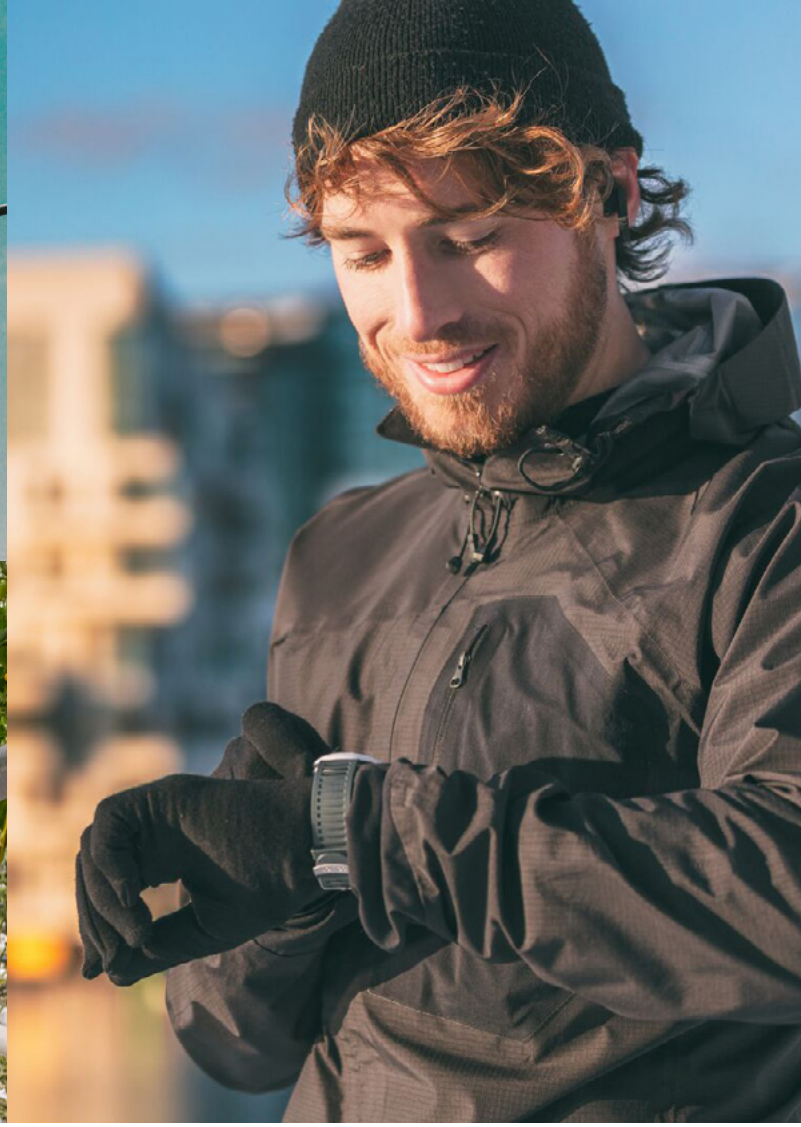
WHITE PAPER

IoT and Sustainability

There are countless ways IoT is contributing to sustainability goals. Across every industry and vertical, from manufacturing to supply chains and transportation, IoT is being used in innovative ways to capture new efficiencies, generate savings, and create a more sustainable world. Read on to learn more.

telenor IoT



IoT and Sustainability

IoT is one of a group of technologies that are enabling new positive impacts on sustainability. Alongside artificial intelligence (AI), cloud and edge computing and advances in data processing and analytics, IoT is enabling sensors to communicate to help optimize processes, operations, and consumption of materials.

By enabling organizations to align production with demand, waste is minimized and energy usage can be more tightly controlled. Using IoT and machines, lighting systems can be shutdown when not required.

Enterprises are turning to IoT solutions to reduce their impact on the environment as well as in adding new capabilities to existing, less sustainable processes. There are many good examples of this. Over the coming pages we explore some of these.

