Gas Stations are Changing – Video Technology Driving Sales

White Paper





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The future of gas stations

Overview and current developments

The gas station market is complex. Not only is it diverse, from independent gas stations to franchisers through to big chains that all have different needs. But the facilities at each gas station also vary (from simply a gas station and store to a car wash and/or workshop through to a service station with restaurant, etc.). Location also plays an important role: On freeways, at entry and exit points into and out of cities, in urban or rural locations. Gas stations are not all the same, rather they are all their very own small microcosm. This also places varying demands on the technology used, as well as on video technology and how it is embedded, and what network connections are required.



Gas stations with convenience store breakup in the US by number of stores

The current situation following the Coronavirus pandemic and during the Ukraine crisis 2022

Before we discuss the long-term trends relating to the gas station industry, let's take a brief look at the current situation. The recent years that have been shaped by the Coronavirus pandemic and the Ukraine crisis have had, and are still having, a significant impact that is far outlasting the interim restrictions on travel. An unsurprising effect is the fall in demand for gasoline due to higher prices. Many drivers are driving more slowly and therefore in a more economic way, are establishing car pools, or are switching to public transport for some journeys at least in part and where possible to do so.

What has been a positive development for many workers has had a negative impact on gas stations:

• Since the pandemic, many employees have been able to work from home, at least to some extent. This means that these people have been able to save on their commute and do not need to refuel as often.

- Digital conferencing is reducing the need for business travel.
- This has an impact not only on fuel sales, but also on convenience stores – think of the classic coffee-to-go or car wash.

However, every cloud has a silver lining:

- The car is regarded as a safe means of transport: In contrast to public transport or airplanes, there is no risk of infection if you are traveling alone.
- People appreciate short distances to gas station stores. They are convenient and often gas station stores are not as busy as super-markets. Larger crowds can be avoided.
- People are seeing the benefit of packaged goods in the wake of the Coronavirus crisis. This is an advantage for gas stations.





Number of Gasoline Stations, 1994-2004

The number of gas stations has been consolidated in recent decades and years and has now reached a stable level. While there were still 47,000 gas stations in the Federal Republic of Germany in 1969, there were only around 14,200 in 2014. In 2021, there were around 14,500. In Germany, one gas station supplies around 5,700 people, in Austria around 3,300, in Italy, a gas station supplies around 2,800 citizens. There are around

145,000 gas stations in the USA today. In 1970, there were more than 200,000. The American Petroleum Institute describes just under 128,000 of them as convenience stores which sell gasoline. Here there are already signs of a change in perception, which we will return to below. The world of gas stations is constantly changing, as is mobility.

From refueling to a mobile HUB - the new form of mobility

Various studies and forecasts agree: Our understanding of the gas station business model will continue to change in the coming years and decades. Fuel supply will be integrated into an interconnected mobility concept of logistics, services, and technology, and as a hub for urban and rural life. The bargaining chip of gas station operators' is that they provide great infrastructure on a conveniently located site. They are highly customer-oriented and enjoy broad acceptance. The 24/7 opening hours, relations with regular customers plus helpful attitude and technical expertise (car mechanics) contribute to this.

In the automotive sector (cars and trucks), alternative drives (electric, hydrogen, solar) will fully or at least to some extent replace the internal combustion engine. Gas stations will continue to supply energy to vehicles. The focus will shift more and more from the traditional B2C business and private transport to the fleet segment for autonomous cars, and for mobility and logistics service providers. The future belongs to car sharing models. Sharing will increase in the mobility sector. Quick charging stations will play an even bigger role than they do today. Mobility-as-a-Service offerings will be the rule rather than the exception. On the road, and perhaps even up above – air taxis and logistics drones will beat the traffic jams.

Vehicle maintenance and repair will continue to play a role in gas stations. In particular, to ensure that fleets are readily available. The secure accommodation facilities for truck drivers that are required in many countries help ensure that the motel/hotel division remains relevant. Generally, legal framework conditions (security of mobility, prices, taxes, sustainability) will continue to impact the industry.



