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Sustainability of telecommunication networks and operators in Belgium

Presentation of report

30 November 2022

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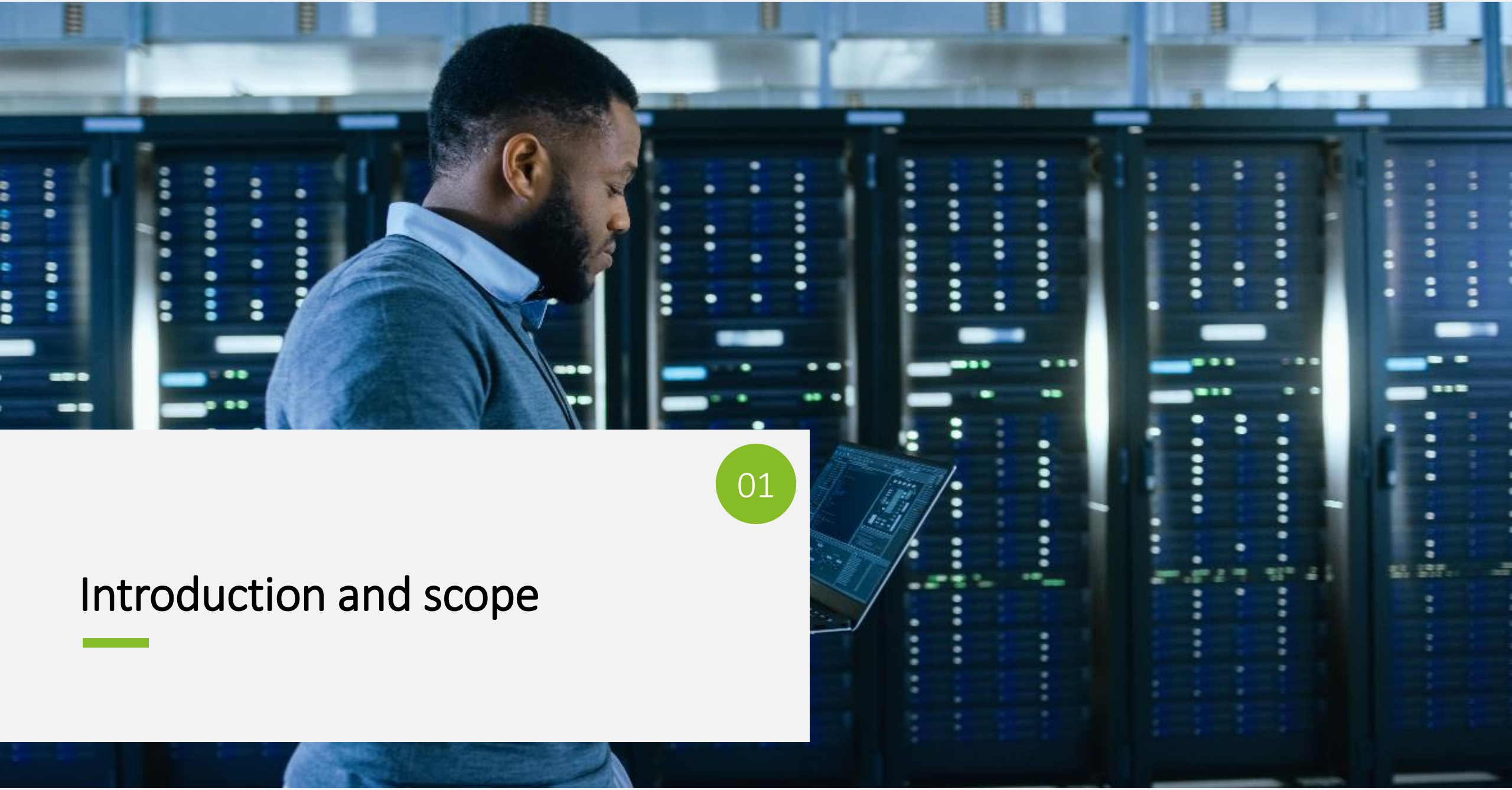

01

Introduction and scope

Objective of the report

In the context of digital and energy transitions, BIPT wishes to obtain a comprehensive view on the sustainability of telecommunications networks and their operators in Belgium;

The digital transition will be one of the key elements in the realization of Europe's green pact in the coming years. Today, the digital and technology sector has a significant ecological footprint. The use of new technologies, as well as the use of related data, is expected to continue to grow and increase the ecological footprint generated.

Some initiatives have been launched by market players regarding the sustainability of their operations. However, they are often not comparable. In Belgium, few in-depth analyses have been conducted on the sustainability of telecommunication networks.

The IBPT/BIPT wants to analyze the sustainability of the telecommunications networks of the largest network operators in Belgium.

The objective of this study is to:

1. Quantify the sustainability efforts made and be able to track progress
2. Formulate possible recommendations on how to make telecom networks more energy efficient for the sector, the government and consumers

Please note that this report focuses on the **environmental** efforts made by telecom operators and analyzes the period **2018-2021.**

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Scope of the study – ESG framework

The focus of the study is on the "E", being the environmental part of the ESG framework

FOCUS OF THIS STUDY

ENVIRONMENTAL

- **Environmental Footprint of Operations:** Telecom operators consume a significant amount of energy, and especially electricity. Depending on the source of energy and the efficiency of its generation, **electricity consumption by telecom network infrastructure** can contribute significantly to environmental externalities, such as climate change, creating sustainability risks for the industry. Although network equipment and data centers are becoming more energy efficient, their **overall energy consumption is increasing with the expansion in telecom infrastructure and data traffic**
- **Enabler in reducing other's environmental footprint:** telecom can use digital technologies to recognize the importance of data-driven net zero strategies and decision making, decarbonize their own operations and supply chains while supporting the sustainability goals of other industries

SOCIAL

- **Data Security:** The Telecommunication Services industry is **particularly vulnerable to data security threats**, as companies manage an increasing volume of customer data, including personally identifiable information, as well as demographic, behavioral, and location data
- **Increasing the societal impact of companies:** Telecom can help companies address their societal challenges, for example by introducing programs that foster **digital inclusion.** As customers pay increased attention to privacy issues, telecoms need to implement strong management practices and guidelines related to **data privacy and their use of customer data,** and can enable other industries to do so the same

GOVERNANCE

- **Product End-of-life Management:** Due to the rapid obsolescence of communications devices, they **represent an increasing proportion of electronic waste (e-waste)** going to landfills
- **Competitive Behavior & Open Internet:** Telcos must manage their growth strategies and production within the parameters of a regulatory landscape designed to ensure competition
- **Managing Systemic Risks from Tech Disruptions:** Telco will face growing physical threats (extreme weather) to their network, with potentially significant social or systemic impacts (systemic or economy-wide disruption may be created if the network infrastructure is unreliable)

Sources: S&P Global, Deloitte Research, Atos, SASB

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Scope of the study – Operators and topics

The focus of the study is on the main Belgian operators and includes their energy consumption, CO2 emissions, water consumption and use of materials

Operators in scope

proximus

telenet

orange™

voo [1]

Topics in scope

Energy consumption

An organization can consume **energy** in various forms, such as fuel, electricity, heating, cooling or steam. Energy can be **self-generated** or **purchased** from external sources and it can come from **renewable sources** or from **non-renewable sources**.

