



Global pipeline thefts

Overcoming global challenges
in pipeline theft detection with advanced technologies



Global pipeline theft challenges

Although pipeline theft has always been a global problem, there are regions that are more heavily impacted than others. As a multidimensional issue, addressing theft is complex. The causes can be far reaching and span across social, economic, political and legal factors. Many crime organizations are run in a sophisticated way, with the right equipment, engineering and chemistry expertise.

New technology is playing a crucial role in forming an effective and reliable pipeline theft detection strategy that is multi-layered. This ebook looks at theft activities in several regions investigating the causes, challenges and how progress is being made with pipeline theft detection and initiatives.



6,400

thefts detected by Atmos International



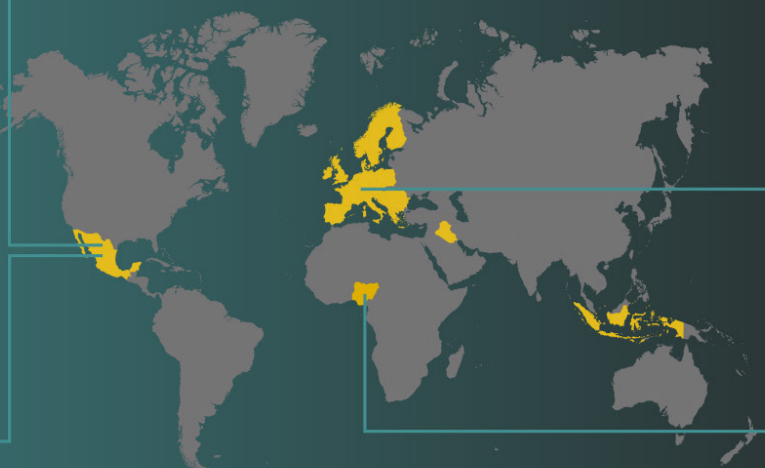
One Mexican pipeline operator loses an estimated **\$1.3bn** per year through the fuel theft



57.1% of all oil and gas fraud relates to corruption schemes



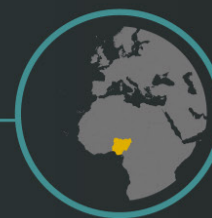
Mexican drug gangs can earn **\$90,000** in just minutes from illegal pipeline tapping



Increased theft activity in Europe since 2010



Estimated **\$133 bn** of crude oil and refined products stolen each year



Nigeria lose **\$18 bn** dollars per year from pipeline tapping and state pipeline theft slashes Nigeria's LNG capacity by Two-thirds

Stats correct as of March 2025. Thefts detected collated by Atmos International based on theft reporting via in-house systems and customer reports. Theft data is based on the number of theft tapping points reported. Each tapping point may be linked to multiple theft events. All other stats sourced are referenced at the end of this ebook

The two main fuel theft techniques

“ There are two main types of fuel theft. Both are dangerous as the likelihood of causing a leak or even a rupture is high. ”



The two main fuel theft techniques

There are two main types of fuel theft we see happening in the energy industry and each has a unique set of characteristics and challenges. Both are dangerous as the likelihood of causing a leak or even a rupture is high, due to the weakening in the integrity of the pipeline.

The first is the “try and remain hidden” approach, characterized by:

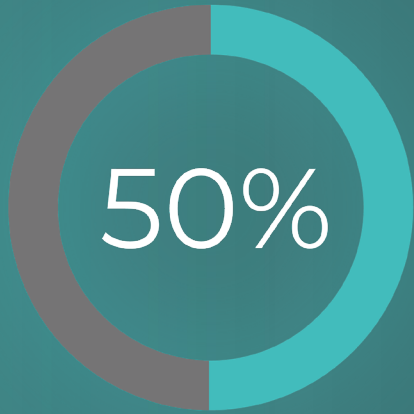
- Opening and closing of valves slowly for small pressure changes
- Using longer hoses (300 meters - 1,500 meters)
- Stealing smaller amounts over longer periods
- Using the environment to hide tapping points
- Maintaining theft rate below flowmeter accuracy level
- Stealing from multiple locations along the pipeline
- Leaving tapping points untouched for long periods (years in some cases)
- Occasional use of double tapping points
- Carrying out theft at night
- Remotely operated theft valves

This type of approach tries to make it difficult for theft detection systems to detect the activity. It's often seen with organized criminal groups. They can be large and involve corrupt workers, officials and even military personnel who are bribed or threatened to turn a blind eye or have an active involvement.

