Telecoms net-zero enablement use case directory

How telcos can help their customers reach net-zero

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Why are we profiling telco net-zero enablement use cases?

- In order to meet the needs of a wide range of stakeholders – shareholders, customers, employees, and government – operators are increasingly focused on how to reduce their scope 1, 2 and 3 emissions
- However, as enablers of digital transformation across many industries, telcos are also exploring how they can enable customers to reduce their emissions
  - This is often referred to as “enablement”, “scope 4” or “avoided emissions”
- The enablement opportunity is particularly interesting to telcos because it could potentially offer new ways to differentiate with customers or capture entirely new revenues, thus evolving the focus of their sustainability activities from risk management to innovation
- This directory brings together a list use of cases and accompanying real-world case studies of services operators are offering or could offer to help their customers reach net-zero. Each use case includes:
  - Descriptions of what the use case is and how it can help customers shift to net-zero
  - Case studies of real-world implementations by telcos or others, including partners, SWOT analysis and monetisation strategies

**see detailed definitions of scope 1, 2, 3 and 4 emissions here*

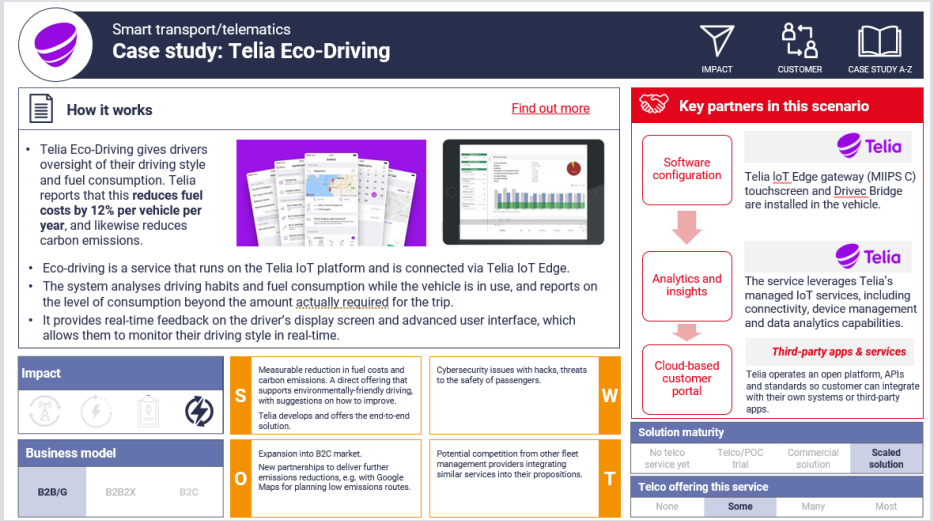
Key takeaways from our net-zero enablement use cases

- **Our analysis shows that telecoms operators are already offering services that can help customers to achieve net-zero, but at the moment their benefits are not clearly communicated.**
- **Therefore, most use cases we identified are not direct net-zero enablers.** Although they deliver sustainability benefits through reduced carbon emissions or other resource efficiencies, **the actual impact of these services is not measured or reported on to the customer**. Currently, the propositions for these services are mostly focused on cost savings for customers, rather than sustainability benefits.
- However, some new B2B and B2C services are beginning to have a more direct sustainability benefit for customers, primarily achieved by reporting on actual carbon or other resource usage. **Many of best examples of net-zero enable services are not currently from telcos, they are from hyperscalers and start-ups.**
- **Operators should therefore focus on how to evolve their services that currently do not clearly communicate or track the sustainability benefit.** To do this they must:
  - Work with third parties to credibly translate energy and cost savings from existing services into measurable carbon savings, or other environmental benefits.
  - For example, many telecoms operators offer fleet management solutions, but few have made attempts to position them as sustainable solutions, as Telia has done with its Eco-Driving service.
  - Partner with industry leaders such as Microsoft and Salesforce to help give customers greater visibility into their scope 3 emissions.
  - While standardisation on reporting for scope 3 emissions is yet to be agreed, the best way to build customer trust when developing these types of solutions is to **be transparent about reporting methodologies**.
- **Taking these actions to create more explicitly sustainable services can also enhance the business benefits for telcos.**
  - Currently, indirect net-zero enablement services are primarily monetisable through connectivity or other service revenue.
  - Telcos with a rich and credible portfolio of net-zero enablement services can also benefit from differentiated brand value or enable sales teams to articulate sustainability benefits more clearly to customers.

Top case studies of enablement solutions in B2B and B2C

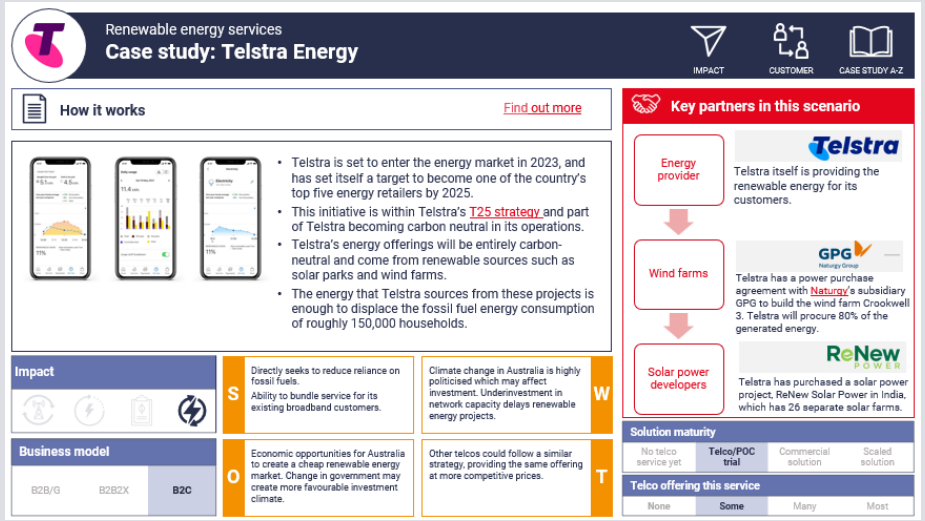
Executive Summary

Leading direct B2B enablement use case
Telia Eco-Driving



- Telia Eco-Driving gives drivers oversight of their driving style and fuel consumption. Telia reports that this reduces fuel costs by 12% per vehicle per year, and likewise reduces carbon emissions.
- The solution is clearly positioned in terms of its positive environmental impact.

Leading direct B2C enablement use case
Telstra Energy



- Telstra is set to enter the energy market in 2023 and has set itself a target to become one of the country's top five energy retailers by 2025.
- Telstra's energy offerings will be entirely carbon-neutral and will be enough to displace the fossil fuel energy consumption of roughly 150,000 households.

Telcos (and others) face challenges in building net-zero enablement capabilities

Executive Summary

- **There is increasing competition to meet customer demand for sustainable services.** Many companies – telcos and others – are seeking to adapt to increasing customer demand for products and services with proven sustainability credentials. Those that do not evolve their services to enable their customers to meet net-zero will miss the opportunity to derive any brand or service differentiation.

- **Solution providers, including telcos, are at risk of falling short of the high standards held by customers with regards to sustainability.** Customers often expect that companies are working within clearly defined regulations, with transparent and validated methodologies for measuring sustainability benefits.

  - Organisations with expertise in developing and validating sustainable reporting methodologies are in high demand, but telcos that move ahead without expert partner support risk accusations of '**greenwashing**' if their reporting lacks credibility.

- **Solution providers, including telcos, face problems with cost effectiveness and limited opportunities for revenue growth**. Despite revenue growth being cited as one of the most common business benefits for offering sustainability related services, it can still be elusive for new IoT and analytics services. For example, smart farming is an area with significant opportunities for net-zero enablement given the greenhouse gas emissions that the agriculture, forestry and other land-use industries are responsible for. However, demand for smart faming services is typically in rural areas without reliable cellular connectivity, these customers often operate on extremely thin margins, and are looking to support niche use cases, hence it may be difficult for telcos to secure the necessary ROI.

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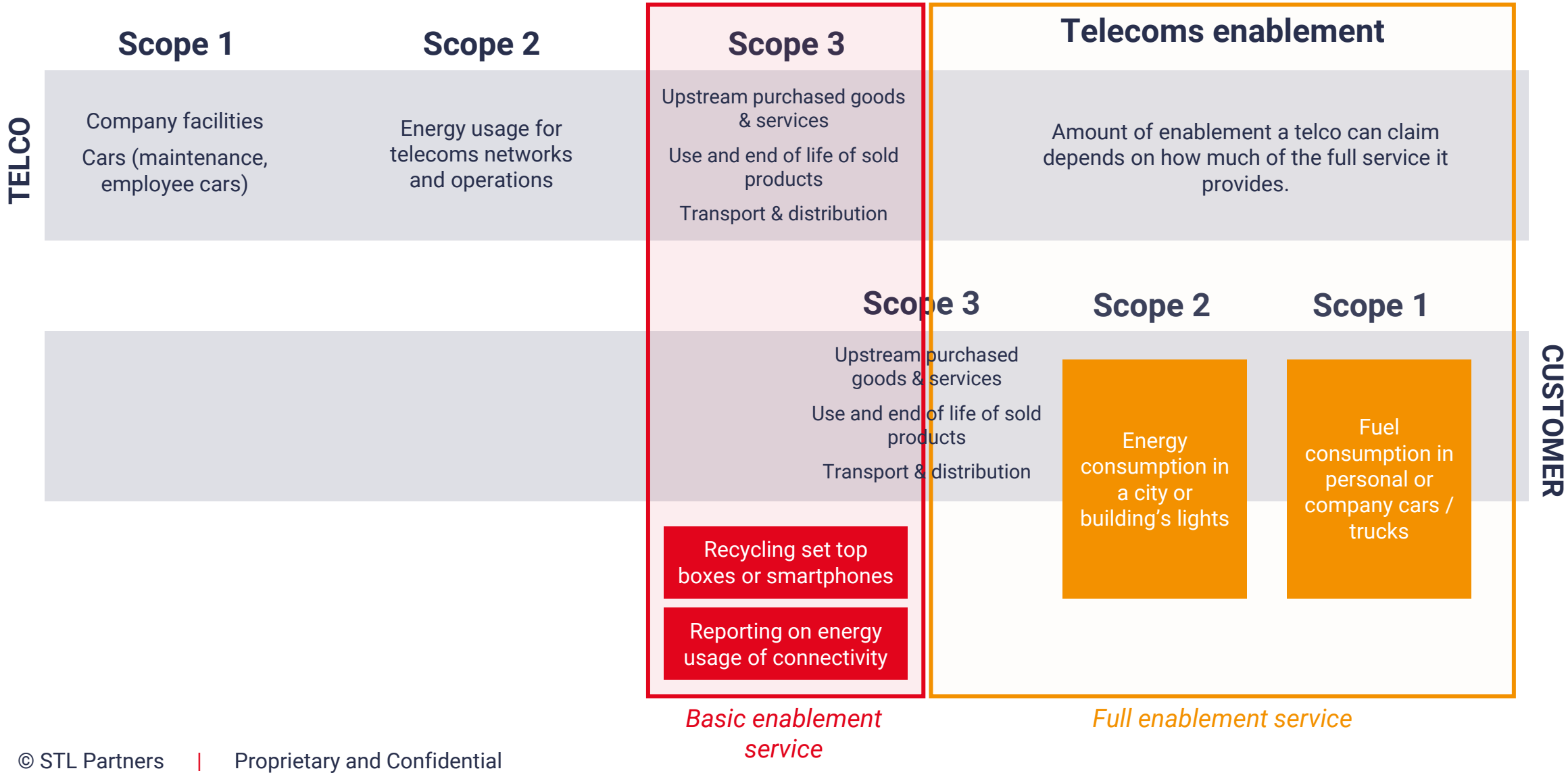
This directory includes a new methodology for establishing the sustainability impact, as well as six new use cases

- The enablement impact is still a relatively nascent concept. Therefore, there is little standardisation around which services can legitimately count as enablement, or even what enablement really means.
- In this latest version of the net-zero use case directory, STL has:
  - Established a framework for assessing what does and does not qualify as enablement
  - Identified four different levels of impact across the use cases
  - Updated the use case and case study templates to reflect the impact level and business model of each case study
  - Added six new enablement use cases

What qualifies as enablement?



Four levels of sustainability enablement services

	Basic	Indirect	Reporting	Direct
SERVICE TYPES	A core telecoms service delivered in a more sustainable way by the telco, with indirect benefits for the customer	An existing service that has sustainability benefits as a by-product for the customer (e.g. smart lighting)	A reporting service to enable customers to measure their carbon footprint associated with a specific service or operational area	A new service that is specifically developed and positioned to help customers track reduction of their carbon or other resource usage
	Upgrade to or integrated with existing service	IoT or value added service beyond connectivity	Add-on to existing service or sold separately	New service sold separately
IMPACT	Captured in the telco's scope 2 or 3 emissions Captured in customer's scope 3 emissions	Outside telco's emissions reporting Captured in customer's scope 1 or 2 emissions	Outside telco's emissions reporting Enabling customers to track emissions to identify opportunities for reductions	Outside telco's emissions reporting A quantifiable impact on the customer's emissions / resource usage

Telcos should be doing this anyway

Opportunity for differentiation on sustainability

What counts as a sustainability benefit?

A product or service can be classed as having a sustainability benefit if it can help its customers to minimise the usage of the following resources

Co2 emissions

Water usage

Waste to landfill

Fertiliser usage

November 2022 update: 6 new case studies

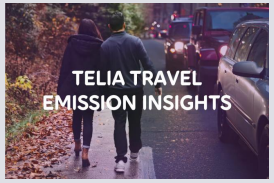
Smart transport (consumer)

Telia Smart Heating for Buses

Telia developed and fitted 2,000 buses with connected temperature sensors and control systems. This ensures that buses are not heated when sitting idle to minimise energy usage.

Telia Travel Emissions Insights

Telia launched a tool for planning changes to public transport that will help to reduce carbon emissions.



Smart agriculture

Proximus Weed and Pest Control

Proximus' solution captures images of a site and AI identifies the weed or disease pattern. A task map is then created for a robot or pesticide sprayer. It could help to reduce pesticide use by 80%.

Telecoms Scope 1-3 footprint

Bouygues Source Mobile

Bouygues has launched a mobile-only data contract that encourages users to minimise their data usage, and convert data saved into charitable contributions.

Customer retail carbon footprint

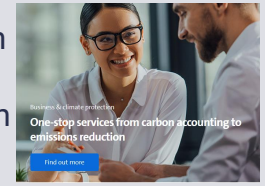
Friends with Holograms

Friends with Holograms creates AR/VR training solutions. These can help to minimise carbon emissions by encouraging remote collaboration.

Sustainable digital transformation

Swisscom Green ICT

After implementing a carbon reduction strategy in their own business, Swisscom have created a consultancy solution for other businesses to reach net zero.