Shopping - Profits are not driven by fuel and energy alone

Most purchases are already being made over the Internet. Trade will continue to move toward e-commerce. Therefore, fewer goods have to be stocked in store. Stores are more likely to resemble showrooms. Gas stations could be used as a distribution point or as central pick-up points. With sites conveniently located in urban areas and at entry and exit points, gas stations are already well placed for this purpose.

Gas stations take on a further function that has previously been denied to traditional retailers. There are many opportunities, such as collaboration with online retailers and corresponding commission-based models. Especially as the main margins are already being achieved in the retail sector rather than in fuel sales.

According to the 2015 NACS Consumer Fuels Survey, around 35% of people refueling in the US visited the store too. This survey revealed the following breakdown of purchases back then:

Non-alcoholic hot and cold drinks	36%
Snacks/confectionery	33%
Cigarettes	24%
Lottery tickets	22%
Alcoholic drinks	11%
Food	9%
Sandwiches/meals	8%

Optimizing store turnover is a source of great potential and is one of the major tasks for operators. Convenient location, customer-friendly opening hours, and the fact that customers come back automatically to ensure they stay on the road are just some of the aces up the sleeves of gas station operators that are worth playing. In this way, gas stations are able to stand out and occupy a positive position on the market and build lasting ties with their customers.





Mobility hub and social networking

There are many other initiatives available to boost sales. Gas stations and, above all, service stations are already offering ranges of food and are mobility hubs (such as car pools, hitchhikers). Gas stations will take on additional functions. They will become even more important as a social hub for people, especially in rural areas. As they are easily accessible, gas stations are becoming independent commercial hubs and therefore a daily meeting place too. The gas station then takes on role previously occupied by the local café, the village pub or the small village store. Operators will offer lounge areas, cafés and perhaps even office space in the style of co-working spaces. Even authorities and doctors' practices could be incorporated within commercial hubs of this kind.

Change presents a challenge for technology

Many scenarios, such as the comprehensive plans for the future as drawn up by ARAL and Shell, see gas stations as future Smart City logistics hubs which will combine mobility and logistics services. These developments promise new opportunities for the market, and a lot of changes. This in turn requires a high degree of flexibility in the technical systems used. Modular and decentralized systems, such as the MOBOTIX cameras, are ideal for this. The individual steps can be followed easily. They can be customized and are scalable.

Operators of gas stations can tap into lucrative potential for business if they are ready for change and willing to adapt to new conditions or actively pursue new paths. This will reinforce the gas station operators' position as an indispensable part of the mobility and logistics infrastructure. It also means operators will need to keep up with technology and be willing to stay that critical one step ahead. Most gas stations are already equipped with a great deal of technology. Just think of the cash register system, automatic price displays, digital advertising displays, road toll terminals, fuel dispensers, e-charging terminals, car washes, alarm systems and, last but not least, video surveillance systems.

On top of that there are new offerings and services and their associated technical requirements, which must be integrated into the overall system. Pick-up locations (Post, DHL, UPS, Amazon) are already a feature. Banking

and logistics services, workshop technology, software for warehouse handling, new payment methods, and many other applications are all examples.

Video technology is also changing. Whereas video systems were previously primarily used for security purposes, they are now a key contributor to process control and service optimization too. They can even lead to improved sales potential. More on this later. Above all, however, the systems need to be flexible and scalable. A gas station operator cannot afford to replace its systems with every relevant change. Ideally, technology has to keep up with change – whether it's a matter of modification, redeployment, adaptation, or growth.

MOBOTIX systems have always been pioneers in this area. Thanks to the decentralized approach and modular concept, they can be flexibly adapted to changing challenges. This can involve expanding or tweaking hardware (such as optical or thermal modules), or can also be solved by the software loaded onto the cameras. The open MOBOTIX 7 platform allows apps to be used in a flexible way. Even software applications, which are individually programmed to meet specific requirements, can be loaded onto the cameras. The MOBOTIX video systems are therefore ready for every conceivable application.

