etn Geir Langeland
Nordic Semiconductor

IoT CAN HELP CREATE A MORE SUSTAINABLE FUTURE

Sustainable manufacturing is essential to preserving the finite natural resources of the planet. While the term has become somethings of a mantra in recent years, it's now also forming a central pillar of business and economic activity.

The IoT will form a key platform for many sustainable initiatives. And although its implementation will have a significant upfront energy cost, the long term savings will quickly compensate for this. A Transforma Insights and 6GWorld report, Sustainability in New and Emerging Technologies In 2030, found that IoT technology will not only generate enough savings to pay back the energy cost of its manufacture and deployment, but will also

then save around eight times the energy it consumes.

The benefits of the data it gathers will also more than justify the IoT's environmental footprint. When combined effectively with, for example, Machine Learning (ML) applications, the IoT will gather large amounts of information to help people and organizations better understand their energy costs and make informed environmental

decisions, or even automate these decisions using technology such as smart energy distribution.

Managing e-waste

The heart of the IoT is its digital network. This relies on electronics that, since the 1980s, has expanded more rapidly than most other industries, and this rate of growth is showing no signs of slowing down. According to analyst Fortune Business Insights, the silicon chip sector alone will expand from $527 billion in 2021 to $1.3 trillion in 2029.

This rapid growth is making the management of electronic waste ("e-waste") one of the most important environmental issues. Things are moving in the right direction though and, according to the UN, 20 percent of e-waste is successfully recycled today. The UN has also announced a plan to substantially reduce any waste occurring in the first place through reduction, repair, and recycling.

Developing sustainable solutions

Nordic Semiconductor is helping developers do their bit to create IoT solutions that cut down on the use of finite resources. For

example, the Smarter Sustainable World Challenge with Nordic Semiconductor competition—launched in conjunction with hardware education community hackster.io (an Avnet company)—encouraged participants to plan, design and prototype cutting-edge solutions to reduce humanity's ecological footprint using sensors and wireless connectivity. Participants were provided with the Nordic Thingy:53 multiprotocol prototyping platform to help them fulfil their innovative ideas.

The overall winner, Elijah Maluleke from South Africa, created a smart water tap leakage controller that automatically closes a valve whenever there is an abnormal flow of water through the water tap. The volume of water saved by using this device, when multiplied by millions of water sources, would have a huge impact. Another entrant, Mateusz Pająk from Poland, used the IoT technology to create a vertical soilless farm built to fight the food storage crisis and achieve maximum yield.

Monitoring key resources

Nordic's customers are also developing innovative commercial solutions to help other businesses and communities work

towards a greener future. One example is China-based MOKO Smart's MK117NB Smart Plug, a Nordic-powered Bluetooth LE/cellular IoT electricity plug that can be used to monitor energy usage and reduce power consumption by remotely controlling load switches.

Another example is Canadian technology firm AquaSensing's Leak Sensor 1.0, a battery free, self-powered leak detection device that uses a sensor as both its power source and for detecting water leaks.

The solution harvests energy from this fluid to power the Nordic nRF52832 SoC that wirelessly connects to a smartphone, where the user can receive alerts of any leaks.

Building sustainable solutions...

Nordic's customers can take advantage of the company's flexible IoT solutions by customizing the balance between the product's duty cycle, throughput, and battery life to suit the needs of the application. In doing so they can lower the energy consumption of their end-products.

This is especially beneficial for the planet as Nordic Semiconductors products are used in millions of IoT applications ranging from energy, travel, transport, agriculture, manufacturing, waste handling, smart cities, and more.

Nordic also builds its products to last for many years, while making sure new iterations are backwards compatible with previous generations of its products. Software can be continuously upgraded to include new features through over-the-air software updates.

These updates make it easy for customers to enhance the performance and lower the energy consumption of products in the field without the need to replace hardware.

...and eliminating batteries

Network equipment provider Cisco suggests that in as little as a decade, there could be more than 50 billion wireless and cellular IoT sensors. Many of these will be powered by batteries. Aside from being difficult to replace every time they run out, there is the environmental impact of mining materials such as lithium for battery manufacture, as well as transporting and eventually disposing of the cells.

Nordic has continually lowered the power consumption of its wireless solutions without compromising performance. It's latest nRF54H Series SoC has proven its world-leading processing efficiency, along with superior processing performance, enabling innovative IoT end-products previously deemed impossible. The modest power consumption of its latest generation of products means that, in certain applications, energy from harvested sources alone can power the product.

Tomorrow's wireless solutions will be even more efficient, dramatically extending the range of applications that will be able to harvest all their energy from the environment. And a new generation of power management ICs (PMICs), customized for energy harvesting devices, will stabilize the variability of harvested-energy sources and play a significant part in freeing IoT products from batteries.

The future of sustainability

Together with clever engineers and environmentally aware consumers, Nordic's IoT solutions can ensure sustainability becomes a part of everything we design, manufacture, use and eventually sensitively discard. If we embrace wireless technology and all do our part to reduce energy consumption and waste, the future for the planet will be much brighter. ∎