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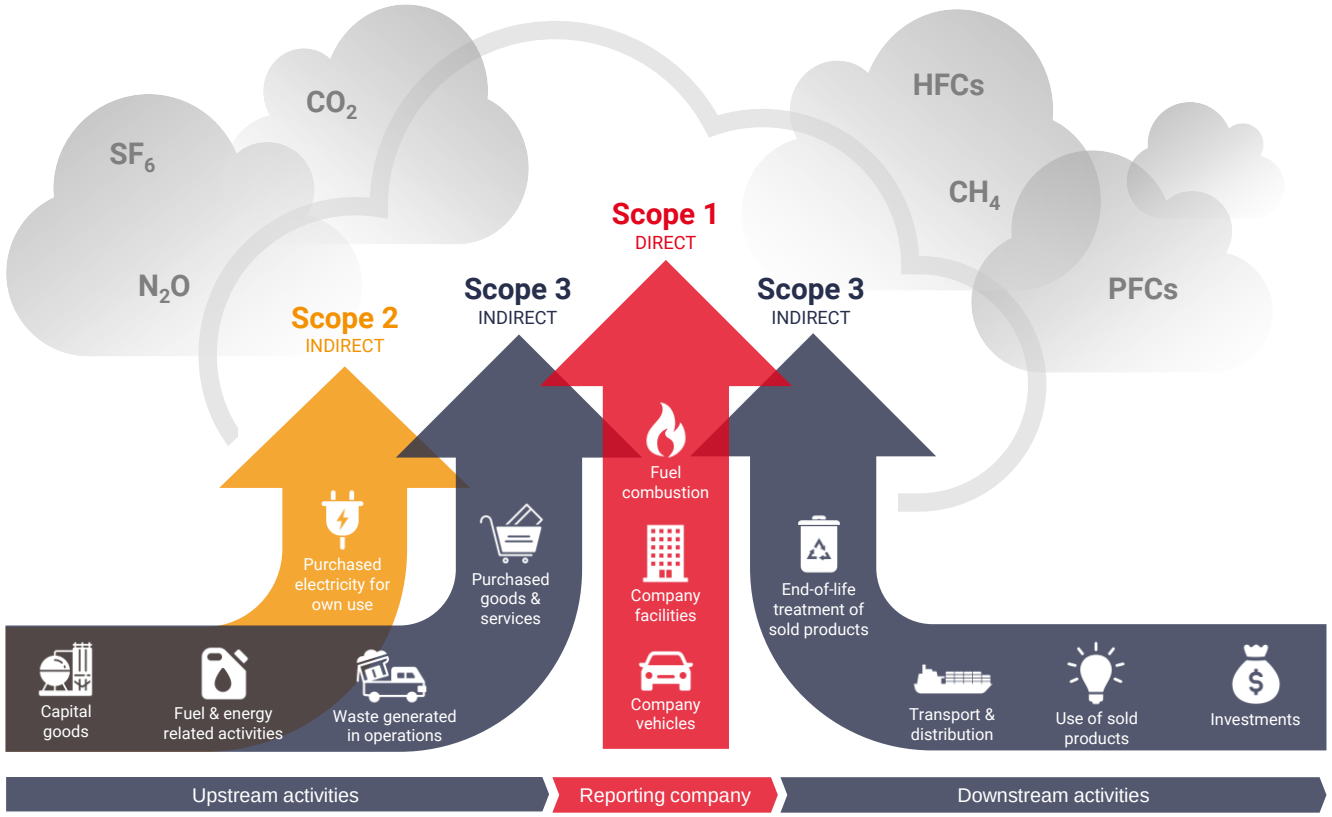
What is the telecoms net-zero enablement use case directory?

- This telecoms net-zero enablement use case directory highlights a selection of sustainability use cases that telcos could offer and associated case studies of companies (including, but not limited to, telcos) that are **enabling their customers to reach net-zero.**
- It includes the following:
  - An STL Partners **SWOT analysis** on each case study
  - **Ecosystem partners** for each use case and **key partnerships** for each case study are highlighted
  - The type of **impact** (direct or indirect) on net-zero enablement, the **telco capabilities** and **business model** of each use case, as well as the **solution maturity** of the case studies
- There are three ways of navigating the deck: alphabetically, by direct/indirect impact on net-zero enablement, or by business model.
- The case studies and use cases all follow the same templates throughout the deck.
  - Slides 11 and 12 demonstrate the layout of the use cases and cases studies, with descriptions of the slide icons.

Definitions: Scope 1, 2, 3 and 4



- For most telecoms operators, **scope 1** (e.g. emissions from the fleet of vehicles used to install equipment or perform maintenance tasks on base stations) and **scope 2** (e.g. the electricity they purchase to run their networks) makes up less than 20% of their overall footprint. These emissions can be recorded and reported on accurately and there are established methodologies for doing so.
- **Scope 3** is where 80%+ of telco carbon emissions come from. This is because it captures the impact of the organisation's whole supply chain, e.g. the carbon emissions released from manufacturing the network equipment that they deploy. It also includes the carbon emissions arising from supplying customers with products and services that a telco sells, e.g. from shipping and de-commissioning consumer handsets or servers provided to enterprise customers.
- **Scope 4** or 'avoided emissions' are carbon reductions that occur as a result of the use of a product, for example use of videoconferencing to avoid travel. It is the focus of this document.

Source: Telco roadmap to net-zero carbon emissions: Why, when and how

Use case template

Generic example of service telecoms operators could / do offer with sustainability benefits

Hyperlinked navigation tool

USE CASE A-Z

How it works

- A description of how the general use case group works

How does it enable net-zero?

- How this collection of use cases contributes to net-zero, including driving evolving customer mindsets

Relevant capabilities highlighted in blue

Technology capabilities

LPWAN	**IoT platform**	2/3/4/5G	Others (fixed, satellite)	Security
Edge	Systems integration	Private networking	AI/analytics /automation	Digital twins

Potential ecosystem partners

- Players involved in bringing together the end-to-end service or solution for customers

Applicable business models highlighted in blue

Further reading

Link to relevant case studies or other research

How this document works

LOGO

Use case

Case study template

NEW | IMPACT | CUSTOMER | CASE STUDY A-Z

How it works

Find out more

- Outline of how the product or service works in practice, and about the company offering it

Impact

Business model

B2B/G | B2B2X | B2C

S	▪ Text
W	▪ Text
O	▪ Text
T	▪ Text

Key partners in this scenario

Element of the ecosystem	Company logo Description of partnership
XXX	XXX
XXX	XXX

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

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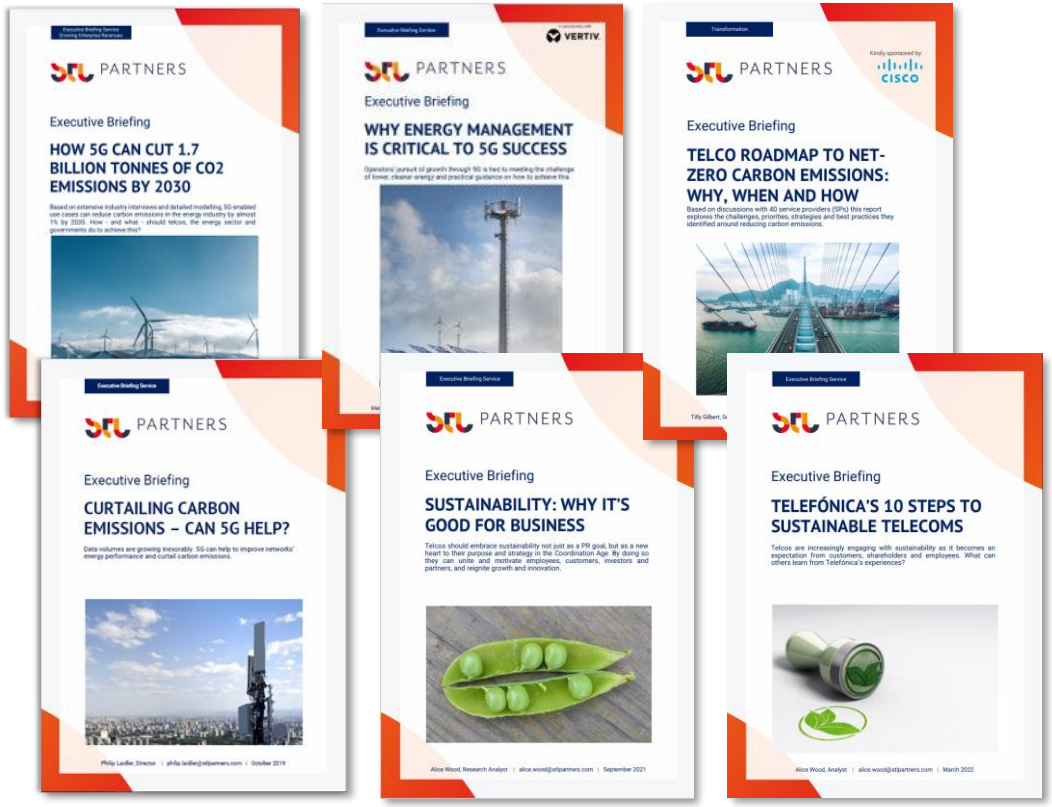
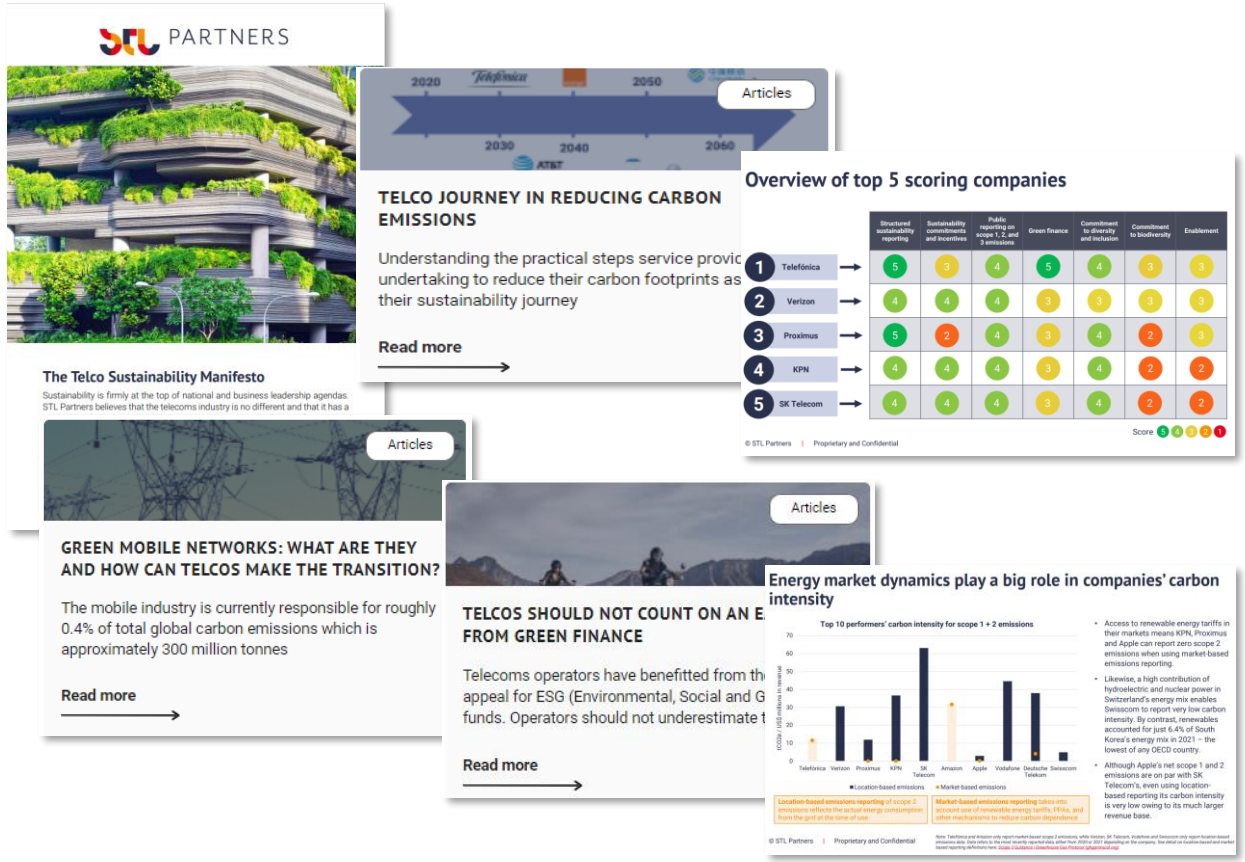
About STL's sustainability work

- STL covers sustainability through research, consulting, webinars and participating in industry forums
- Last year we launched our Sustainability Hub, which brings together insights, learnings and perspectives on sustainability, and sets out the implications for telecoms





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Telco B2B services sustainability labelling

USE CASE A-Z

How it works

- Operator provides sustainability labelling on their enterprise services:
  - Connectivity services
  - Cloud services (IaaS, SaaS)
  - IoT solutions
  - Professional and managed services
- Labelling methodology is transparent, follows industry standards and, ideally, is validated by a third-party.
- Ultimately, the customer should be able to readily incorporate labelling from the telco into their procurement process.

How does it enable net-zero?

- Helping enterprise customers make 'positive' choices to meet sustainability goals by incorporating sustainability into their decision making.
- Setting customer expectations from other suppliers (not necessarily operators) encourages customers to request similar reporting and labelling from their other suppliers.
- Inspiring similar initiatives from own suppliers (e.g. equipment vendors, software suppliers).

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Industry bodies / initiatives**
- **Telco suppliers**
  - Network infrastructure and software
  - Device vendors
  - OSS/BSS and EMS providers
- **Delivery partners:** Sustainability teams and consultants

Further reading

Telefónica Eco Smart services, Telefónica sustainability strategy report

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Case study: Telefónica Eco Smart Services

How it works

Find out more

- Four labels (or seals) have been defined: energy saving, reduction in water, reduction in CO2 and circular economy.

- Eco Smart labeling is formally evaluated and applied to B2B services (this includes solutions and services in Cloud, IoT, Big Data and AI services, in Spain and following in other major markets).
- Labelling is simple: a product either qualifies for the label if it meets the criteria, or it doesn't.
- In 2021, 52% of Telefónica's B2B services deliver a sustainability impact. Eco Smart scoring will be a factor in prioritisation of future product development.

Key partners in this scenario

Big Data, IoT, Cloud and AI teams → Telefónica

The Telefónica Tech team evaluated Telefónica's existing services.

Sustainability team → ECOSMART SERVICES, Telefónica

The sustainability team applies the labelling to the solutions using previously defined criteria.

Third-party validation → AENOR Confía, CARBON TRUST

The Eco Smart label is externally validated and verified by AENOR and the Carbon Trust.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S

Clear, simple labelling makes it easy to follow.

Not offered by many telcos and is a differentiating factor for its B2B services.

W

Limited differentiation between energy savings and CO2 reduction labels. Could do more to by link assessment methodology with suggestions for reducing emissions.

O

Existing framework to develop its B2B portfolio with sustainability in mind.

Expand into reporting for consumer services.

T

Other telcos adopt the same labelling.

Labelling becomes outdated (e.g. if the EU sets new standards) or sets high customer expectations.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

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B2B services customer-level reporting (for customers' scope 3)

USE CASE A-Z

How it works

- Operator provides sustainability reporting on their enterprise services, based on actual customer usage of:
  - Connectivity services
  - Cloud services (IaaS, SaaS)
  - IoT solutions
  - Professional & managed services
- Emissions (or other sustainability) allocation and/or calculation methodology is transparent, follows industry standards and, ideally, is validated by a third-party.
- Ultimately, the customer should be able to readily incorporate data from the telco for more granular scope 3 reporting, rather than rely on industry factor scoring.

How does it enable net-zero?

- Helping enterprise customers to make 'positive' choices to meet sustainability goals.
  - By incorporating sustainability into their decision making and rewarding this
  - By providing a better mechanism for reflecting this in their scope 3 reporting
- Setting customer expectations from other suppliers (not necessarily operators).
- Encourages customers to request similar reporting and labelling from their other suppliers.
- Inspiring similar initiatives from own suppliers (e.g. equipment vendors, software suppliers).

Technology capabilities

LPWAN	**IoT platform**	2/3/4/5G	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Industry bodies / initiatives** that validate and/or standardise emissions impact reporting methodology
- **Enterprise service suppliers** including telcos, ERP systems, other business systems
- **Delivery partners:** System integrators, OEMS, MSPs, cloud providers

Further reading

Microsoft Emissions Impact Dashboard + Salesforce Sustainability Cloud

B2B service customer-level sustainability reporting

Case study: Microsoft Emissions Impact Dashboard

How it works

Find out more

- Microsoft Emissions Impact Dashboard quantifies an organisation's **monthly** carbon emissions related to **Microsoft cloud services usage.**
- Reporting includes Microsoft Scope 1, 2, and 3 emissions data, all quantifiable and shown in mtCO2e (CO2-equivalent metric tons).
- Methodology is usage-based allocation of region-specific scope 3 emissions including use of cradle-to-gate and hardware component-level life cycle evaluation emission factors.
- In June 2022 it expanded the service to include Microsoft 365 for existing Power BI customers.
- It also launched Microsoft Cloud for Sustainability enabling customers to centralise data from across their ERP and business systems into one platform with pre-built methodologies for calculating GHG emissions across Scopes 1, 2, and 3.

