VUZIX®

WHITEPAPER



Augmented Reality: The New Way to Reduce Your Carbon Footprint

Connect with remote experts to improve first-time resolution rates, boost customer satisfaction, and save on travel costs.

With a worldwide annual output of 57 gigatons of CO_2, there is a significant global push to scale down carbon emissions. In 2021 alone, the world produced a staggering 40.8 billion metric tons of greenhouse gasses, with the U.S. accounting for almost one-sixth of this total output. *(1)*

Nevertheless, the United States is committed to reaching net-zero targets by 2050, with the Long-Term Strategy (LTS) documentation identifying cutting energy waste as one of the crucial ways to achieve 2050 goals, and requiring companies to make significant changes to support.

Field service, transportation, manufacturing and almost every other industry are being called upon to transform to a more sustainable approach. This includes developing and adopting more efficient and environmentally-friendly workflows for front line workers. One frontrunner approach is the use of advanced augmented reality (AR) and artificial intelligence (AI) tools to reduce energy waste through improving first-time fix rates, and drastically cutting travel and travel-related emissions.

Augmented reality (AR) smart glasses help connect technicians in the field to AI databases and remote specialists, providing them with heads-up, hands-free support and training that improves overall productivity and safety.

The use of AR smart glasses in the field provides an array of benefits to both the user and customer.

- **Reduce costs with faster fix rates.** Improve resolution rates by putting key information in a worker's field of view and providing key workflows.
- **Improve compliance with protocols.** Provide step-by-step instructions and training in the field to reduce error rates.
- **Accelerate customer response times.** Reduce downtimes required for maintenance, repairs, and upgrades.
- **Get the right experts on the job.** Access experts remotely to gain technical support while minimizing travel costs.

VUZIX
M400™



- First Smart Glasses 8 Core 2.52Ghz Qualcomm© XR1 Platform
- See-through waveguide optics
- 2-12 hours of operation based on external battery choice
- Auto-focus camera with up to 12.8 megapixels and 4K 30fps video
- Various mounting options available for comfort
- Integrated speaker with up to 97db output
- USB, Wi-Fi, and Bluetooth connectivity
- IP67 certification against water and dust

Enable First-time Fix Rates

Many organizations face major challenges when it comes to resolving technical issues in the field. It can be time consuming, and often ineffective, for a field service technician to try and describe issues to an expert over the phone, and yet scheduling experts for on-site service calls is expensive and slows resolution times. With smart glasses, field service professionals are able to drastically reduce travel time - unlocking economic and environmental savings.

Compared with companies not currently using AR in field service, companies that employ AR see a 12.7% year-over-year increase in first-time fix rates; an improvement of more than 2x that of organizations not using AR. *(2)*

For frontline workers, it's important to have technology at their disposal that is entirely voice-controlled and, therefore, hands-free. Using AR smart glasses, the wearer of the device can connect with colleagues via various video conferencing applications (like Microsoft Teams, Zoom, Webex, etc.), where experts on the other end of the line can see what the worker sees as s/he observes a specific scenario in the field. This aids in collaboration and productivity between staff and enables a more productive workflow. AR smart glasses make it possible for technicians and other field workers to make fewer trips to and from job sites, and reduce the expenses that frequent travel incurs (i.e. gasoline, vehicle maintenance, etc.), all of which reduces consumption and lowers carbon footprint.

Reduce Carbon Footprint by Reducing Travel

U.S. vehicles produce 1,098 million metric tons of carbon dioxide equivalents in just one year - almost one-fifth of the nation's total carbon dioxide emissions. *(3)* Travel time and mileage reduction can positively impact the environment in a significant way. Field service workers are better able to 'get the job done right, the first time' using AR technology, and eliminate the need for multiple follow up site visits, thus reducing emissions.

Field service professionals across industries have improved their operations as a direct result of deploying AR smart glasses. Most importantly, they have helped reduce their carbon footprint, especially when AR devices are deployed at scale (such as major food and beverage manufacturing operations).

