

**Mededeling van de Raad van het BIPT
van 29 november 2022
over
de studie betreffende de duurzaamheid van de
telecomnetwerken in België**

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1. Context

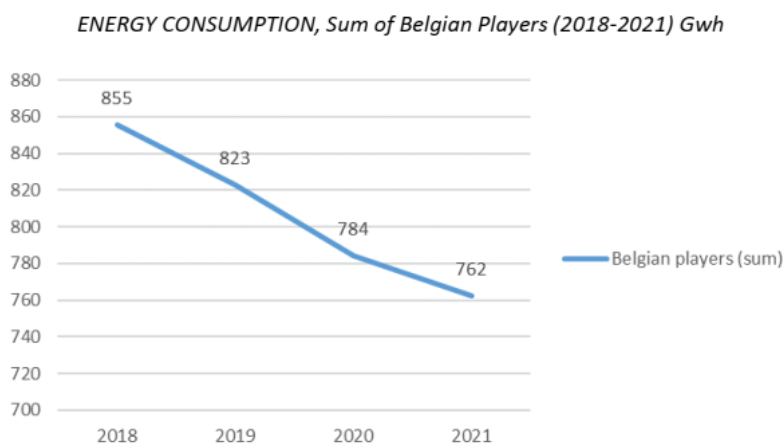
1. De digitale transitie vormt een van de belangrijkste pijlers van de ecologische transitie omdat deze andere sectoren in staat stelt om sneller en grondiger duurzamer te worden. Beide transities versterken elkaar en gaan hand in hand. Het groeiend dataverbruik ten gevolge van deze transitie zou er echter voor kunnen zorgen dat de eigen ecologische impact van digitale infrastructuren steeds groter wordt. Om te vermijden dat de voetafdruk van de verdere digitalisatie de ecologische voordelen zou tegenwerken, is het belangrijk om goed te begrijpen wat de huidige voetafdruk is van de digitale toepassingen en hoe deze evolueert.
2. Tot nu toe is er weinig grondig onderzoek verricht naar de **duurzaamheid van de telecomnetwerken in België**. De verschillende operatoren hebben zich in de voorbije jaren weliswaar geëngageerd om de duurzaamheid van hun operaties te verbeteren, maar het ontbreekt aan een algemeen kader om deze inspanningen onderling te vergelijken. Om een beter inzicht te krijgen in de huidige situatie inzake duurzaamheid van de Belgische telecommarkt, heeft het BIPT een studie laten uitvoeren door Deloitte Consulting & Advisory Belgium.
3. De focus van deze studie ligt op de impact op de duurzaamheid van de grote Belgische operatoren **Telenet, Orange en Proximus**. Initieel werd ook Voo opgenomen in de scope van deze studie, maar wegens beperkte aangeleverde data, wat het BIPT in dit stadium enkel kan betreuren, kon de informatie niet op een nuttige wijze worden verwerkt. De studie is desalniettemin ook zonder de cijfers van Voo afgewerkt om alsnog een eerste versie te kunnen opleveren. In de toekomst zal er getracht worden om o.b.v. alle relevante data van de voornaamste operatoren te werken, zo nodig door gebruik te maken van de formele bevoegdheden van het BIPT inzake het opvragen van informatie.
4. Specifiek wordt gekeken naar de evolutie van het energieverbruik, de CO₂-uitstoot, het waterverbruik en de afvalverwerking. Op basis van de resultaten van deze studie zijn enkele aanbevelingen opgesteld waarmee de energie-efficiëntie en duurzaamheid van telecomnetwerken opgevolgd en verbeterd kan worden.
5. De studie zal dienen als basis voor het BIPT om te bepalen welke acties inzake duurzaamheid genomen kunnen worden.