Key partners in this scenario

Methodology

Stanford University

Microsoft's emissions reports are determined via a methodology that was validated by Stanford University in 2018, which aligns to ISO standards.

Cloud services

Microsoft Azure, Microsoft Dynamics

The dashboard reports carbon emissions generated by usage of Azure and Microsoft Dynamics.

Platform

Power BI

The Emissions Impact Dashboard runs on Power BI Pro.

Impact

Business model

B2B/G	B2B2X	B2C

S	Enables customers to better track and report on their emissions. Frequency and transparency of reporting.	Service only provides reporting on services but could go further to provide recommendations to end users to enable a *reduction* in emissions. **W**
O	Potential to expand partnerships with other organisations (including telcos) for end-to-end service reporting of applications hosted on Azure.	Other reporting dashboards could integrate this data and offer wider-scale reporting. **T**

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

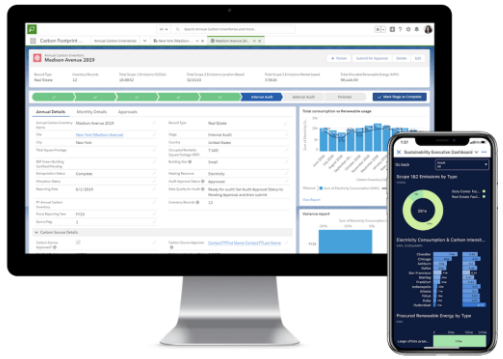
None	Some	Many	Most

Use case B2B service customer-level sustainability reporting

Case study: Salesforce Net Zero Cloud

How it works

Find out more



- Salesforce Net Zero Cloud solution helps companies to accurately disclose their Scope 1, 2 and 3 emissions by calculating GHG emissions using global emissions factors.
- The solution calculates emissions from data sources including business travel, electricity bills, fuel use (as logged by employees submitting expenses) and supply chain emissions. It is also preloaded with reference data.
- It avoids some of the issues that tend to be associated with carbon reporting, including incomplete data and manual inputting.
- Through Salesforce's dashboarding tools, carbon emissions data is visualised. The tool provides investor-grade data.

Key partners in this scenario

Salesforce platform

GREENHOUSE GAS PROTOCOL

Carbon inventory calculations are automated based on the GHG Protocol Corporate Accounting and Reporting Standard, but users can choose their own reference data.

Salesforce application

Users map record types (stationary assets, vehicle assets, building energy records) to configure the report.

Tableau CRM

The Net Zero Analytics app leverages Tableau to provide additional data visualisations.

Impact

Business model

B2B/G	B2B2X	B2C

S	Easy to use and innovative solution that is useful and applicable for a wide range of enterprise customers.	
W		No obvious advantage to Salesforce to partner with a telco on this service. However, telcos are a major reseller of Microsoft 365, this could work similarly.
O	Telcos could partner with Salesforce and act as a reseller. This could help to boost telcos' credibility in the carbon disclosure space.	
T		Different methodologies across providers of reporting platforms could create frustration for customers.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	Many	Most

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Sustainable digital transformation / digitalisation

USE CASE A-Z

How it works

- Many SPs offer professional services to enterprises to assist in their digital transformation. Typically, these involve a digital maturity assessment and project prioritisation.
- With these services, telcos could enable customers to integrate more sustainability (alongside financial and other operational) benefits as criteria for maturity assessment and selecting solutions to implement.
- This requires a clear understanding of the environmental impact of current activities and potential improvements through digital transformation (i.e. implementing EMS).
- Ultimately, this would enable customers to combine digitalisation with progress toward net-zero emissions targets.
- **We have not yet identified good case studies of this use case (get in touch if you know of one!)**

How does it enable net-zero?

- **Although net-zero is not the main objective,** this approach ensures that transformation incorporates and maximises sustainability.
- **Helping combat climate change** – (edge) cloud, IoT, Big Data and AI can help enterprises operate more efficiently and reduce waste and CO2 emissions.
- **Moving to cloud computing** means ageing data centers using large amounts of heating and lighting are no longer required.
- Many activities that have previously required in-person action can be monitored or carried out virtually.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Systems integrators** to integrate outcomes of transformation into wider enterprise systems.
- **Cloud providers** – solutions will move to Cloud/Edge and IoT, therefore connecting to the cloud will becoming increasingly important, as insights need to be shared across multiple parties.
- **Software providers** – transformation initiatives will include existing and new enterprise systems.

Further reading

Telefónica sustainability strategy report

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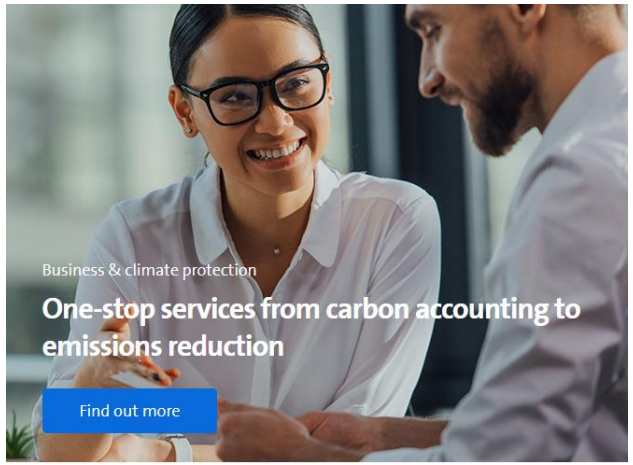
Case study: Swisscom Net Zero Consultancy

NEW | IMPACT | CUSTOMER | CASE STUDY A-Z

How it works

Find out more



- After implementing a carbon reduction strategy in their own business, Swisscom have created a consultancy solution for other businesses to reach net zero.
- The end-to-end service relies on their own wide ranging digital solutions to reduce CO2 emissions through ICT, fleet management and raising employee awareness. They also work with a climate advisory specialist to develop strategy and define measures to reduce emissions.
- To date 893,000 tonnes of CO2 has been saved by Swisscom customers as a result of implementing green ICT solutions from Swisscom's partner network.

Key partners in this scenario

Solution provider	swisscom: Swisscom oversees the delivery of the comprehensive solution to enterprise customers
Climate advisory specialist	accenture: Accenture explore strategies for including technologies within Scope 4 classification that can help reduce carbon emissions from solution customers

Impact

Business model

B2B/G	B2B2X	B2C

S	Swisscom has diversified its business model to become a sustainability consultancy, enabling it to directly contribute to emissions reductions of other companies.
W	Relies on many partnership organisations for solution creation, minimising Swisscom's own revenue from the service.
O	Swisscom could potentially establish itself as the go-to telco for recommendations on carbon reductions.
T	Other specialist consultancies operate in this space and have reputations built entirely on their sustainability credentials.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

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Smart transport (consumer)

USE CASE A-Z

How it works

- There is a growing range of services giving consumers more options to travel around cities in a time and carbon efficient way.
- This has been propelled by the rise of the sharing economy, for example with car sharing services, electric bikes and scooters.
- It has also been driven by maturing IoT across the public transport sector, enabling cities and third-party applications to provide consumers with real-time route planning across public infrastructure.
- In some cases, these services also include price and time comparisons between public and shared private .nfrastructure (i.e. ride hailing, electric bike rental, etc.).

How does it enable net-zero?

- A growing range of public and shared travel services reduces consumers' dependence on private car ownership.
- This in turn can help to reduce both the total car ownership (through sharing) and the number of cars on the road at any given time (due to alternative travel options).
- By delivering time and cost efficiencies with shared infrastructure, these services are encouraging environmentally beneficial choices among consumers, even if it is not a priority for them.
- **These services may be able to drive behavioural change in consumer if they demonstrated their impact on individuals' carbon footprints.**

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	**Digital twins**

Potential ecosystem partners

- **Telcos** providing fixed and mobile connectivity for smart city IoT solutions.
- **OEMs (bikes, cars) or their partners / subsidiaries** offering services in the sharing economy.
- **Application developers** leveraging AI, automation and connectivity to provide real-time travel information and services to consumers.
- **Government bodies** (local and international) distributing smart city grants or creating regulatory support for companies seeking to address pollution / congestion challenges in cities.

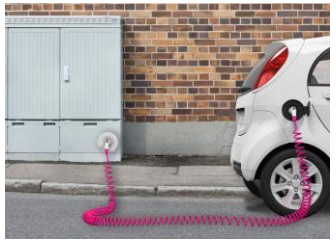
Further reading

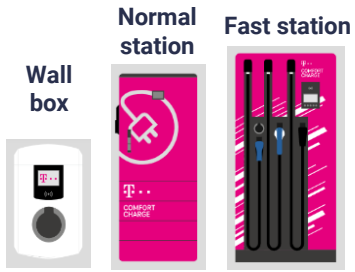
DT, SKT, Mobike, The role of 5G in public transport

Case study: DT Electric vehicle Charging Stations

How it works

Find out more here





- A key barrier to electric vehicle take-up is drivers' peace of mind that the battery will get them to their destination. Through its wholly owned start-up Comfortcharge, Deutsche Telekom is addressing this barrier by upgrading existing cable distribution boxes to become electric vehicle (EV) charging stations.
- Since launching in 2018, it has expanded to include smaller charging stations on multi-dweller units and office buildings.
- A normal sized charging point can recharge an EV to 75km within an hour.
- In 2021, DT announced a partnership with Swedish utility Vattenfall to accelerate the installation of wall box charging stations in partnership with municipalities and private sector customers. The partnership will be managed through Vattenfell Smarter Living unit, VLINK.
- In January 2022, Chargemap identified 215 Comfortcharge stations in Germany.

Key partners in this scenario

Infrastructure	DT is upgrading is the cable distribution boxes used for fixed-network and internet connections.
Technology	Compleo Charging Solutions provides EV charger installation, maintenance and service.
Commercial partner	Collaborating with Comfortcharge to commercially scale charger deployments.

Impact

Business model

B2B/G	B2B2X	**B2C**

S	DT has a large existing infrastructure and field workforce available to support EV chargers. Strong brand differentiator by doing something innovative.	Existing telecoms boxes are not always next to the road, which may make access difficult. Getting city permits can take time and be costly. **W**
O	Potential to partner with local municipalities to offer perks to citizens using EVs, like free parking and/or road tax advantages, to encourage greener driving.	Other EV charging services may be more tailored to end users (rather than adapting existing infrastructure). **T**

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Operators offering this service

None	**Some**	Many	Most

Smart transport (consumer)

Case study: Autonomous Electric Public Transport

How it works

Find out more here and in this STL Partners report

- Through the creation of high detailed 3D maps on pre-defined routes, autonomous buses can safely and cost-effectively cover underserved areas with public transport. This offers residents a reliable alternative to driving and therefore helps to reduce the number of vehicles on the road.
- Telia is working with a consortium of companies, including Ericsson and Intel, to test autonomous buses.
- In the trials, 5G control towers are used to remotely manage the buses, transmitting live video feeds to track their travel and ensure the security of passengers (e.g. if there is violence or a medical emergency).
- The 5G network also supports GNSS and GPS correction information, which allows positioning down to a centimetre level.
- In April 2021, Ericsson integrated 5G into the autonomous shuttles Drive Sweden is testing in Gothenburg, which are operated by public transport company Keolis.
- In 2020 Keolis carried more than 200k passengers across 40 autonomous electric vehicle services.

Key partners in this scenario

Innovation organisation → Network technology → Connectivity → Bus operator

Drive Sweden brings together 150 partners to create a mobility system for the future.

Ericsson provides 5G networking capabilities for bus positioning and live video feed prioritization.

Telia Company provides connectivity for automated buses.

Keolis operates the autonomous buses.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S Innovative solution that leverages a 5G network. Uses EVs and is an impressive coordination of technology players being brought together.

W Production of the vehicle components are environmentally intensive.
Telia is only providing the connectivity in this use case.

O Opportunity to scale outside of Gothenburg initially. In the future, could be scaled internationally to countries (like the US) that are typically underserved with public transport.

T Regulation is not yet fully developed to govern AEPT-as-a-Service. Not fully autonomous as uses 3D mapping and pre-defined routes. More regulation and testing needed before it can scale.

Solution maturity

No telco service yet	**Telco/ POC trial**	Commercial solution	Scaled solution

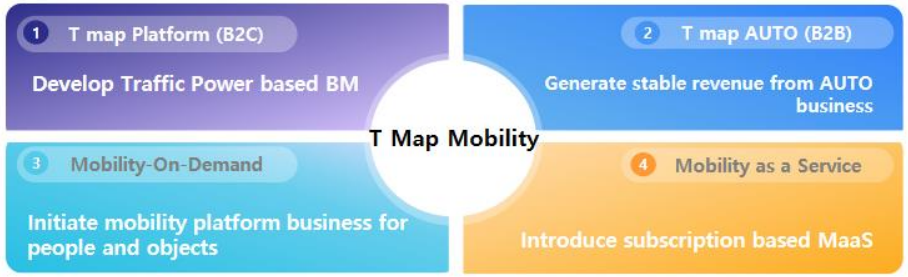
Operators offering this service

None	**Some**	Many	Most

Case study: SK Telecom Mobility as a Service

How it works

Find out more



- Mobility as a Service (MaaS) brings together a range of on-demand transit options, enabling users to pay-as-they-go to access multiple modes of transport. See more detail on this concept in STL report on How telcos can provide a tonic for transport.
- SKT subsidiary T Map Mobility focuses on a number of mobility businesses, including ride hailing, in car payments and usage-based insurance, with plans to launch a MaaS offering. With the MaaS it plans to provide access to diverse means of transportations at discounted rates through a subscription model. It will be targeted at T Map's base of 13mn monthly active users as of 2020.
- T Map Mobility is also expanding its reach through a joint venture with Uber in 2020, and with flying taxi companies eVtol and Joby in 2022.

Key partners in this scenario

Connectivity

SK Telecom can provide the connectivity for vehicles.

Application & analytics platform

T Map Mobility provides the application, software and platform for mobility solutions, independently from SKT.

Mobility partners

Ride hailing and sharing companies are partners and/or investors in T Map Mobility.

Impact

Business model

B2B/G	B2B2X	**B2C**

S	T Map Mobility is an established mobility business outside of SKT's core operations, with large existing datasets to understand individuals' travel patterns.	MaaS is still in development, limited detail on partners. Limited sustainability benefits (or at least not clearly measured or articulated). **W**
O	Significant opportunity to add a sustainability angle to proposition. Potential to support other telcos to build up similar MaaS offering.	Other companies may come to market sooner with sustainability focused MaaS offerings. **T**

Solution maturity

No telco service yet	**Telco/ POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

Use case

Case Study: Telia Smart Heating for Buses

NEW | IMPACT | CUSTOMER | CASE STUDY A-Z

How it works

Find out more

- Nobina, the Nordic region's largest public transport service provider, usually heats its buses in depots before they depart.
- Telia developed and fitted 2,000 buses with connected temperature sensors and control systems.
- The temperature sensors are screened in real time and temperature updated depending on how the buses are being utilised.
- The IoT-service lowers Nobina's power consumption by 22GWh yearly which is equivalent to the output from mid-sized two wind turbines.