The internet of things in agriculture for sustainable rural development

An IoT-enabled agritech system can reduce over-use of fertilizer or pave the way for greener farming, for instance, while adding smart building capabilities to existing building management systems can identify when rooms are unoccupied and turn off lighting or adjust heating/cooling systems.

Sustainability and the incremental gains of IoT

IoT alone won't save the planet from global warming, but it is increasingly part of a system of incremental gains which together add up to significantly improved sustainability across industries. It can be used to ensure a delivery van leaves the depot full, that it travels the most efficient route to deliver all the parcels, that the driver is advised on techniques to minimize fuel consumption and predictive maintenance programs are followed to minimize CO2 emissions.

It is also helping factories to opreate using less energy and IoT-enabled production systems are making the whole supply chain more efficient. The use of robotics can further contribute to this efficiency by driving down costs, lowering waste, improving quality etc.

At the same time, IoT is enabling greater connectivity in cities, buildings, and homes. Power consumption is being reduced and alternative sources of energy, such as wind and solar, are being effectively managed thanks to IoT connectivity. This connection is fundamental to the future because being able to collect and process data from sensors, networked objects and systems and then to analyse it is the foundation of a sustainable, efficient and waste-free way of living.

Telenor IoT is not the inventor of sustainable applications in IoT. Our role is to support our customers' innovations by enabling them with the most appropriate connectivity for their services and devices wherever they are in the world. Sustainability is about achieving incremental gains continuously across multiple dimensions. When these gains compound together, they add up to a substantial impact. Our connectivity performs an important part in enabling sustainability and our experience across the five sectors listed below is helping customers develop innovations for a cleaner, better future.

Automotive

You might not normally consider a vehicle manufacturer to be an organization that is at the forefront of promoting sustainability but IoT-enabled capabilities are enabling auto makers to radically improve vehicle efficiency and reduce the impact of their products on the environment. Everyone from electric car makers to ride sharing providers are looking to maximize the distance they can cover while minimizing their consumption and pollution. IoT is playing its part, enabling vehicle makers to analyse usage data and to deploy systems to make vehicles shareable, more efficient and improve driver behaviour.

Swedish motorcycle manufacturer RGNT is disrupting the transportation industry by manufacturing electric motorcycles, connected by IoT, that emit no CO2 and offer a quieter means of transportation than combustion engines.

Astrata is a software company with strong foundations in supply chain optimization, geolocation, telematics and fleet management systems. With operations spanning six continents, Astrata enables the world's light commercial vehicle (LCV) fleets with systems to enhance driver behavior and maximize efficiency, utilizing connectivity from Telenor IoT to drive performance enhancements.

In the heavy trucks market, the stakes are even higher because of the greater fuel consumption of truck fleets and the higher mileages these vehicles travel each year. The central challenge for this industry is that trucks are meant to be on the road earning money. But how can you optimize utilization, minimize downtime and at the same time save costs and cut emissions?

The answer is in the real-time data that trucks provide which encompasses real-time access to data on fuel consumption, vehicle diagnostics and positioning. While these help in daily operations, they can also be used to lower fuel consumption and increase vehicle uptime, thereby maximizing truck utilization. Telenor IoT has been working with Scania Trucks to enable new solutions that increase productivity, performance, and profits, while at the same time reducing emissions.

Access to the right information on vehicle and driver behaviour combined with suitable driver coaching, provides fleet owners with the capacity to reduce fuel consumption by as much as 10 percent which, considering trucks are on the road more than 200,000 km each year, has a great impact on the bottom line and emissions.

Transport and Logistics

There are obvious and easy wins to be made in transport and logistics by applying IoT solutions to this energy intensive and high emissions sector. Utilizing connected vehicles to optimize driving habits and fuel consumption is one such example. Next, routing efficiently to reduce unnecessary mileage, also limits emissions and cuts vehicle wear and tear thereby extending vehicle life. However, these applications focus largely on vehicle performance. There are also further sustainability wins to consider.