2. Resultaten

6. De studie heeft zich toegespitst op vier gebieden inzake duurzaamheid, nl. het energieverbruik, de CO₂-uitstoot, het waterverbruik en de afvalverwerking waarbij ook de evolutie van de voorbije 4 jaren (periode 2018-2021) werd nagegaan.
7. Voor de studie werd gebruik gemaakt van de gegevens die werden verkregen van de operatoren. Deze gegevens werden niet onderworpen aan een afzonderlijke verificatie door het BIPT of haar consultant wegens praktische redenen. De kwaliteit van deze studie en haar resultaten is bijgevolg volledig afhankelijk van deze aangeleverde gegevens.
8. Uit de studie blijkt dat duurzaamheid reeds een belangrijk thema is voor de drie onderzochte telecomoperatoren en dat deze reeds meerdere initiatieven en objectieven vooropgesteld hebben.

2.1. Energieverbruik

9. In het algemeen is **het aandeel van de telecomsector in het totale energieverbruik in ons land beperkt**, met een bijdrage van ongeveer 0.2%. Het energieverbruik van de telecombedrijven bestaat voor 80% uit elektriciteit en voor het overige uit de verbranding van fossiele brandstoffen (bv. diesel). Het **energieverbruik van de telecomoperatoren is in de periode 2018-2021 afgenomen met 11%**, wat vooral te wijten is aan het verminderen van het gebruik van fossiele brandstoffen door het wagenpark.



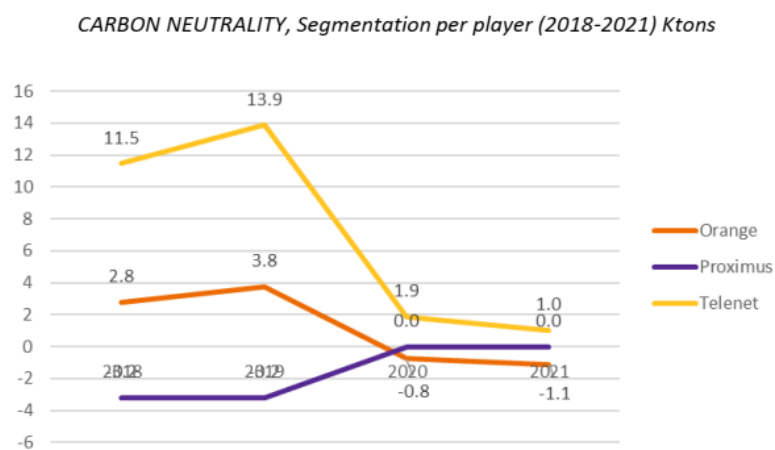
Figuur 1: Evolutie energieverbruik van de Belgische telecomoperatoren

10. Bekijken we enkel het totale **elektriciteitsverbruik**, dan zien we dat telecom een aandeel heeft van minder dan 1%. De elektriciteit wordt voor 81% opgewekt uit hernieuwbare bronnen en wordt vooral via de markt aangekocht. Slechts 2% wordt zelf geproduceerd.
11. Ongeveer 77% van de elektriciteit wordt verbruikt door het netwerk, 15% door datacenters en 7% door kantoren en winkels. Hierbij is het energieverbruik van de datacenters in de voorbije 4 jaar niet gestegen en dat van het netwerk is zelfs gedaald, ondanks de grotere hoeveelheid data die verstuurd werd.

12. Ongeveer de helft van het elektriciteitsverbruik van het netwerk zit in het mobiele toegangsnetwerk, 30% wordt verbruikt door het "Core" netwerk¹ en de overige 20% door het vaste toegangsnetwerk.
13. In vergelijking met buitenlandse operatoren, zijn de Belgische operatoren volgens de door hen aangeleverde data iets meer energie-efficiënt wanneer we het energieverbruik uitzetten t.o.v. de inkomsten. Wat betreft het gebruik van hernieuwbare energie zijn ze in lijn met de Europese benchmark.
14. Alle operatoren formuleren doelstellingen inzake energieverbruik, maar de ambities verschillen. Niettemin geven de operatoren allen aan tegen 2030 gebruik te willen maken van 100% hernieuwbare energie. Daarnaast zullen ze overschakelen naar meer energie-efficiënte technologieën zoals 5G en FTTH.

