Surveillance technology for future-ready cities

AXIS COMMUNICATIONS | THOUGHTLAB

ThoughtLab

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Introducing future-ready cities

Cities are constantly evolving. To keep things running smoothly, local authorities must account for a vast range of variables. Rising populations, sustainability goals, environmental resilience, and public safety standards are just the tip of the iceberg. Yet new advanced technologies are helping to address these challenges and provide valuable insights. The right investments can make all the difference.

To better understand how leading cities prioritize and steer their decision making, global research firm, ThoughtLab, surveyed 250 cities across the world*.

ThoughtLab used the findings of its survey, along with additional third-party data, to produce a model to assess the 'future-readiness' of cities; that is, how well equipped they are to face the challenges of tomorrow. The final output of which was ThoughtLab's 2025 *From Future Vision to Urban Reality* report, sponsored by Axis Communications, among others.

* Population sizes ranged from 50,000 to over 37.1 million, with 46% in developing markets and 54% in advanced markets. Further sample details can be found in the ThoughtLab report, **here**.

The 6 core principles of future-ready cities

Cities within the top 20th percentile were deemed future-ready as they had made the most progress. As well as highlighting their top-level investment priorities and tactics, the report identified six pillars at the heart of these future-ready cities' strategies:

> **Placing humans at the center of their strategies** by creating an urban environment that enhances every aspect of city life, from infrastructure to mobility.
> **Creating frictionless experiences for citizens** by making urban living easy, efficient, and seamless, moving from siloed solutions to integrated digital systems.
> **Building productive, skilled, and diverse workforces**, by nurturing and attracting talent and removing barriers.
> **Diversifying funding and business models** beyond traditional taxes and fees to fund investments.
> **Integrating innovation ecosystems** into operating models by collaborating with technology startups and established tech firms.
> **Taking a cross-departmental, holistic approach** to problem-solving.

To achieve many of these goals, cities used a combination of IoT sensors, surveillance and security technologies. These provided valuable and actionable sources of data to inform decisions, justify investments, gauge successes, and enhance city workflows.

250
cities

78
countries

734.2M
residents

9%
Of global population

The survey's size and scope made it one of the most comprehensive studies of smart cities ever conducted.

Introducing Axis Communications

This report from Axis Communications, titled, Surveillance technology for future-ready cities, builds on the findings from ThoughtLab. We hope to provide further context, example use cases, and tangible next steps for city authorities through the lens of surveillance technologies. It is our aim to illustrate how their valuable data, insights, and actionable workflows can contribute significantly toward making cities future-ready.

As the industry leader in video surveillance, Axis Communications develops and supplies innovative network solutions that improve security, safety, operational efficiency, and business intelligence.

We work with countless cities and local authorities across the world. Our solutions are already making cities safer, more efficient, more productive, and less polluted, raising standards and enhancing the lived experience for citizens and tourists alike.

More information on our value proposition can be found toward the end of this report.

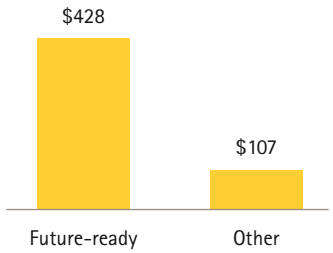
The power of surveillance technology and data

Central to every future-ready city's plan is a commitment to investing in technology.

ThoughtLab's report found that future-ready cities plan to spend four times as much as their peers on technology over the next three years.

Future-ready cities are, in fact, already well ahead in their current use of digital solutions. Use cases such as IoT/sensors, automation, and modernized IT platforms were five-to-six times more widely used.

Surveillance technology underpins all of these applications. That is because there is a fundamental shift happening with how we think about and can use surveillance technology.



Average technology spending over the next three years

Achieving more with surveillance technology
While public safety and basic surveillance remains vitally important, the quality, quantity, and breadth of data surveillance systems now capture means we can do so much more with network cameras and devices.

Advances in analytics, AI, and automation workflows mean we can now achieve all manner of new and complex objectives. This could be to react and respond to instances in real-time; anticipate, prevent and change outcomes; or even inform plans with new, varied data. This in turn provides more meaningful ways to gauge, measure, or even redefine success.

As a result, surveillance technology now serves as a vital contributor to data platforms and informed decision-making for city authorities. It provides a robust data foundation to build upon. By surveillance technology we mean networked (IP-based) solutions, spanning cameras, speakers, radars, and other sensors. IP-based devices connect to your standard network, making it quick and easy to scale systems up and down. Devices can also communicate with one another, allowing for rules-based event triggers and escalations.

These capabilities greatly expand the potential use cases that surveillance technology can support and its ease of deployment. Installations can, in fact, contribute toward multiple initiatives at once, and, by extension, cross-departmentally.