Ensuring the secure delivery of sensitive cargo such as pharmaceuticals, for example, often relies on uninterrupted cold chains and high levels of security. If either is breached this can lead to wastage because the product cannot be used safely. Therefore, utilizing IoT to accurately track conditions leads to automated assurance that goods are transported in the desired manner. Further applications include logging shocks or impacts which can be important to protect shipments of electronics.

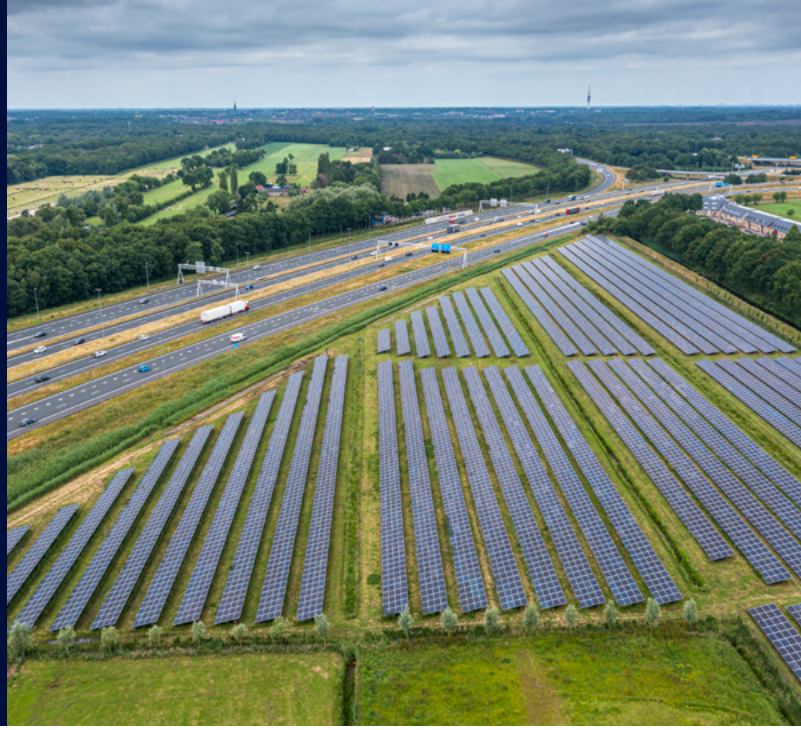
An example of this is how Telenor IoT and M2Cloud connected the supply chain of South Korea's leading pharmaceutical distributor to ensure vaccines and medicines arrive safely to health workers.

Another example is the Visilion asset tracking and supply chain visibility solution, created by Sony Network Communications Europe and connected by Telenor IoT. The LTE-M based platform enables two different solutions – outdoor tracking for the logistics sector and indoor tracking for the healthcare sector.

Visilion's outdoor tracking solution operates mainly in transport and logistics, and its indoor solution is tracking equipment in the healthcare sector.

Visilion has enabled logistics customers to get control over their supply chain and keep deliveries of high-value or critical goods flowing smoothly. Efficiency has improved and customer costs have been reduced by optimising transit times, inventory, and delivery ETAs (estimated time of arrivals). The other benefits include greater control of theft and loss with alerts for route deviation, geo-fencing and detecting shock anomalies.

Smart Cities



The cities in which we live place enormous pressure on our planet with power and water consumption presenting environmental challenges alongside heating, cooling and pollution. By thinking of smart city services in new ways, authorities are using IoT data to drive new initiatives to improve sustainability, lower energy usage, reduce waste and operate more efficiently. The goal of smart cities are measured holistically in the form of indicators such as improved quality of life but in reality, advances are achieved by enhancements made across the entire cityscape.

ENERGY SAVING IOT

Integrated transport that runs at optimum utilization fits alongside efficient approaches to heating and cooling of public spaces, effective traffic management and optimized streetlighting as just some of the ingredients that make up a smart city.