2.2. CO₂-uitstoot

15. Gedurende de periode 2018-2021 is de **CO₂-uitstoot van de telecomoperatoren verminderd met 38%**.² Voor 95% wordt deze uitstoot veroorzaakt door de verbranding van fossiele brandstoffen (voor voertuigen of verwarming, zogenaamde "scope 1" uitstoot) en in mindere mate door de productie van elektriciteit ("scope 2" uitstoot).
16. De totale Belgische telecommarkt is daarentegen CO₂-neutraal wanneer rekening gehouden wordt met de aangekochte emissierechten. Zowel Orange als Proximus zijn al CO₂-neutraal volgens hun data, Telenet verklaart op haar beurt dat ze de inspanning verderzet om dit te worden. Bij alle operatoren is het aankopen van emissierechten populair.



Figuur 2 : CO₂-neutraliteit van de Belgische telecomoperatoren

¹ Het core-netwerk of kernnetwerk zorgt voor de verbinding tussen alle mobiele- en vaste toegangsnetwerken en de centrale diensten van de operator, zoals de verbinding met internet.

² Volgens het Greenhouse Gas Protocol wordt de uitstoot van CO₂ ingedeeld in 3 scopes. Scope 1 omvat de directe CO₂-uitstoot veroorzaakt door de eigen bronnen voor bv. Verwarming en vervoer. Scope 2 is de indirecte CO₂-uitstoot door de opwekking van aangekochte elektriciteit of warmte. Scope 3 is de indirecte CO₂-uitstoot veroorzaakt door de bedrijfsactiviteit van een andere organisatie in de waardeketen.

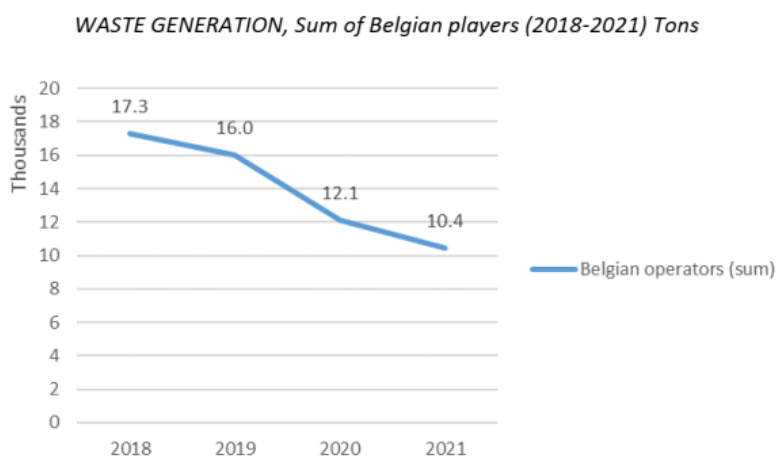
17. De operatoren wensen allen over te gaan naar “net zero” waarbij de CO₂-uitstoot niet alleen gecompenseerd wordt, maar zoveel mogelijk verder verminderd wordt. Om dit te bereiken zullen de operatoren hun wagenpark verder vergroenen en volledig overgaan naar hernieuwbare en zelfgeproduceerde elektriciteit.

2.3. Water

18. Het **waterverbruik** is over de periode 2018-2021 **vermindert met 47%**.
19. Er bestaan volgens de verklaringen van operatoren echter weinig specifieke initiatieven om het waterverbruik verder te beperken, behalve bij renovatieprojecten waar o.a. regenwater zoveel mogelijk hergebruikt wordt.

2.4. Afval

20. De hoeveelheid geproduceerd **afval** (kabels, antennes, servers, maar ook smartphones en modems) is over de periode 2018-2021 **afgenomen met 40%**. Van het afval werd 16% niet gerecycleerd of hergebruikt.