A holistic, data driven approach
One of ThoughtLab's 6 pillars was taking a holistic approach to problem-solving. It describes how future-ready cities analyze the interdependence of various components and processes, looking at these elements as a system, rather than individual parts.

Once again, this is where surveillance data shines. While it clearly helps inform department initiatives on an individual basis, it can also highlight any effects on adjacent projects or departments, intended or otherwise.

For example, new traffic management pilots have wide ranging implications. They also directly affect emissions and environmental schemes; there may be fewer accidents at a junction; use of alternative transport like bikes and e-scooters may increase; pedestrian footfall may go up. Now, the same cameras that are helping inform traffic flow and signal timings are affecting and informing on progress across multiple fronts.

Surveillance technology now serves as a vital contributor to data platforms and informed decision making for city authorities.

"Future-ready cities are increasingly drawing on AI to drive real-time analysis and predictive capabilities."

ThoughtLab

Digital twins and real-time modelling
Many cities are taking this data driven, cross-departmental approach to the next level by investing in digital twins. ThoughtLab explains how these digital twins are using AI to drive real-time analysis and predictive capabilities. As a result, they are fast becoming foundational tools for digital transformation strategies.

This kind of modelling allows you to gauge the efficacy of new changes and proposals before rolling them out. Pilot schemes and local initiatives can provide a feedback loop of learning, improvement, and verification ahead of major city-wide investments.

Yet the two biggest challenges they face in running digital twins are ensuring accurate data (cited by 73% of respondents) and keeping data updated in real-time (68%). This is where the power and reliability of surveillance technology is abundantly clear – providing a rich and constant stream of accurate, high-quality data.

And the good news is that this same, valuable surveillance data is available and ready to use, regardless of whether your city can invest in digital twin technologies or not.

Fostering an innovation ecosystem
According to ThoughtLab's findings, future-ready cities know that they cannot drive full-scale transformation alone or with just a few partnerships. Instead, they must create innovation ecosystems that are integrated with their operating models.

One of the many benefits of working with Axis and our network of partners is our focus on open innovation and collaboration. We understand that we contribute toward something greater than the sum of its parts. So, we choose to build our products and services on open platforms that readily integrate with existing and future systems. This way our customers have the upmost flexibility and potential to generate value from their investments and to use them in innovative and exciting new ways.

Enabling city management
One thing remains clear: Surveillance data is, and will remain, instrumental in effective city management. With it, authorities have far more tools at their disposal to make better, safer, healthier, more sustainable and informed investments. This same data helps with transparency, too. Decisions can be easily explained and justified. Their success measured and held to account.

All the while these cameras still help to maintain the safety and security of citizens we so readily associate with them.

93% of cities are now using, piloting, or planning to use digital twins. In 3 years it will be 100%.

"Future-ready cities establish collaborative networks with a variety of partners, from businesses and startups to other government agencies and cities, to share ideas, resources, and best practices. On average, they prioritize eight different types of partners."

ThoughtLab

"Future-ready success comes from developing cross-functional roadmaps that build off of firm, data-driven foundations. This means you need to think about scalability and future-proofing systems. Making sure they work just as well for the leaders of tomorrow as they do today. Encouraging interdepartmental planning and budgeting. Sharing costs for mutual investments in cameras, sensors, and IoT devices. This will also speed up your digital-twin programs, providing valuable data to train AI models and inform policies. It comes down to giving yourselves the tools, information, and leverage you need to make the right decisions in the best possible way."

Anders Grafström | Global End Customer Marketing Manager, Axis Communications

Urban mobility

ThoughtLab describes how future-ready cities use technology and data to make travel simpler and safer for their citizens. The importance of real-time data to inform all manner of functions is front-and-center. Cities are already using it to enable systems such as traffic management, parking, public transport, and digital payments. Even their predictive maintenance systems require regular (near-time) data.

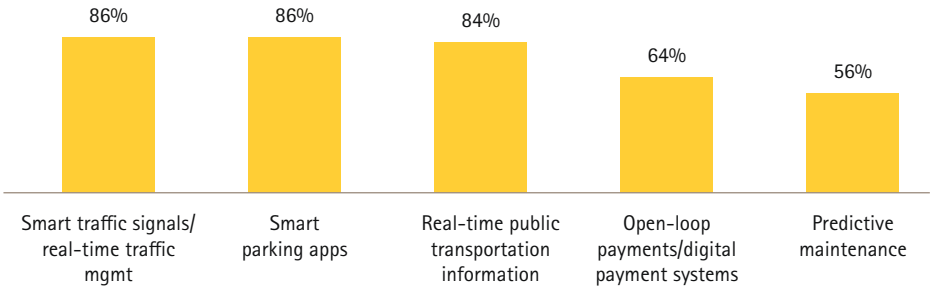
The benefits are plain to see. Future ready cities enjoy fewer traffic headaches and less pollution, indexing 2.5 points and 11.1 points better (respectively) than their peers on both fronts, according to ThoughtLab's report. Their initiatives improve safety, drive efficiency and quality of service, enhance social equity and physical access, all the while making services more sustainable.

