CLEAN AND GREEN:

Innovative Tools Help Cities Shed the “Dirty City” Stigma

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Adopting Smart City Technologies Boosts ROI with Clean and Safe Streets

Cities have long battled the stigma that their streets are broken public assets — littered with waste and graffiti, and unsafe for citizens and visitors. Many cities are also challenged by the growing proliferation of homeless encampments, which further exacerbates the "dirty city" stigma. But the tide has turned, with major metropolises throughout the nation leading the charge toward a cleaner, greener future. An innovative suite of technology products and services is making this possible. One such technology is Routeware SmartCity, a cloud-based technology suite that helps local governments everywhere run more efficient, effective, and sustainable operations. It is revolutionizing solid waste collection and propelling sustainability and efficiency across municipal operations.

Cities are empowered by cutting-edge technology such as Artificial Intelligence (AI) to keep streets clean, combat waste issues, and improve citizen satisfaction. This type of technology also benefits fleet operators by optimizing trash and recycling collection, organic waste pickup, and street sweeping, helping cities stay cleaner and run operations more efficiently. Ultimately, deploying these technology solutions assists city governments in saving money and building trust with residents by improving customer satisfaction and service transparency, while simultaneously empowering and protecting drivers in their day-to-day work.

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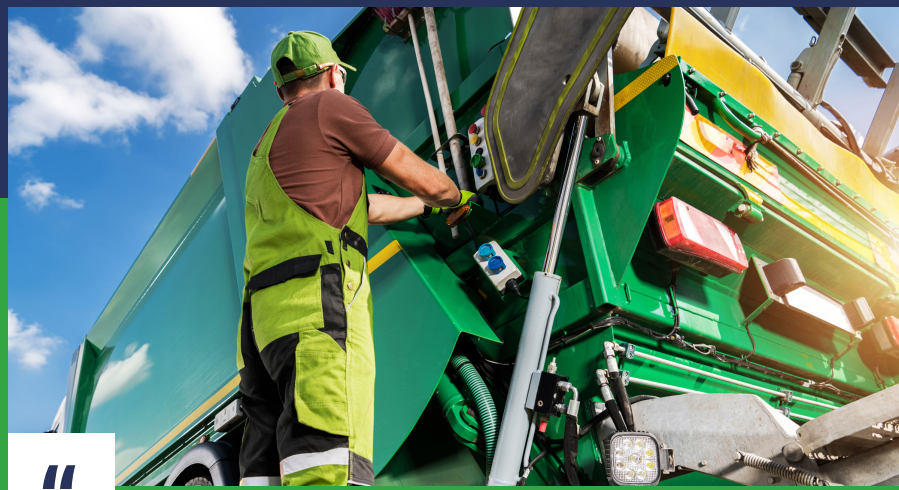

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Technology helps shoulder the responsibility, or assign it where it should be. By integrating these tech solutions in municipal fleets, public works and solid waste departments become a highly effective "front line," helping to alert other departments in real-time, whether creating individual 311 calls or tracking them for a speedy resolution."

HARRY HAYES, former COO and solid waste director, City of Houston, TX

Change Your Approach to Fleet Management, Meet Sustainability Goals

Routeware SmartCity released a native turn-by-turn navigation app. Features include points of interest like gas stations to help drivers orient by landmarks. A skip feature allows drivers to navigate around closed streets. A route simulation feature allows the driver to preview their entire route. The algorithm has been re-vamped to deliver the best possible recommended path."

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Cities that implement route optimization and waste management technologies will realize operational efficiencies and improvements that contribute to positive environmental outcomes, including reductions in greenhouse gas emissions and pollution, and improvements in waste diversion rates. Cities implement route optimization technologies to create more efficient routes and turn-by-turn navigation, thereby making fleets more efficient in terms of route time, stops, tonnage and mileage. Cities simply dispatch their routes for trash pickup, recycling, or street sweeping and drivers can easily follow in-cab directions, whether their first day on the job or a veteran driver. Back at the office, supervisors can click and drag stops to ensure they are in the most efficient order, or they can use the sequencing tool to automatically generate efficient routes for a growing neighborhood.