Figuur 3 : Geproduceerde afval in ton door de Belgische telecomoperatoren

21. De operatoren hebben meerdere initiatieven lopende om afgedankte smartphones, routers en settopboxes te hergebruiken of te recycleren. Het aantal hergebruikte producten steeg tussen 2018 en 2021 met 265% (van 500.000 naar 1,8 miljoen).
22. Op basis van de data van operatoren, wordt er in vergelijking met andere Europese operatoren minder afval hergebruikt of gerecycleerd.

2.5. Aanbevelingen

23. Tenslotte formuleert de studie enkele aanbevelingen voor de verschillende actoren op de Belgische telecommarkt.

24. Zo kan de **regulator** een faciliterende rol opnemen in de discussies met de operatoren over duurzaamheid en een terugkerende en uitgebreide analyse van de gehele sector invoeren op basis van een reeks KPI's.
25. De **operatoren** kunnen een meer gedetailleerde duurzaamheidsstrategie opstellen met een focus op het vertalen van de doelstellingen in initiatieven in de hele organisatie, over alle milieuthema's heen.
26. Bij de **consumenten** tenslotte zou het bewustzijn kunnen verhoogd worden over het effect van hun telecomconsumptie, om hen in staat te stellen een keuze te maken tussen de operatoren op basis van duurzaamheid.

2.6. Conclusie

27. Deze mededeling bevat de voornaamste conclusies die voortvloeien uit het onderzoek naar de duurzaamheid van telecomnetwerken in België.
28. Voor meer gedetailleerde informatie verwijst het BIPT naar het volledige rapport in bijlage.

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Bijlage 1. Beschrijvend rapport



Sustainability of telecommunication networks and operators in Belgium

Public Report

October 2022

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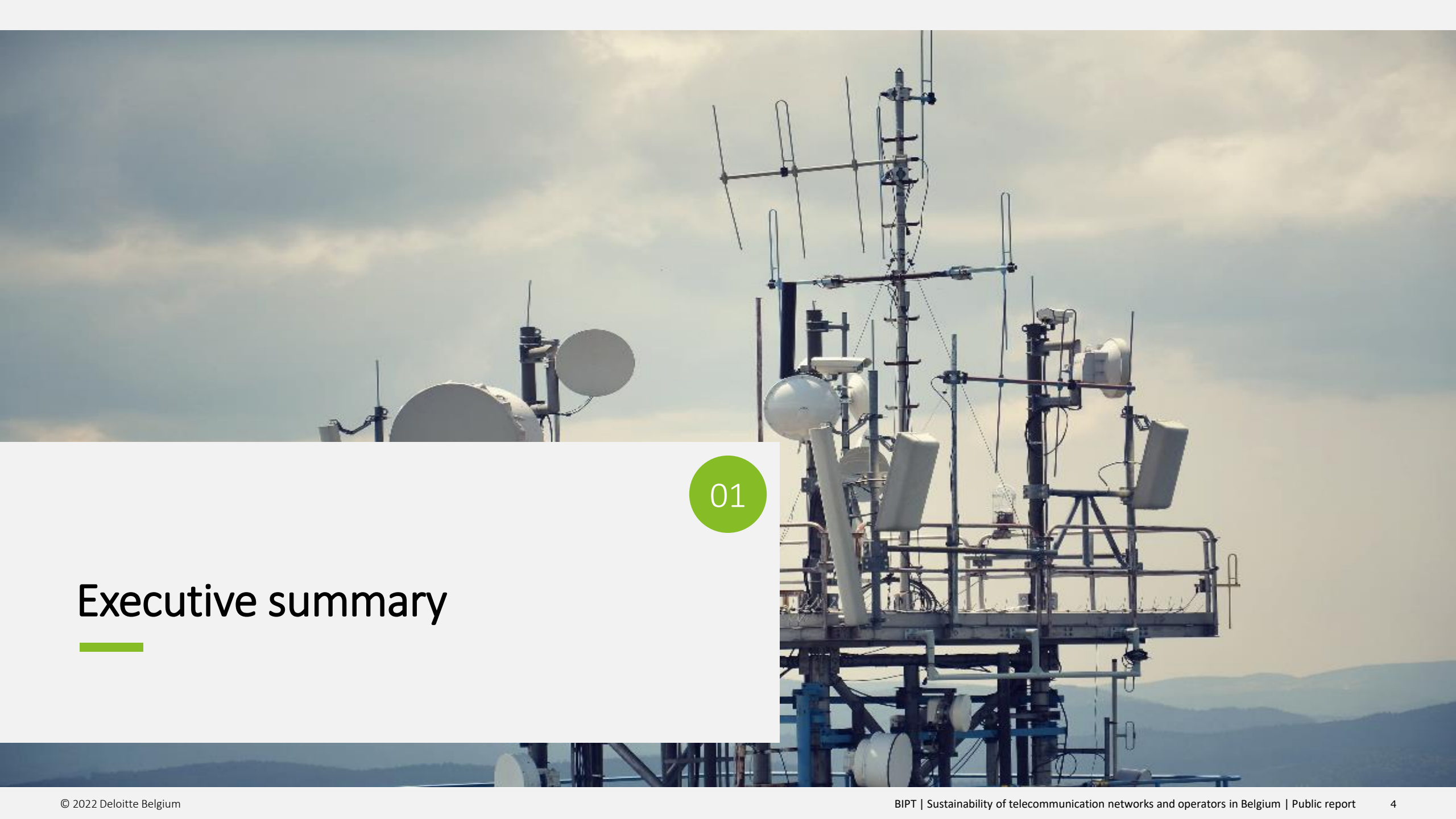
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01