Summary:

- The gas station market is diverse
- General shift toward the mobile hub
- Shopping as a means of increasing margins
- Technical equipment must be flexible and scalable

Security as a constant basic requirement

A key motivation for using video security systems in gas stations, service stations, and car washes is to protect employees, customers and property. This will continue to be the case in the future. Of course, fire prevention, handling hazardous substances or clearing up and preventing violence and vandalism play key roles in this context. However, the focus of gas stations and stores is on petrol theft and shoplifting, burglary and robbery. Unfortunately, gas stations are repeatedly affected by this. Smart video technology can help clarify and clear up these threats, thereby driving them down.

Fuel theft

Fuel theft will remain a key issue for service station operators in the years to come. Refueling and driving off without paying is a classic scenario. In this context, there is a clear and obvious trend: The more expensive gas is, the more cases of theft there will be. Of course, it does not help operators to simply make gasoline cheaper, especially as they have little influence on purchase prices and need to keep their low fuel margins stable. And what makes matters worse: Although margins are lower than is the case with many goods in the store, the absolute loss in the case of fuel theft is immense as the amount of fuel stolen quickly generates substantial damages. What's more, theft will also remain an issue for future fuels such as electricity or hydrogen. The creativity shown by criminals is proof that future fuels open up opportunities for refueling for free too. Premium video technology can dramatically improve the clear-up rate of fuel thefts. Images need to be clear if they are to help with this. The clearest image allows the registration number, the brand of vehicle, the color of the vehicle and also the perpetrator to be identified. It is important that the vehicle license plate is easy to read, even under back-lit conditions,

in weak light or where there is reflection. The MOBOTIX long-pass filter is a valuable tool in conditions such as these:

In combination with an infrared illuminator, a lens unit with long-pass filter provides the basis for optimal license plate recognition in all lighting conditions. Below you can see another example of where a long-pass filter is effective: License plate recognition in winter at night: Left image: Sensor module with long-pass filter ensures license plates can be recognized perfectly (tighter angle for license plate recognition). Right image: Day/night sensor module with wider viewing angle and additional IR illumination module for better contextual information. Smart apps help to curb and clear up fuel theft. This means that the MOBOTIX cameras can use the apps to determine the type, color and make of the vehicle in addition to the license plate. The gas station operator can use this data to place the vehicle on a banned list. An alarm will be triggered on the next visit and the potential customer may be denied access to fuel or may be denied sale of fuel.





MOBOTIX Beyond Human Vision

Robbery, burglary and theft

In addition to fuel theft, gas station operators also face the dangerous, annoying, and expensive challenges of shoplifting, burglary and robbery.

the proportion represented by gas stations and convenience stores rose from 7.55% in 2010 to 9.6% in 2019.



If you look at the general overview of robberies in the USA as an example,

What makes gas stations so attractive to robbers and thieves?

Robbers, thieves and burglars target gas stations for several reasons: While there is hardly any place for cash any more in the most well-secured of banks, it is still a popular means of payment at the gas station. According to a study by electronic payment systems company ACI Worldwide, around half of respondents prefer to pay with a credit card when refueling and in the store, while 21% prefer to or only pay with cash (the rest switches between card and cash). Cash remains the main motive for gas station robberies. Another study by the Federal Reserve Bank of Atlanta in 2020 confirms the industry-specific focus on cash in relation to the retail sector.



Number of payments by transaction type and payment type

In the case of burglaries and theft, however, the composition of the product range plays a key role. The proportion of high-value products, such as tobacco and alcohol, is very high in relation to the overall range. This means that thieves can quickly and easily access expensive goods in a targeted manner. Short distances allow for quick access.