CO2 emissions

An organization can emit **emissions** in various form. This section addresses **emissions into air**, which are the discharge of substances from a source into the atmosphere. **Greenhouse Gas (GHG) emissions** are a major contributor to **climate change.**

Water consumption

This section addresses **water consumption**. The amount of water **withdrawn and consumed by an organization** and the quality of its discharges, can impact the functioning of the ecosystem in numerous ways.

Waste and recycling

Waste & recycling can be **generated by an organization's own activities**, for example, during the production of its products and delivery of services. Circularity and thus avoidance of waste can be achieved by focusing on **reusage, refurbishing** or **recycling.**

Note: 1. Voo has been excluded from this analysis due to a lack of data provided

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Scope of the study – Emission scopes

The focus of the study is on all 3 scope of emissions

NORMS

The **Global Reporting Initiative (GRI)** framework as well as **ISO norms and GHG protocols** are used as frameworks for the definition and selection of data points

Scope 1

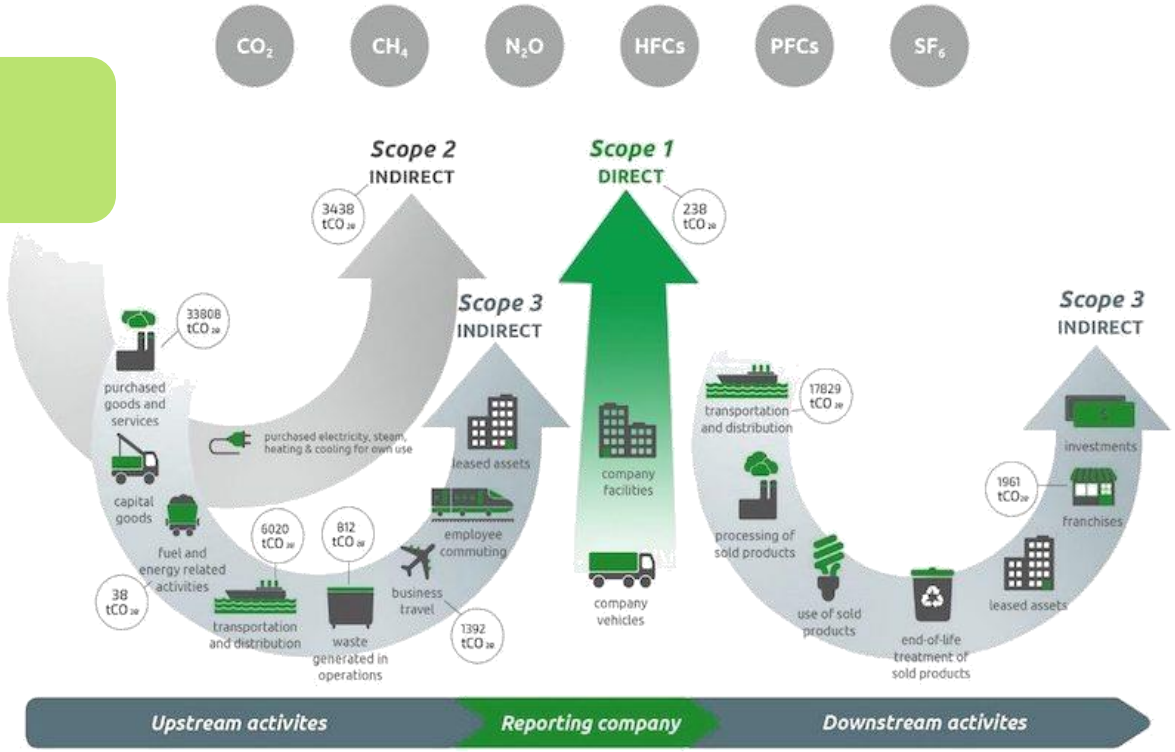
Scope 1 regroups direct emissions from owned or controlled sources. For example, the heating of buildings or the vehicle fleet is part of scope 1.

Scope 2

Scope 2 regroups indirect emissions from the generation of purchased energy consumed by the reporting company. For example, the electricity used for the data centers is part of scope 2.

Scope 3

Scope 3 regroups all other indirect emissions that occur in a company's value chain, these can be both upstream and downstream emissions. For example, the usage of set-top boxes consumers is part of scope 3.



Sources : GHGProtocol

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02

Sustainability landscape and trends

Sustainability landscape

The pressure is mounting on practically all sectors of the economy to become more sustainable, leading to a shift in their operations, business model and societal impact

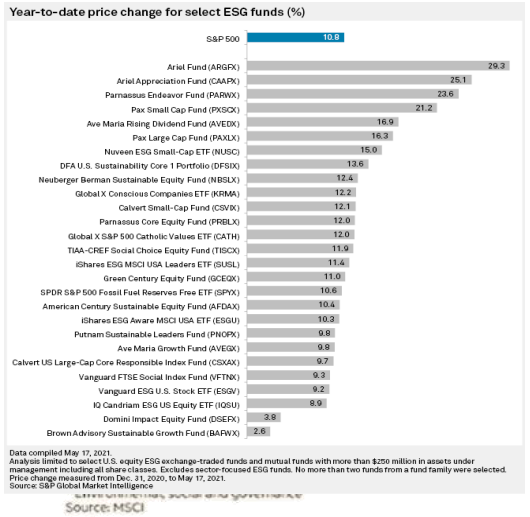
Climate change is a threat to global sustainability

Align to 2°C scenario: innovate assets and operations to enable the low-carbon energy transition.

Regulatory push

Public sector ambitions on climate and sustainability grow. Regulations & programs, such as the EU Green Deal and related policy areas, have a global reach.

Growing investor expectations



Source: MSCI

Investors will require more holistic ESG performance to allocate funds and reduce the cost of financing (e.g. according to the EU-taxonomy of green & socially sound investments).

Growing societal pressure

Society, especially the young generation, is expecting more from companies regarding their impact on society and the environment.