Executive summary



Executive summary

Taking actions will **stimulate the sector to become more sustainable**, whilst continuing to **act as an enabler** in consumers', its own and other industries' roads towards sustainability.

In the context of the transition towards a more digital and energy efficient industry, BIPT wishes to obtain a **comprehensive view of the sustainability of telecommunications networks and their main operators in Belgium**. The objective of the study is to **quantify** the sustainability efforts made and be able to track progress and formulate a **set of recommendations** on how to make telecom networks more energy efficient for the sector, the government, and consumers.

The focus of the study is on the environmental efforts of **Telenet, Orange and Proximus**, focusing on four areas: **energy consumption, CO2 emissions, water consumption and waste & recycling**. Voo was not able to provide sufficient data and is thus not analyzed in this study.

Overall, the share of the telecom sector in the total Belgian energy consumption and CO2 emission **is limited**, contributing to less than 1% of both. Next to its own energy consumption and emissions, the **sector also contributes to the reduction of other industries' emissions** through its networks and activities as well as providing solutions that help **consumers** to live more environmentally consciously and connected.

A set of key recommendations was created, focusing on the role of different players. The **regulator** could take up a facilitating role in the discussion with operators on the sustainability analysis and introduce a recurring and expanded analysis of the entire sector based on the established framework and set of KPIs. On the other side, **operators** could create a more detailed sustainability strategy with a focus on translating the goals into initiatives throughout the organization, across environmental topics. **The consumers** could also build more knowledge on the impact of their consumption.

Going more into the details, **takeaways and recommendations** can be articulated around **the four environment areas** mentioned above.

The Belgian telecom market has reduced its **energy consumption** by 11% between 2018 and 2021, with 77% of the electricity consumed by the network. In 2021, 79% of the total energy consumed was renewable, reaching 100% of renewable electricity is a key priority for operators. The operators need to continue work on the efficiency of the network for all technologies and optimize their overall energy mix.