Take, for example, a field service organization with a workforce of 1,000 technicians that complete 800,000 jobs a year, covering approximately 15 million miles. With medium-sized trucks averaging 8 miles/gallon and every gallon of gasoline releasing 22 pounds of CO_2 emissions into the atmosphere, the typical field service business can produce up to 41,250,000 pounds of CO_2 yearly. By cutting travel time by just 40 percent to 9 million miles, annual carbon emissions can be reduced to 24,750,000 pounds per year. *(4)*

Lower Travel Costs with Remote Support

In addition to environmental benefits, leaning on AR solutions for remote support can significantly reduce a company's financial burden where travel costs are concerned. CH Four Biogas, a leading producer of anaerobic digestion and



Did you know? A failed first service visit results in an average of 1.75 more visits to fix the problem and adds about 13 days to Mean Time to Resolution.



alternative energy installations, turned to AR smart glasses to assist field operators performing plant inspections remotely. CH Four Biogas' plant construction operations require frequent site inspections, oftentimes across the U.S. and Canadian border, to ensure both contractual obligations and building requirements are being met.

Prior to the 2020 Covid-19 pandemic, the company would travel to a given project site on average four to five times per quarter to conduct these inspections. A typical trip traveling to a rural, and in some cases extremely remote, job site could easily span 3-5 days, eating up a week's worth of time and resources for a single inspection. *(5)* With the Covid-19 pandemic and border restrictions, CH Four Biogas was no longer able to travel to many of the plants to do the necessary, mandatory audits.

In order to maintain contractual obligations, CH Four Biogas turned to Vuzix' AR solutions. By equipping project site construction managers with Vuzix M400 smart glasses, CH Four Biogas was able to remotely inspect, commission, and troubleshoot on the spot as needed, without the need to send an on-site engineer. With frequent, week-long travel to and from job sites, for a visit that can be as quick as a few hours, Vuzix' solution offered significant cost saving benefits to the company amounting to about the salary of an engineer in their first year. In addition to cost savings, the company is also able to make better use of senior engineers' time. "We're able to better utilize our engineering staff. This means we can take on more projects simultaneously," said Dave Lapointe, VP of Engineering at CH Four Biogas.

Minimize Waste With First-time FIx Rates

In 2022, the average cost for field service operations increased by 7%, despite an overall improvement in performance across service organizations, including an increase in first-time fix rates of 2.34%. *(6)* This is astounding given that for years, first-time fix rates were often the only key performance indicator (KPI) organizations used to determine if they were successful. Companies have long depended on an increase in first-time fix rates to boost their bottom line, but reliance on this alone is not enough to overcome today's cost pressures.

Field service is a "people and parts" business - labor comprises 60% of total field service costs, while spare parts expenditures are responsible for an additional 22%. *(7)* Inflationary surges dampen field service revenue generation as a result. While economic forces are outside the control of field service organizations, leaders can control how they respond to these challenges and create conditions for success. By having a better process to manage assets and inventory through AR glasses, field service organizations are able to cut down on costs and waste, while improving KPIs.

Stepping Away From Pen and Paper

While field service technicians still consult paper manuals and rely on manual documentation, a 'pen and paper model' often requires sending, receiving and printing documents via fax machines and printers, which produces over 60,000 tons of carbon dioxide. Paper is not a massive emitter of carbon dioxide but it is responsible for 1.3% of global greenhouse gas emissions. *(8v)* Nevertheless, paper consumption impacts the environment and must be taken into account in climate action efforts.



Firms seeking to reduce their carbon footprint have to make the paperless transition. AR smart glasses enable easy audio and visual documentation, allowing industry players to digitize operations and, therefore, cut down on paper use. Best of all, leaning on AR provides a hands-free, intuitive interface between your company's digital content - detailed instructions, diagrams, and videos - and technicians in the field. Field service technicians using wearable AR have real-time access to schematics, diagrams, step-by-step instructions, and historical service data and can quickly connect with supervisors and more experienced technicians for additional assistance when needed. Compared to paper-based records, digital information is also more quickly accessible, helping reduce follow-up technician visits caused by limited or incomplete information.

Sustainability Made Possible Through Augmented Reality

Field service organizations that have not incorporated AR into their operations are missing out on a crucial tool for creating a competitive advantage. AR wearables make it possible to increase operational efficiency and productivity by enabling first-time fix rates, enhance the customer experience while maximizing the customer value and driving growth across an organization - all while eliminating unnecessary travel and reducing CO2 emissions. By leaning on AR smart glasses, organizations can equip their technicians in the field with the tools necessary to 'get the job done right, the first time' - a competitive advantage that has benefits to both the company, as well as the planet. The time to invest in next-generation technology to aid in the reduction of carbon footprint is now.

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