The statistics show that: Targeted monitoring of gas stations using top-quality imaging in order to have the best possible chance of the perpetrators being convicted remains key; day and night, even when it is dark or in poorly lit conditions, such as back-lit conditions. Using MOBOTIX premium video technology can make the difference here and be a key driver toward perpetrators being convicted or greatly deterred. For example, a MOBOTIX video system with a Wide Dynamic Range (WDR) function ensures that dark areas are automatically brightened and areas that are too bright are avoided. The result is an image that is detailed in all areas and helps or even enables the intruders or robbers to be convicted. In the image on the bottom left, you can see the image captured by the MOBOTIX Q71 Hemispheric with and without WDR. The person outside the glass frontage (next to the door on the right) would not be visible without WDR due to the back-lighting and the reflection.

If incidents can be reliably cleared up and damage averted, the video surveillance system will pay for itself as far as the operator is concerned. Every gas station leaseholder is pleased with an attractive return on investment (ROI). The effective and well thought-out use of video technology counts toward this. For example, smaller stores are able to simultaneously monitor their cash registers and their products with just one camera and two sensors, using the S74 sensor cables that are up to 34 m long. A hemispherical module with its full 360° view keeps an eye on the store, while a second optical module is explicitly directed toward the cash register area. Effective protection with one single camera. This saves both acquisition and installation costs.



MOBOTIX Q71 (without WDR)



MOBOTIX Q71 (with WDR)

Summary:

- Intelligent apps and long-pass filters help to clear up fuel theft with the help of license plate recognition
- Theft, robbery and burglary remain a threat (cash and goods)
- Best picture quality (WDR, effective video technology) is essential to convict the perpetrators



Improved processes to achieve increased cost efficiency

Mobility and the associated supply of fuel and energy will change in the coming years, as described above. Gas stations will focus on the retail sector. The margins are significant. Store and restaurant areas promise attractive sales in the future. Gas stations in rural areas will become commercial hubs. In the context of increasing e-mobility, gas stations in urban areas are associated with the convenience of getting what you need when passing (charging times, traffic hub/changeover, etc.). This is where attractive niche markets can be opened up. However, this only works if the gas station operators also know who the customers are, where they come from and what they want. This is exactly where smart video technology comes in.

Generating revenue and profit with video technology

More than a third of refuelers already visit the store that is affiliated with the gas station. If the type of vehicle drive changes, this number may well increase. Connecting passengers, car-sharing users and passengers on public transport will automatically arrive at the gas stations of the future daily. Convenience becomes the highest priority. Why not do our shopping on our way home?

For gas station operators, this means aligning the range as closely as possible with the needs of the customer and positioning the goods in the store in such a way that they become as attractive as possible to the customer. Smart video technology can contribute key insights to this.

- By means of video analysis, face recognition can provide customer profiling data (male/female, age)
- Number plate recognition provides data about the catchment area
- Information about the type and make of vehicles allows conclusions to be drawn about financial position and preferences
- Profiles of how customers are moving around the store (heat maps) can help operators to position goods effectively





Video technology can help increase sales potential (product line customization, appropriate digital advertising displays, ads in the catchment area) and improve the shopping experience. On the other hand, digital technology supports more streamlined processes. Around half of gas stations are managed as individual sites. The other half consists of chains ranging from at least two to 50 or more gas stations. Keeping track of this takes a great deal of effort on the operators' part. Videoas-a-Service (VSaaS) solutions provide centralized visibility across multiple sites. This is done via the cloud or via more complex video management systems (VMS), which allow access anytime, any place. Of course, this includes appropriate access, encryption and cybersecurity measures.

How MOBOTIX tackles convenient remote access

Smaller and medium-sized branch and franchise chains use the MOBOTIX CLOUD. It can be accessed from anywhere via smartphone, tablet or PC. For the operator and its employees, there is no need for local servers and no need to be IT savvy. The system is agile, flexible and scalable. Thanks to fast digital wrap-around visibility, it saves you from having to walk the routes previously taken during in-person on-site patrols.

Operators can use the MOBOTIX video management platform

MOBOTIX HUB to retain a central overview of several branches. The platform allows all components (servers, cameras, users) of video security systems to be integrated, managed and controlled centrally – even across any number of sites. The system is particularly attractive for medium and large chains because it gives you control over the entire video security network at a glance. Even across 50, 100 or more sites. This too is done via mobile devices, a laptop or PC through to a large-scale video wall.