The Belgian telecom market decreased its **CO2 emissions** by 38% between 2018 and 2021, and is carbon neutral. Net zero – Scope 1, 2 & 3 objective, should be achieved in 2040 at the earliest. Additionally, operators should develop ways to report on Scope 3 Emissions. Once these emissions have been identified, actions can then be taken to reduce both upstream and downstream Scope 3 CO2 Emissions.

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. As there is limited to no knowledge of the water consumption of Belgium telecom operators, introducing clear and unified reporting will enable comparison and introduction of new initiatives to reduce water usage.

The **waste generation** of the Belgian telecom market decreased by 40% between 2018 and 2021. Operators are not moving as fast as other European operators in terms of waste reuse and recycled, with objectives that are on a 2030 or later horizon. Goals and objectives for reducing waste disposal should be introduced to reduce this share. All aspects of waste management should be considered.



02

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.

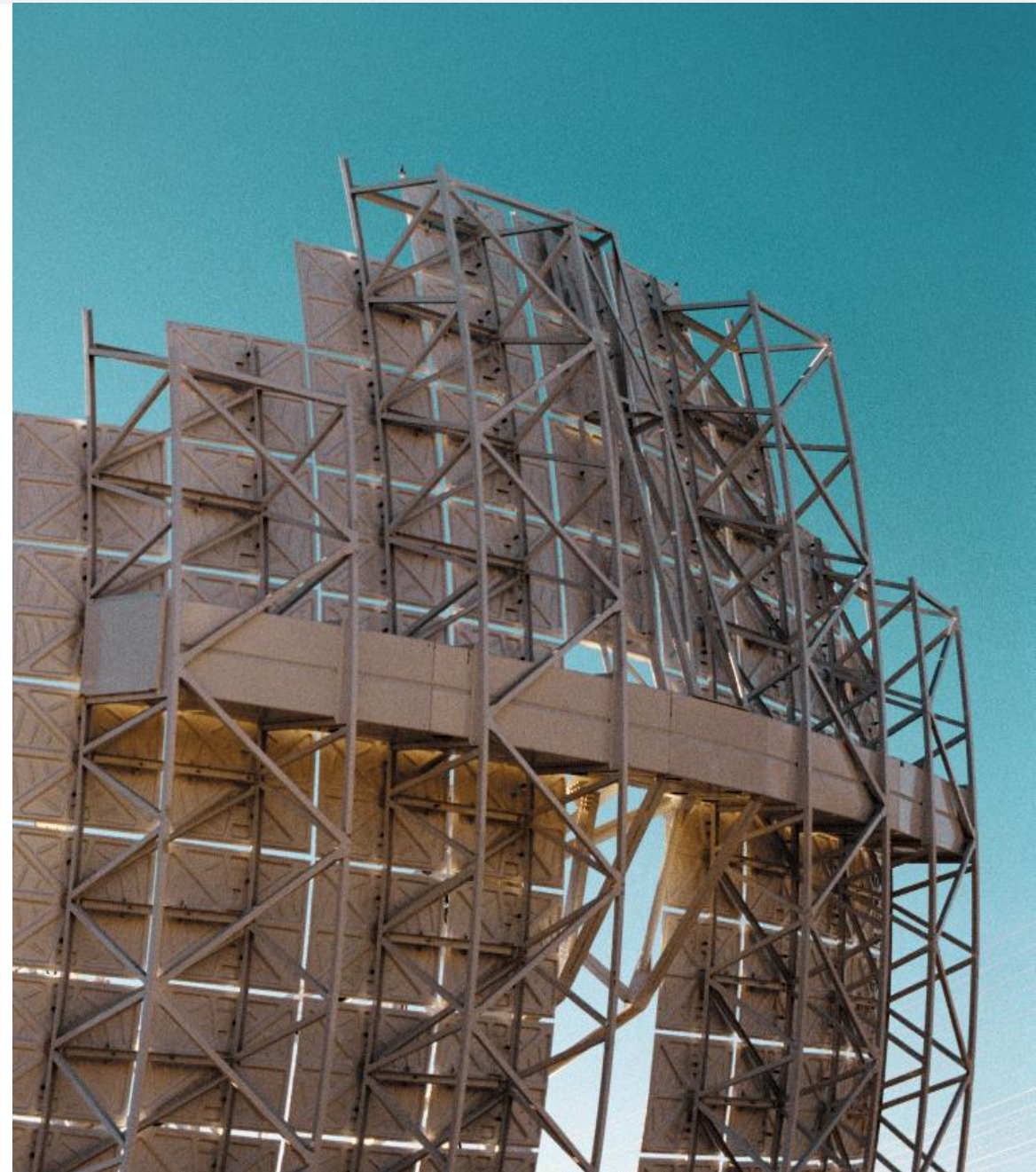
Some initiatives have been launched by market players regarding the sustainability of their operations. However, they are often not comparable. In Belgium, few in-depth analyses have been conducted on the sustainability of telecommunication networks.

