
Industry 4.0 brings Environment, People and Profits on an equal footing

Eric CARIOU, CEO & Co-Founder of UWINLOC SAS

September 1st, 2021

An excellent article by Alina Gross “How Industry 4.0 Helps Firms Address - The Triple Bottom Line / Forbes” [1] stressed in Aug 21, how critical it is for today’s organisations to support all dimensions of the Triple Bottom Line: Profits, People and Environment.

In a world with increasing population and limited resources, Industry 4.0 transformation is becoming rapidly vital. This transformation is about gaining in operational efficiency & agility but for the first time considering on an equal footing workers conditions and environmental impact by reducing wastage & energy.

Industry 4.0, enabled by smart traceability, localisation and sensing solutions, AI, robotics, and others, leads to efficiency and effectiveness gains through new ways of producing goods and optimising the supply chain but it will never happen if that translates into billions of additional batteries thrown into dumps around the world and draw further stress on additional mineral and chemical resources.

Energyization of IoT but more generally low power electronics found in every part of our daily life has become a major societal challenge. Indeed, with the progress of semi-conductors and as shown by UWINLOC, technology is now sufficiently mature to enable a major societal shift in coming years by eliminating the need of batteries in billions of low power electronics products such as IoT, wearable electronics, home sensors, remote controls, etc by using existing energy sources readily available in our environment from radio to light. While light has shown limitations for indoor usage, radio 3D propagation and pervasive use in multiple bands

use for 3G, 4G, 5G or Wi-Fi for our day-to-day life makes this energy the only type of energy exploitable in both enterprises and consumer settings at scale.

UWINLOC has been the first company worldwide to offer a scalable track & locate solution, meeting Industry 4.0 requirements, for a simple reason: Tags developed & used do not require any batteries. To achieve this breakthrough UWINLOC invested over 10M€ in the development of two state-of-the-art integrated circuits combining radio energy harvesting and ultra-low power electronics.

Thanks to this bedrock established by UWINLOC, the door is now open to multiple applications in low power devices as wearables, remote controls, consumer electronics...

The Future is “Green” with Battery Free ‘Fit and Forget’ Asset Tags

Tags with batteries contain hazardous waste substances such as mercury, lead and cadmium. If they are disposed in a landfill site, they could leak into the surrounding environment. The EU Landfill Directive placed a ban on the disposal of such hazardous waste in landfill sites. Hazardous waste such as batteries is NOT allowed to be mixed up with other waste streams. It must be separated, stored safely, and collected for treatment before being disposed. Strict statutory targets for the recycling of batteries exists. The EU Batteries Directive is to minimise the negative impact of batteries and accumulators on the environment, thus contributing to the protection, preservation, and improvement of the quality of the environment.

In addition, beyond the environmental impact, Battery-powered tags require programmed maintenance tasks for the users, going against the efficiency and productivity gains originally desired.

Onerous Do's and Don'ts

Do's - Batteries should be removed from the body of the tag. If the batteries are physically damaged, they need to be stored in an insulated plastic bag to avoid short-circuiting. Ideally, they should be kept in a cool and dry place to avoid combustion. Ultimately, they need to be physically taken to a certified recycling provider who can safely deal with the hazardous materials they contain.

Don'ts - Desposing of used batteries into your corporate recycling bin is a big NO unless its specifically allocated to battery disposal. Damaging batteries by squashing them down can result in leakage and/or short-circuiting. Storing quantities of lithium-ion batteries close together without proper precautions in a warehouse for example can lead to fire situations. It's important not to store old batteries close to flammable materials. The only safe way to recycle li-ion batteries is to have them processed by an authorised and correctly qualified electronic recycling facility. That means looking up your nearest centre and dropping off any old tags or tag batteries if exchangeable or getting them collected by a reputable service.

In an ideal world, batteries should be accepted for correct recycling free of charge in small quantities, but larger commercial volumes may well attract a charge. The hassle of collection removal, and if appropriate battery replacement, should not be underestimated and carries a cost as well as a carbon footprint.