IOT ENERGY EFFICIENCY & SUSTAINABILITY

New approaches to traditional city management activities are being adopted across the world. One example of a company working to transform the traditional service model is the pest control company Anticimex.

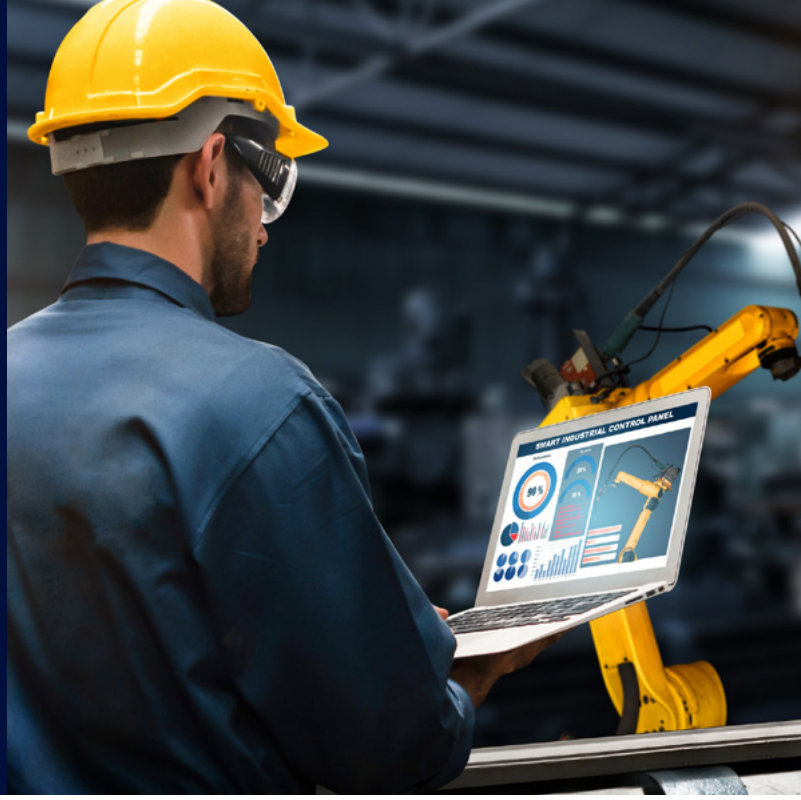
Until recently, pest control has traditionally relied on traps filled with toxins to exterminate pests. Anticimex set out to work with Telenor IoT to change the approach of relying on the placement of multiple traps that require continuous manual checking. They developed an intelligent system of connected traps that has enabled Anticimex to changed the way they work, resulting in both greater business value created and end user benefits. Importantly, the substantial decrease in use of toxins is both safer and kinder to the environmental.

Similarly, the Danish pump manufacturer Grundfos has a vision to connect all of its pumps and offer water-as-a-service, thereby reducing energy consumption and waste whilst gaining deeper insights into operational performance.

Through a highly collaborative partnership with Telenor IoT, Grundfos is leveraging IoT technology as an enabler to help improve water management and reduce energy consumption, as well as other optimizations.

The other functions of a city are also becoming smart thanks to connectivity. Smart transport, smart grid and smart buildings are all aiding greener living by enabling greater efficiencies, lower energy consumption and increased utilization of services.

Industrial Manufacturing



Industrial manufacturing is energy intensive, often involves costly manual processes and is subject to significant efficiency losses caused by machine downtime. The traditional production line is inflexible and once in operation typically continues to run, sometimes leading to over-production and wastage. IoT-enabled smart factories can be reconfigured and are easily adaptable to make products as required.

This saves energy consumption and reduces wastage while contributing to overall business efficiency. Added to this, systems to monitor machines ensure they operate optimally, and predictive maintenance can be enabled to prevent breakdowns and unplanned maintenance which brings the whole production environment to a halt.

This new manufacturing arena tightly ties materials, machines, production and the first step of distribution together, streamlining the organizational flow and creating efficiencies at each step. IoT can't stop a plastics factory creating emissions, but it can assure optimized operations of machines and minimized wastage.