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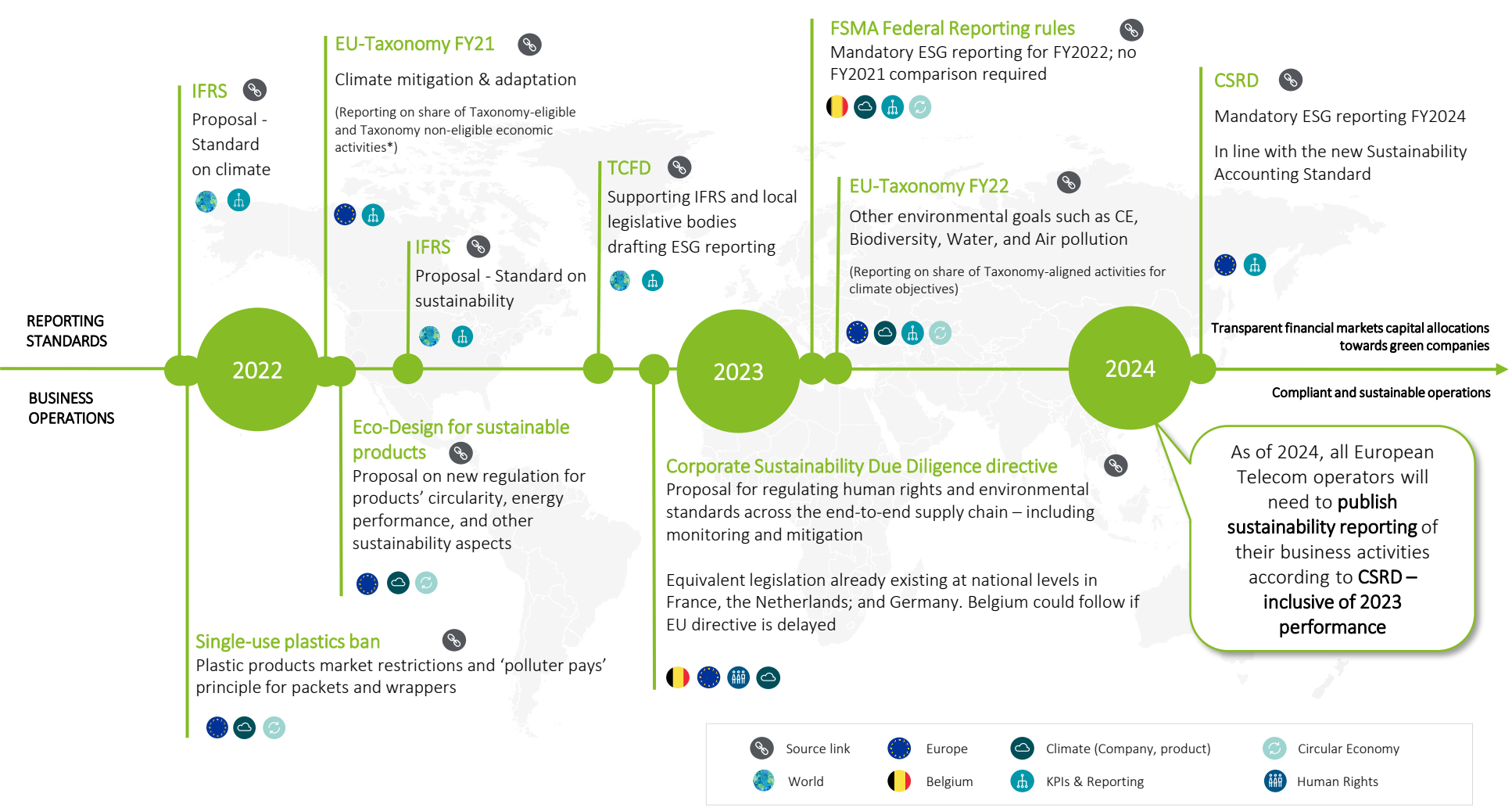
Sustainability landscape - Regulatory push (1/2)

New regulations will be introduced on the global, European and Belgian level in the following years

The **EU** Climate Law aims to achieve a **55% reduction in emissions by 2030** (from 1990 levels) and net zero GHG emissions by 2050.



Impact on companies

Growing diversity of topics: increasing requirements for management approaches and scope of data collection

Increasing demands on data: higher granularity and quality of disclosed data

Larger need for integration: in functions and processes

Increasing investor needs: information needs and management quality

* EU-Taxonomy Article 8 Delegated Act – Article 10: From 1 January 2022 non-financial undertakings shall only disclose the proportion of Taxonomy-eligible and Taxonomy non-eligible economic activities in their total activities and the qualitative information referred to in Section 1.2. of Annex I relevant for this disclosure

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Sustainability landscape - Regulatory push (2/2)

In addition to regulations, organizations and labels are supporting companies by providing sustainability guidelines and target-setting

Organization	Description	Relevance for operators	Label	Description	Obtention by BE operators
United Nations Global Compact[1,2]	Non-binding pact to encourage businesses and companies to **adopt sustainable and socially responsible policies** and to report on their implementation.	• **Environment** pillar › **3 principles** are linked to this pillar[1].	Ecovadis[5]	World's most trusted provider of **business sustainability ratings**.	proximus, telenet
The Sustainable Development Goals (SDGs)[3]	Collection of **17 interlinked global goals** to have a **better and more sustainable future for all**	• Relevant goals for Belgian telecoms in light of environmental efforts: › Affordable and clean **energy** › Responsible **consumption** and production › Clean water and sanitation	Bcorp[6]	B Corp Certification is a designation that a business is meeting **high standards of sustainability performance**	No operator is certified
Science-based targets (*SBTI*)[4]	Show companies how much and how quickly they need to **reduce their greenhouse gas** (GHG) **emissions**	• Defines and promotes best practices **in emissions reductions and net zero targets 2025** telenet proximus orange	ISO[7]	ISO have sustainability norms, such as the 14001:2015 that specifies the requirements for an **environmental management system**	No operator is certified

Sources: 1. United Nation - Global Compact, 2. United Nations – General Assembly, 3. United Nations – SDGs, 4. Science-Based Targets, 5. Ecovadis, 6. Bcorp, 7. Nbn. Non-exhaustive

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Sustainability landscape - Industry benchmark

The impact of the telecom market in the total Belgian energy consumption and CO2 emission is limited

Insights and takeaways

The telecom sector consumes 0.2% of energy and 0.8% of electricity in Belgium:
In 2020, the share of the Belgian telecom market out of the total Belgian energy and electricity consumption equaled 0.2% and 0.8% respectively. The telecom market is therefore not a driver of the Belgian energy and electricity consumption. Due to the increase of data traffic in the following years, the telecom share of the energy and electricity consumption is expected to continue to grow if no actions are taken.

The energy consumption of the telecom market is decreasing slightly slower than the overall Belgian market:
From 2018 to 2020, the Belgian telecom market decreased its energy consumption by 8.3%, which is less than the 9.4% decrease from the overall Belgian market.

The telecom sector emits 0.04% of the CO2 in Belgium:
In 2019, the share of the Belgian telecom market out of the total Belgian CO2 emission equaled 0.04%. The telecom market is therefore not a driver of the Belgian CO2 emission. This percentage is explained by the fact that scope 2 emissions are remarkably low for the Belgian telecom market as compared to others. Indeed, the 3 main players purchased nearly entirely green electricity, leading to limited scope 2 CO2 emissions.

The transport sector and the buildings, electricity and heat sector are the two main drivers of the Belgian CO2 emission (accounting for 41% and 32% respectively)

Notes: 1. StatBel (for the energy consumption per sector excluding the telecom sector), 2. Data provided by the 3 telecom operators (for the telecom sector), 3. The telecom sector refers to Telenet, Proximus and Orange, 4. OurWorldInData (for the CO2 emission per sector excluding the telecom sector), 5. Data provided by the 3 telecom operators (for the telecom sector)

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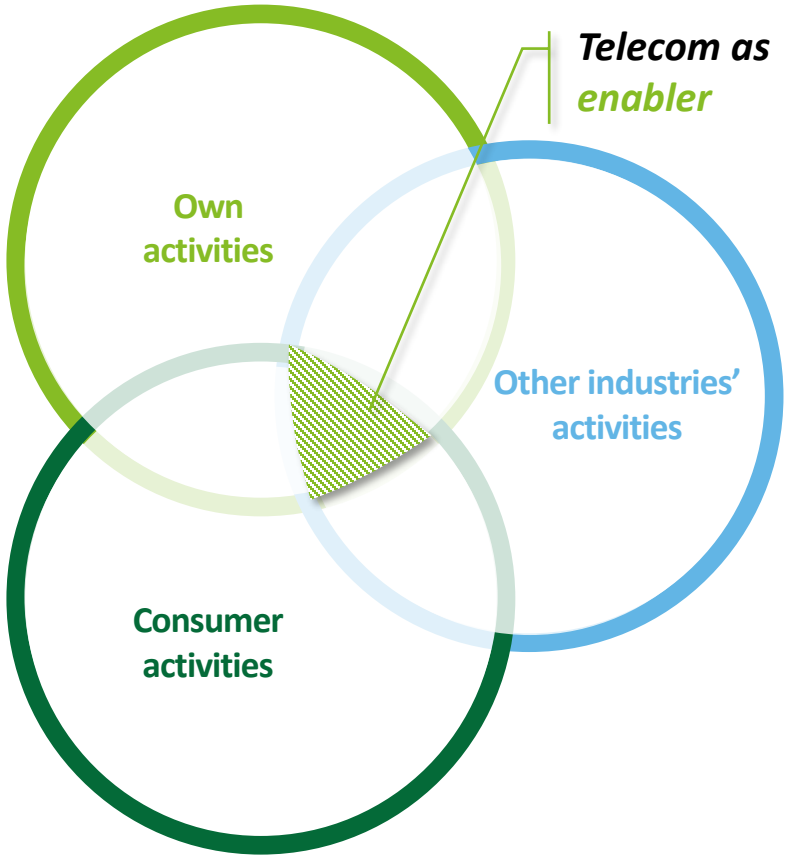
Sustainability landscape - The telecom sector as an enabler