Comparatively, future-ready cities have made more than four times as much progress in making their transportation and urban infrastructure fit for future purposes than their peers.

Accidents, near-misses, and incident management
As with all public initiatives, safety comes first. The reduction of incidents and fatalities is always the number one priority, especially when it comes to urban mobility.

The benefits are far reaching. With fewer incidents you have less congestion. Often, safety measures include speed calming and traffic management tactics. With less sharp acceleration and smoother traffic flow you have lower exhaust emissions. And this says nothing of the savings in direct cost from responding to an accident, lost productivity of those delayed, and mental well-being of citizens.

Top five technology investments by future-ready cities:
Urban mobility and transportation



Surveillance technology underpins all of these initiatives, providing much of the analytics and rich data streams needed to make them work.

Understanding how and why accidents occur requires data. Surveillance footage provides detailed accounts that enable forensic levels of analysis into driver behavior trends.

"When exploring traffic management systems, city authorities need to approach it in a holistic, cross departmental way in order to get the most out of it. It needs to be connected to emergency response teams and law enforcement. Environmental and sustainability teams need access to its data and to input on policies. The end result is a more people-centric city that improves lives and the lived experience, not just a more efficient road."

Andrea Sorri | Segment Development Manager, Smart Cities EMEA, Axis Communications

Identifying root causes
Understanding how and why accidents occur requires data. Surveillance footage provides you with detailed accounts that enable forensic levels of analysis into driver behavior trends. You can then use this analysis to inform new policies and preventive measures, and then use it to gauge their effectiveness.

82% of future-ready cities have equipped city infrastructure and assets with sensors.

Likewise, surveillance data enables you to introduce new measurement metrics to track performance. Almost universally, only accidents and rule violations are logged and used to benchmark success. These figures hide the countless dangerous near misses that pose a huge threat to the public.

Surveillance systems with onboard analytics can identify dangerous behaviors like sharp lane changes or stops, drivers heading the wrong direction, as well as speeding and red-light violations. A reduction in these kinds of figures could then be used as additional benchmarks.

When it comes to instances of clear rule violations, systems can drive significant processing efficiencies. When combined with license plate recognition (LPR), they can trigger fines or notifications automatically for more efficient safety measures and helping promote future traffic compliance.

Fast and appropriate responses
In the same vein, surveillance systems can provide automatic incident detection. Cameras can detect unusual or sharp changes in direction, or when a car stops in the middle of a road. When an incident occurs they can then trigger escalation protocols, such as notifying staff or first responders. Smoke and heat detection provides further valuable information. All of which helps expedite response times and can save lives.

Traffic management, intelligent signaling, and intersection controls
Reducing traffic congestion is a top priority for transport departments. Junctions, roundabouts, and crossings are often prime culprits. Getting traffic light signaling right here can be the difference between gridlock and free flowing traffic.

ThoughtLab's survey revealed that, in the transportation and mobility domain, smart traffic signaling and real-time traffic management solutions are the number one technology investment made by future-ready cities and the number one use case for mobility-centric AI.

Surveillance systems are used to collect queue length data at these hotspots. By collating data and identifying patterns over hours, days, and weeks, systems can present optimized signal timing profiles.

The same cameras can also be used as smart sensors to operate and optimize intersections in real-time. With adaptive control, traffic light cycles can be adjusted to the speed of a pedestrian or cyclist crossing, for example, extending the traffic lights for an elderly pedestrian crossing the street.

Similarly, real-time data can also be used to control variable speed limits or open and close lanes, using pre-set rules.

86% of future-ready cities have invested in smart traffic signals or real-time traffic management solutions.

Intelligent parking
Smart parking solutions ranked among the top mobility investment made by future-ready cities, and it is clear why. Parking is a perennial issue and a major source of traffic congestion. Up to 30% of drivers in congested urban environments are searching for a space. And this number doesn't even account for those who have since given up looking and are travelling elsewhere instead. In short, any improvement here can have a huge knock-on impact on congestion and emissions.

Surveillance data supports many functions vital to parking systems. As well as spotting spaces to inform availability signage, LPR enables frictionless automated payment systems. Both of these help to reduce bottlenecks at entrances and make journeys smoother.

Up to 30% of drivers in congested urban environments are searching for a space.

You can also use these cameras to spot parking violations, such as identifying double parking, overtime, illegal parking, and even measuring whether vehicles have parked far enough from corners.

These same cameras can, of course, also be used for typical surveillance and security purposes. They can spot and trigger events to deter criminal activities such as theft and vandalism by playing audio messages, turning on floodlights, and alerting security staff to suspect behaviors.