The second fuel theft technique is the “slash and grab approach”. This approach is less likely to be associated with organized crime groups. For many instances where this technique is used the drivers are basic human needs, such as obtaining drinking water or fuel for heating and cooking. However, this type of theft can have the worst consequences, with a high risk of causing a rupture.

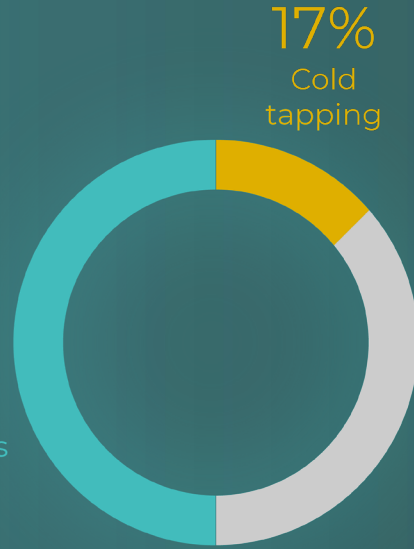
This technique is characterized by:

- Pipeline tampering
- Larger diameter taps
- Poor installations
- Hitting the pipeline once and not returning
- Angle grinding the pipeline
- High risk of pipeline rupture



50% of pipeline operators use a combination of methods for monitoring their pipelines for theft

50%
Both of these methods



Illegal tapping methods most commonly seen

33%
Hot tapping



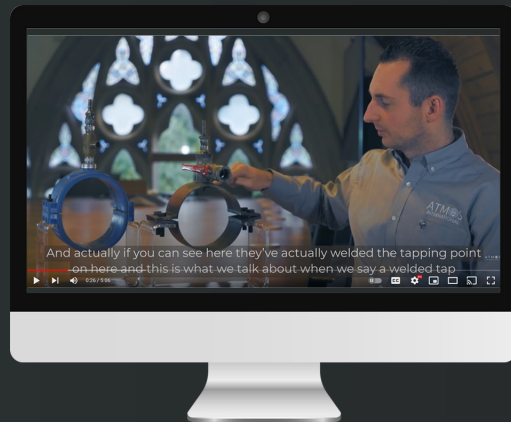
Opening/closing valves slowly and stealing smaller volumes are the most common tactics

(Source: Atmos International LinkedIn poll, 2024)

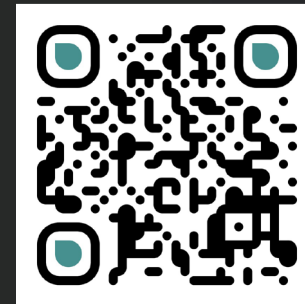
There are also different types of tapping points that are used

Watch the video where our theft expert discusses them

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Global pipeline theft challenges

Africa:

- Theft activity is why one African pipeline company is only operating at $\frac{1}{3}$ of its capacity⁵
- Illegal tapping from organized crime groups is plummeting Nigeria's LNG exports⁶
- Pipeline sabotage and theft often results in lives lost⁷
- Large networks of people involved
- Profits laundered through financial centers globally
- Challenged by old infrastructure
- Many pipelines run through areas where remote monitoring is necessary

Asia and Middle East:

- Fuel smuggling is common
- Creative approaches to stealing product are increasingly being used in Asia⁸
- Three million liters of fuel are smuggled daily over land alone from Malaysia to Thailand
- One fuel smuggling network generates around \$1bn a year for Iran⁹



Global pipeline theft challenges

Latin America:

- Oil theft costs Mexico up to \$3bn per year¹
- Tapping points in Ecuador increased from 32 to 773 in 2024²
- Heavily impacted by organized crime groups
- Poverty, inequality and a high degree of lawlessness
- Many pipelines run through areas where remote monitoring is necessary
- Theft increased over the COVID 19 pandemic period due to the fall in profits from other illegal activities

Europe:

- Theft has been on the rise since 2010
- Fuel fraud becoming a popular activity
- Profits made on black market
- Perpetrators often flee the scene when faced with a large leak



Longstanding theft activity in Africa



Longstanding theft activity in Africa

Pipeline operators in areas of Africa are hit hard by theft activity, with Nigeria's liquefied natural gas (LNG) exports plummeting due to illegal tapping from organized crime groups.⁶ Being Africa's largest crude oil producer,¹⁰ Nigeria has been plagued by theft activity for a long time.