Key partners in this scenario

Hardware and application	FÄLTCOM: Provides sensors and the platform to monitor, control and analyse temperature.
Connectivity	Telia Company: Provides the 5G connectivity for real time monitoring and control
Mobility partners	Nobina: Nobina operates the buses

Impact

Business model

B2B/G	B2B2X	B2C

S	An early intervention that leveraged diverse ecosystem partnerships and paved the way for further collaboration on smart transport.	
W		Telia only provides the connectivity in this use case.
O	Using pre-installed sensors there is the opportunity to expand functionality to other aspects of bus function, e.g., heating the engine prior to ignition to prevent energy intensive cold starts.	
T		Poor public 5G coverage outside of city centre locations might restrict the service geographically.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Use case

Case study: Telia Travel Emissions Insights

NEW | IMPACT | CUSTOMER | CASE STUDY A-Z

How it works

Find out more

- Telia launched this service to produce better insights on travel emissions and create a tool for planning changes to public transport.
- The reporting service is based on anonymised and aggregated mobile network data from Telia subscribers. From the data crowd movement patterns, the number of people in different locations, is determined.
- This data is then applied to the CERO model which determines the carbon emissions generated by each journey.
- The insights provide concrete recommendations of actions to take - and what CO2 reductions they can achieve. The data answers questions like: Where should we invest in bus lanes and where should we invest in bike lanes? Where could public transport improvements make public transport faster than taking the car?

Key partners in this scenario

Data and connectivity	Telia anonymises and aggregates cell tower data from its user base
Application and analysis	Telia runs its data through the travel emissions model developed by the Climate and Economic Research Organizations to determine emissions generated by the population
Local authorities	Use this data to optimize public and private transport systems to reduce emissions

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S This use case relies on data exclusively owned by telcos. Telcos are the only enterprises who can provide this solution.

W Despite data being anonymized and aggregated, concerns about data security might prevent local governments from investing in the service.

O There is opportunity to move this beyond a B2G solution, enterprises need to track employee data as part of scope 3 emissions tracking, this could provide a valuable monetisation opportunity for telcos.

T There is competition from other apps that track carbon footprint from travel.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

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Smart buildings for consumers

USE CASE A-Z

How it works

- Sensors are installed throughout a home and measure indoor temperature, pressure, humidity, noise, battery charge and motion detection.
- The data from the sensors is then collected (typically hosted on the cloud) where it will be analysed, processed and then used to trigger actuators and/or generate reporting.
- Actions are automatic (by user policy) and/or made directly by consumers (locally or remotely) to optimise energy use e.g. turn off the A/C, close a window.
- More macro insights can be gathered from the analysis of sustained patterns for example, time of day scheduling.
- Other data sources are also used (e.g. user location, weather patters, variable energy prices).

How does it enable net-zero?

- **Lighting** – motion detecting sensors control lighting to turn off automatically when no one is present, reducing energy consumption.
- **Heating** – temperature sensors keep the room temperature within a pre-set range, reducing excess heating or cooling. Also, heating can be set to a time schedule e.g. to only be on during the day. This reduces energy consumption and harmful chemical release (fluorocarbons).
- **Motion** – motion detection can be analysed to measure the utilisation of building space. If space is underutilised, it can be rented out and therefore reduce the need for additional building space.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	**Security**
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Device manufacturers** – the IoT sensor may be manufactured by the telco or partner with an external manufacturer.
- **Software developers** – to provide the software which will analyse the data received and action insights either automatically or manually.
- **Cloud providers** – data will need to be sent to various parties to be actioned and this is likely where data analysis will occur.

Further reading

Tado + Heata

STL PARTNERS

Smart buildings for consumers

Case study: Tado Smart Heating System

How it works

Find out more

- European market leader in smart home climate management, Tado° offers smart thermostats and apps that adjust to the weather and location of users in homes and small businesses.
- The product includes: Smart thermostat, smart radiator thermostat (retrofit to over 3,000 radiator types), smart AC control, smartphone app, cloud-based heating controller, premium subscription service.
- Primary devices sold as kits, app and support free of charge (even for second-hand devices), small premium service.
- Currently, the system works with an ethernet connection to a broadband gateway, but set-up can be unreliable. It interfaces with Alexa and Google Home.
- Geo-fencing works with a combination of home Wi-Fi and GPS location, but there is potential for improvement through use of **network-based location** and vector.

Key partners in this scenario

Heating OEM	Worcester Bosch Group: Tado works with OEM to ensure products are compatible & agree commercial agreement on maintenance leads / deals.
Channel	E.ON: Direct to market and through channel partners (mainly energy companies).
User Interface	tado°: App user-interface allowing advanced controls + premium + OEM maintenance scheduling.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S A well-designed premium product, e.g. self-installation that supports indirect sustainability benefits. Offers a wide range of capabilities to users.	**W** Relatively expensive. Limited messaging around sustainability benefits.
O Extend to wider energy management (e.g. EV charging) through recent acquisition of aWATTar. Position solution more in terms of energy savings it can provide.	**T** More cost-effective and comprehensive competitors with better channel and clearer communication of potential carbon savings.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	Some	Many	Most

Smart buildings for consumers

Case study: Heata Domestic Water Heat from Cloud

How it works

Find out more

- Heata retrofits millions of existing homes with servers, which provide cloud compute power to application providers and enterprises, while 70-80% of (waste) heat is transferred for domestic hot water, all year long.
- Product includes: server with dedicated WLAN link, dedicated router, stats, dedicated fibre/FWA broadband link, smart radiator thermostat, energy meter.
- It doesn't require any plumbing, only simple re-wiring.
- The sustainable compute is sold on open market for generic (batch) workloads.
- The resident is compensated for electricity used (at cost) and receives free/subsidised water heating and the property owner benefits from improved EPC rating (note new minimum performance standards are being introduced).
- Other potential upsides include:
  - Rising demand for distributed cloud and edge compute: resilience, gaming and immersive experience (Metaverse), O-RAN workloads

Key partners in this scenario

Marketing sales and contracting	Heata sells and contracts with resident and/or landlord for service.
Installation (including fibre or FWA broadband)	Mixergy, Insta, hyperoptic Installation and commissioning of server block, router, wiring and connectivity. Standalone retrofit or with another install.
Cloud compute customer	***Application providers, enterprises, telcos*** Consumers of sustainable distributed cloud compute power.

Impact

Business model

B2B/G	B2B2X	**B2C**

S	Innovative solution that provides low cost water heating to consumers. Very low PUE of 0.3. Has positive social implications by reducing household bills.	Stand-alone start-up. Operational challenges (e.g. access). **W**
O	Opportunity to forge new partnerships with more consumers, enterprises and even the government to minimse carbon intensity of boilers.	A complex and expensive offering. May require frequent call-outs. Other companies may provide better funded and subsidised technologies. **T**

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

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Renewable energy services

USE CASE A-Z

How it works

- Buildings can generate their own electricity or heat from renewable energy sources, such as sunlight, wind and geothermal heat.
- There are different renewable energy technologies available: solar panels, wind turbines, hydroelectricity.
- Renewable energy is used in three main areas:
  - Electricity generation
  - Air and water
  - Heating and cooling
  - Transportation
- Customers can save money on their electricity bills and reduce the carbon emissions of electricity networks.

How does it enable net-zero?

- **Reducing carbon emissions of the electricity networks –** renewable energy provides off-grid energy solutions in rural and remote areas.
- 'Off-grid' in this sense refers to houses disconnected from the national energy grid. These houses rely on energy from solar power and battery storage systems.
- Renewable energy generally produces minimal greenhouse gases, significantly reducing carbon emissions, and does not rely on fossil fuels.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Infrastructure manufacturers** – solar panels and heat pumps may be manufactured by a partner with an external manufacturer.
- **Infrastructure installers** – solar panels or heat pumps have to be installed by specialist installers.
- **Wind farms** – wind turbines provide renewable energy.
- **Financial support** – renewable energy projects need investment.
- **Insurance providers**

Further reading

Tesla Energy Plan + Telstra Energy

STL PARTNERS

Case study: Tesla Energy Plan

How it works

Find out more

- The Tesla Energy Plan is an energy tariff specifically designed for homes that leverage solar power. Installing the Tesla Powerwall can offer 100% clean electricity and savings of up to 64% compared to the UK's "Big 6" tariffs, based on electricity consumption of 8,000 kWh/year.
- The service reduces reliance on the grid and protects customers' homes from power cuts. As such, it is designed to help support the energy needs and stability of the electricity grid.
- The service also launched in Germany in 2021, where customers pay direct procurement and network costs, plus at a flat rate of €3 for 2 years, protecting them from price increases driven by geopolitics or an energy supply crunch.

Key partners in this scenario

Energy provider	Octopus Energy provides customers with the tariff and administers the energy.
Infrastructure	Octopus Energy installs the smart meter into home if required and Tesla installs the Powerwall.
Electricity grid	National Grid supplies the UK's electricity grid.

Impact

Business model

B2B/G	B2B2X	**B2C**

S	Directly enables consumers to reduce energy bills and reliance on the grid by using more sustainable energy sources.	
	Expensive to implement; customers need MCS-certified solar panel installations, residential electricity supply and compatible smart meter.	**W**
O	Tesla can expand this service to partner with other energy suppliers, further reducing the reliance on the energy grid.	
	Depending on the kind of property and installation, customers may need planning permission.	**T**

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: Telstra Energy

How it works

Find out more

- Telstra is set to enter the energy market in 2023, and has set itself a target to become one of the country's top five energy retailers by 2025.
- This initiative is within Telstra's T25 strategy and part of Telstra becoming carbon neutral in its operations.
- Telstra's energy offerings will be entirely carbon-neutral and come from renewable sources such as solar parks and wind farms.
- The energy that Telstra sources from these projects is enough to displace the fossil fuel energy consumption of roughly 150,000 households.

Key partners in this scenario

Energy provider → **Wind farms** → **Solar power developers**

Telstra itself is providing the renewable energy for its customers.

Telstra has a power purchase agreement with Naturgy's subsidiary GPG to build the wind farm Crookwell 3. Telstra will procure 80% of the generated energy.

Telstra has purchased a solar power project, ReNew Solar Power in India, which has 26 separate solar farms.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S
- Directly seeks to reduce reliance on fossil fuels.
- Ability to bundle service for its existing broadband customers.

W
- Climate change in Australia is highly politicised which may affect investment. Underinvestment in network capacity delays renewable energy projects.

O
- Economic opportunities for Australia to create a cheap renewable energy market. Change in government may create more favourable investment climate.

T
- Other telcos could follow a similar strategy, providing the same offering at more competitive prices.

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	**Some**	Many	Most

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Circular economy: Device recycling/refurbishment

USE CASE A-Z

How it works

- Operators provide a service to customers seeking to replace their devices. Customers return devices to the operator, which can then be refurbished and resold to other customers.
- Devices unsuitable for refurbishment can be recycled and the raw materials recovered and reused, some of which are non-renewable natural resources like gold or cobalt.
- Operators can incentivise customers financially, such as through discounts on new products, gift cards, or by offering "device-as-a-service" for greater convenience.
- Refurbished devices are sold at a discounted price to new customers.
- Vendors also offer various repair schemes which further reduces the need for new devices.

How does it enable net-zero?

- Helping customers to make more environmentally conscious device choices by reducing the hassle of dealing with old hardware.
- 90% of materials in mobile devices can be reused. Doing this at scale for a broad customer base means that telcos could make a significant impact on:
  - **Production:** Refurbishing old devices reduces demand for new ones, lowering carbon emissions associated with production
  - **Resources:** Non-renewable natural resources can be recovered from old devices reducing carbon emissions associated with extraction and processing

Technology capabilities

LPWAN	IoT platform	2/3/4/5G	Others (fixed, satellite)	**Security**
Edge	Systems integration	Private networking	AI/analytics /automation	Digital twins

Potential ecosystem partners

- **Telco suppliers**
  - Device vendors / OEMs – Support refurbishment of old devices or reuse of non-renewable resources, partner with operators to offer DIY repair kits for consumer devices
  - Network infrastructure
- **Recycling partners**
- **Non-profit organisations**

Further reading

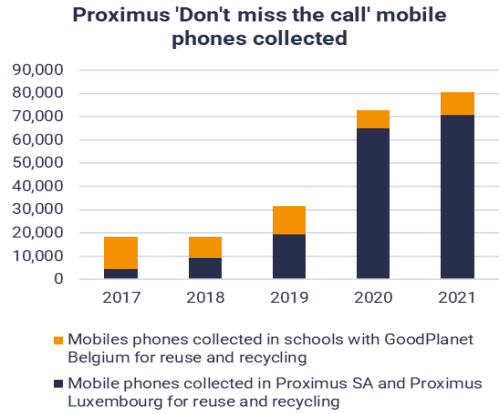
Proximus + EcoATM

Case study: Proximus Circular Economy Solutions

How it works

Find out more

- Proximus has established a distribution centre to refurbish modems, decoders, power supplies, Wi-Fi boosters and smartphones on site. Between 2014 and 2021 Proximus refurbished around 2.85 million devices, including 845k in 2021 alone.
- In 2021 it launched an eco-design modem with 25% fewer electronic components and 50% less plastic, by using recycled plastic. It also works with partner Umicore to recycle extracted materials.
- In 2021 it launched an ongoing campaign Don't Miss the Call where it reports live on the number of devices it has collected and incentivises customers to hand in old devices with €10 vouchers on top of their trade-in value.
- Refurbished phones are graded from A+ to C in relation to the condition of the device and sold at prices according to the score, ranging from 30-50% less than new phones.
- This also extends to modems and decoders. Around 40% of modems and decoders installed in 2020 were refurbished devices.



Key partners in this scenario

Telecoms operator — Proximus incentivises customers to return old mobile devices in exchange for vouchers.

Recycling partner — Umicore extracts, refines and purifies materials from the whole mobile device.

Non profit partner — Customers exchanging old devices can donate vouchers to Umicore partner **Eight**, an artisanal cobalt mining NPO in Congo.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S Designing products with fewer components reduces environmental impact. Telco ownership of broadband CPE ensures high penetration of recycled devices.

W It is a basic, non-differentiated offering. Some privacy concerns are limiting consumer uptake.

O Expand range of partners to further ease drop off and educate consumers on privacy protections.
Create holistic solution with MyFootprint.

T Larger retailers or OEMs offer competing service direct to consumers, e.g. Carrefour in France.
OEMs make it difficult / costly to repair devices.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	**Many**	Most

Case study: Carrefour EcoATM

How it works

Find out more

- EcoATM installs kiosks at retail locations where consumers can sell their old mobile phones, or recycle them for free if they no longer have a resale value.
- The majority of all devices collected from the kiosks are sold for full reuse to extend the usage period for as long as possible. The remaining devices are sold to certified recyclers, refurbishes and wholesalers, to guarantee the component materials are responsibly reclaimed and reused.
- In November 2021, Carrefour expanded its partnership with EcoATM to increase the number of mobile device automatic recycling kiosks at its stores from 50 to 250 by early 2022. Consumers will be able to exchange their old devices for Carrefour vouchers on the spot.
- After EcoATM refurbishes devices collected at Carrefour locations, they will then be resold on secondhand electronics website Back Market.
- EcoATM has been operational in the US for over 10 years and diverted 23 million devices from landfills, equivalent to removing more than 2,500 cars from the road.

Key partners in this scenario

Recycling provider	EcoATM provides the kiosks, valuation and recycling / refurbishment of mobile phones.
Retailer	EcoATM kiosk are installed at Carrefour locations, where customers can exchange old smartphones for store vouchers.
Resale partner	Back Market sells the refurbished devices on its website.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S An offering that makes it easy for customers recycle their devices and receive immediate payment. Available in a large number of convenient locations. It's also quick: the process takes 3-5 minutes.	**W** The devices are valued at lower prices than through other channels. Limited focus on consumer privacy concerns.
O EcoATM could partner with telcos to help increase reach and provide greater security / privacy assurances to consumers whose devices will be resold.	**T** Other players may develop similar solutions but provide large device valuations.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	**Many**	Most

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Customer retail carbon footprint

USE CASE A-Z

How it works

- Becoming carbon neutral or net-zero is a goal for both individuals and organisations.
- Carbon footprint tracking apps enable customers to understand how their spending behaviour affects the environment.
- Apps can track things like the type of food customers eat, modes of transport and length of journeys.
  - GPS tracking automatically predicts emissions from daily journeys.
- The goal is to help customers to understand which activities make the biggest / smallest impact on the environment.