Encouraging alternative travel
Cities want more people to use alternative travel methods to cars. This might be public transport, riding bicycles or e-scooters, or simply walking. Doing so helps with both air quality and noise pollution levels, reduces traffic congestion, and improves the health and wellbeing of citizens.

One of the most frequently cited deterrents is a lack of safety, especially at night. Smart poles, equipped with lighting, cameras, speakers, and intercom help points can provide much needed assurance to the public, helping create established safe walking and travel routes.

In a much the same way as how traffic management and analysis systems work, surveillance systems can also collect data on cycle lanes or even pedestrian pavements. They can help identify causes of repeat accidents, flag overcrowding, or help inform new investment strategies and safety policies.

Improving safety on public transport systems is discussed in the following chapter.

CUSTOMER STORY

City of Dubuque | Iowa, United States

The City of Dubuque has linked its public safety and traffic management camera networks to resolve crimes and reduce roadway congestion. The city's nearly 1400 Axis multisensor, PTZ, panoramic, and license plate cameras help create safer streets and parks.

Dubuque's traffic management system employs a combination of radar and Axis camera technologies for robust vehicle detection and signal control. The cameras record intersection traffic from multiple angles, providing police and insurance companies with an accurate account of collisions and other accidents on the roadways.

Deploying Axis cameras with telephoto lenses saves the need for putting cameras on every block throughout the city, providing an efficient way to achieve maximum coverage while minimizing investment in hardware and associated maintenance costs.

The city now has over 2500 Axis cameras deployed when you include other local governmental entities using Axis.

Beyond mobility
In 2023 alone, Axis cameras helped Dubuque police department resolve 77% of the city's crimes committed against persons.

"Connecting our separate video networks from all the government entities gives authorized users a way to view cameras across networks from a single log on. That's especially critical for dispatchers responding to 9-1-1 calls."

Dave Ness, Technical Civil Engineer for the City of Dubuque

Though Dubuque continues to maintain four separate networks for traffic, public safety, county operations and the school district, the plan is to eventually link all four. Users will still retain local control over their own network of Axis cameras for daily use. But when events happen, authorized parties will have easy access to all the pertinent livestreams and archived video allowing for greater situational awareness and shorter investigative timelines no matter on which network(s) the cameras reside.

FIND OUT MORE

Public safety

People want to feel safe, secure, and protected in their cities. Yet high crime is a challenge for more than a third (35%) of the cities surveyed.

ThoughtLab explains how the effects of crime extend well beyond safety and security. How it reduces property values, displaces residents, and adds to evictions and homelessness. High crime hurts the economy. And public transportation suffers, with more vandalism, service disruption, and lower ridership.

In short, a smart city is a safer city. The right combination of technologies provides situational awareness, aids police investigations, helps maintain public order, assists with emergency responses and management, reduces risk, and works to prevent crime.

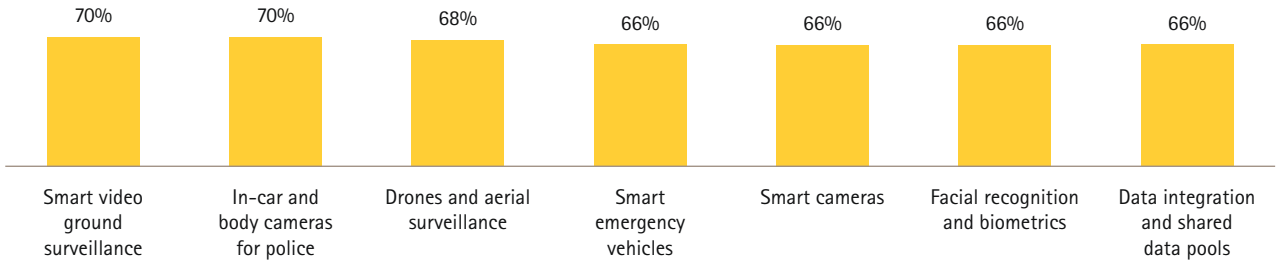
Future-ready cities continue to outperform their peers when it comes to public safety preparedness, indexing 8.2 points higher.

ThoughtLab's report highlights the importance of investing in data integration and shared data pools and the synergies this drives. As a result, collaboration among law enforcement and emergency services is improved, while command-and-control centers that coordinate emergency responses are enhanced.

Unsurprisingly, surveillance and security technology features underpin many of these capabilities. Smart video ground surveillance, in-car and body cameras for police, drones and aerial surveillance, smart cameras, and facial recognition and biometrics are all present within the top investments made by future-ready cities.

Top technology investments by future-ready cities:

Safety, security, and resilience



"The power of predictive analytics within a surveillance system, whether it's looking at different anomalies within a scene or measuring various thresholds is extremely helpful in preventing crime. Once police are getting those alerts, deterrent countermeasures can be put in place and staffed responses happen far more promptly. All of which helps prevents escalation or even deters crimes from occurring in the first place."