MOBOTIX Beyond Human Vision

Collecting, linking, and analyzing data

You will likely be familiar with the situation yourself from when you do your shopping online. You may be storing your personal details and payment data on the Internet. You will be used to seeing ads for the products you're interested in. Targeted data collection allows this to happen. While this seems to happen quite seamlessly online, in a retail store, it happens on many levels and across many touch points all at the same time. This also applies to gas stations and their stores. Gas stations can reach and galvanize customers in an even more targeted manner by collecting, linking and analyzing data.

In a gas station, the cash register and payment system provides one touch point, for example. As a customer, you may have a loyalty card or use a bonus program. This means the cash register system provides an early opportunity to analyze the purchase value and typical shopping basket. Data is becoming more and more important. It gives the gas station operator the opportunity to learn more about customers and their needs. Tailoring offers, services and processes ultimately increases the potential for revenue. This means complying more and more with data protection (GDPR) and privacy-related regulations and standards. And this is completely justified in the interests of the customers.

Video technology can also provide operators with important data about how customers behave. Collecting customer data in this way, to improve marketing and sales for example, requires a robust, secure infrastructure. MOBOTIX fulfills this requirement thanks to its decentralized approach to video systems, which are continuously tested by leading institutes to prevent them from being breached and have a solid cyber roadmap.

Customer data			
Customer master data	Purchasing behavior	Tracking data	
Age, gender, payment information	Frequency, duration of stay, shopping cart	Utilisation of the services, origin	

For example, MOBOTIX video technology can use face recognition to provide data about gender and age, to determine the length of a customer's stay, or to provide information about where they have come from (license plate number) or frequency of visits (e.g. how often was the registration number on site in a month?). All of this information is useful for the operator to tailor its offer even more precisely to its target group. And that means more potential for revenue for the operator and a greater shopping experience for the customer.

Clearing up complaints in an effective way – preventing financial losses

Finally, we would like to quickly draw your attention to a stressful, time-consuming task which video technology can help to massively reduce. Complaints from customers are particularly irritating for operators of gas stations because they mean customers are dissatisfied and they take time and effort to clear up. Time is money. Documenting day-to-day processes in a diligent manner, thus allowing them to be verified, helps shorten the time involved for these processes, simplifying them for all involved.

Transparency in payment transactions and flows of goods

Incorporating cash registers into the video surveillance system means any anomalies for customers and staff can be cleared up quickly and unequivocally. For this purpose, the transaction data of a network cash register is transferred to a MOBOTIX camera and stored in the memory via the Smart Data interface. Cash register transactions can then be searched by item, price, time or personnel number and the exact videos for the respective transaction can be played. In just a few clicks the processes can be reviewed and clarified. Transparency does not just relate to customer complaints. Almost one third of thefts and misappropriations can be attributed to employees and suppliers. Video technology can also be used to clear up cash register differences and anomalies, such as favors to friends.

Avoiding operating errors and complaints

Complaints related to car washes are especially common. Video footage can be used to determine whether the vehicle damage that the customer is complaining about was already present before entering the car wash. The processes within the car wash can also be checked. The MOBOTIX video systems have a robust, weather-resistant design, which means that they can easily handle high and low temperatures as well as spray water. There is also potential for something being done incorrectly during the refueling process. Classic situations, such as damage caused by customers driving away with the fuel filling nozzle still attached, can also be tracked in this way. Cables are frequently run over or parked on during electrical charging processes in particular. MOBOTIX video systems can be used to investigate damage of this nature. The findings from the recordings also help to adapt processes in order to avoid or at least minimize similar events in future. Improving these processes reduces damage and breakdowns and avoids repairs. This makes the technical equipment more profitable and increases levels of satisfaction among partners and customers. Ultimately, more profit will be generated. Video technology quickly pays for itself.

For more information about MOBOTIX solutions, go to **www.mobotix.com**

Sources:

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