The telecom sector acts as a sustainability enabler of its own but also of other industries and consumer activities



Own activities

- Leveraging connectivity, telecom operators can introduce predictive maintenance, avoiding **waste generation** and increasing the networks' lifetime
- Many activities and practices can now be **done virtually**. With the help of telecoms technologies, meetings, healthcare appointments and even surgery can now be done remotely, telecom operators can **eliminate the need for a large proportion of travel**[1]

Other industries' activities

- Telecom can take up its role to **help other industries cut down their emissions**
- These offerings include digitization and dematerialization, data processing, and process, activity and functional optimization. For example, savings in buildings are a result of technologies that improve energy efficiency such as **building management systems and smart meters.** In the transport sector, the use of telematics can for example **improve route optimization and vehicle fuel efficiency**[2]

Consumer activities

- Many end-consumers already apply various strategies to address their consumption habits, yet they are unaware which of these habits have the highest environmental impact. There is a role for telecom and the broader ICT sector to **guide consumers.** Telecom solutions will help consumers to live more environmentally consciously and connected. Many activities can now be done virtually. With the help of telecoms technologies, meetings, healthcare appointments and other can now be done remotely, reducing the impact of households on the environment

Sources: 1. Mobile; 2. ECS. *Non-exhaustive list*

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03

Research & analysis

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Methodology

A well-defined methodology has been followed to ensure the quality of the result

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
	Preparation of the data collection	**Data collection**	**Analysis of the data collected**	**Preparation of recommendations and final report**
ACTIVITIES	› Meet every **operator individually** › **Desk research and subject matters interviews. Define** standardized and normalized **datapoints and KPIs** to quantify energy consumption, CO2 emissions, water consumption and waste management of telecom networks and operators › **Validate** standardized and normalized **datapoints and KPIs** with BIPT	› **Collect data** from operators › **Conduct follow-up meetings** to provide further clarification to operators › **Check** that the information is correct and **ask for clarifications** from operators	› **Clean up** the data received by the operators › **Analyze the data collected** (distinction between (i) scope 1, 2 and 3 emissions, (ii) core and access networks) › **Evaluate the efforts** of operators (benchmark) to reduce their environmental footprint (internally and with end customers)	› **Compare and rank** the most sustainable networks and initiatives › **Provide recommendations** for making telecommunications networks more sustainable › **Finalize the report** on the environmental and climate impact of telecom networks and network operators
SOURCES USED	✓ Discussion with operators ✓ Deloitte Subject Matter Experts ✓ Different norms analysis (GRI, ISO 14001, GHG Protocol) ✓ Operator's reports and datasets ✓ Literature ✓ Other articles	✓ Request for information provided to operators ✓ Input from operators ✓ Discussion with operators ✓ Operator's reports and datasets	✓ Input from operators ✓ Discussion with operators ✓ Operator's reports and datasets ✓ Analysis of European telecom operator's efforts	✓ Operator's reports and datasets ✓ Analysis of European telecom operator's efforts ✓ Deloitte Subject Matter Expert ✓ Exisiting/new regulations

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Contextualization of the units used

In order to facilitate the understanding of the analysis hereafter, the different units can be contextualized

Visualizing what a ton of CO2 or 1 kWh represents is not easy. As these terms will be used in the report, **contextualization is needed**.

- 1 kWh equals:[1]
  - Watching TV during **3 to 5 hours**
  - Using **one washing machine**
  - **49 hours** of low-energy lamps
- 1 ton of CO2 equals:[2]
  - The average emission of one passenger on a **return-flight** from Paris to New York
  - **Driving 6000 km** with a diesel car
  - **72 trips** Amsterdam – Paris with the Thalys
  - **4,289 kWh** of electricity
- To compensate for 1 ton of CO2, **31 to 46 trees** are needed during a year[3]
- The average CO2 emission of a person living in Belgium is **8 tons per year**[2]
- To limit global warming to 2°C, the average level of CO2 emission per capita on our planet **must not exceed 2,1 tons by 2050**[2]

Sources: 1.EDF, 2. Energyguide, 3. Encon

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Analysis limitations

The analysis contains limitations in terms of data quality and availability

Elements to consider

- The analysis is based on data provided by the Belgian Telecom operators for the **period 2018-2021** and **not all data has been audited** by an independent entity
- The data reported by the operators has **different levels of granularity,** and this study is depending on the information and granularity shared
- While most aspects of network sharing have been taken into account, **minor double counting cannot be excluded**
- Voo has **not been able to report sufficient data** and has thus been excluded from the analysis
- The European benchmark refers to a **selection of 4 European telecom operators:** Deutsche Telekom, Telefonica, British Telecom (BT) and KPN
- As the **reporting of CO2 emission for scope 3 is limited**, our analysis is based on scope 1 and 2 emission only

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Data Analysis

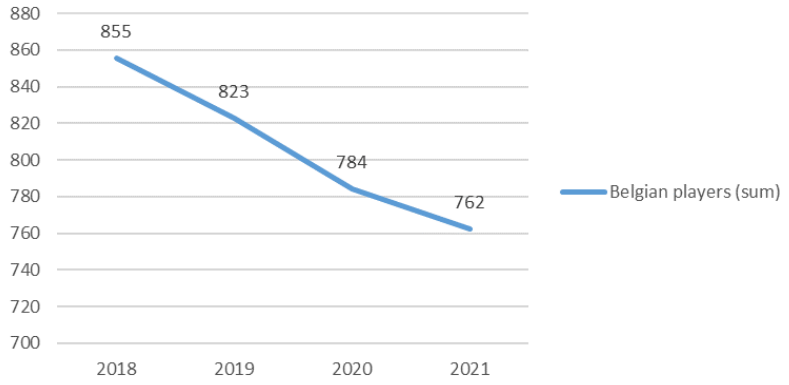
Energy

Energy – Analysis takeaways (1/2)