For example, water scarcity and water quality are among the top environmental issues of the 21st century. Conserving resources requires rethinking the problem and utilizing innovative solutions.

Xylem recently introduced Avensor, a digital water monitoring and control system, connected by Telenor IoT, that enables operators to remotely monitor pump stations and related assets, thereby helping users to conserve resources while lowering costs and environmental impact.

Utilities Industries

Companies in the utilities industries play a dual role in fostering sustainability. On one side they're central to the move to renewable energy, enabling solar and wind generation and reconciling domestic or building-based generation with consumption from the grid. IoT plays a fundamental role here in transmitting information that enables the grid to know whether to generate electricity or to cease production at fossil fuel or biomass power stations.

On the other side, utilities providers have a role in helping customers optimize their power consumption and to enable new use cases such as electric vehicle charging. The demands of this type of intensive service need to be handled carefully to ensure the grid is stable enough to reliably meet the needs of EV charging. By doing so, users will trust the EV experience and migrate away from fossil fuel-powered vehicles.

Therefore, utilities providers face a dual challenge that requires them to position themselves optimally as the providers of future services and of improving their traditional capabilities. A good example of this has been the selection of Sanxing as prime contractor for delivery of meters, the head-end system, communications and system integration at a large Scandinavian energy supplier. Sanxing is a provider of intelligent power distribution and utilization systems that include smart meters, transformers, electric vehicle chargers and other power equipment solutions. Telenor IoT is providing communication services that connect smart meters to the central application.

The new solution developed by Sanxing and Telenor IoT allows for more frequent meter readings at a rate of once per minute compared to once per day in the legacy solution. It also has the bandwidth to allow for transport of much more data. In order to better balance energy production with demand and to analyse and optimize the grid, latency has been reduced to milliseconds. The new solution is also able to facilitate software updates in order to enable introduction of new functionalities and services in the future. Another benefit of smart meters is that they also provide consumers with more detailed information about their energy consumption, thereby enabling possibilities for more flexible energy use and lower costs.