These operational efficiencies reduce miles traveled, shorten route completion times, minimize route overlap, and reduce idling time, which directly translates to decreased fuel consumption. This reduction in fuel usage significantly impacts the greenhouse gas emissions of cities. In addition to sustainability benefits, route optimization also helps to keep cities clean in a more equitable way, because fleets can reach every area of the city efficiently and transparently. Additionally, route optimization equally distributes workloads throughout the week so that the drivers have even and fair work days.

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PROJECT HIGHLIGHT

Challenge

The City of Glendale, Arizona has always been focused on efficiency, but until recently their waste and recycling drivers were using paper routes, presenting several challenges:

- Operations and customer service were slow and inefficient.
- Tracking drivers and identifying issues was difficult.
- Excessive paper usage was negatively impacting the environment.

Solution

Waste collection is expensive, logistically challenging, and dangerous. Glendale recognized this, and after implementing the SaaS product Routeware SmartCity in 2020, the team immediately began optimizing the City's routes to reduce time on the road. The City successfully:

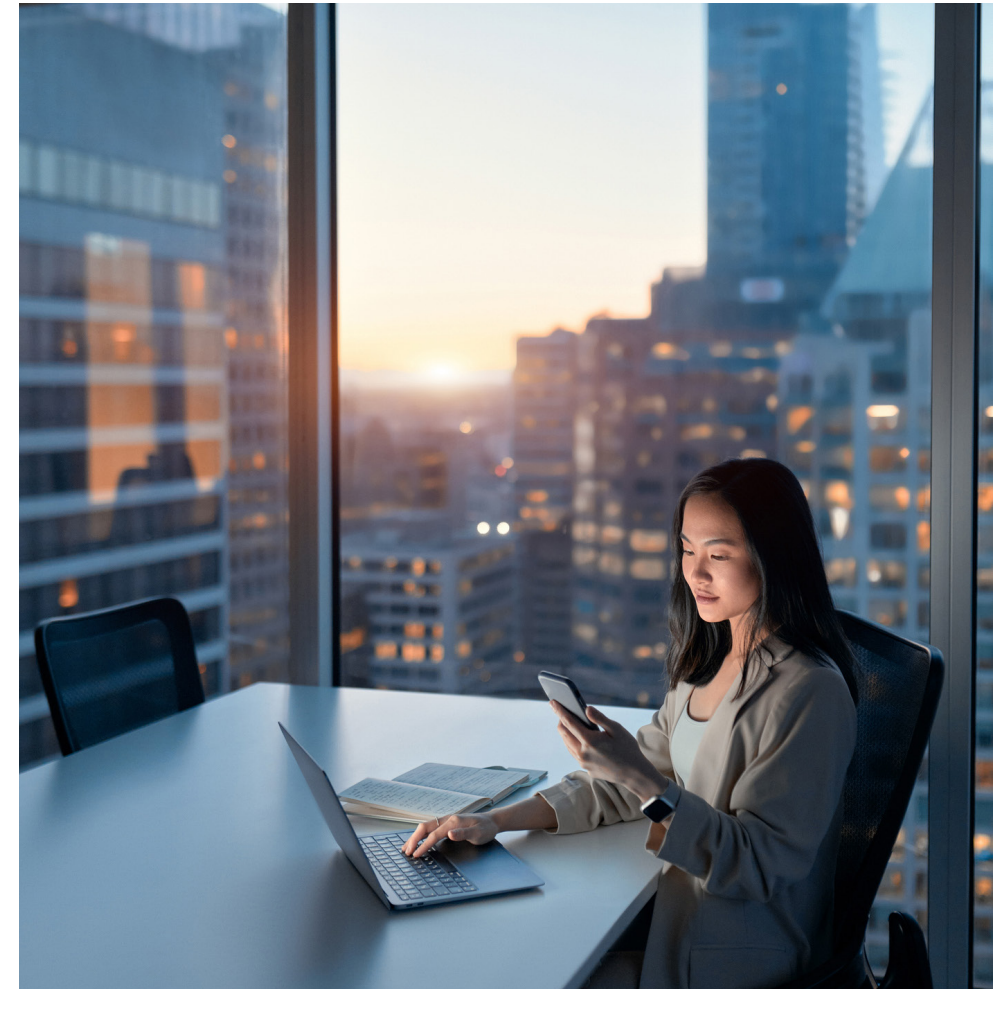
- Optimized 5 garbage collection days and all recycling routes.
- Reduced mileage by 155 miles per day and 24,000 miles annually.
- Increased cost savings from fuel usage and reduced maintenance.
- Avoided carbon emissions.