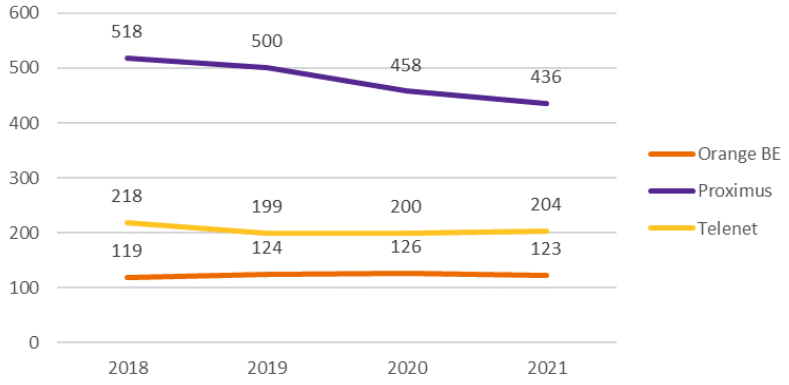
Based on the analysis, key takeaways have been identified

Fact and figures

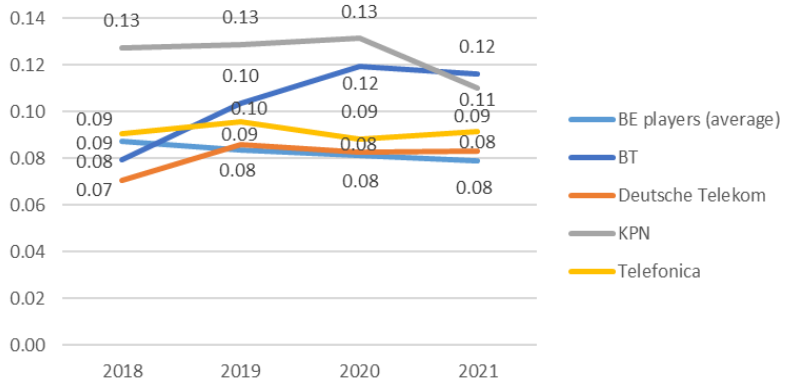
***ENERGY CONSUMPTION**, Sum of Belgian Players (2018-2021) Gwh*



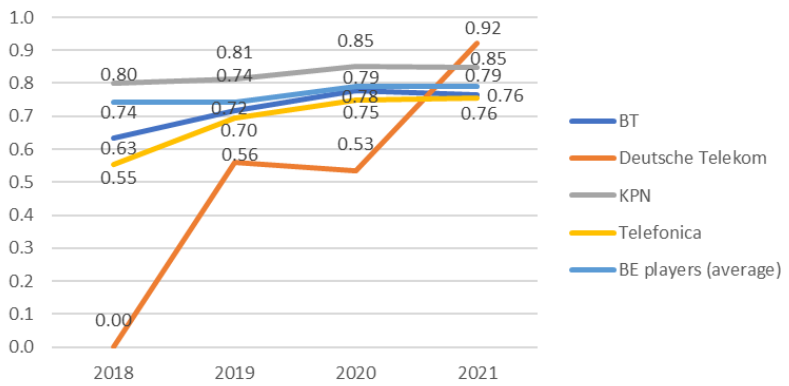
***ENERGY CONSUMPTION**, Segmentation per player (2018-2021) Gwh*



***ENERGY EFFICIENCY**, Comparison with European players (2018-2021) Gwh per Mn € of revenue (adjusted)*



***SHARE OF RENEWABLE ENERGY**, Comparison with European players (2018-2021)*



Key takeaways

- The Belgian telecom market has **reduced its energy consumption by 11%** between 2018 and 2021
- **80%** of the energy used by the Belgian operators is **electricity**
- **77%** of the electricity is **consumed by the network and 79%** of the energy **consumed is renewable**
- When comparing the energy consumption per Mn € of revenue, **the three players have similar values in 2021**
- **100% of renewable energy** is a key priority for operators
- **Every operator has energy efficiency targets,** but ambitions differ

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Energy – Analysis takeaways (2/2)

Based on the analysis, key takeaways have been identified

GOALS OF BELGIAN AND EUROPEAN PLAYERS				
	Yes in 2021	**Yes, by 2025**	**Yes, by 2030**	**No**
100% renewable electricity	T · · kpn orange BT proximus		Telefónica telenet	

	Yes	**No**
Energy efficiency targets	T · · Telefónica BT kpn orange proximus telenet	

	Yes	**No**
Fuel reduction targets	T · · proximus orange Telefónica kpn	BT telenet

Insights and takeaways

100% of renewable electricity is a key priority for operators. In BE, only Telenet is not 100% renewable today, but this is linked to the electricity consumption of internal suppliers that can difficulty be controlled.

Most operators have energy efficiency targets, but ambitions differ. Telenet will reduce electricity-intensity of the network by 15% per year, through to 2030 (in kWh/TB), Proximus and Orange do not communicate targets externally

The move towards 5G and FTTH will reduce consumption but is partly compensated by traffic increase. All operators are moving towards 5G, which is more efficient and consumes much less energy per bit than 4G. However, data usage is growing fast therefore overall energy consumption will increase with 5G. Especially since 5G technology will run in parallel with 4G/3G/2G technologies for several years. FTTH is more efficient than HFC per bit, as it requires less active equipment. Again, with data usage increasing, energy consumption in FTTH will also increase.

Fleet fuel is one of the main energy drivers, with **most operators working towards electrification of fleet and encouragement of alternative mobility.**

On-site sustainable solutions will continue to grow, but are not yet put in place by BE operators. Site level renewable solutions can involve a mix of wind and solar energies to power up the towers while lithium-ion batteries give an “offline” support when the former technologies can’t supply enough energy. Vodafone is currently experimenting this in a set of sites.

Datacenters are identified as high energy consumers and addressed by BE operators. Nevertheless, the consumption of Cloud Storage on third party data centers like AWS is not taken into consideration.

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Data Analysis

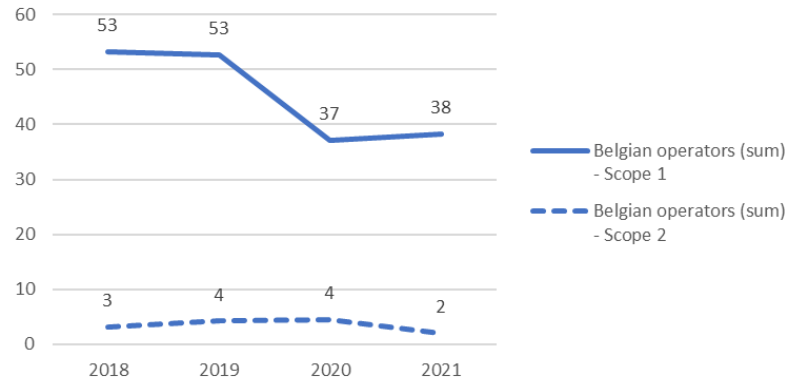
CO2 Emission

Emission – Analysis takeaways (1/2)

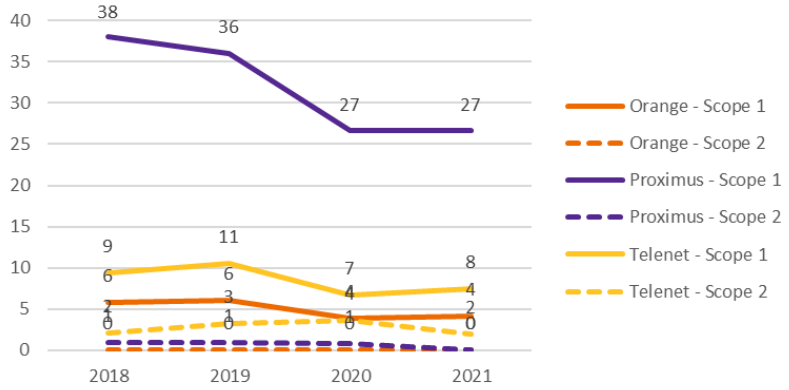
Based on the analysis, key takeaways have been identified