Large networks of people are often involved in the theft of crude oil in Africa, regularly involving corrupt authorities with accomplice workers and commodity traders, making it difficult to trace the stolen product and hold those involved accountable. In Nigeria, this issue is further compounded by the fact that the profits are often laundered through financial centers around the world and used to buy assets both within and outside the country.¹¹ This type of organized crime in Africa is driven largely by poor governance¹² plus other

socioeconomic factors such as the unemployment rate and poverty. There's also the challenge of weak infrastructure like old pipelines, making it easier for thieves to gain access. Older pipelines often don't have a high level of instrumentation and this makes detecting theft activity more challenging, especially when it's well concealed the theft flowrate can be lower than 0.1% of nominal pipeline flowrate.

Additionally there are the geographical characteristics of the region which make it an appealing place for pipeline thieves to operate. Many pipelines run through remote areas, some even through nature reserves, where power and communications are limited. These places are high consequence areas (HCAs) too, where a leak or rupture poses a great threat to the environment and the ecosystem that lives there.

Discover a recent theft we detected in Africa



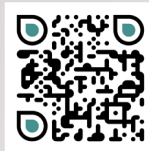
Longstanding theft activity in Africa

Hardware is effective as part of a multilayered theft detection strategy in overcoming these challenges. Not only helping to increase the three core considerations for a pipeline theft detection system (high sensitivity, accuracy and response time), but also being suitable to deploy in these remote areas.

Atmos Odin, a battery powered data acquisition unit continually logs GPS time stamped 60Hz data with measurements from its internal pressure sensor. Atmos Theft Net engineers can then analyze the data to effectively detect and locate theft sites. This unit recently discovered a tapping point in Africa, with the customer being able to uncover the tapping point quickly with the accurate location estimate.

While the government in places like Nigeria continue to pass further laws to deter pipeline thieves and there's a focus on implementing special security teams, technology will play a vital role in forming a long-term strategy.

Atmos Odin



Fuel smuggling in Asia and the Middle East



Fuel smuggling in Asia and the Middle East

It's popular to smuggle fuel in areas of Asia. In Malaysia fuel prices have been subsidized for many years (until 2014), whereas in Thailand fuel prices have been known to fluctuate.¹³ This type of economic strain encourages organized crime groups to take advantage by smuggling the fuel in and selling it at a reduced price. There's the advantage of the difficulty to patrol sea, where fake fishing ships are used to smuggle in gasoline and diesel and then sold at fake filling stations onshore.

The thieves have all the equipment they need to transport the fuel, plus fake shipping documents, knowledge of shipping and checkpoint schedules, inside information from corrupt workers and corrupt public officials on their side.

Fuel smuggling is also common in parts of the Middle East. Terrorist groups like ISIS use the smuggling to fund their operations and one fuel smuggling network generates around \$1bn a year for Iran.⁹



Fuel laundering in Europe



Fuel laundering in Europe

Since 2010, pipeline theft has been on the rise in Europe. It's often a sophisticated operation, however when faced with a large leak the perpetrators commonly flee the scene leaving the product to continue to spill out of the pipeline and potentially cause a major spill, fire or explosion if the leak is not detected quickly.¹⁴

The profits that can be made from selling oil and fuel on the black market is often the key motivation for pipeline theft in Europe. Fuel fraud is also a growing criminal activity, whereby “designer fuel” is created. As a mixed product, in some cases this is exempt from tax in the European Union (EU). This type of fraud often requires relevant expertise from trained chemists, demonstrating again that thieves employ the relevant skills to run their operation.

Governance and legal action against pipeline theft is more well established in Europe than some other regions. However, pipeline thieves are often

determined and will find work arounds to continue stealing and selling the product to make money. For instance, the EU uses several red dyes to mark agricultural diesel, thieves will work to “launder” the fuel, removing the dye. This means they can then sell the lower-cost diesel for a higher price as undyed or white fuel. Criminal groups along the border between Northern Ireland and the Republic of Ireland are well adept in this chemical process.¹⁵

Operations like this are well entrenched and can often be linked to when security of supply is under threat.