How does it enable net-zero?

- Increasing customers' awareness of the footprint their daily actions have and the associated impact on the environment.
- Providing advice on how to reduce carbon emissions and helping customers to make more carbon conscious lifestyle decisions.
- Apps also provide carbon offsetting options through partnerships with projects around the world.

Technology capabilities

LPWAN	IoT platform	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **App developers** – design of the user experience and app, including integration with third-parties.
- **Carbon footprint experts** – analysis of the impacts and suggestions on how to offset or change behaviour.
- **Retail / payment partners** – consumer service providers can integrate their products into the app.

Further reading

Proximus + Pawprint

Case study: Friends with Holograms

How it works

Find out more

- Friends with Holograms creates virtual and augmented reality experiences for soft skills training.
- They also create tailored solutions for clients with potential for scaling the solutions. For example, they have advised Verizon on best practice training simulations, including an experience on in-store safety and another on safe equipment operation.
- Solutions can be tailored to a wide variety of client requirements. For example, some training topics include developing effective responses to workplace harassment, communication training for nurses, and dealing with racially aggravated situations.

Key partners in this scenario

Hardware manufacturers	Friends with Holograms is designed to work on a number of different headsets
Client	amazon verizon Meta Friends with Holograms work with their clients to produce fit for purpose training materials using actors
Application development	Different software applications need to be developed depending on the end customer

Impact

Business model

B2B/G	B2B2X	B2C

S	Friends with Holograms is a versatile solution that can be adapted to specific requirements.	
W		The solution can help to reduce emissions by connecting people remotely and reducing travel, but it does not currently emphasise its ability to do so.
O	Could position itself as an environmentally-friendly training solution, as it reduces the need for travel. Currently it emphasises cost and time savings.	
T		VR/AR is already offered by other operators as part of 5G package, and may be better at communicating the sustainability benefit of this solution.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	Scaled solution

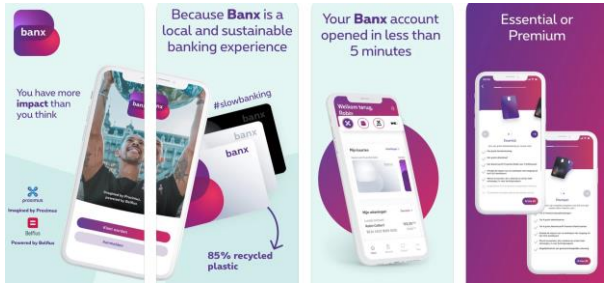
Telco offering this service

None	Some	Many	Most

Case study: Proximus Banx App

How it works

Find out more



- Proximus, in partnership with Belfius, has launched Banx, a fully digital banking experience.
- An app-connected credit card enables Banx customers to track and measure their carbon footprint from every transaction.
- Proximus teamed up with Doconomy to create a dashboard that tracks users' ecological footprint (kg of Co2) as they spend.
- The dashboard uses the Åland Index (a JV between with Doconomy and Bank of Åland) which calculates the Co2 impact of users' activities from payment and financial transaction data.
- Proximus also has a similar offering called MyFootprint which is only available through its MyProximus app. This helps consumers to measure their carbon footprint by answering in app questions (as opposed to pulling from financial transaction data) to produce results about how sustainably they shop, eat, live, etc. It also provides tips for users on how to reduce their carbon footprint.

Key partners in this scenario

Digital tools and expertise provider

Belfius Doconomy

Proximus signed a partnership with Doconomy to provide digital tools and expertise and with Belfius to bring digital banking to market.

Cloud-based software service

Åland Index Solutions

Åland Index, JV with Doconomy and Bank of Åland, a cloud-based service for climate impact calculations for payments and transactions

Application platforms

Android and the iOS App Store host the Banx/MyProximus app.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S

Advice on how to reduce customers' carbon footprint.

Very few other apps/services like this.

W

Being linked to only one banking provider may be limiting for customers.

MyFootprint only available to MyProximus customers.

O

Potential to make the service more direct by providing advice and recommendations for users based on their activity.

T

There may be global consumer company competition from apps that provide more specific recommendations for reducing carbon footprint.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: Pawprint App

How it works

Find out more

- Pawprint brings technology, behavioural science and carbon data into a single platform. The app enables users to measure, understand and reduce their carbon footprint, or their 'pawprints'.
- The app's carbon calculator looks at the user's footprints across four buckets: home, travel, diet, other/spending.
- Questions range from how much customers spend on electronics each month to how much meat they eat each week.
- These buckets are then subdivided into data points. Each data point holds an average carbon emissions score.
- Pawprint relies on data provided solely by the user.

- The app has both paying corporate customers, 'Pawprint Pioneers' and free individual users.
- Pawprint was certified as a B Corp in recognition of its commitment to sustainability, ethics and accountability.

Key partners in this scenario

Carbon data experts

energy saving trust · SMALL WORLD CONSULTING

Carbon expert Mike Berners-Lee of Small World Consulting built the carbon footprint calculator, and Pawprint use data from the Energy Savings Trust and the UK Government.

Application platforms

Google Play

Google Play and the iOS App Store host the Pawprint app for its users.

Third-party certification

B Corporation

Pawprint is now a certified B Corp, authenticating its service.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S

The app provides individuals with a greater understanding of their carbon footprint.

Free for individual users.

W

The onus is on the customer to input their own data each day / week. This could lead to them eventually neglecting the app.

O

Businesses could use Pawprint to track their carbon emissions for their annual reporting.

Potential to partner with telcos for wider market reach.

T

Competition from other apps that track carbon footprint in a more automated way.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Customer retail carbon footprint

Case study: SK Telecom Happy Habit

How it works

- SK Telecom formed the "Habit Eco Alliance" in an effort to help solve the environmental problems caused by the use of disposable plastic cups.
- 23 organisations and companies form part of the alliance, including the Ministry of Environment and Seoul Metropolitan Government. The alliance launched the '"happy habit" project which advocates the reusable cups.
- There is a happy habit app which is designed to manage participants' performance and incentivise them with benefits.
- Happy habit has formed partnered with Starbucks to encourage the use of reusable instead of disposable cups within their stores. Customers return their used cups to machines, where they are sterilised and repackaged.

Key partners in this scenario

Hardware manufacturer	오늘의 분리수거 Vending machines scan the app and the users depositing the cups and takes them to be sterilised and disinfected.
Software application	happyhabit The happy habit app encourages users to deposit their cups and incentivises this behaviour with rewards.
Retail and consumer businesses	SKT have stated their plan for 2022 and beyond is to continue building the ecosystem of partners within this scheme.

Impact

Business model

B2B/G	B2B2X	**B2C**

S	SK Telecom has leveraged a large and diverse ecosystem of partnerships to develop this solution.	
	SKT's ongoing role and involvement with happy habit is not completely clear in the solution's messaging. Limited scope of activity despite large number of partners.	**W**
O	Opportunity for the Habit Eco Alliance to roll this out in further retail and consumer businesses within South Korea, as well as into other markets.	
	Failure to scale or deliver brand value benefits to participating organisations could see them lose interest.	**T**

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Table of Contents

Smart metering

USE CASE A-Z

How it works

- Smart meters are the next generation of meters, designed to encourage more efficient energy usage.
- Whereas traditional meters log overall energy usage, smart gas and electricity meters are self-reading meters that show the up-to-date cost of the energy being used.
- By displaying energy usage in real time, consumers are able to adapt their usage and behaviour to ensure they are not wasting resources.
- More granular data on energy usage patterns can enable suppliers to make more efficient infrastructure investments.
- Around 132 million smart meters were shipped worldwide in 2018, and this is expected to exceed 200 million by 2024.

How does it enable net-zero?

- Because customers can see the cost of their energy usage in real time, this encourages efficient energy usage by demonstrating the cost savings that can be derived from reducing energy consumption.
- The less energy being used, the less the overall carbon intensity of delivering gas and electricity to homes.
- According to the European Commission, smart metering reduced energy consumption in households by up to 10% of annual consumption, and reduced CO2 emissions in the EU by 9-15%.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems Integration**	Private Networking	**AI / analytics /automation**	Digital twins

Potential ecosystem partners

- **Device and OEM manufacturers** – companies that create the user equipment that monitors and displays energy usage.
- **IoT devices / smart home systems** – these devices and platforms monitor household appliances' energy usage and enable consumers to improve efficiency by managing heating and other systems remotely.
- **Connectivity providers** – mobile networks transmit the data from the appliances to the end devices.

Further reading

Deutsche Telekom smart metering

Case study: Deutsche Telekom Smart Metering

How it works

Find out more here and here

- Smart meters automate the energy readings of household devices and enable consumers to monitor their usage in real time. Consumers are billed according to the energy they use, which incentivises more efficient energy usage.
- T-Systems provides the SIMs, connectivity and dashboards for users to manage their energy usage. DT's narrowband IoT network delivers reliable connectivity to devices that are often in basements or other hard to reach locations.
- DT's Data Intelligence Hub provides a data marketplace including power generators, distributors and customers. It integrates data to share system information to help predict behaviour and manage the use of resources in a more efficient way.

Key partners in this scenario

Systems integration	kamstrup: Kamstrup integrates meters into existing systems of household appliances and has its own electricity meters.
SIM cards	T-Mobile: SIM cards are installed into the smart meter devices and uses NB-IoT to send the data to end applications.
Application	T-Mobile: DT's platform enables visualisation of this data to help users make decisions about their energy usage.

Impact

Business model

B2B/G	B2B2X	**B2C**

SWOT

S

Relies on SIMs from DT.

Paired with its smart home solutions, creates both B2B and B2C opportunities.

W

In more advanced markets, smart metering is already mature, so limited space for new entrants. New entrants would need to provide differentiation.

O

Energy management could prove a strong selling point for smart home solutions, especially with the shift to EVs.

T

Many energy companies have their own platforms and apps so the marketplace for these solutions is already somewhat crowded.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	**Some**	Many	Most

Table of Contents

Smart transport/telematics (enterprise)

USE CASE A-Z

How it works

- Smart transportation or telematics solutions are M2M solutions that can track data in real time.
- This data can include the performance of a driver, location of the vehicle and the routes being taken.
- These solutions can help companies that manage fleets to improve productivity and fuel management in a number of ways.
- The solutions tend to include small IoT devices that are installed into vehicles, which connect to a cloud based platform that allows remote monitoring and analytics.
- Benefits are both commercial and sustainable, including reduced gas consumption, operational efficiencies and overall savings, as well as to pre-empt vehicle maintenance to reduce downtime.

How does it enable net-zero?

- **Tyre pressure** can contribute significantly to fuel consumption and overall emissions. If tyres are not inflated correctly, this can impact fuel efficiency. A telematics system can monitor and ensure correct tyre pressure.
- **Route planning** is a key component of enabling fuel efficiency. Telematics systems can monitor live traffic to enable fleet managers and drivers to take the quickest and therefore most fuel-efficient routes.
- **Load optimisation** functionalities can help fleet managers to identify opportunities for vehicles to deliver more freight in fewer journeys.
- **Engine running on stationary vehicle.** Can detect idle engines that may be left on to keep the vehicle warm/cold.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	**Security**
Edge	**Systems Integration**	Private Networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **Device/OEM manufacturers** – the IoT devices that are inserted into vehicles may be produced by the telco or another partner.
- **Edge and cloud providers** – connecting the IoT devices to the cloud to provide real time dashboard insights. As real-time analysis becomes more prevalent, smart transport will become a key drive of edge compute demand (see more detail).
- **Software providers** – third parties can connect through APIs to enhance the functionality of the solution for enterprise customers.

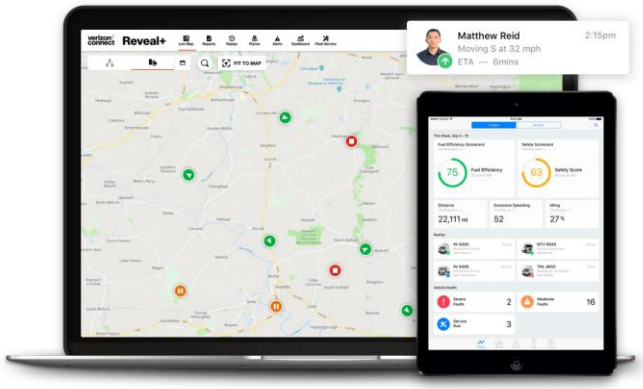
Further reading

Verizon Connect + Tata FleetMan + Telia Eco-Driving

Case study: Verizon Connect

How it works

Find out more



- Verizon Connect produces its own hardware devices, which are inserted into vehicles. From these devices, it enables various applications.
- Data is collected in real time and is visible through dashboards.
- Fleet managers can choose from a range of functionalities, including the ability optimise routes based on traffic and therefore save fuel, or monitor driver behaviour to ensure enhanced fuel efficiency (e.g. detect harsh acceleration and braking).
- Can be bought directly from Verizon or through vehicle OEM partners.

Key partners in this scenario

Sensors / hardware	verizon connect: Devices fitted with sensors are installed in a vehicle, which can then track vehicle location, driver behaviour and more.
Connectivity	verizon: Connectivity via own or other telcos' cellular coverage.
Application	verizon connect: Verizon Connect offer several applications available through its dashboard. Can be accessed via mobile or desktop.

Impact

Business model

B2B/G	B2B2X	B2C

S	Verizon has created a market leading telematics solution with global reach. It provides the full stack including proprietary software and hardware.	W: The solution does not clearly convey the sustainability benefits it provides. Also, Verizon Connect is the result of intense M&A activity that may be hard for others to replicate.
O	Evolve proposition to be more explicitly sustainability focused, e.g. prioritising development of apps with clear carbon benefits. Expand from B2B into B2C market.	T: There are a number of operators with their own telematics solutions. Verizon must continue to innovate to stay ahead of its competition.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

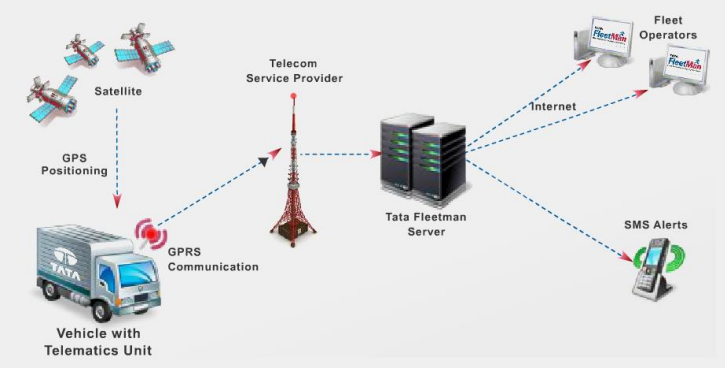
Telco offering this service

None	Some	**Many**	Most

Case study: Tata FleetMan Telematics

How it works

Find out more



- Tata FleetMan is the fleet telematics solution from Tata Motors (the largest commercial vehicle manufacturer in India). As of 2021 it had connected more than 2m vehicles in India.
- Users can track and control vehicles with a wide range of features, such as real time monitoring of engine idling, fuel consumption, harsh acceleration, and geo-fencing of sites / zones / points of interest.
- Analytical reports aggregating behavioural data enables customers to optimise fleet management according to the parameters of their choice. Carbon emissions tracking are not currently a prominent measurement, but could easily be added to the solution.

Key partners in this scenario

Manufacturers → **Service locations** → **Application Platforms**

TATA MOTORS

Tata FleetMan is installed in the vehicle at the manufacturing stage to ensure smooth integration.

TATA FleetMan Fleet Telematics for higher productivity

Tata FleetMan is supported by 1200 service locations across the country.