Dean Cunningham | Segment Development Manager, Public Safety, Axis Communications

Real-time crime centers and centralized operations
Real-time crime centers (RTCCs) provide centralized operations and intelligence capabilities to law enforcement and other emergency response teams. This model allows them to take advantage of a wide range of technologies that function as a force multiplier to their ability to respond effectively to any situation.

RTTCs gather data inputs from surveillance cameras, radar, audio equipment, and intelligent analytics to have real-time situational awareness and to generate powerful new insights.

44% of future-ready cities are creating command-and-control centers to coordinate emergency responses.

These feeds are integrated into your main operations management platform and wider solutions mix, allowing users to work with their video streams and data all in one place. Investing in solutions engineered on open platforms greatly improves the ease of integration and helps futureproof systems to accept new, emerging technologies.

As a result, agencies have all the intelligence needed to coordinate, allocate resources, investigate efficiently, and act decisively at their fingertips.

Both city-owned cameras and private networks can be unified to increase coverage and collaboration. You can also use the data collected by these systems for detailed retrospective analysis. Powerful features like forensic search expedite investigation evidence gathering and review.

These same centralized operations can equally be used for emergency response beyond law enforcement, such as coordinating responses to natural disasters, dangerous leaks, spillages, or terrorism.

Loitering, intrusion, and trespass detection
Loitering and after-hours intrusion detection can be a powerful tool in crime-prevention efforts. Gangs may congregate in closed parks or parking lots. Illegal graffiti or dumping often occurs at night. And wrongdoers may loiter with criminal intent near points of ingress at high value or sensitive locations.

Cameras with analytics on the edge can detect loitering and trespass in designated areas. It uses various parameters such as time-based triggers, duration, and people/object counts meaning you can precisely specify and refine your alert criteria. So, for example you could program an event to trigger should more than 6 cars enter a closed parking lot after 11pm and spend more than 5 minutes there.

When cameras identify an event, a wide range of responses and workflows can be automated. Examples include playing pre-recorded messages from loudspeakers or turning on flood lights, through to sending alert notifications and video live streams to local security agencies or RTCCs.

70% of future-ready cities have invested in smart ground surveillance.

In the same vein, mobile surveillance trailers can be situated at high value locations such as public works sites, providing temporary coverage with the same advanced capabilities as static installations.

Body-worn cameras
Body-worn cameras offer all the benefits of modern IP camera technology within a wearable solution. They capture valuable video and audio evidence for law enforcement and legal proceedings. You can send video streams to RTCCs, providing live, in-field footage for maximum data collection and situational awareness.

As well as evidence gathering, body-worn cameras also serve as an effective way to deter bad behavior and positively influence the actions of camera wearers and the public alike.

Beyond law enforcement

Body-worn surveillance is also increasingly being used beyond law enforcement. It suits a wide array of applications, wherever the management of people and protection of assets requires a flexible solution that provides high-quality coverage at an incident's point of origin.

You can also use body-worn cameras for situational training and evaluation. They can be highly beneficial in educating operatives about the management of incidents. By providing real-life evidence, they illustrate exactly how a particular situation was managed, greatly enhancing the theoretical learning taught in the classroom.

While there are understandably concerns around privacy, processes such as face redaction and masking are used to remove or obscure the identity of bystanders before footage of an incident is used for legal proceedings. Additionally, the users of body-worn cameras will establish clear policies regarding where and when they can record.

Onboard, in-vehicle cameras

Beyond the clear benefits of equipping law enforcement and emergency response vehicles with onboard camera systems, integrating recording technology across all government vehicles — including snowplows, utility trucks, and public transit — enhances risk management, accountability, and operational efficiency. This digital transformation not only improves public safety but also plays a critical role in building smarter city infrastructure and delivering a fully connected passenger experience.

70% of future-ready cities have invested in in-car and body cameras for police.

Real-time patrols

Installations make real-time, multi-camera, interior and exterior footage readily available to security personnel, even while vehicles are in motion. This enables virtual patrols of vehicles, proactive monitoring during busy periods or known events, and quick reactions to security alerts. Live multi-camera monitoring ties multiple views together to create a single story of any incident.

Technologies such as wide dynamic range (WDR) and Axis Lightfinder combat strong backlight and low light conditions while advanced compression technologies like Axis Zipstream preserve the important forensic detail whilst lowering bandwidth and storage requirements.

CUSTOMER STORY

City of Atlanta | Georgia, United States

Connect Atlanta is a public safety program linking the city's Axis cameras with 15,000+ private business and residential cameras. It helps police investigate crimes while deterring criminal activity and improving emergency response.

Building a real-time crime network

Atlanta Police Foundation launched Connect Atlanta (formerly Operation Shield) in 2007 with the aim of providing the Atlanta Police Department (APD) with greater awareness of criminal activity happening throughout the city. The project pulled video streams from city- and privately-owned cameras into a single Video Integration Center where it could be viewed by officers on a large 18-monitor video wall.