In addition, some battery-tag providers do not allow end-users to simply replace the batteries on the spot, but rather force the users to send the tags back to the supplier, which consumes time and energy. A typical cost of around \$50 to get the battery replaced is not unusual. Needless to say, such an approach is economically not viable nor scalable beyond a few tens of tags and cannot be deployed for most use cases encountered.

From a “Green” environmental sustainability viewpoint there are other considerations

If we look at a ten-year scenario where 10,000 battery driven tags have been sold into an organisation with an assumption that these will die over a three-to-four-year period, then that means that 10,000 tags or tag batteries must be exchanged, optimistically up to three times. So, over a ten-year period that could result in 30,000 tags or tag batteries requiring legal disposal.

Not only does this have a cost implication, unit replacement costs, time, and effort to remove replace batteries or complete tags but other considerations are at play.

The physical delivery and deposit of tags attracts transport costs and naturally creates a carbon footprint. Most tags are sourced from the Far East, so that means a flight or ship journey. Tags have a shelf life and so fresh stock is always a requirement, therefore it is safe to assume that in our 30,000-tag scenario over ten years that would incur three separate shipments, as well as local delivery and ultimate collections all times three. Clearly however, in our scenario this is not going to destroy the planet. The issue is that the more assets that become tagged with battery driven technology to meet the requirements of the consumer, as predicted and driven by the IOT explosion, we start to see a picture where billions of tags are in service. Then that becomes a much bigger picture.

In 2018, 191,000 tonnes of portable batteries were sold in the EU; 88,000 tonnes of used portable batteries were collected as waste to be recycled. Only 48% of portable batteries sold in the EU were collected for recycling. Some countries are doing better than others with Canada reported as only achieving 5% in 2021.

The battery recycling market size is forecasted to be worth USD 24.57 Bn growing at 5.3% CAGR Till 2027; By 2030, the revenue opportunity in reusing and recycling lithium-ion batteries is expected to stand at around eight billion U.S. dollars in China alone. The market for recycled batteries is gradually growing as demand for ethical consumer electronics has emerged in countries such as the UK and Germany. As the world demand for lithium-ion batteries continues to soar, the mining industry will

need to ramp up production of lithium. Recycling capabilities of lithium-ion batteries will also need to significantly increase by 2030 in order to cope.

As the recycling opportunity from a business perspective gains momentum it is anticipated that solution providers will undoubtedly be expected to address this and will be held accountable with stronger legislation evolving as more devices are battery enabled. Legislation certainly will apply to all battery types from car batteries, mobile phones, and general asset type tag batteries.

Green is for GO with ‘battery free’ tags.

Advances in technology by innovative companies like UWINLOC, now mean that the same transmit/read distances and location accuracy are comparable with battery driven ‘Active Tags’. By default, the tags are cheaper as they do not contain a battery. The TCO is also far lower since the labour-intensive replacement or associated maintenance cycles of tag battery replacement is removed. So back to the ‘Green Theme’ the overall effect on the planet regarding reducing the carbon footprint is reduced by using battery free products. Addressing the issue now could just make a difference. Why would you invest in costly battery driven asset tag technology, when a cheaper ‘Green’ alternative with like-for-like performance is available?

Eric CARIOU,

UWINLOC CEO & Co-Founder

+33 7 61 67 60 28

eric.cariou@uwinloc.com

www.uwinloc.com



References

- [1] Forbes. *How Industry 4.0 Helps Firms Address The Triple Bottom Line*. URL: <https://www.forbes.com/sites/sap/2021/07/06/how-industry-40-helps-firms-address-the-triple-bottom-line/>.
- [2] ABI Research. *Environmentally Sustainable 5G Deployment*. URL: https://go.abiresearch.com/lp-environmentally-sustainable-5g-deployment?utm_source=sprocket-menu.
- [3] Emergen Research / Stat Sources. *Industry Revenue, Statistics, Forecast*.

[3] [2]