Google play

The FleetMan app is hosted on Android for Google play and the App Store.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S	This solution is the first of its kind in India. Users can become more conscious about the impact of their driving on fuel consumption.	Limited sustainability element within the current proposition. Cybersecurity issues with hacks, threats to the safety of passengers.	**W**
O	More explicit sustainability focus across the proposition.	There are a number of operators with their own telematics solutions. Tata must continue to innovate to stay ahead of its competition.	**T**

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	**Many**	Most

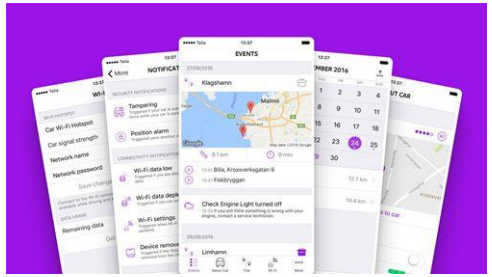
STL PARTNERS

Case study: Telia Eco-Driving

How it works

Find out more

- Telia Eco-Driving gives drivers oversight of their driving style and fuel consumption. Telia reports that this **reduces fuel costs by 12% per vehicle per year**, and likewise reduces carbon emissions.



- Eco-driving is a service that runs on the Telia IoT platform and is connected via Telia IoT Edge.
- The system analyses driving habits and fuel consumption while the vehicle is in use, and reports on the level of consumption beyond the amount actually required for the trip.
- It provides real-time feedback on the driver's display screen and advanced user interface, which allows them to monitor their driving style in real-time.

Key partners in this scenario

Software configuration

Telia IoT Edge gateway (MIIPS C) touchscreen and Drivec Bridge are installed in the vehicle.

Analytics and insights

The service leverages Telia's managed IoT services, including connectivity, device management and data analytics capabilities.

Cloud-based customer portal

Third-party apps & services

Telia operates an open platform, APIs and standards so customer can integrate with their own systems or third-party apps.

Impact

Business model

B2B/G	B2B2X	B2C

S

Measurable reduction in fuel costs and carbon emissions. A direct offering that supports environmentally-friendly driving, with suggestions on how to improve.

Telia develops and offers the end-to-end solution.

W

Cybersecurity issues with hacks, threats to the safety of passengers.

O

Expansion into B2C market.

New partnerships to deliver further emissions reductions, e.g. with Google Maps for planning low emissions routes.

T

Potential competition from other fleet management providers integrating similar services into their propositions.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	**Some**	Many	Most

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Smart buildings for enterprise (excluding industrial)

USE CASE A-Z

How it works

- Sensors are installed throughout a building to monitor the overall energy consumption and equipment conditions. The goal is to increase the building's energy efficiency and maintain comfort levels.
- In addition to real-time optimisation of building energy (e.g. heating, ventilation and air conditioning), examples of advanced controls include dynamic solar shading (mechanical shades to alter solar radiation and reduce the need for internal heating/cooling).
- Insights from the data collected and other data (e.g. weather, traffic) provide greater predictive power for optimising actions.
- Energy consumption data can also be used for energy audits or compliance.

How does it enable net-zero?

- **Demand response –** grid energy usage aligns to peak renewables generation.
- **Optimised for occupancy** – ventilation and air conditioning can be set to meet predicted/actual occupancy rates to avoid unnecessary heating and cooling.
  - For example, edge AI company Foghorn has developed an application that uses Florida schools' timetable schedule data to predict classroom occupancy and automatically determine energy use accordingly (pre-emptive heating, cooling, lighting controls)

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems Integration**	Private Networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **OEM and device manufacturers** – the IoT sensor may be manufactured by the telco or partner with an external manufacturer.
- **Software developers-** to provide the software which will analyse the data received and action insights either automatically or manually.
- **Cloud providers** – data will need to be sent to various parties to be actioned and this is likely where data analysis will occur.

Further reading

DT + KT

Case study: DT Building Management as a Service

How it works

Find out more

- Building Management as a Service (BMaaS) provides the sensors and IoT solution for the customer.
- Deutsche Telekom offers a 'building monitoring and analytics' IoT bundle which provides the building manager with insights on energy use and space utilisation.
- The sensors measure indoor temperature, CO2 levels and humidity along with motion detectors which measure room usage.
- This data is sent to the cloud IoT platform based on Microsoft Azure which analyses the data and visualises it in almost real time allowing the building manager to make data driven decisions.
- Insights could result in changes to lighting/heating/cooling requirements to reduce energy consumption.

Key partners in this scenario

Connectivity & Hardware

Deutsche Telekom

Telekom provides the sensors and the mobile connectivity to connect to the IoT.

Data Analytics

Microsoft Azure

The IoT is based on Microsoft Azures cloud which is where the data is analysed.

User Interface

Deutsche Telekom

Telekom provides the final user interface on which the data is visualised.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S

Scalable solution that has positive environmental impacts.

Integration with Microsoft Azure.

W

Sustainability benefits of the solution are not clearly communicated and are only a byproduct of the service.

O

The ability for this solution to save carbon emissions could be more clearly communicated.

T

Smart building solutions that clearly convey both the cost and sustainability benefits to their customers may be more attractive.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: KT Building Energy Management System

How it works

Find out more

- In order to receive a building permit in South Korea, you must submit an energy-saving plan which includes a building energy management system (BEMS). These systems monitor a buildings energy needs.
- Korean Telecom offers an end-to-end IoT solution, KT Estate, which monitors various building features such as overall energy consumption, boiler and water tank efficiency and other energy consuming equipment.
- The overall goal of this is to reduce the building owners' costs by reducing energy consumption while meeting BEMS regulations.
- The applications of the data collected can be operational changes from insights gained or predictive maintenance/replacing inefficient equipment.

Key partners in this scenario

Cloud, IoT, AI and Big Data	Korea Telecom uses these for smart building management and integrated building management solutions.
Control Centre	KT Estate's smart integrated control centre offers remote an energy management service.
Cloud Storage	KT's BEMS model is installed in cloud storage.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S Widely applicable smart building solution with clear cost savings benefits.	**W** Sustainability benefits of the solution are not clearly communicated and are only a byproduct of the service.
O Could be positioned more specifically as a sustainability solution. Potential to expand to consumer homes.	**T** Smart building solutions that clearly convey both the cost and sustainability benefits to their customers may be more attractive.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Table of Contents

Smart farming

USE CASE A-Z

How it works

- Smart farming solutions use sensors to monitor various environmental conditions such as soil moisture, water level, light, humidity, obstacles, and motion.
- As farming is highly resource intensive, leveraging the data from these sensors enables farmers to ensure efficient use of resources to deliver the highest yield possible.
- More sophisticated solutions leverage automated solutions for crop and system management on farms.
- Major IoT applications for farming include farm vehicle tracking, livestock monitoring, water level monitoring, storage and inventory levels, soil and crop monitoring.

How does it enable net-zero?

- According to the IPCC agriculture, forestry and other land-use accounts for 24% of greenhouse gas emissions globally, the second largest industry contribution after electricity and heat production. Efficiency gains can therefore have a significant impact on reaching emission reductions targets.
- **Improved crop yield** via IoT sensors ensures minimal wasted resources (e.g. water and fertiliser). This directly reduces the carbon footprint of fertiliser production.
- Reduction of fertiliser use will also reduce the amount of runoff, mitigating the negative knock-on impacts upon the environment.
- Automating processes reduces human intervention and associated transport emissions.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	**Security**
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	**Digital twins**

Potential ecosystem partners

- **Device manufacturers** – to produce specific IoT devices which will improve farming processes.
- **System Integrators –** opportunities for end-to-end IoT solutions, including device and data management.
- **App developers** – as partners for telcos, enabling them to provide a range of services to meet specific needs of different agricultural customers.
- **Cloud / edge compute providers** – to host applications and support real-time advanced analytics.

Further reading

AT&T and WaterBit + DroneSeed + Allflex + Growlink

Case study: Vodafone Smart Trees

How it works

Find out more

- Vodafone UK, Forest Research and DEFRA have formed a partnership which aims to measure the efficacy of trees in absorbing carbon dioxide from the atmosphere.
- Using IoT sensors that connect to the internet, the sensors measure the circumference of a live tree trunk to within a few hundredths of a millimeter. The greater the circumference, the more CO2 it has absorbed. Determining the rate of sequestration can help foresters to manage trees more effectively.
- This initiative is currently in a trial phase. If successful, the technology will be deployed in other rural locations by DEFRA.

Key partners in this scenario

IoT sensors	HARDWARIO Sensors produced by Hardwario measure the tree's circumference, soil moisture and temperature, air temperate and humidity, and susceptibility to wind damage.
Connectivity	vodafone Data is transmitted across Vodafone UK's long range IoT network.
Forest managers	Department for Environment Food & Rural Affairs Working with DEFRA, forest managers can make data-driven decisions and plan accordingly to maximise sequestering efforts

Impact

Business model

B2B/G	B2B2X	B2C

S	Obvious telco play in providing the connectivity and network across which the data is shared, ensuring Vodafone's continued role as this use case is scaled.	The operator in this scenario is relegated to providing only the connectivity. The data being captured feeds into reporting only.	W
O	Opportunity for Vodafone to position itself as an authority on sequestering within the UK once the trials have successfully concluded.	Given that the operator is only providing connectivity in this scenario, it is a low barrier to entry for other operators to provide a similar solution.	T

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

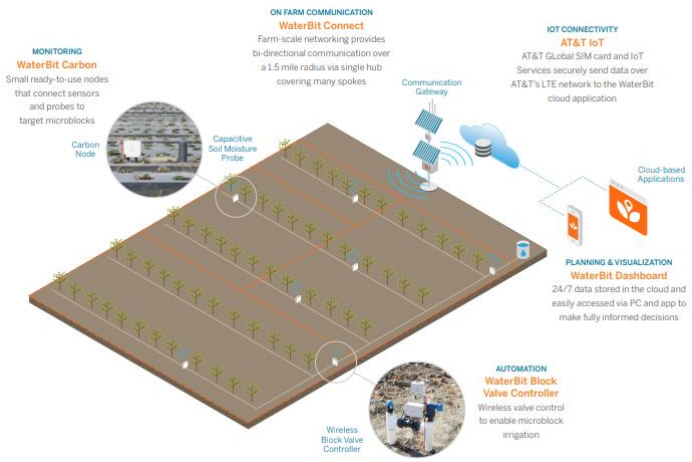
Telco offering this service

None	Some	Many	Most

Case study: AT&T & WaterBit Smart Farming

How it works

Find out more



- Asparagus farming is a water intensive process. Farmers need to manually probe the ground for soil for moisture levels.
- With WaterBit, small solar panel sensors automatically measure the soil humidity and temperature and send the data to the cloud over an LTE network.
- This presents the farmer with accurate data about where to add water.
- For this solution, AT&T provides the IoT services and SIM cards to enable data transfer over its LTE network, and WaterBit provides the application.

Key partners in this scenario

Hardware	WaterBit has developed nodes that connect to sensors and target blockages.
On farm connection	Farm scale networking for communication via single hub.
Connectivity	AT&T Global SIM card and LTE connectivity.
Application	Data is stored in the cloud and accessed via PC + mobile apps.

Impact

Business model

B2B/G	B2B2X	B2C

S	Clear sustainability benefit through efficient water usage. End to end solution for customers.	Limited benefit for the telco beyond providing connectivity services. W
O	AT&T could move up the value chain, e.g. by developing its own hardware or application. Bundle with other smart farming services or app marketplace.	Others telcos that offer similar smart agri solutions, but provide more than just connectivity, will be able to claim a larger portion of enablement. T

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Smart farming

Case study: Allflex Livestock Intelligence

How it works

Find out more

- Allflex's solution supports sustainable agricultural practices through digital livestock management technology.
- Allflex provides over 500 million tags every year to identify, monitor, and track animals.
- Data from monitoring systems helps farmers to optimise and maximise their production practices while reducing adverse impacts on natural resources or animal welfare.
- The tags show shipping, origin, vaccination and health status of the animal as well as allowing remote feeding and levels of control for milking automation.
- Allflex also partners with a wide range of identification, milking and monitoring companies globally to drive further innovation in the industry.

Key partners in this scenario

Hardware	SenseHub™ Livestock are fitted with tracking devices that monitor their condition.
Connectivity	Telco Telcos provide the connectivity that enables data transmission and monitoring.
Application & analytics	SenseHub™ SenseHub livestock monitoring software provides health alerts and monitoring reports of cattle.

Impact

Business model

B2B/G	B2B2X	B2C

S	This solution is broad and can have a positive environmental impact in several different ways.	The specific sustainability impact of this solution is not clearly communicated and is only a by-product.	W
O	Opportunity to calculate the resources saved through the use of Allflex (e.g. reduced use of farm vehicles), helping to more clearly position this as a sustainability solution.	Other solutions that are clearly labelled as sustainability solutions but provide similar functionality may be more attractive.	T

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	Some	Many	Most

Case study: DroneSeed Drone Reforestation and Farming

How it works

Find out more

- Drones map out areas of forest and identify the best candidates for reforestation by relaying information to experts who decide where and when to deploy their resources.
- The drones disperse biodegradable seedpods through the air into the ground, allowing a drone to reforest one hectare every 20 minutes.
- One human can plant around 1,500 seeds per day whereas a pair of drones can plant almost 100,000 a day.
- Droneseed helps landowners in places that have been impacted by increasingly devastating wildfires, e.g. western United States.
- A number of telcos are currently trialing the use of drones as a 5G use case. Telcos may look to partner with a company like DroneSeed or develop a similar, sustainability-led proposition with their technological capabilities.

Key partners in this scenario

Hardware

drone seed

The key hardware element in this use case are the drones that can gather data to generate 3D maps and disperse seedpods.

Connectivity

Telco

Cellular connectivity enables data from the drones to be sent to the visualisation applications.

Application & analytics

drone seed

Enable the data collected from the drones to be visualised, from which decisions are made.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S Innovative use of new technologies to regenerate agricultural sites by planting more seeds that will lead to better sequestering.	**W** A niche offering that may be difficult to scale.
O The carbon emissions that are saved through the use of drones could be calculated to more clearly communicate the sustainability impact of this solution.	**T** Drones are a key use case for 5G. Early movers like DroneSeed should secure their advantage.

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

Case study: Growlink Crop Management

How it works

Find out more

- Growlink provides data driven farm automation and networking systems for greenhouse and indoor cultivation.
- It provides hardware to monitor and control irrigation in crop production, with the option to extend its functionality and connect to other Growlink climate and fertigation controllers to ensure greater control over the cultivation facility.
- This allows for the remote management of crops and the more efficient use of energy and resources in the agricultural process.

Key partners in this scenario

Hardware	Growlink manufacture hardware devices including climate sensors, irrigation controllers and moisture sensors.
Application	Growlink App visualises the data for optimisation testing.
Connectivity	Telcos provide the connectivity that enables data to be sent from the hardware devices to the monitoring applications.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S	Solution helps farmers to reduce the resource intensity of production through the use of small and easy to deploy IoT devices.	Solution is focused on cost and resource savings and the sustainability impact is currently more of a by-product.	W
O	Opportunity to model the positive environmental impact of this solution, e.g. carbon emissions saved from farm vehicles by enabling remote management.	Other solutions that are clearly labelled as sustainability solutions but provide similar functionality may be more attractive.	T

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Smart farming

Case study: Microsoft FarmBeats

How it works

Find out more

- Microsoft FarmBeats is working to provide an end-to-end technology solution for farmers to help increase productivity and reduce costs in the context of increasing demand for food production, limited additional arable land and receding water levels
- They have worked with Seeed Studio to develop customised Sensor Box hardware to collect data which is then stored in Azure and visualized in the FarmBeats app.
- Farms tend not to have power or internet connectivity, so the FarmBeats project aims to build solutions that resolve these issues, by leveraging low cost sensors, drones and vision and machine learning algorithms and combining this enabling technology with the knowledge and intuition of farmers.

Key partners in this scenario

Hardware (sensors)

Seeed Studio's Sensor Box contains 8 sensors to monitor the environmental conditions that can affect crops.