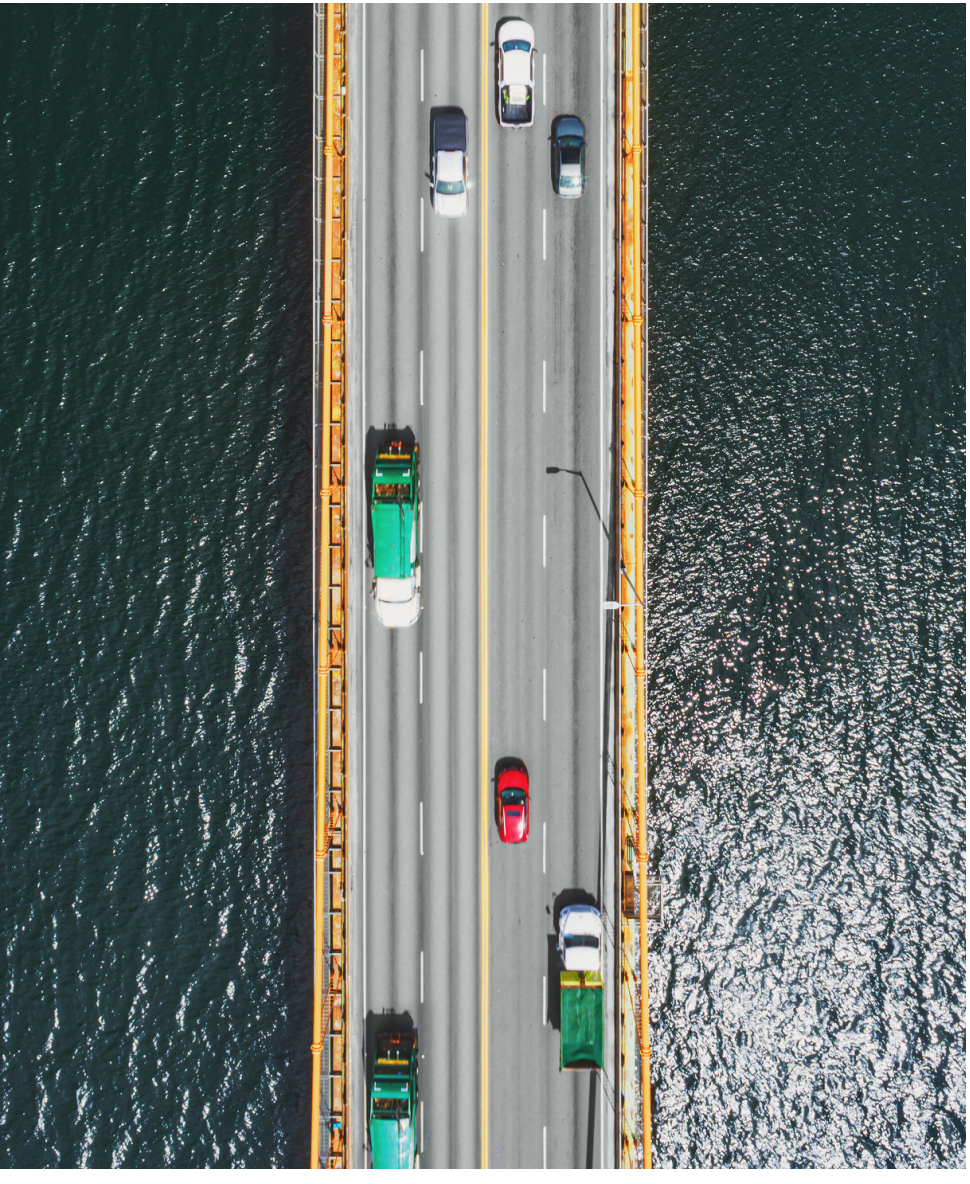
Glendale has leveraged this software beyond solid waste collection. The City's Solid Waste Department is now helping other departments detect issues such as graffiti, litter, hanging branches, and vacant cars, enabling these departments to address them before receiving resident complaints.

