Wireless and green with cellular M2M

by Axel Hansmann, Vice President, Strategy and Marketing, Cinterion

M2M - machine to machine - technology connects machines via wireless networks to improve efficiency and productivity in a wide variety of applications. M2M also has a highly beneficial impact upon the environment. By monitoring machines in real-time, M2M can reduce their carbon output, improve air quality and make energy systems more efficient. Just one company, UPS, shaved nearly 30 million miles off delivery routes, saved 3 million gallons of gas and reduced emissions by 32,000 metric tons of CO2.

Axel Hansmann is Cinterion's Vice President of Strategy and Marketing. Before joining Cinterion, Mr Hansmann was with Boardeleven Management Consultants where he focused on evaluating market entry and strategic growth options in the M2M industry. Prior to that,

Mr Hansmann worked at Telefónica O2, where his responsibilities covered network technology, product management and business strategy.

Axel Hansmann earned degrees in electrical engineering and telecommunications management.

If you follow the wireless industry, then you already know that the machine-to-machine (*M2M*) sector is exploding and generating significant revenues for mobile network operators (*MNOs*), device manufacturers, original equipment manufacturers (*OEMs*), service providers and integrators while end-users enjoy significant savings M2M technology connects machines via wireless networks to improve communications, processes, efficiency and productivity. It's used in an astonishing array of vertical markets and industries such as: remote maintenance and control; metering; payment systems; routers and gateways; security systems; healthcare; automotive and eToll; tracking and tracing; environmental monitoring and more. The latest report by ABI Research estimates an M2M projected compound annual growth rate (*CAGR*) of over 25 per cent per year with 232.5 million cellular M2M connections by 2014.[1] Since there are currently an estimated 50 billion machines in the world that would benefit from M2M connectivity, market growth is expected to accelerate.

While we'd like to say that zero carbon footprint is a major contributor to growth, the reality is the significant environmental benefits of M2M are often fortunate side effects of business decisions to invest in smart technology. M2M is good for the balance sheet, which encourages adoption. The vast majority of M2M applications - perhaps 70 per cent - have intrinsic environmental benefits that promote environmental sustainability and good corporate citizenship at the same time. M2M is a win-win proposition for going green and growing profits!

Planet at risk

With increased worldwide awareness of the risks of global warming, environmental pollution and related health issues, as well as the importance of natural resource conservation, it's becoming more and more important to governments and businesses to consider environmental economics and the impact that operations have on the planet. China, the world's most prodigious emitter of greenhouse gas, continues to suffer the downsides of exponential economic growth. Despite the country's 2020 goal of generating 15 per cent of its energy from renewable sources - mainly wind and water - today's coal-burning power plants and exhaust from millions of new cars is tainting the air in Chinese cities. Beijing alone violated the World Health Organization's standards more than 80 per cent of the time during the last quarter of 2008.[2]

Worldwide, road traffic air pollution has a major impact on air quality and human health. The European Environment Agency (*EEA*) identified in its 2008 report Transport at a Crossroads, that growing transportation

needs are undermining efforts to solve many pressing environmental problems; in Europe, transport sector greenhouse gas emissions increased by 28 per cent during 1990-2006.

Scientists tell us that the world needs to cut greenhouse gas emissions in half by mid-century to avoid the worst effects of air pollution and climate change. M2M is a crucial enabling technology in the cleaning up of the world's environment and the greening up of its transportation and energy systems.

An M2M primer

Cellular M2M technology uses wireless modules, mostly GSM-based, to connect machines to each other and to central servers to improve a company's operations, productivity and efficiency through optimized business processes. M2M is used for smart meters and smart grids, mHealth medical solutions, automotive and fleet management applications, alarm and security systems, tracking and tracing devices and a lot more. Enterprises implement M2M because the technology can transform business processes, improve productivity and cost efficiency and sharpen their competitive edge. Governments implement to increase revenue, cut costs or to achieve energy conservation targets.

Pollution, traffic and M2M

The average driver in the United States contributes some 11,500 pounds (over five metric tons) of climate changing emissions each year according to LiveNeutral3. The impact of heavy-duty vehicles is even greater, underscoring the need for effective solutions to reduce emissions. And the US Environmental Protection Agency and the Intergovernmental Panel on Climate Change estimate that every gallon of gas a vehicle burns puts 19.4 pounds of carbon dioxide into the air.4 Increasing fuel efficiency by just 5mpg would eliminate approximately 17 tons of carbon dioxide from the earth's atmosphere each year!