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** and is based on publicly available data or aggregated confidential data. The analysis is based on data provided by the Belgian Telecom operators and not all data has been audited by an independent entity



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)

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



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**.

Operators in scope



proximus

telenet

orange™

voo¹

Topics in scope

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

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

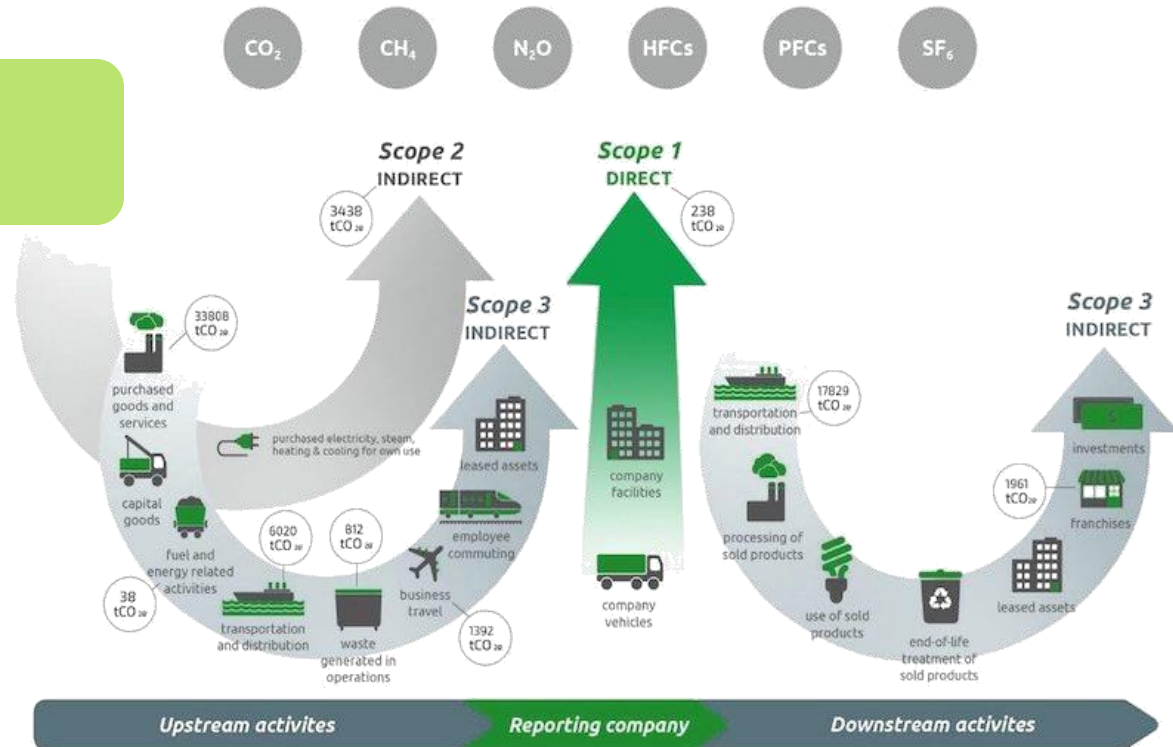
Scope 1 regroups direct emissions from owned or controlled sources. For example, the heating of buildings or the vehicle fleet is part of scope 1.

