Case studies: Sustainable solutions for transforming the smartphones and ICT sector

# Powering green ICT and smartphones

Although ICT products and smartphones are generally getting more energy-efficient, their growing complexity and production volumes continue to push up the energy demand required to manufacture and operate them. It is estimated that the ICT industry's relative contribution could exceed 14% of global greenhouse gas emissions by 2040 if no dramatic reductions are made.[1] The footprint of smartphones alone could exceed the combined contribution of desktops, laptops and displays.

## Smarter devices – more energy demand

The majority of ICT's energy impact and smartphone products comes from manufacturing and extracting the materials they require. A small share of the impact comes from using the devices, but when it comes to smartphones and other devices connected to the internet, the impact is increasingly shifting towards data transmission. Increased data transmission speeds require continuous updates of the physical network infrastructure, which again requires more energy and natural resources. Additionally, data centres, where user data or content provider data is stored, use ever more electricity. If left unchecked, servers and data centres could represent 45% of ICT emissions by 2020.

By contrast, smartphones and ICT can also help to save energy in other sectors, for example in smart technologies that allow for real-time monitoring of energy consumption and balancing supply and demand on the grid. ICT can also help reduce travel emissions by enabling virtual meetings. Therefore, strategic action is required to keep the ICT sector's own energy demand in check whilst making sure it contributes to energy efficiency and energy reduction in other sectors.

1 Belkhir, L., & Elmeligi, A (2018): Assessing ICT global emissions footprint: Trends to 2040 & recommendations. Journal of Cleaner Production. bit.ly/2W9m8tW

## Renewable energy champions lead the way

Many of the world's leading tech companies are aware of these challenges and acting on them. For example, Google, Facebook and Apple, as part of the RE100 initiative run by The Climate Group in partnership with CDP, have set ambitious targets to power their entire operations, including data centres, with 100% renewable energy.  Google and Apple announced that they reached their goals in 2018. Whilst this is very encouraging, it does not mean that all the electricity these companies consume is necessarily renewable. These businesses are still partly

> **Apple has a 2020 goal to deploy 4 GW of renewable energy to its supply chain, which represents one third of the electricity required to make its products.**



dependent on the energy mix in local grids where they operate, which are powered partly by fossil fuels in most countries. The companies often need to offset this impact by buying renewable energy equal to their total annual electricity consumption, validated by green electricity certificates.

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Ambitious renewable energy targets are therefore not enough to ensure emissions from the ICT industry do not skyrocket before it is too late. What really matters is the actual reduction in carbon emissions and decarbonising the supply chains. This means drastically reducing energy consumption, and increasing investment in renewable energy projects where the products and components are made.

## Green energy from manufacturing to data centres

Apple has showed leadership in this regard having made a renewable energy commitment for both its own operations as well as its supply chain. The company now has a 2020 goal to deploy 4 GW of renewable energy to its supply chain, which represents one third of the electricity required to make its products. Furthermore, Apple announced in 2018 that together with its ten suppliers, it has created an investment fund in China where the majority of its products are made. The purpose of the China Clean Energy Fund is to invest in clean energy projects and connect Apple's Chinese suppliers with these renewable energy sources.

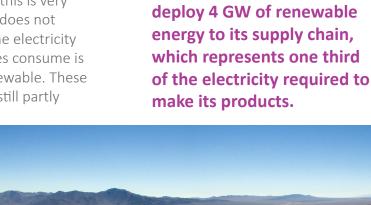Decarbonising the whole smartphone and ICT supply chain does not stop with the device and component manufacturers either. Data transmission through mobile networks also requires a lot of energy. In response to this, many telecommunication network operators have developed innovative solutions to improve their energy efficiency. For example, Nokia's AirScale Base Stations have a 60% lower energy consumption than its previous generation radio access solution. The company states that modernising a typical legacy base station site to a Single Radio Access Network (SRAN) can achieve an energy saving of up to 70%.

Energy-hungry data centres also have a massive impact on emissions. For example, a single YouTube video watched five billion times is estimated to have used 850 GWh of energy, equivalent to 360,000 tons of carbon per year. In response to this, data centres need to become zero-carbon **–** and beyond. A promising example of this comes from Falun in Sweden, where EcoDataCenter announced the launch of the world's first 'climate-positive' data centre. This new facility promises to be not only zero-carbon, but to contribute to overall reduction in carbon emissions. It aspires to achieve this with state-of-the-art energy efficiency, running its operations with 100% renewable energy and making use of excess heat in the local district heating system.

## Calling governments and consumers

Significant commitments and efforts on all fronts are therefore required to decarbonise the entire smartphone and ICT supply chains. In addition to the action businesses are taking, governments need to act on decarbonising the energy networks on which business operations depend. This means setting ambitious climate and energy policies and targets in line with climate science, and working on greening the power networks as part of this.

Consumers too have a significant role to play in this. The lifecycle energy and carbon impact of ICT devices and systems depends not only on how energy efficient they are, but also how consumers use them and whether they recycle them. But as most of the energy and carbon impact of smartphones and ICT comes from production, what matters most is designing them to last longer. This is to avoid, or at least delay, the impact of producing new products altogether.

### Find out more:

RE100

Apple

Nokia

EcoDataCentre

## Keys to success

- Business and governments set ambitious renewable energy and carbon targets

- Create partnerships and initiatives that accelerate clean energy transition in the supply chain

- Promote the use of smartphones and ICT that support long product lifetimes and energy-efficiency of other sectors.

## About Transform Together

Transform Together works with civil society, governments and businesses to advance sustainable consumption and production in high and middle income countries. Bioregional is the convenor and secretariat of the partnership.

## About Bioregional

Bioregional works with partners to create better, more sustainable places for people to live, work and do business. We call this One Planet Living®.