M2M-powered fleet management solutions track vehicles in the field, increase business productivity and efficiency and manage vehicle maintenance to reduce the need for major repairs. These solutions also offer powerful tools to save fuel and cut emissions. By enabling real-time communication between the vehicle and dispatcher, vehicle routes are optimized and job assignments reassigned in real time to save miles and fuel. M2M technology shortens distances travelled and saves manpower.

Many M2M fleet management solutions include emissions-monitoring tools that schedule preventive maintenance to keep vehicles working at peak performance and help reduce emissions. Fleet management solutions can issue alerts when a vehicle exceeds pre-determined limits for idle time or speed, prompting drivers to respond in real time; managing speed and idle time reduces carbon emissions. M2M solutions help devise the best routes for truck deliveries to avoid unnecessary idling and to cut down on left-hand turns. According to UPS, one of the world's largest delivery and distribution services, between 2004 and 2008 this simple technique shaved nearly 30 million miles off delivery routes, saved three million gallons of gas and reduced emissions by 32,000 metric tons of CO2 - the equivalent of removing 5,300 passenger cars from the road for an entire year!5

Electric vehicles offer another way to reduce the pollution caused by traffic. Car manufacturers are responding to consumer demand by introducing designs of sporty new electric cars. Still, to be truly green, electric vehicles need to be charged at environmentally friendly, green-powered, charging stations that tap into smart grids. M2M technology is crucial to support an unmanned electric vehicle charging infrastructure. The always-on M2M communications connect individual charging stations to the station's control centre, the utility company and to the smart grid. All the charging tasks such as user authentication, start and stop commands, determining user-defined charging session length, charging speed/rate, transmission of usage data and credit card payment procedures can be remotely managed with cellular M2M communications. Charging stations users can choose the energy source (sustainable vs. traditional). The station can also provide energy-holding tanks for use during peak consumption hours.

Energy efficiency and M2M

M2M technology - smart meters, smart grids and remote monitoring solutions - are widely used around the world to control and manage energy distribution and improve consumption efficiency. Smart meters and smart grids deliver electricity from suppliers to consumers using two-way digital and cellular technology to control appliances (or anything that consumes energy) in homes, businesses and at industrial sites. Smart M2M technology helps to conserve energy, reduce costs and increase reliability and transparency in the energy supply chain. It also tracks all electricity flowing into the system and incorporates a wide variety of sustainable energy sources. Smart grids allow utilities to track consumption trends and optimise their energy generation. The goal is to minimise traditional fuels usage and maximise the use of renewable energy sources.

Smart grid technology can shift demand to match supply or even power-down or switch off non-critical consumption during peak hours to reduce energy consumption.

The power industry also uses cellular M2M technology to monitor risky environmental operations and behaviours on the grid. M2M remote monitoring lets utility and gas companies manage equipment in the field and detect oil and gas pipeline problems before costly and dangerous leaks occur. M2M can also manage fields of solar panels and wind turbines and respond in real time to output changes due to changing weather, equipment failure or cleaning or maintenance issues. This helps maximize energy production and further reduces the need for carbon burning energy sources. With M2M communications, energy distribution networks can be better managed so brown and black outs can be more easily avoided.

The bottom line

M2M technology offers a powerful tool to improve business operations and quality of life. Enterprises and governments the world over are turning to these specialty wireless solutions to improve operations, boost productivity and efficiency and, ultimately, to generate greater profitability and peace of mind. The consequences are remarkable - reduced carbon output, improved air quality, more efficient energy system, the ability to integrate alternative energy resources into the supply chain, environmentally responsible corporate and global citizenship; and long-lived electronics that foster a greener future instead of overloading landfills. Whether put to use to manage fleets, alternative vehicle fuelling or fields of windmills, M2M technology is driving positive growth and the move toward a healthier planet. ●

[1] ABI Research, October 2010, http://www.abiresearch.com/press/3528Cellular+M2M+Connections+Will+Show+Steady+Growth+to+Top+297+Million+in+2015
[2] New York Times, July 2010, http://www.nytimes.com/2010/07/29/world/asia/29china.html
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