Azure Cloud

Data collected by the Sensor Boxes is sent to a FarmBeats gateway (a Windows PC) and then stored and refined in Azure Cloud

FarmBeats App

Simplified and visualised data available in the FarmBeats app to inform decisions, e.g. when and where to plant certain crops

Impact

Business model

B2B/G	**B2B2X**	B2C

S

An end-to-end technology solution that benefits a previously technologically-underserved segment in a practical way.

W

Solution is framed as having a cost saving impact, sustainability is not central to the solution. Currently still in trial period with unclear roadmap for commercial deployments.

O

Given Microsoft's global footprint, potential to make a major impact in response to food production pressures. The solution could more clearly measure and report on its sustainability benefits.

T

A number of smart agricultural solutions exist in the market, Microsoft will have to differentiate itself sufficiently to corner the market.

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

Use case

Case study: Proximus Weed and Pest Control

NEW | IMPACT | CUSTOMER | CASE STUDY A-Z

How it works

Find out more

- Proximus' smart agriculture solution uses drones to capture the images of a site and AI identifies the weed or disease pattern. Based on this information a task map is created for a burner-equipped robot (for weeds) or pesticide sprayer (for pests/disease).
- The burner-equipped robot or sprayer follows the task map using a flame or pesticide spray. It uses a high flame or pesticide in areas with more weeds/pests and a low flame or no pesticide where there are fewer weeds/pests.
- By 2030, farmers in Europe will have to reduce their use of pesticides by 50%. In this test case, Proximus found pesticide use could be reduced by 80%.
- This directly reduces harmful environmental impacts such as damage to non-target organisms, and indirectly reduces emissions created as a by-product of the manufacture and distribution of pesticides and herbicides.

Key partners in this scenario

Hardware	Exobotic provides the drones for image capture and the robot.
Connectivity	Proximus provides the 5G connectivity that enables data to be sent from the hardware devices to the monitoring applications.
Application and analytics	Robovision provide AI interpretation of the drone images.

Impact

Business model

B2B/G	B2B2X	B2C

S	This solution clearly articulates its sustainability impact, and helps farmers to meet sustainability related targets by measuring the amount of pesticides it can save.	Unclear whether test results will be replicated when deployed in imperfect conditions. W
O	Opportunity to expand into other agricultural solutions, helping farmers to clearly identify the resource savings they can expect with each solution.	Industry specific providers are also active in this area and Proximus must continue to innovative to stay ahead of its competition. T

Solution maturity

No telco service yet	**Telco/POC trial**	Commercial solution	Scaled solution

Telco offering this service

None	**Some**	Many	Most

STL PARTNERS

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Food waste management

USE CASE A-Z

How it works

- Supply chain management solutions can help to reduce food waste and its associated environmental impacts.
- Around 1/3 of all food produced globally goes to waste each year which contributes to harmful GHG emissions.
- Waste management systems include inventory tracking which can ensure produce is rotated in accordance to food safety guidance and helps to reduce spoilage.
- A complex supply chain is a significant contributor to food waste. Having visibility into the supply chain can allow businesses to make informed decisions and therefore take steps to reduce wastage at each stage of the process.

How does it enable net-zero?

- **Food waste** – When food is disposed of in landfill it rots and produces methane, an extremely potent greenhouse gas. Reducing food waste reduces methane production.
- **Food production** – Food production accounts for around 1/3 of global greenhouse gas emissions. Reducing food waste should inform the levels of food production and minimise unnecessary production intensity.
- **Transport** - Streamlining supply chains and making informed decisions centered around sustainability rather profit will reduce emissions caused by transport of food product.

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	Security
Edge	**Systems integration**	Private networking	**AI/analytics /automation**	Digital twins

Potential ecosystem partners

- **IoT device manufacturers**– produce the IoT equipment used in many of the solutions.
- **Application developers** – create an easy to navigate interface for the supply chain participants.
- **Cloud providers –** provide application hosting as well as space for data to be stored and analysed.

Further reading

TELUS Ignition

Food waste management

Case study: Ignition Supply Chain Management

How it works

Find out more

- TELUS' supply chain management solution aims to improve the efficiency of the food supply chain. This helps to prevent unnecessary food waste while positively contributing to company profits.
- Ignition by Telus offers a range of solutions by providing a purpose-built platform to analyse operations. Data visualisation provides suppliers actionable insights.
- Demand forecasting lets suppliers observe changes in customer demand over an extended period allowing them to plan future inventory. This means customer demand can be met while avoiding ordering needing excess inventory.
- Warehouse management systems allow expiration date tracking and visibility giving suppliers a comprehensive overview of their stock.

Key partners in this scenario

Software provider	AFS is a specialist in food and beverage software solutions and has partnered with TELUS to deliver.
User interface	Offer the solution on the final user interface, run and manage it.
Food distributors	Ignition partners with food distributors to provide a tailored service.

Impact

Business model

B2B/G	B2B2X	B2C

S	The solution is market leading in the supply chain management space. It has a suite of applications to handle diverse requirements. Directly helps reduce food waste.	W: The solution is not currently packaged in a way that demonstrates its sustainability credentials.
O	TELUS has an opportunity to brand the solution as being specifically beneficial for sustainability.	T: A number of industry specific providers of supply chain management solutions compete directly with Ignition by TELUS.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

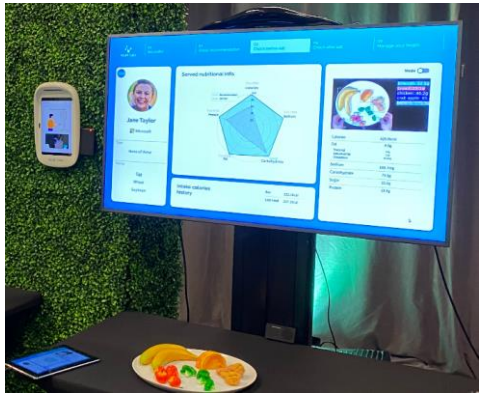
None	**Some**	Many	Most

Food waste management

Case study: Nuvilab Smart Consumption

How it works

Find out more



- Nuvilab aims to solve global warming and nutrition problems by reducing food waste. By leveraging AI and big data, it provides both an 'Earth Care' proposition and a 'Health Care' proposition.
- Using scanners to register the amount of food that a user has on their plate, Nuvilab provides information on the nutritional content as well as the amount of food left over at the end of a meal.
- This data can be used by individuals to help them receive nutritional insights. It is also used by businesses, including restaurants and cafes.
- By receiving accurate insights on consumption, businesses can adjust their order quantities and avoid unnecessary waste.
- To date Nuvilab claims its solution has avoided 12 million kilograms of food waste and 16,000 tons of CO2.

Key partners in this scenario

Hardware	Nuvilab provides three AI enhanced scanners, the 'stand scanner', 'auto scanner' and 'mobile' scanner.
Software application	Nuvilab provides a dashboard that provides users (consumer and enterprise) to view the insights and adjust accordingly

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S Innovative solution that caters both to consumer, and enterprise customers. Combines technology with data analytics to provide direct insights into optimal sustainable practices for consumer.	**W** Limited transparency on methodology for calculating CO2 impact of food waste. Only available in South Korea only.
O Partner with companies offering consumer-facing carbon tracking apps.	**T** Lack of transparency on methodology puts company at risk of greenwashing claims.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	Scaled solution

Telco offering this service

None	Some	Many	Most

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Smart city

USE CASE A-Z

How it works

- Elaborating on the ITU definition, a smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other emerging technologies to improve quality of life, efficiency of urban operation and services, while ensuring that it meets the needs of the present and the future generations with the respect to economic, social, environmental as well as cultural aspects.
- To achieve those objectives, several systems of the city need to become smart and sustainable. Examples are: **improving energy efficiency of buildings and infrastructures, efficiency of water distribution systems, waste management, and intelligent mobility**.

How does it enable net-zero?

- There are four main objectives in smart sustainable city applications:
  - Optimisation of energy consumption of buildings and city infrastructures.
  - Optimising water consumption and reducing losses.
  - Optimising waste management systems.
  - Integrating system data from different cities to enable sustainability-based decision making (the role of smart city platform is crucial)
- Technological capabilities should also include: LPWAN, IoT and cybersecurity solutions

Technology capabilities

LPWAN	**IoT platform**	**2/3/4/5G**	Others (fixed, satellite)	**Security**
Edge	**Systems integration**	Private networking	AI/analytics /automation	Digital twins

Potential ecosystem partners

- **The ecosystem has a public-private partnership nature.** On one side, the technology players – often organised in consortium, public authorities, and local universities and further education colleges.
- **On the technology side**, those are the typical players involved: MNOs, other telco providers, system integrators, smart city application specialists, smart city platform providers, smart city hardware manufacturers. Note: local organisations could play a vital role.

Further reading

ITU-T Smart Sustainable Cities

STL PARTNERS

Case study: Cambridge Intelligent City Platform

How it works

Find out more

- Cambridge smart city is an initiative to use digital technology to improve transport, the environment and communities.
- At the core of Smart Cambridge is the Intelligent City Platform (iCP). The iCP collates and processes real time data from sensors around the city.
- The city-wide sensor network is gathering data from existing systems such as traffic lights, bus movements, and car parks, together with new traffic monitoring cameras and air quality sensors. These can be used to monitor a range of measures including air quality, traffic, cycle and pedestrian movements.
- A new LoRa network has also been established to transfer the data flowing in from the sensors to the data hub. The combined data can then be analysed and visualised to plan smart solutions.
- The platform will also allow citizens, third-party developers and commercial partners to use the data to 'test bed' innovative applications

Key partners in this scenario

Local authorities	Cambridge City Council, Cambridgeshire County Council Developing smart city strategy and leading the ecosystem
Universities	University of Cambridge, Anglia Ruskin University Contributing to strategy development and project solutions
Implementation partners	GeoSpock, Telensa, CW Cambridge Wireless A mix of third-party developers and commercial partners

Impact

Business model

B2B/G	**B2B2X**	B2C

SWOT

S

Creating an integrated view of the city for better decisions and actions in sustainable policies. Ability to track processes, which could later be expanded into more direct sustainability offerings.

W

The exclusive use of LPWAN tech limits the domain of applications. A connectivity mix that looks at big-data applications is necessary.

O

Open data model enables innovation for better sustainable solutions.

Improve engagement with citizens on sustainable behaviour.

T

Hacking of the platform is a critical threat to take into consideration through dedicated cybersecurity strategies.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: Rotterdam Smart Waste Management

How it works

Find out more

- Rotterdam has installed a smart waste management system with the aim or lowering the energy consumption of waste collection vehicles by monitoring their degree of filling and optimising collection routes.
- Sensors have been installed at waste facilities (like city centre bins) to measure the filling percentage and indicate when the container has reached its maximum fill level – or when it has been emptied.
- Data is communicated through a network to a centralised management system. The results are a 25% decrease in labour and equipment (costs) and a change from 203 static waste collecting routes into 165 dynamic waste collecting routes. There is also a reduction of 20% in driven kilometres, and 20% in CO2 emissions.
- The LoRa city network is the backbone for this service and others developed by the City of Rotterdam within a wider project called Ruggedised.

Key partners in this scenario

Local authorities

Ruggedised is European smart city consortium in which City of Rotterdam belong to.

Waste management specialist

Dutch providers of sustainable energy and waste solution.

Connectivity specialist

Leading mobile network operator in the Netherlands with a country wide LoRa network.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S

The optimisation of routes leads to a CO2 emission reduction of 20%.

Resource cost reduction estimated at 20%.

W

The role of KPN as connectivity provider only could limit its access to the potential opportunities at the platform and application level.

O

Replication of the model for the entire city of Rotterdam and also nearby cities and communities.

T

Scaling might be slow.

The Netherlands has great public coverage, in other countries poorer coverage might hinder replication.

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: Verizon Smart Street Lighting

How it works

Find out more

- The municipality of West Springfield chose to replace its old street lighting system that cost $444,000 to run per year and consumed more energy than was compatible with the goal to reduce the municipality's energy use by 20%.
- To achieve climate and cost goals, West Springfield chose to deploy Verizon's cellular-based Grid Wide Intelligent Lighting solution. The system uses sensors, lighting control nodes, 4G LTE connectivity and a cloud-based management system, to control the municipal street lighting system.
- This remote-based lighting solution makes the town operations more efficient, turning lights on and off when they are not needed, and responding to issues more quickly.

Key partners in this scenario

Municipality	West Springfield Municipality, leading the project
Hardware provider	Realterm Energy provides the LED lighting system and sensors.
IoT solution provider	Through Grid Wide, Verizon provides connectivity and platform solution.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S	Cost-efficient solution for the municipality. Grid Wide also creates a data management tool for further actions.
W	The initial investment could be high for the municipality, which could hamper further projects. Possible issues with LED technologies.
O	Solutions can be expanded, deploying other sensors in the lighting posts. Developing an open data model for innovation.
T	Physical and cyber security risks need to be considered.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	**Some**	Many	Most

Case study: Telstra Smart Water Management

How it works

Find out more

- Telstra are trialing a water management solution using IOT sensors and an analytics solution to save water and lower costs.
- Deployed by Busselton Water in Western Australia, a new generation of digital water meters collect data including pressure, consumption, and alerts such as pressure drops.
- The sensors are managed via Telstra's IoT platform and software partner Software AG's Cumulocity IoT Accelerator running in the cloud. Dashboards provide users with near real-time full state-of-play at any given time.
- The solution is due to be rolled out across Australia as a standalone solution or as part of the IOT for intelligent utilities package.

Key partners in this scenario

Utility partner	Bussleton water provides water to a population of more than 28,000
IoT platform and connectivity	Provides the IOT platform and sensor connectivity
IoT solution accelerator	Integrates Telstra IoT platform with Cumulocity to provide real time data visualisation

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S

Telstra provides platform and analytics services rather than just connectivity.

The solution directly support ways to reduce water waste.

W

As a small city, scalability of the solution beyond Busselton still needs to be proven.

O

Solutions can be expanded to other utilities, like street lighting.

Developing an open data model for innovation.

T

The cyber-security aspect of the solution must be a priority.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	Many	Most

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Telecoms scope 1-3 emissions reduction

USE CASE A-Z

How it works

- Telecoms operators are adapting their internal operations to be more resource efficient.
- In some cases, they are positioning these as enablement solutions for customers. For example, as well as delivering much higher quality of experience, fibre broadband is far more energy efficient than copper. Some telcos are highlighting this benefit in their propositions to customers.
- While these use cases are key contributors to achieving net-zero broadly, we believe they should be counted within operators' scope 1, 2, and 3 emissions targets rather than as enablement solutions, so. have separated them out in this deck
- We profile a combination of high profile case studies on telcos' core operations, and some innovative ones that operators are highlighting to their customers.

How does it enable net-zero?

- Replacing existing infrastructure with more efficient solutions that are more energy efficient, have longer life spans, or require less maintenance.
- Replacing physical products with recycled or sustainably sourced materials, including offsets on shipping and sustainable decommissioning.
- Adopting software that can manage network and compute resources more efficiently without impacting on quality of service.

Technology capabilities

LPWAN	IoT platform	2/3/4/5G	Others (fixed, satellite)	Security
Edge	Systems integration	Private networking	**AI/analytics /automation**	**Digital twins**

Potential ecosystem partners

- **Telecoms hardware and equipment suppliers** – providing more sustainably sourced physical elements to telcos' supply chain
- **Telecoms software suppliers** – to provide innovative ways to adapt demand to renewable energy supply.
- **Government** – providing incentives or partnerships to accelerate the shift towards more sustainable operations.
- **Investors** – providing green finance for largescale shifts from copper to fibre infrastructure.