Fact and figures

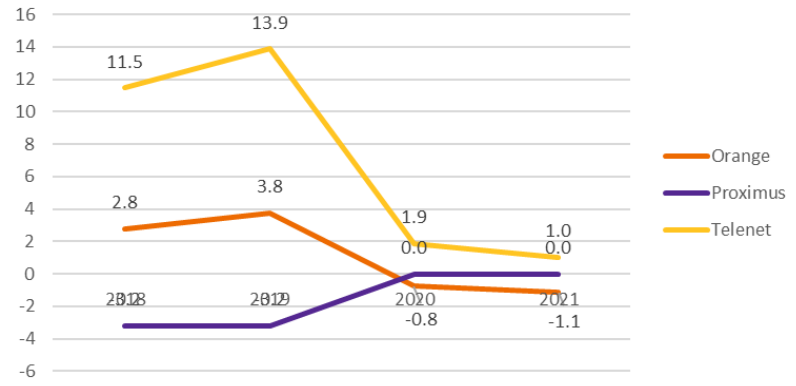
***CO2 EMISSION SCOPE 1 AND 2**, Sum of Belgian Players (2018-2021) Ktons*



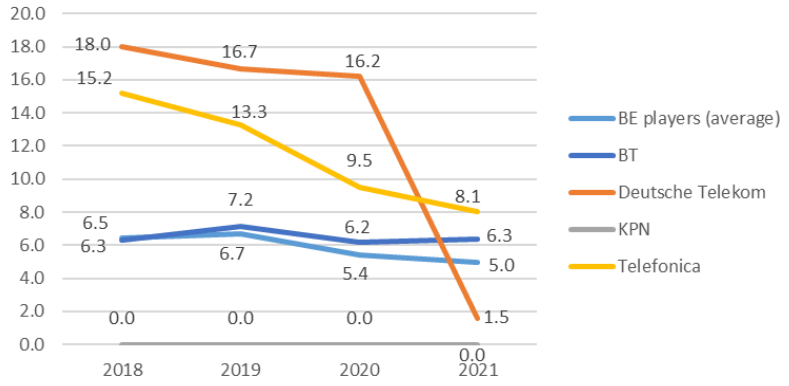
***CO2 EMISSION FROM SCOPE 1 AND 2,** Segmentation per player (2018-2021) Ktons*



***CARBON NEUTRALITY,** Segmentation per player (2018-2021) Ktons*



***CARBON INTENSITY,** Comparison with European players (2018-2021) Tons of scope 1 and 2 emissions per Mn € of revenue (adjusted)*



Key takeaways

- **CO2 emissions** of the Belgian telecom market **decreased by 38%** between 2018 and 2021
- **The Belgian telecom market is carbon neutral**
- The Belgian players are **performing in line with European benchmark**
- **Net zero[1]** – Scope 1, 2 & 3 objective, should be achieved **in 2040, the earliest**
- More initiatives can be put in place to **grow the proportion of self-produced renewable energy**

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Emission – Analysis takeaways (2/2)

Based on the analysis, key takeaways have been identified

GOALS OF BELGIAN AND EUROPEAN PLAYERS					
	Yes in 2021	Yes, by 2025	Yes, by 2030	Yes, by 2040	No
Net zero – Scope 1 & 2	kpn	Telefónica	proximus, telenet	orange	
	Yes in 2030	Yes, by 2040	Yes, by 2050	No	
Net zero – Scope 1, 2 & 3		Telefónica, BT, kpn, proximus, orange	telenet		
	Yes		No		
Carbon positive commitment	Telefónica, kpn, proximus		orange, BT, telenet		

Insights and takeaways

Net zero is on the agenda of all Belgian telecom players, but it could go faster. For scope 1 & 2, KPN has already achieved this since 2021 and a few other operators will follow by 2025**, whilst the target is to achieve this by 2030 for Telenet and Proximus and by 2040 for Orange.**

Net zero – Scope 1, 2 & 3, should be achieved by 2040, the earliest. This is in line with other operators.

For scope 1, the fleet is the main emission driver and electrification is key. All operators are working towards a green fleet and sustainable transportation.

For scope 2, the purchase of renewable energy is the norm. Orange and Proximus already purchased 100% renewable energy today.

More **initiatives can be put in place to grow the proportion of self-produced renewable energy,** as today only 2% is self-produced. Deutsche Telekom has been investing in solar panels and wind farms.

Other initiatives are in place to reduce **scope 3 emissions**, with supplier programs and local partnerships that are put in place by all the operators. Telefonica for example is developing a Supply Chain program encouraging strategic suppliers to set science-based targets and reduce their GHG emissions.

Compensation of CO2 emissions is also a popular lever within telecom companies. In BE, Telenet invests in afforestation projects in Ecuador via Bos+ and Orange invests in mini-hydro plants in Liberia and in an agroforestry project in Kenya and Zimbabwe.

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Data Analysis

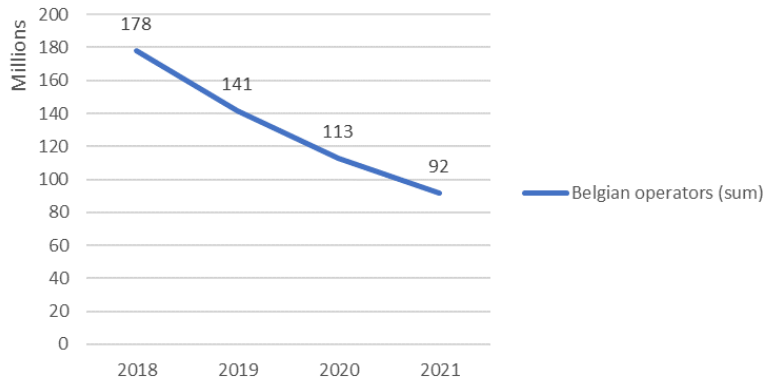
Water

Water – Analysis takeaways (1/2)

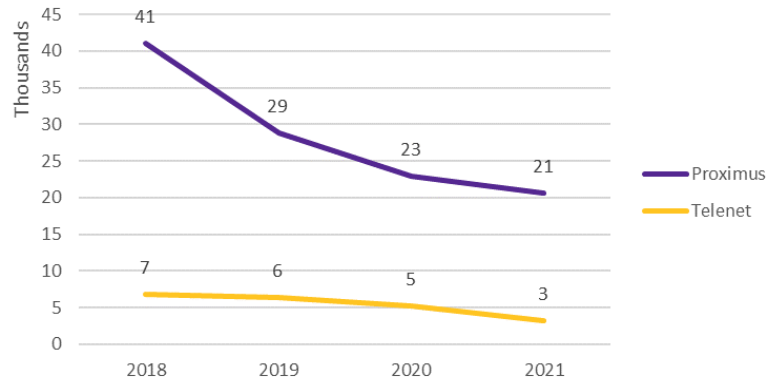
Based on the analysis, key takeaways have been identified