Digitally Track Waste and Recycling for More Sustainable Waste Management

Cities can also use SaaS technology to minimize landfill waste and encourage participation in recycling and composting programs. During the Covid pandemic, many municipalities suspended or altogether dismantled their recycling programs due to safety issues, a lack of staffing, and escalating recycling costs. Some of these cities are bringing recycling back online, and technology is helping them continually engage and educate customers with the ultimate goal of reducing recycling contamination.

John Culbertson, vice president of MSW Consultants notes, "Education is critical to changing behavior, but technology that allows us to view, observe and quantify contamination down to the individual generator level provides us data about the ways customers really behave. As program providers and policymakers, this data is both fascinating and critical." Helvia Quinones, deputy director of the South Operation, Solid Waste Department, Houston, TX concurs: "With strong data we are able to see where our trucks are, how much fuel they consume, how long they last, how many hours our staff is running their routes, the tonnages they're producing, and even how the city is growing. All of this information is captured, analyzed, and fed to the mayor's office."





One such technology suite, from Routeware SmartCity, that helps local governments everywhere run more efficient, effective, and sustainable operations has now been deployed in more than 150 customer cities. The scale and the amount of data that these operations generate is staggering:

- More than 4,000 vehicles are running routes using Routeware SmartCity, with 40,000 unique routes scheduled and routed every month.
- In addition, drivers and supervisors log 400,000 exceptions at the curb monthly and service 6 million individual customers monthly.
- Over the course of the last month alone, 48 million pounds of waste and recycling have been managed through this digital solution.
- That translates to 5 billion pounds of waste and recycling that's been hauled and digitally tracked in the past year.

This data provides insight into where the waste originated, where it was picked up, where it ended, and what happened on the way. Cities are maximizing this opportunity by taking additional action en route: scanning their recycling collection for contaminants in hoppers, identifying potholes along the way, or addressing 311 calls in real time.

PROJECT HIGHLIGHT

Challenge

The City of Atlanta needed to optimize waste and recycling collection throughout all City neighborhoods by:

- Improving the operational efficiency of City departments.
- Increasing recycling participation rates and effectiveness.

Solution

Routeware SmartCity is now installed in all City-owned refuse trucks (89 garbage, recycling, and yard waste vehicles servicing 96,000 residential customers) serving as a data collection tool to provide baseline data and valuable insights into Atlanta's waste and recycling services and trends.

After analyzing landfill diversion data from a 6-month pilot of the technology, the City:

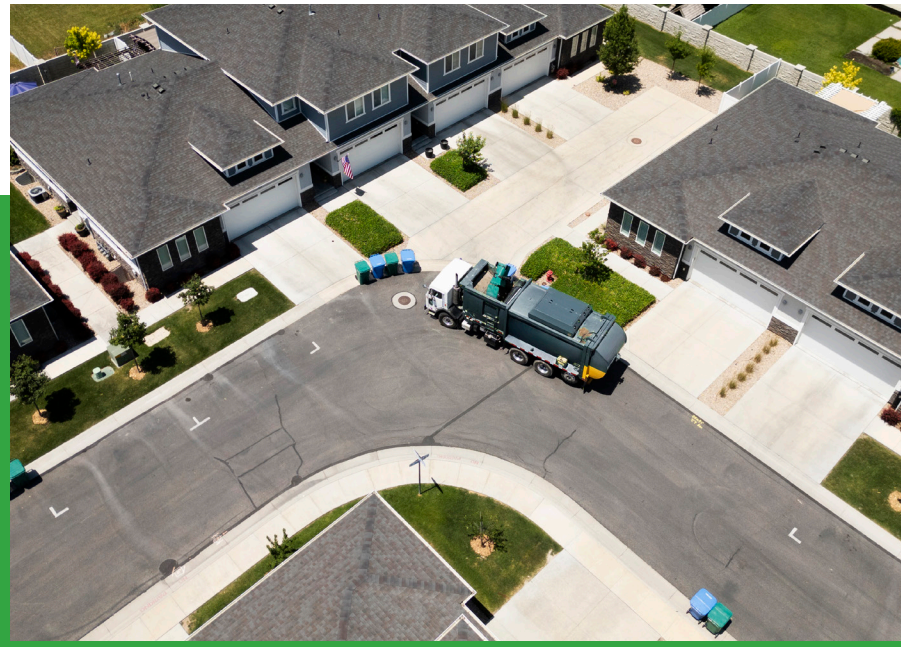
- Reduced the number of recyclables going to landfills over six months by 83%, equaling **355 tons of recyclable material** kept out of landfills.
- Delivered savings of **4,752 MTCO2e**, which is equivalent to avoiding greenhouse gas emissions from **1,656 tons of waste** (or 237 full garbage trucks) recycled instead of landfilled.

Additionally, as part of a route optimization project for the City, Atlanta and Routeware unlocked major potential cost savings and increased efficiencies by adjusting the City's solid waste service schedule from four to five days, decreasing the total amount of trash routes per day and balancing the number of hours driven among drivers.

Cities of the Future: Emerging Technologies Improve City Insights

Heavy-duty fleet operators are the eyes of the city, from waste management trucks to street sweepers and snowplows. Because they traverse every street in a city on their weekly routes, they notice issues such as potholes, litter, graffiti, hanging wires, broken street signs and overturned bins. Drivers equipped with a mobile app can capture and document these issues through photos and notes, which are uploaded to their supervisors and then routed to the appropriate department for repair. This technology allows cities to proactively address concerns that would otherwise likely arise from citizen complaints, keeping city streets cleaner and safer more quickly.

Emerging technologies will further improve these city insights that drivers encounter on their routes. Cameras placed either at the front of the cab or inside the waste hopper use AI models to scan for certain anomalies like potholes and contamination, providing detailed insight into the state of city streets. These capabilities allow cities to turn fleet vehicles into roving data collectors. As a city continues to use this technology, insights become stronger and more actionable.



6.2 million

issues at the curb have been tagged by drivers in over 150 cities using Routeware SmartCity.

The right tech stack is not enough to help you deliver and build the future. Once you get the right technology, that's when the work of training your team to use it and incorporate it into your operations and processes begins. This critical work of technology implementation is the 'X-factor' that determines whether your operation is equipped to succeed in this new world that we're entering — a world of warmer temperatures and more natural disasters, electric vehicles, and artificial intelligence."

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For example, an AI model can automatically detect and document contamination in hoppers, which helps to monitor and educate residents about recycling and organic waste programs. This is vital because recycling contamination is a pernicious problem and a core issue for all municipal recycling programs or private haulers. The national average for contamination is estimated to be around 17% but, in reality, that number can be a lot higher in certain regions and communities. This affects not only the amount of material that gets recycled, but the bottom line of any operation, since it incorrectly lowers the costs associated with collecting and disposing of those recyclables. Technology is an important tool in understanding, monitoring, and addressing contamination across all stages of education, collection, and processing.

Technology Helps City Planners Solve Challenges and Educate Citizens

- Optimize routes to reduce mileage, fuel consumption, and emissions.
- Digitally track waste and recycling while engaging and educating customers.
- Proactively detect and address maintenance issues to safely and efficiently keep city streets cleaner.

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Routeware SmartCity is a technology suite that helps local governments everywhere run more efficient, effective, and sustainable operations. A software-as-a-service (SaaS) offering originally designed for waste and recycling fleets, this full-service solution can be deployed across virtually any fleet to help reduce costs, improve service, and contribute to an enhanced quality of life for citizens.

Learn more