Further reading

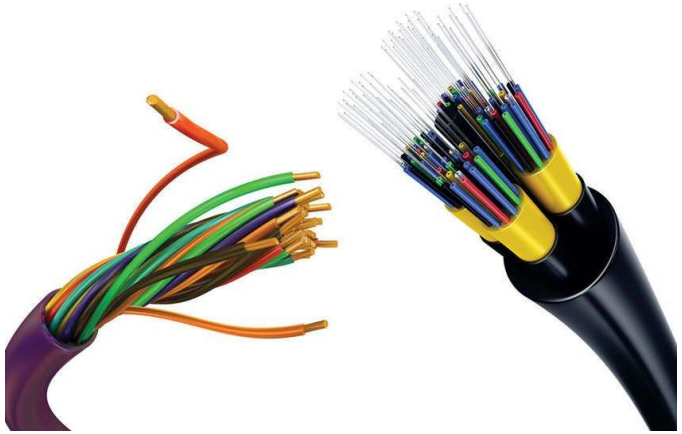
BT Openreach Copper to Fibre switch

Telecoms scope 1-3 emissions

Case study: BT Openreach Copper to Fibre

How it works

Find out more



- In 2021, Openreach announced that it had upgraded a further 86 exchange locations across the UK to fibre, covering an additional 500,000 premises.
- The UltraFast Full Fibre network connects homes and businesses directly to BT exchanges with a single pure fibre cable.
- For existing customers, the switch over happens on a nominated "Switch Over Day".
- By 2025 BT Openreach plans to decommissioned its entire ageing Copper Wire Telephone Network and replace it with a Fibre Optic Broadband Network.
- By the end of 2026 it plans to have rolled out fibre to 25 million homes in the United Kingdom.

Key partners in this scenario

Infrastructure	openreach The fibre infrastructure is installed and maintained by Openreach, and is available for use by non-BT ISPs.
Data analytics	Qlik Sense A tool by Qlik is helping BT halve the time taken to install business fibre connections.
Hardware	openreach Openreach uses its SOGEA products (Single Order Internet Access) and an OMT modem.

Impact

Business model

B2B/G	B2B2X	B2C

S	Telcos with full fibre networks can guarantee lower emissions for customers. Fibre networks also have 70-80% fewer faults than copper.	**W** Improving sustainability is not the primary purpose of this solution and should not be positioned as such. The copper products must be disposed of properly for a fully sustainable process.
O	Opportunity to drive infrastructure convergence. Access to green financing for costly network transformation.	**T** Communicating this solution as an enablement service could attract accusations of greenwashing.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

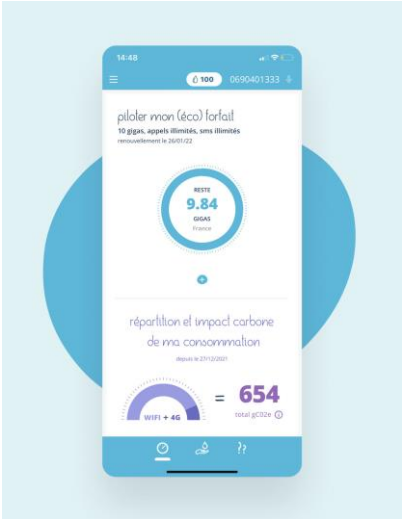
Telco offering this service

None	Some	**Many**	Most

Case study: Bouygues Source Mobile

How it works

Find out more



- As a leading MNO in France, Bouygues Telecom has created Source, a sustainable and responsible subscription plan that is opened and accessed entirely through its mobile app.
- The app contains a dashboard to estimate the Co2 consumption of the data being used. It also provides advice for limiting data consumption (e.g. using Wi-Fi instead of cellular connectivity).
- The app enables users to accumulate 'water drops' (a type of points/currency system) for any unused gigabyte of data from their subscription package.
- Customers can 'donate' these water droplets to different associations. Bouygues has partnered with Lilo, which provides access to over a thousand associations. Lilo is a search engine that is designed to facilitate donations to associations.

Key partners in this scenario

Subscriber account management

Application

Search engine

Thales and triPica joined forces to create a solution that optimizes subscriber account management of new remote registrants

Created Source, a mobile only subscription plan

Lilo is a sustainable search engine that facilitates the conversion of unused data into donations

Impact

Business model

B2B/G	B2B2X	**B2C**

S	A unique, Bouygues-specific offering that allows it to differentiate itself as a sustainability-conscious telco. Encourages customers to save data (hence reduce carbon emissions) and to support a particular cause.	This service costs Bouygues to deliver. It does not receive a direct cost benefit from its customers using less data, instead it has to pay the associations the directly. Still within Bouygues own scope 3. **W**
O	Opportunity to further advise consumers about how to reduce their carbon footprint beyond just minimising their data consumption. This could enable Bouygues to provide a more holistic sustainability service.	Other telcos in France could develop a similar offering with enhanced or extended functionality, eroding the differentiator that Bouygues has developed. **T**

Solution maturity

No telco service yet	Telco/POC trial	**Commercial solution**	Scaled solution

Telco offering this service

None	**Some**	Many	Most

Case study: Cloud Workload Placement

How it works

Find out more

- Renewable energy is not always locally available for powering cloud workloads (e.g. no local wind or sun).
- Companies wishing to reduce the emissions associated with cloud workloads (including telco operators) have limited options: e.g. time-shifting computation, energy storage, DC transmission.
- Furthermore, as renewables contribute a greater proportion of power, local 'green' surpluses are increasingly common.
- Intelligent workload placement allows firms to move workloads to where low-carbon energy is plentiful by including carbon intensity as an optimisation factor into workload management.
- By using a distributed fabric of heterogeneous compute, data, and intelligence, telcos can power on-demand, context-aware, distributed modern applications for customers and themselves.

Key partners in this scenario

Distributed cloud compute

Local cloud infrastructure providers including telcos and third-party infrastructure provider such as Vapor.io

Kinetic grid platform

Intelligent optimisation can support goals like meeting application SLAs while minimising carbon emissions

Emissions and performance optimised cloud compute

Service providers also provide a channel and mechanism to meet emissions targets

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S
- Offers a real alternative to carbon accounting or storage.
- Increases the value of renewables.

W
- May result in under-use of compute facilities.
- Still need to move workloads.
- Not all workloads can be moved across distances.

O
- Cloud differentiation for telcos with geographical coverage.
- Reduce energy costs.
- Educate market on 'real' 100% renewables.

T
- Hyperscalers also have coverage and networks.
- Storage and hydrogen provide viable alternative.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	Scaled solution

Telco offering this service

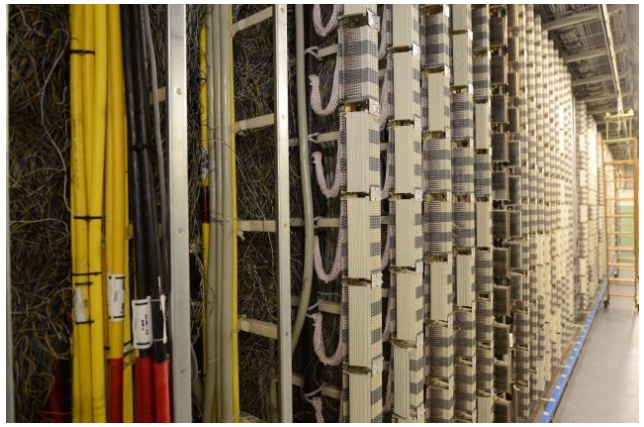
None	Some	Many	Most

Telecoms scope 1-3 emissions

Case study: Telefónica Green Bond for Network Upgrade

How it works

Find out more



- Telefónica launched a hybrid Green Bond (of debt and equity) in 2020, the first of its type in the telecoms industry, amounting to €500 million. It launched two further green bonds in 2021.
- In turn, this Green Bond issuance enabled Telefónica to finance the transformation of its copper network into fibre optic in Spain. The new fibre network is 85% more energy efficient.
- The deployment of fibre has enabled Telefónica to close hundreds of its technical buildings, reuse the equipment and recycle the material as part of its circular economy commitment.
- Telefónica's goal is to have 100% of its Spanish retail customers using fibre optic by 2025.

Key partners in this scenario

Investors → Internal teams → Third-party verification

Allianz

E.g. Telefónica and Allianz have reached an agreement for the creation of a joint venture to deploy FTTH in Germany.

Telefónica

The sustainability and finance team worked together to create the green bond.

SUSTAINALYTICS

Sustainalytics verified Telefonica's framework for its green bonds.

Impact

Business model

B2B/G	B2B2X	B2C

S	Bonds and loans are regularly oversubscribed. Telefónica can cost effectively deliver higher value services.	This solution does not help Telefónica's customers to lower their own carbon footprints, W
O	Sets precedent for accessing green bonds for other sustainable investments. Brings change to finance industry.	There is a risk of 'greenwashing' if it is not clearly reported on how the bond is invested. T

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	**Many**	Most

Case study: Thales Eco SIM

How it works

Find out more

- Thales and Veolia created the Eco SIM, the world's first SIM to be made of 100% post-consumer recycled plastic.
- It delivers a 30% reduction in the SIM card carbon footprint. Using recycled materials, and as part of a specific industrial production process, the Eco SIM could eliminate the need for around 5,000 metric tonnes of virgin plastic a year.
- It is the first SIM card to be certified as carbon neutral in accordance with The CarbonNeutral Protocol (the global standard for carbon-neutral programmes).
- The CO2 emissions from the manufacturing process and the electronic components that cannot be recycled are fully offset by Thales's carbon offset programme.

Key partners in this scenario

Raw materials → SIM manufacturer → Operators

VEOLIA

Veolia process polymer plastic from waste electrical and electronic equipment at its recycling plants in France.

THALES

Thales engineers worked with Veolia experts to develop a process that uses recycled materials to manufacture industry-standard SIMs.

vodafone

Vodafone is currently using these SIMs in its devices.

Impact

Business model

B2B/G	B2B2X	B2C

SWOT

S	Simple solution for telcos to adopt to reduce their scope 3 emissions and improve transparency in their supply chain.	
W	Current market advantage given only available Eco SIM. High cost compared with traditional SIM cards.	
O	Opportunity for telcos to publicise their use of Eco SIMs to garner positive associations from end customers. Ability to report scope 3 accurately.	
T		Operators that use eSIMs should be careful in how they position it (e.g. not as an enablement service). Shift to eSIMs could eliminate need for physical SIMs altogether.

Solution maturity

No telco service yet	Telco/POC trial	Commercial solution	**Scaled solution**

Telco offering this service

None	Some	Many	Most

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Sustainability use cases and case studies: A-Z

Use cases and associated case studies

Use case	Case studies
Circular economy – Device recycling/refurbishment	Case study: Proximus circular economy solutions Case study: Carrefour and EcoATM device
Customer retail carbon footprint	Case study: Friends with Holograms Case study: Pawprint Case study: Proximus Banx (MyFootprint) Case study: SK Telecom Happy Habit
Food waste management	Case study: Ignition supply chain management Case study: Nuvilab Smart Consumption
Renewable energy services	Case study: Telsa Energy Plan Case study: Telstra Energy
Smart buildings for consumers	Case study: Tado Smart Heating System Case study: Heata Smart Heating System
Smart city	Case study: Cambridge Intelligent City Platform Case study: Rotterdam Smart Waste Management Case study: Smart Smart Street Lighting Case study: Smart Water Network Management
Smart farming	Case study: Smart Trees Case study: AT&T and WaterBit Case study: Allflex Livestock Intelligence Case study: DroneSeed Drone Reforestation and Farming Case study: Growlink Crop Management Case study: Microsoft FarmBeats Case study: Proximus Weed and Pest Control

Sustainability use cases and case studies: A-Z

STL PARTNERS

Use cases and associated case studies

Use case	Case study
Smart metering	Case study: DT Smart Metering
Smart transport (consumer)	Case study: DT Electric Vehicle Charging Stations Case study: SKT Mobility as a Service Case study: Telia Smart Heat for Buses Case study: Telia Travel Emissions Insights
Smart transport/telematics (enterprise)	Case study: Verizon Connect Case study: Tata FleetMan Telematics Case study: Telia Eco-Driving
Sustainability digital transformation / digitalisation	Case study: Swisscom Net Zero Consultancy
Telco B2B services customer-level reporting (for customers' scope 3)	Case study: Microsoft Emissions Impact Dashboard Case study: Salesforce Sustainability Cloud
Telecoms scope 1-3 emissions reduction	Case study: BT Openreach Copper to Fibre switch Case study: Bouygues Source Mobile Case study: Cloud workload placement Case study: Thales Eco SIM Case study: Telefónica Green Bond for Network Update
Telco B2B services sustainability labelling	Case study: Telefónica Eco Smart services

Sustainability use cases: Impact

Case studies

Basic	Indirect
Proximus Circular Economy Solutions	Telia & Keolis Autonomous Electric Public Transport
BT Openreach Copper to Fibre	SK Telecom Mobility as a Service
Telefónica Green Bond for Network Upgrade	Tado Smart Heating System
Thales Eco SIM	Deutsche Telekom Smart Metering
Cloud Workload Placement	Verizon Connect
	Tata FleetMan Telematics
	Deutsche Telekom Building Management as a Service
	KT Building Energy Management System
	Allflex Livestock Intelligence
	DroneSeed Drone Reforestation and Farming
	Microsoft FarmBeats
	Friends with Holograms

Sustainability use cases: Impact

Case studies

Reporting	Direct
Telefónica Eco Smart Services	Deutsche Telekom Electric Vehicle Charging Station
Microsoft Emissions Impact Dashboard	Telia Smart Heating for Buses
Salesforce Sustainability Cloud	Telia Travel Emissions Insights
Pawprint App	Heata Domestic Water Heat from Cloud
Vodafone Smart Trees	Tesla Energy Plan
Growlink Crop Management	Telstra Energy
Cambridge Intelligent City Platform	Carrefour EcoATM
Proximus Banx App	SK Telecom Happy Habit
	Telia Eco-Driving
	AT&T & WaterBit Smart Farming
	Proximus Weed and Pest Control
	Ignition Supply Chain Management
	Nuvilab Smart Food Consumption
	Rotterdam Smart Waste Management
	Verizon Smart Street Lighting
	Telstra Smart Water Management
	Bouygues Source Mobile
	Swisscom Net Zero Consultancy

Sustainability use cases: Business model

Case studies

B2C	B2B/G	B2B2X
Telefónica Green Bond for Network Upgrade	Telefónica Green Bond for Network Upgrade	Microsoft FarmBeats
BT Openreach Copper to Fibre	BT Openreach Copper to Fibre	Cambridge Intelligent City Platform
Deutsche Telekom Electric Vehicle Charging Stations	Verizon Connect	Verizon Connect
Telia & Ericsson Autonomous Electric Public Transport	Microsoft Emissions Impact Dashboard	Microsoft Emissions Impact Dashboard
SK Telecom Mobility as a Service	Salesforce Sustainability Cloud	Salesforce Sustainability Cloud
Tado Smart Heating System	Tata FleetMan Telematics	Tata FleetMan Telematics
Deutsche Telekom Smart Metering	Rotterdam Smart Waste Management	Rotterdam Smart Waste Management
Heata Domestic Water Heat from Cloud	Telia Travel Emissions Insights	
Tesla Energy Plan	Friends with Holograms	
Telstra Energy	Telefónica Eco Smart Services	
Proximus Circular Economy Solutions	Telia Smart Heating for Buses	
Carrefour EcoATM	Telia Eco-Driving	
Proximus Banx App	Deutsche Telekom Building Management as a Service	
Pawprint App	Korea Telecom Building Energy Management System	
SK Telecom Happy Habit	Vodafone Smart Trees	
Bouygues Source Mobile	AT&T & WaterBit Smart Farming	

Sustainability use cases: Business model

Case studies

B2C	B2B/G	B2B2X
	Allflex Livestock Intelligence	
	DroneSeed Drone Reforestation and Farming	
	Growlink Crop Management	
	Proximus Weed and Pest Control	
	Ignition Supply Chain Management	
	Nuvilab Smart Consumption	
	Telstra Smart Water Management	
	Verizon Smart Street Lighting	
	Thales Eco SIM	
	Cloud Workload Placement	
	Swisscom Net Zero Consultancy	

Questions? Get in touch

Schedule a briefing call here with the authors or reach out directly for any questions you may have:

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