Between 2013 and 2016 in Europe, there was a 400% increase in oil theft, which notably occurred at a time when the region's oil prices increased.¹⁶

Fuel laundering in Europe

Recently, one European customer combined our Atmos Wave Flow software and Atmos Eclipse hardware to identify numerous theft events. It was a sophisticated operation with double isolation valves on the illegal tapping point and a portable pipe bend and hose connected to six intermediate bulk containers (IBCs) on a truck. The thieves had been getting bolder, stealing from the pipeline for three nights in a row on one occasion. After working with the customer, the tapping point was found 40 meters away from the calculated leak location.

Atmos Eclipse



Atmos Wave Flow



Organized crime on steep incline throughout Latin America

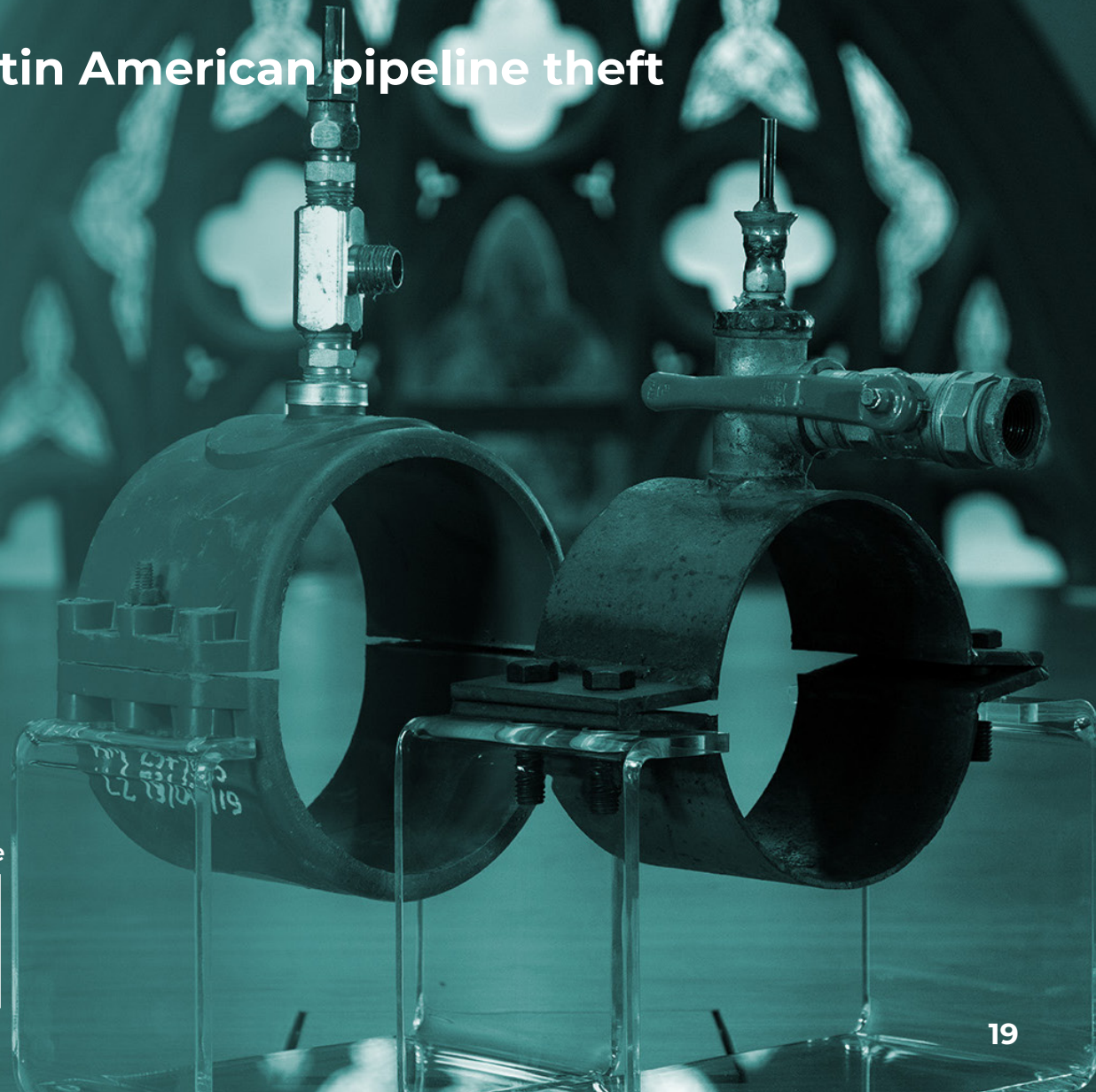


Learn more in our spotlight on Latin American pipeline theft

Latin America is also heavily impacted by the theft activity carried out by organized crime groups. It's a lucrative business, with fuel theft being the most significant non-drug revenue stream for Mexican cartels.¹⁷

Pipeline theft has been an issue for years in Latin America, due to the deeply entrenched issues faced by the region. It's an area with ongoing poverty, inequality and high degrees of lawlessness. Mexican drug cartels often use violence and threats to pressure pipeline operator workers to give them information that will help them steal the oil. Similar to those in Africa, the pipelines often pass through remote areas and are often above ground which means that can be easily accessed with a lower risk of being spotted.¹⁸