Starting with 17 AXIS Q60 PTZ Series Cameras installed in the downtown area, the project quickly grew as other municipal departments like MARTA (Atlanta's rapid transit authority), Public Works, Watershed Management, Aviation, Parks and Recreation, and the Atlanta Public School System integrated their cameras into the network.

APD also reached out to local businesses, shopping malls, multi-housing properties, and homeowners asking them to join the program. While some chose to integrate their cameras into the police network, others registered their cameras to provide recordings upon request.

Today, Connect Atlanta is one of the largest public-private surveillance networks in the country. More than 15,000 community-owned cameras have integrated themselves alongside 1800 Axis cameras owned by APD. Another 16,500 business and homeowner cameras are currently registered in the program. And that number continues to grow.

"Creating this network of city-owned Axis cameras and privately-owned security cameras from local businesses and homeowners has enabled Atlanta to affordably saturate surveillance coverage in our business district and neighborhoods. Having access to these additional resources helps our police department expedite criminal investigations and apprehend offenders more quickly."

Greg McNiff | Vice President of Programs for the Atlanta Police Foundation

FIND OUT MORE

Environmental monitoring

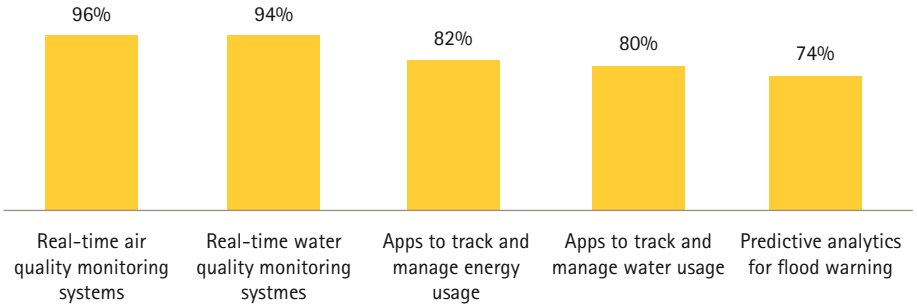
Addressing climate change continues to be the most pressing challenge for city authorities, according to ThoughtLab. This is because it is often associated with other urban challenges, including public health and safety, food security, water and air quality, as well as the daily lived experiences of citizens.

Future-ready cities are significantly ahead of their peers when it comes to sustainability goals, with 46% of future-ready cities already significantly ahead of their net-zero plans vs. just 5% of others. But these differences don't just stop at energy usage and emissions. Future-ready cities are notably more prepared to weather environmental risks and natural disasters, reducing both the cost and speed of recovery.

While many of the top steps taken by future-ready cities centered on setting emissions targets and investment budgets for alternative fuel infrastructures, the monitoring and tracking of key indicators such as air quality and pollution levels, and the use of predictive analytics for flood warnings were among the top five investments made by future-ready cities.

46% of future-ready cities are already significantly ahead of their net-zero plans.

Top five technology investments by future-ready cities:
Environment and sustainability



"Cities need to implement proper early-warning systems with smart sensors to be able to react as quickly as possible. These systems can also be further developed by AI-enabled simulations and digital twins. With flooding, water, and pollution sensors, cybersecurity is very important to prevent false alarms caused by hackers. So, cities need to invest in long-term solutions that are both reliable and cybersecure."

Andrea Sorri | Segment Development Manager, Smart Cities, EMEA, Axis Communications

Flood detection and poor road conditions
One of the most critical threats that can occur in an urban environment is flooding. Following periods of heavy rainfall, drainage systems can quickly become overwhelmed, leaving key routes impassable, causing damage to infrastructure and threatening lives.

Cameras and IoT sensors can help to monitor areas that are prone to flooding and alert officials once a pre-determined threshold is met, such as river water levels reaching specific heights. This allows you to quickly put measures in place, from communicating the crisis with affected communities via loudspeaker or text message through to arranging evacuation if needed. Acting quickly can help remove people from immediate danger and enable emergency teams to re-route traffic, restrict access to dangerous areas, and manage the situation as it develops.

Similarly, water-saturated and icy road conditions are dangerous. Cameras can detect when unsafe road surfaces are developing and send automated, preventive alerts to authorities to take action.

74% of future-ready cities have invested in predictive analytics for flood warnings.

Low emission and clean air zones
In efforts to reduce traffic emissions, many city authorities have rolled out low emission or clean air zones (CAZ) that impose charges on entering specified areas when vehicles do not meet emission standards. London's ultra-low emission zone (commonly referred to as the ULEZ) is a prime example.