Fact and figures

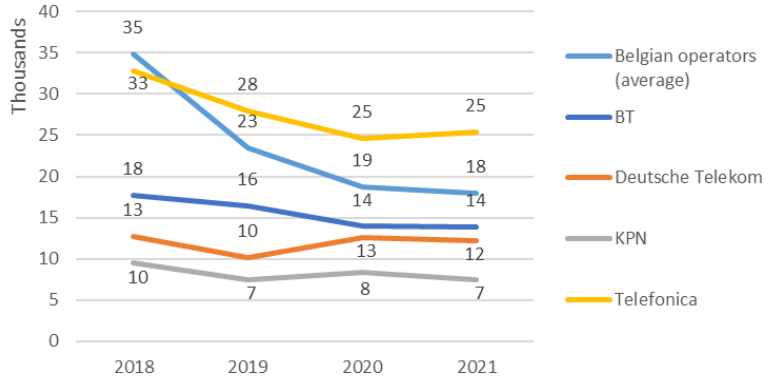
WATER CONSUMPTION, *Sum of Belgian players (2018-2021) Liter*



WATER EFFICIENCY, *Segmentation per player (2018-2021) Liter per employees*



WATER EFFICIENCY, *Comparison with European players (2018-2021) Liter per employee*



Key takeaways

- The Belgian telecom market has **reduced its water consumption by 47%** between 2018 and 2021
- Overall, **water consumption is lower on the agenda** of the telecom operators, with no specific long-term goals defined
- **Most operators,** including in Belgium, **have initiatives in place** to reduce the consumption

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Water – Analysis takeaways (2/2)

Based on the analysis, key takeaways have been identified

GOALS OF BELGIAN AND EUROPEAN PLAYERS		
	Yes	**No**
Commitment to reduce water consumption		T · · Telefónica kpn orange™ BT telenet proximus

Insights and takeaways

Overall, water consumption is lower on the agenda of the telecom operators, with no specific long-term goals defined.

Most operators, including in Belgium, have initiatives in place to reduce the consumption, but those remain rather limited compared to other preoccupations. Example of initiatives are the increased usage of rainwater or reuse of water.

Water usage of data centers is one of the larger aspects of water consumption (when cooling is done by water and not air). One can work on the water reduction but also on reusing the heat that is generated for local heating.

Earlier this year, Europe's data center operators have told the European Commission that they will cut water use to a maximum of 400ml per kWh of computer power by 2040.

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Data Analysis

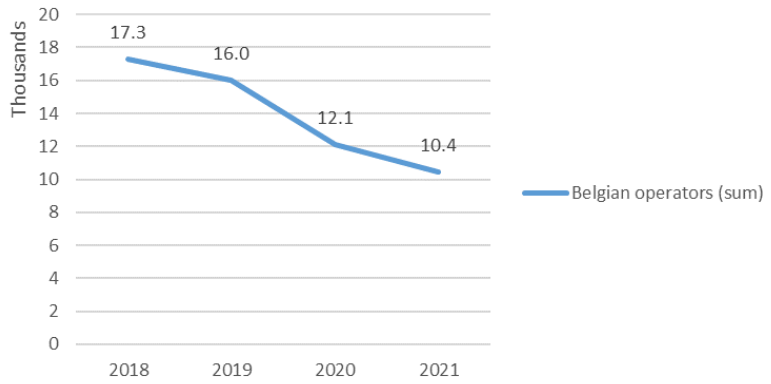
Waste & recycling

Waste – Analysis takeaways (1/2)

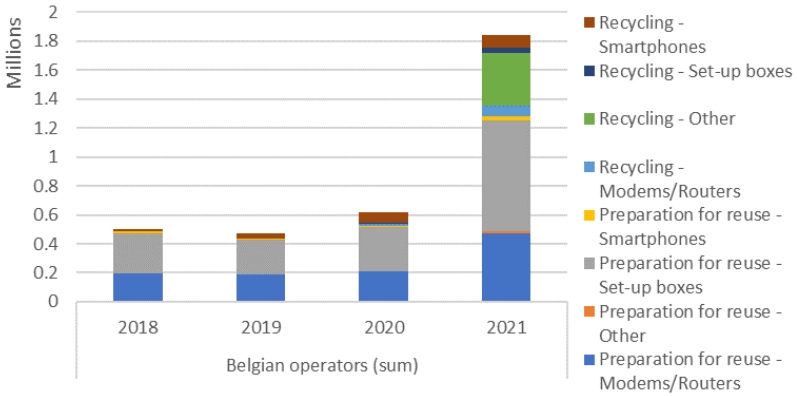
Based on the analysis, key takeaways have been identified

Fact and figures

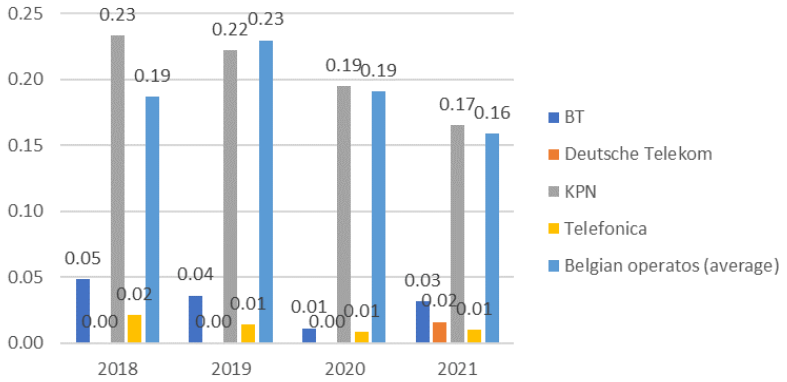
WASTE GENERATION, *Sum of Belgian players (2018-2021) Tons*



PRODUCT DIVERTED FROM DISPOSAL, *Segmentation per player (2018-2021) Units*



SHARE OF WASTE DISPOSED OUT OF TOTAL WASTE, *Comparison with European players (2018-2021) Tons of waste disposed / Tons of Total waste*



Key takeaways

- **Waste generation** of the Belgian telecom market **decreased by 40%** between 2018 and 2021
- **The share of waste being disposed** by the Belgian operators **decreased** between 2018 and 2021, going from **19% to 16%**
- The **products diverted from disposal** of the Belgian telecom market **increased by 265%** between 2018 and 2021
- The Belgian telecom operators **dispose a high amount of waste** per Mn € of revenue
- BE operators **are not moving as fast as other operators in terms of waste reuse and recycling,** with objectives that are on a 2030 or later horizon

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Waste – Analysis takeaways (2/2)

Based on the analysis, key takeaways have been identified

GOALS OF BELGIAN AND EUROPEAN PLAYERS				
	Yes in 2021	Yes, by 2025	Yes, by 2030	No
All waste reused or recycled		T-Mobile, kpn, BT	proximus, Telefónica	orange, telenet

	Yes	No
Waste reduction commitment for circularity	T-Mobile, proximus, BT, telenet, orange, Telefónica, kpn	

Insights and takeaways

Waste has since long been a central preoccupation of operators, amongst others through waste reduction commitments for circularity.

KPN has for example developed an impactful plan to “reduce and recycle in an energy efficient manner”.

BE operators are not moving as fast as other operators in **terms of waste reuse and recycling,** with objectives that are on a 2030 or later horizon.

Multiple initiatives have been put in place over the years, with **phone recycling and refurbishment being among the most popular actions** that operators undertake. However, not only operators need to take up this role, other distributors can equally contribute to these programs.

To reduce waste generation, Belgian operators have launched multiple initiatives, working on the entire value chain, from internal use, with Orange launching an internal marketplace, to production, with Proximus working on eco-design of CPE, and al the way to customer delivery, working a sustainable way of delivering parcels to consumers and stores.