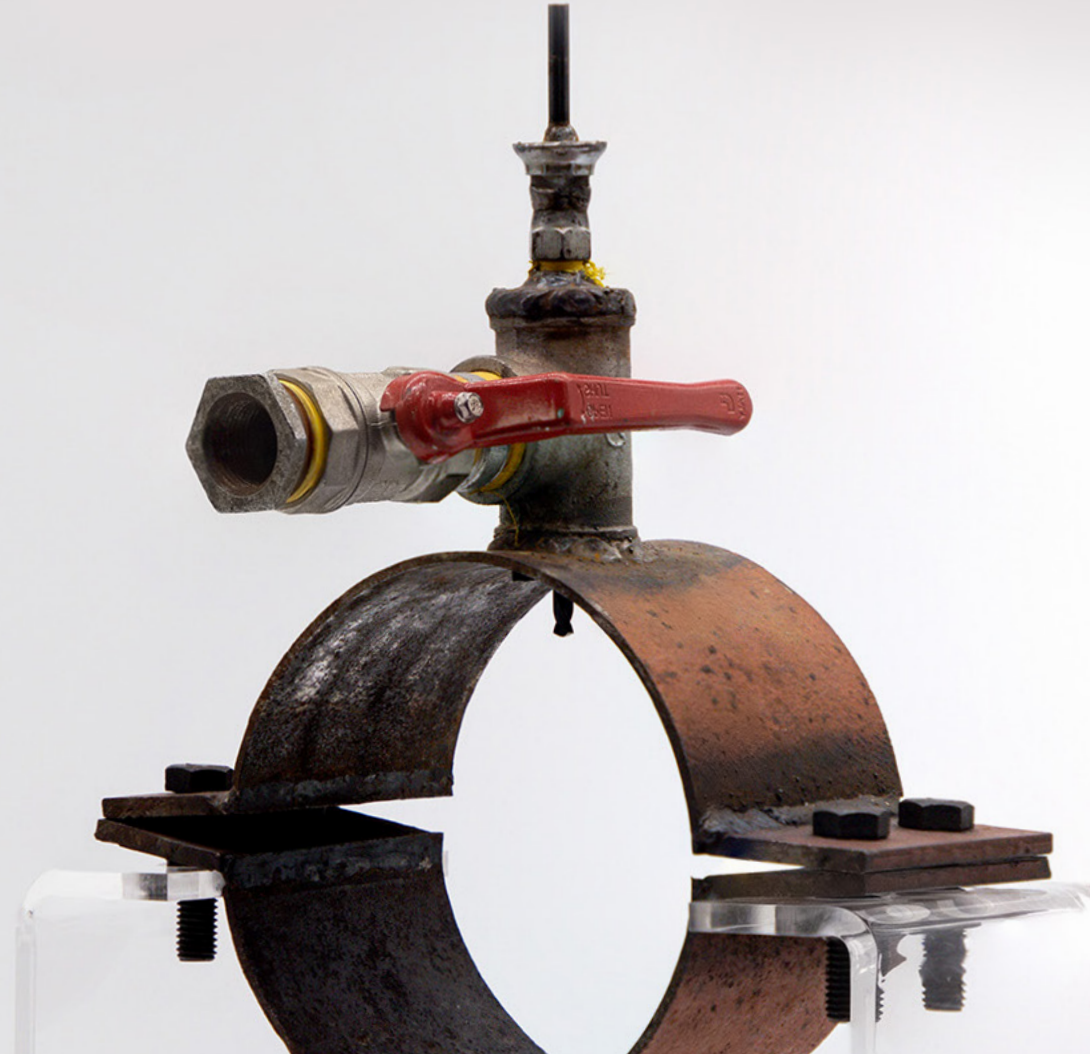
Learn more



Organized crime on steep incline throughout Latin America

The image opposite shows a tapping point that was detected on a multi-product pipeline in Costa Rica. Using Atmos Wave and our Atmos Theft Net service, the customer was able to detect and accurately locate it.

Since the start of the pandemic, theft in areas of Latin America has been on a steep incline. The National Oil Company estimated around 2,500 barrels per day of oil and other products was being stolen at the peak.¹⁹ This is likely to be partly due to the fact that criminal profits from other illicit activities were falling. Also due to government offences that have helped overcome kingpins in recent years, the cartels are also keen for new income sources and oil theft doesn't carry the same implied risk as drug related crimes.



The global water shortage and how pipeline thieves are responding



What happens when security of supply is under threat?

The global population is rapidly increasing. Paired with the climate crisis causing extreme weather events, a quarter of the world's population is facing extremely high water stress.²⁰

Not only does this put a lot of strain on water utility companies, but when security of supply is under threat it generates the need for theft activity.

Combined with socioeconomic factors, the global water shortage results in water becoming less affordable and can be directly linked to increased water theft across the world. Look at some of the countries it's impacted.

Learn more



A worldwide theft response

USA:

A period of illegal cannabis growers and other thieves breaking into water facilities to drill into pipelines and threaten utility workers with violence²²

India:

Heatwaves and acute water shortages have raised the threat of pipeline tampering and theft on rising mains, leading to more line walks and an increased police presence²¹

Mexico:

Organized crime groups use construction equipment, uniforms matching those worn by water utilities and getaway vehicles to steal and sell water illegally²³

Australia:

Regular drought raises concerns about available water and can lead to increased hoarding and theft activity²⁴

The environmental, regulatory and social impacts of water theft



Environmental