Establishing and enforcing these zones requires cameras set up with automatic license plate recognition technology and boundary crossing. Entrant's details can automatically be checked against registration databases and fees can be issued accordingly. Naturally, the previously detailed traffic management systems also assist considerably with emissions reduction goals.

70% of future-ready cities are setting up low or zero emission zones.

In most European countries, more than half of the population is exposed to a harmful level of traffic noise.

Noise pollution management
Noise pollution is a serious environmental threat for people's health and safety in cities, according to the WHO. In most European countries, more than half of the population is exposed to a harmful level of traffic noise. The European Economic Area (EEA) estimates that long-term exposure to noise above 55 decibels contributes to 48,000 new cases of ischaemic heart disease every year across Europe.

A combination of high-quality microphones, acoustic sensors, and AI analytics can help to identify and monitor excessive noise levels. Video surveillance can then be used to provide visual verification. An example use case could be, when an intersection becomes unduly noisy at certain points in the day. It might be because it can't accommodate the rush of traffic during peak times. Based on the data, operators can then adjust traffic lights, open new lanes, or divert traffic.

When complaints are received, the city council can glance at the real sound levels instead of having to attend and measure them in person. This also makes it possible for you to measure the success of any noise reduction initiatives, such as pedestrianization, or replacement of vehicle lanes for bicycle lanes.

Air quality monitoring
Air pollution is one of the greatest environmental risks to child health, according to the WHO. In 2019, 99% of the world's population was living in places where the WHO air quality guidelines levels were not met. Ambient (outdoor) air pollution is estimated to have caused 4.2 million premature deaths worldwide in 2019.

It therefore comes as no surprise that real-time air quality monitoring systems were the number one investment made by future-ready cities for environmental and emissions reduction reasons.

Surveillance systems provide you with vital infrastructure for air quality monitoring efforts. The presence of IP-based hardware guarantees both power and network access for any sensors you need to provide particulate matter (PM) readings, or otherwise.

What's more, cameras provide 'eyes on the scene', allowing for remote visual assessment of the causes behind high pollution readings. Smoke and heat detection capabilities offer further data to correlate with survey results, accounting for any unexpected reading spikes.

These systems work hand-in-hand with traffic management systems, providing real-time data of how effective initiatives have been in reducing emissions.

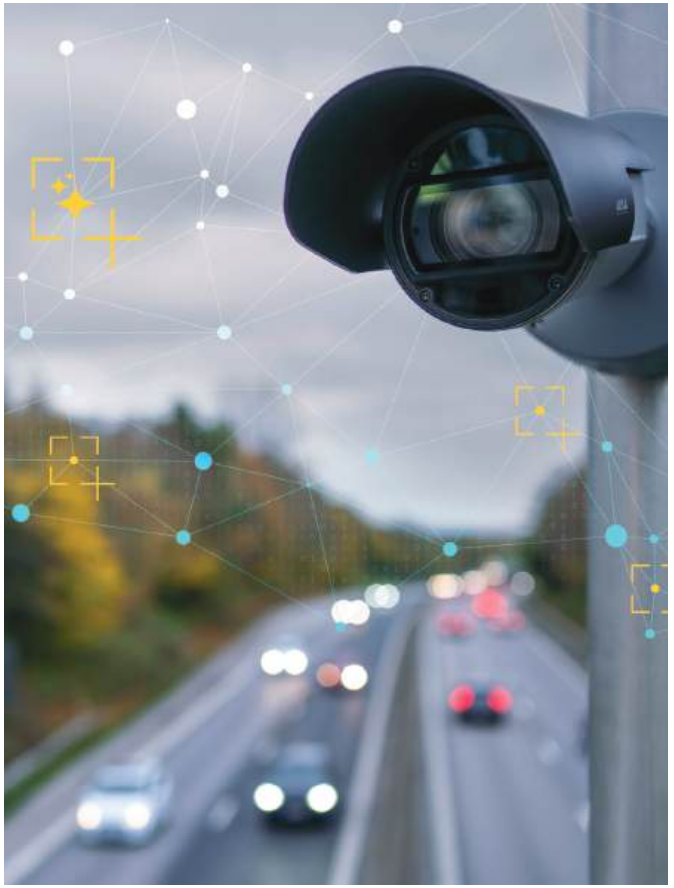
Preventing illegal dumping
The illegal dumping of waste (also known as 'fly-tipping') on streets and into rivers is an issue for many cities. Surveillance technology can help with deterrence and identifying illegal fly-tipping.

Installing cameras at known hotspots can discourage dumping. When combined with license plate recognition technologies, you can capture vehicle details for legal action and alert relevant authorities when known, watch-list vehicles visit geofenced locations.

This surveillance footage can also be shared between law enforcement agencies and waste management services, enabling coordinated budgeting, clean-up efforts, and tracking of repeat offenders.

A combination of smart IoT sensors and surveillance cameras with analytics at the edge can even monitor legal waste disposal habits and locations, prompting timely clean up and action should waste thresholds be met.