The Sustainable Future

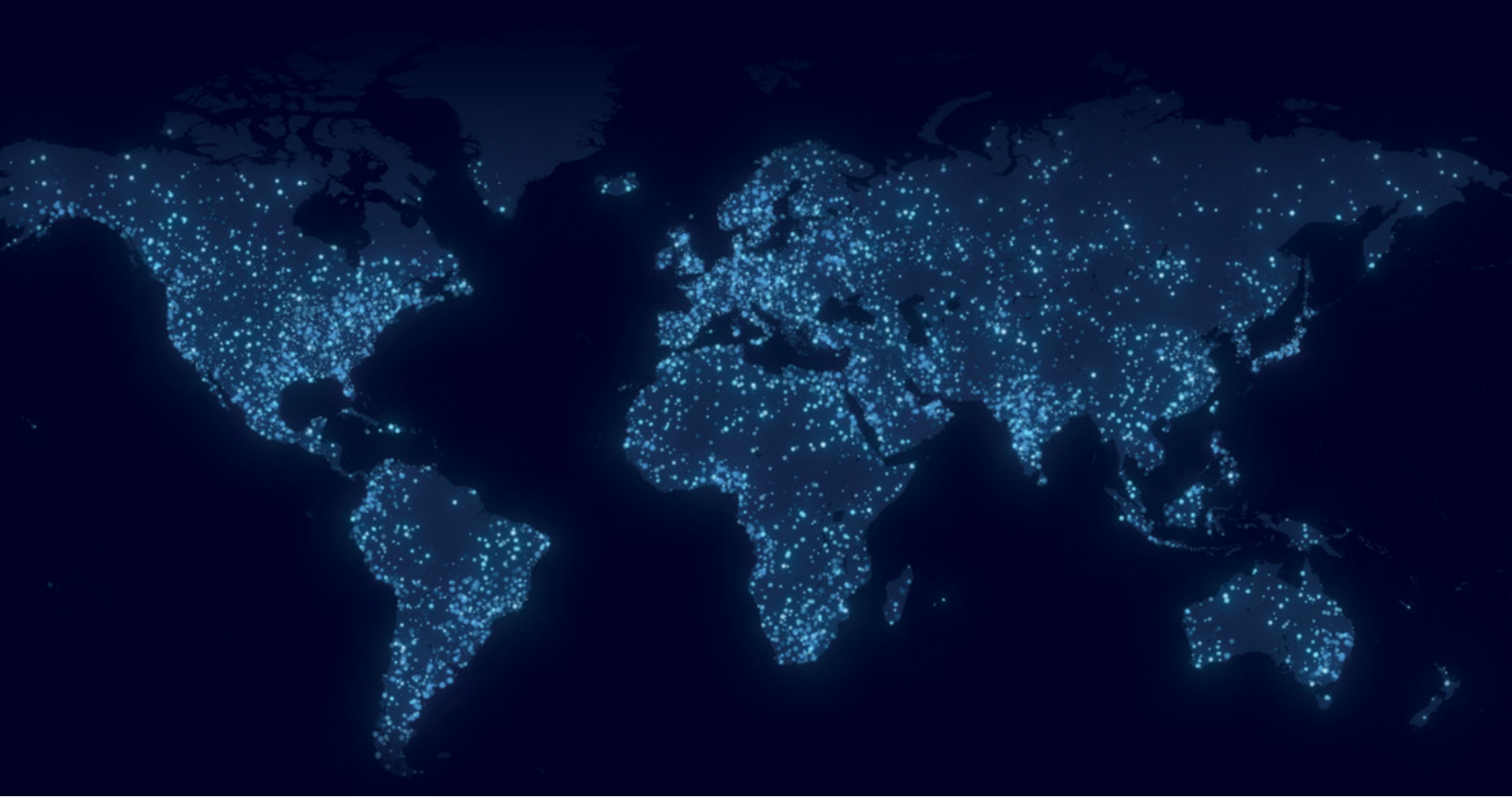
IoT initially had been seen as a way to drive organizational efficiency and help sell more products and services to customers. However, it is increasingly identified as an enabler of sustainability alongside these goals. Advancement in adjacent technologies such as data processing, edge computing, AI, sensors and wireless networking have made IoT capabilities available to a wider audience and this is encouraging responsible adoption of IoT.

Compelling new applications, many of which contribute to sustainability are emerging constantly from all market sectors as specialists bring their sector expertise to IoT and uncover new efficiencies, savings and innovations. This is driving energy-efficient practices and new organizational processes the reduce waste and increase utilization – one step at a time. When each of these incremental advantages is added together, it is clear that IoT is contributing multiple different sustainability gains and there are further advances to be made in future. We are proud of our role in helping customers optimize sustainability by enabling them to innovate and create new IoT services, products and applications.

RESPONSIBLE BUSINESS IN TELENOR

We have put responsible business as one of three key strategic pillars for the company – ingraining it within everything we do. We realize that global challenges cannot be addressed alone. As a global company, we are part of a larger effort guided by the UN's Sustainable Development Goals (SDGs) and delivered through our partnerships.

Read more about Telenor's responsible approach to business.



telenor IoT

TELENOR CONNEXION

Telenor IoT is the portfolio of IoT solutions from Telenor Group, one of the world's major mobile operators. With more than 20 years' experience of providing global IoT connectivity, cloud services and expert support to companies of all sizes, Telenor is one of the world's most advanced IoT solution providers.Telenor IoT manages international IoT deployments for global customers in some 200 countries and today operates more than 17 million connected devices to enterprises such as Volvo, Scania, Hitachi, Verisure Securitas Direct and Husqvarna. The IoT solutions are offered to national customers in the Nordics through the local Telenor operations in each country, and on a global level through Telenor Connexion, Telenor's specialized unit that provides IoT solutions for large, international enterprises who need a customized offer with advanced support.

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