A Sharing Instead of Owning approach is also an approach shared by multiple operators, allowing contribute significantly to resource conservation, including Telenet and its Laptops-as-a-Service offer, and Proximus and its Smartphones-as-a-service offer.

Network waste is one of the key components of waste for operators. As such, network sharing can be considered as a way of reducing this waste. Recycling and recovering valuable raw materials like copper cables is becoming a standard in the sector today.

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04

Recommendations

Recommendations for different parties in the telecom market

Several recommendations can be made based on our analysis, for both the regulators, the operators as well as the consumers

Regulators

- **Take up a facilitating role** in the discussion with operators on the sustainability analysis and next steps
- Introduce a **recurring and expanded analysis of the entire sector** based on the **established framework and set of KPIs,** creating an observatory of the entire sector, including Tier 2 players and public infrastructure providers
- Introduce a **transparent comparison method** for consumers and operators to evaluate the sustainability efforts from all players
- Create a **guidebook for the telecom sector** based on concrete best practices, use cases, funding opportunities and upcoming regulations
- Set-up **knowledge sharing** with different players, such as EGDC, GSMA, EtNo, and others, and leverage best practices in guidebook
- Set **clear and nationally aligned sustainability goals** for Belgian operators, in line with or beyond upcoming regulations, such as EU regulations[1]

Operators

- Set-up elaborate **sustainability reporting** based on framework and KPIs shared, as well as on the expectations from different regulators
- Activate a **multidisciplinary sustainability squad** to leverage the guidebook and embed sustainability throughout the organization
- Take up an **educational role** towards consumers to inform them on the environmental impact of their network usage
- Leverage the opportunity for telecom operators to become **enablers towards a sustainable Future**, leveraging their network, data and technologies
- Develop **tangible sustainability goals** in line with regulators' expectations and beyond
- Create a **sustainability strategy** to translate the goals into initiatives throughout the organization, across the environmental topics

Consumers

- Learn more about the environmental impact of **network usage** and adapt usage behavior where possible
- Be able to **compare operators** from a sustainability perspective (in addition to the current options, for example comparison of network coverage)

Note: 1. More information on European regulations can be found on Legislative Train Schedule (europa.eu)

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Zoom on recommendations for operators (1/4)

ENERGY

As part of a sustainability strategy to implement different goals and initiatives throughout the organization, several recommendations can be made on efforts to improve energy efficiency

Overall, the telecom sector represented 0.2% of the total Belgian energy consumption in 2020 and 0.8% of the total Belgian electricity consumption in 2020, this is rather limited as compared with other industries in Belgium. In order to further improve energy consumption, the operators need to continue **work on the efficiency of the network, with a focus on both access and core, for all technologies.**

When looking at the key elements in the total energy consumption composition, it is worth **investigating datacenters.** More specifically, we recommend to gain clarity on the consumption of both own datacenters and those provided by suppliers. Based on this knowledge, goals can be set to decrease or optimize the energy usage of datacenters. These goals can be translated to initiatives, which could include upgrades and consolidation of technology, air flow and water management.

Telecom operators currently have limited insights in the energy consumption by network type. Detailing out fiber and mobile energy consumption, will allow to **optimize the split and usage of different network types**, such as 2G, 3G, Coax, etc.

It will be important for telecom operators to **optimize their renewable energy mix**. When looking at the longer term, there is a case to be made for operators to switch towards own energy production, in addition to purchasing green energy through Power Purchase Agreements (PPA), which some Belgian operators are already doing. Operators could create a roadmap of energy consumption, which lead to CO2 Emission, detailing out the plans for optimizing this mix over the following years.

Telecom operators also encourage energy consumption on the consumer side through the **usage of modems and set-top boxes**. Operators could re-evaluate this consumption, by creating an **energy efficient approach** when it comes to **switching** from active to stand-by mode. In a later stage, this approach could be unified throughout different operators in Belgium.

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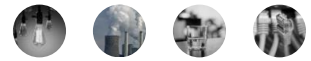
Zoom on recommendations for operators (2/4)



CO2 EMISSION

As part of a sustainability strategy to implement different goals and initiatives throughout the organization, several recommendations can be made on efforts to reduce CO2 Emissions

Telecom operators should develop strategies to **reduce their fleet emissions**, as these are the key drivers in the emissions. In addition to electrifying the fleet, which all telecom operators have committed to, initiatives could be created to increase the amount of self-produced electricity used to electrify the fleet, as well as revisions of mobility plans. The revision of mobility plans would allow employees to combine mobility options to commute to work and would encourage them to commute in alternative ways.

Overall, telecom operators are **performing well in terms of Scope 2 CO2 Emissions**, driven by a high percentage of purchased renewable energy. While other industries are purchasing renewable energy as well, they are not at the level of telecom yet. However, ambitious decarbonization projects focusing on the use of energy to run networks and IT, could further reduce the CO2 emissions as a whole.

Today, little to no insights exist on Scope 3 CO2 Emissions, however these can not be neglected as some experts mention scope 1 and 2 combined would only make up for one third of the total CO2 Emissions. Telecom operators should **develop ways to report on the Scope 3 Emissions**. Once these emissions have been identified, actions can be taken to reduce both **upstream and downstream Scope 3 CO2 Emissions**. Upstream initiatives could include demanding transparency on supplier's footprint, joint-target setting or even collaboration and co-investments in innovation with suppliers to reduce the upstream footprint. The downstream Scope 3 CO2 Emissions are driven by the consumption of the network by B2C and BB customers. Initiatives on downstream Scope 3 CO2 Emissions could include education of consumers to generate less energy on network and data consumption, or even encouraging consumers to use renewable energy at home.

Overall, telecoms have an **important opportunity to enable other industries and consumers** to become more energy efficient and reduce their carbon footprint. Digital and smart products and solutions, such as smart metering and smart logistics, help others reduce their carbon emissions by significant amounts. Additional initiatives can be driven by telecoms, such as simplification of IT and network infrastructure at end customers.

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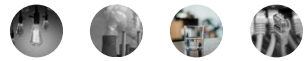
Zoom on recommendations for operators (3/4)



WATER

As part of a sustainability strategy to implement different goals and initiatives throughout the organization, several recommendations can be made on efforts to reduce water usage

There is limited to no knowledge of the water usage at Belgium telecom operators as there are limited insights on how water is consumed for most Belgian operators. **Introducing clear and unified reporting** will enable comparison and introduction of new initiatives to reduce water usage or introduce alternatives such as rainwater.

Telecom operators could **review their data centers** operations to limit the water usage or loss of energy. In a regular datacenter, cool air or water goes in, warm(er) air or water leaves the center, which leads to a significant loss of energy. Optimized datacenters could reuse the heat generated by the datacenters to heat the surrounding buildings or facilities.

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Zoom on recommendations for operators (4/4)

WASTE & RECYCLING

As part of a sustainability strategy to implement different goals and initiatives throughout the organization, several recommendations can be made on efforts to reduce waste

In terms of waste management, circularity should be the goal for telecom operators, keeping products and materials in use to rule out waste and pollution. **All-encompassing initiatives**, including e-waste, paper, network waste, etc., to drive circularity should be introduced, rather than isolated segments.

In Belgium, the share of waste disposed out of total waste remains high. **Goals and objectives on reducing waste disposal** should be introduced to reduce this share. As mentioned, when translating these goals into clear initiatives, **all aspects** of waste management should be taken into account to aim towards circularity as a whole, rather than only focusing on reducing the amount of waste disposed.

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