96% of future-ready cities have invested in real-time air quality monitoring systems.



CUSTOMER STORY

New Orleans | Louisina, United States

New Orleans launches Clean Up NOLA initiative using Axis network radar detectors and network cameras to curtail illegal dumping.

New Orleans Sanitation Department purchased a series of Axis cameras augmented with IR-filters for night vision and deploy them at chronic illegal dumping sites across the city. If they could catch law breakers on video and successfully prosecute them, it would likely help deter future offenders.

Because illegal dumping is a crime, staff at the New Orleans Real Time Crime Center monitors the Sanitation Department's cameras along with the other 400+ municipally-owned public safety cameras installed throughout the city. The cameras are integrated into the Genetec Security Center™ unified platform, and the Stratocast™ cloud-based video monitoring system, allowing the video to be displayed on the Crime Center's video wall and to be archived for forensic evidence as needed.

The advantage of this radar-camera pairing is that when not focused on an abandon lot, the Axis network PTZ cameras are available to monitor the surrounding area for public safety.

"When we've caught somebody illegally dumping, we've sent video clips to the local news media to show that the city is taking this issue seriously and is going to enforce the law. We want people to take more pride in our city and change their behavior accordingly."

Ross Bourgeois | New Orleans' Office of Public Safety and Homeland Security.

If caught, illegal dumping in New Orleans is a minimum fine of $1,500. Now that the city is using radar technology and network video cameras to catch culprits in the act, successful prosecution is likely guaranteed. And that's money that can go back into the city's funds to continue supporting the Clean Up NOLA initiative.

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The Axis advantage
A perfect fit

Axis is ideally positioned to help your city become future-ready. With our extensive experience working with municipalities, security services, law enforcement, emergency responders, and environmental agencies, we know and understand the challenges you face and how best to meet them.

Our broad and deep portfolio of solutions, combined with our extensive partner ecosystem, enables us to tailor precisely to your needs and objectives. What's more, we build our solutions using open standards, meaning our solutions readily integrate with other existing systems and legacy hardware. As they are also IP-based technologies, our devices connect directly to your existing standard networks. This makes it even quicker and easier to scale systems up and down at your own pace.

Saving you money
We understand how important it is to know the true total cost of ownership and return on investment that your systems will provide. That means not only considering the hardware costs, but also the solution design, deployment, operation, and maintenance. As such, we've made our solutions as accessible and value-driving as possible at every step of the way. Here's how:

> Our extensive customer tools to save time and money in product selection and site design
> We have developed our solutions using open standards meaning they integrate readily with your existing systems
> We make technologies that lower bandwidth, storage, and energy consumption, noticeably reducing ongoing operating costs
> We build high-quality, rugged cameras that last, even in harsh or vandal-prone environments
> Our solutions provide you with market-leading quality footage and data, ensuring we capture the highest forensic value possible
> Our systems can drive significant efficiencies, increase productivity, and spur growth thanks to the power of intelligent analytics, automated workflows, and measurable outcomes.

In other words, we save you money and deliver value every step of the way, from design and deployment to ongoing operation and maintenance.

Secure and private
When it comes to using surveillance technologies throughout your city, we understand just how important privacy and data security are. Not only do we build all our solutions to the highest security and regulatory compliant standards, but we also provide a range of privacy-first technologies to suit the needs of your use case.

All of our technologies come with built-in cybersecurity features and come with default security settings. And we are ISO/IEC 27001 certified and work only with ISO 9001 certified suppliers.

Axis implements cybersecurity best practices throughout the entire development of our solutions, spanning our information security management system, supply chain, software and hardware development, and vulnerability management. And because cybersecurity is a shared responsibility, we also offer ongoing customer guidance, technologies, tools, and services.

A sustainable choice
Axis is committed to sustainability. It is what drives us to develop innovative, long-term, and reliable products and solutions for a smarter, safer, more sustainable world. We want to help cities grow and develop while taking environmental impact into account, and also to help you meet your own ESG goals. As such, our approach to sustainability and how we operate as a company comprises four cornerstones. They are:

> Respecting people: People come first. For us respect and ethics drive everything we do. Every day.
> Protecting the planet: We do our utmost to minimize the environmental impact of our operations to help beat climate change, reduce our carbon footprint, and responsibly use natural resources.
> Responsible innovation: We believe innovation should never come at the cost of privacy or other ethical principles.
> Being trustworthy: We want to make a smarter, safer world by doing business the right way. So, we work to remain transparent and reliable.

Together, we can make your city future-ready.

LEARN MORE

About Axis Communications

Axis enables a smarter and safer world by improving security, safety, operational efficiency, and business intelligence. As a network technology company and industry leader, Axis offers video surveillance, access control, intercoms, and audio solutions. These are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 5,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.

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