Theft exacerbates water scarcity and limits access to the resource. This can also lead to increased pump speed to ensure demand is met, consuming more energy.



Regulatory

With regulatory focuses being on improving leakage figures and reducing supply interruptions, theft can result in water companies failing to meet performance commitments, resulting in fines and penalties.



Social

Customers can end up with increased bills when utilities are unable to recoup the costs associated with water theft. This can risk creating conflict between utilities and their customers.

Challenges and progress globally

The issue of pipeline theft is multidimensional. There's no one single cause, which is what makes it so challenging to overcome.

- Both hot tapping and cold tapping are commonly seen
- 50% of pipeline operators use a combination of methods for monitoring pipelines for theft
- Opening/closing valves slowly and stealing smaller volumes are the most common tactics

(Source: Atmos International LinkedIn poll, 2024)

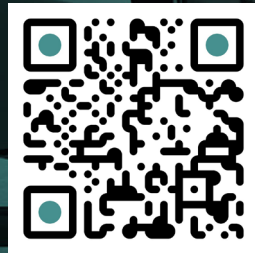
In many cases, the thieves are becoming increasingly advanced in their operations, using sophisticated equipment and techniques to try and remain undetected. Although the causes for pipeline theft differ by region, forming a multilayered approach is crucial to successfully detecting and quickly locating theft activity, anywhere in the world. Technology has an important

role to play in this and theft detection systems are continually evolving to be more advanced than the operation the thieves run.

It's also vital for pipeline operators to consider the social, economic, political and legal factors. Though not all of them are aspects pipeline operators can control, there are initiatives that can be put in place to help address the social side for instance. Some pipeline operators work with communities to place more value in the pipeline, helping to prevent the residents close to it becoming involved in a theft operation. One pipeline operator in Brazil for instance has invested in education for the community and funding school activities for people around the pipeline.

“ Forming a multi-layered approach is crucial to successfully detecting and quickly locating theft activity, anywhere in the world. ”

Find out more about our theft detection systems and the strategies used



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