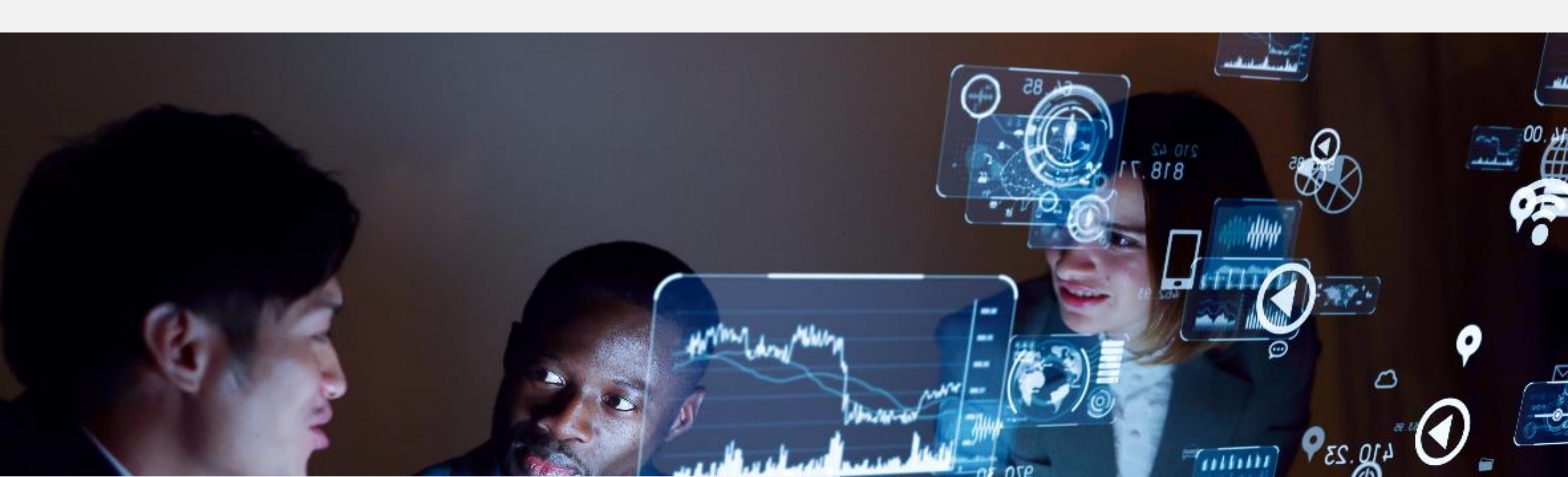
Scope 2

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.





03

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.



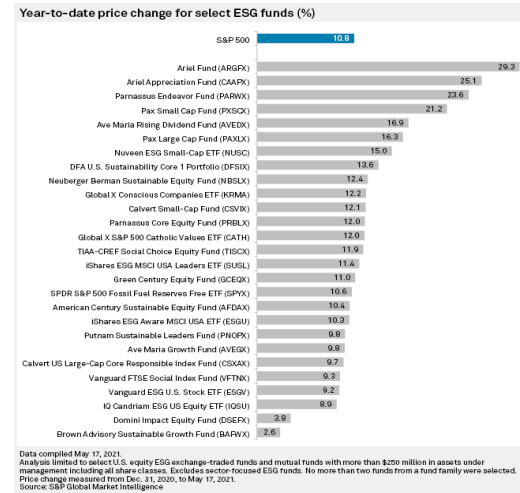
Regulatory push



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



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

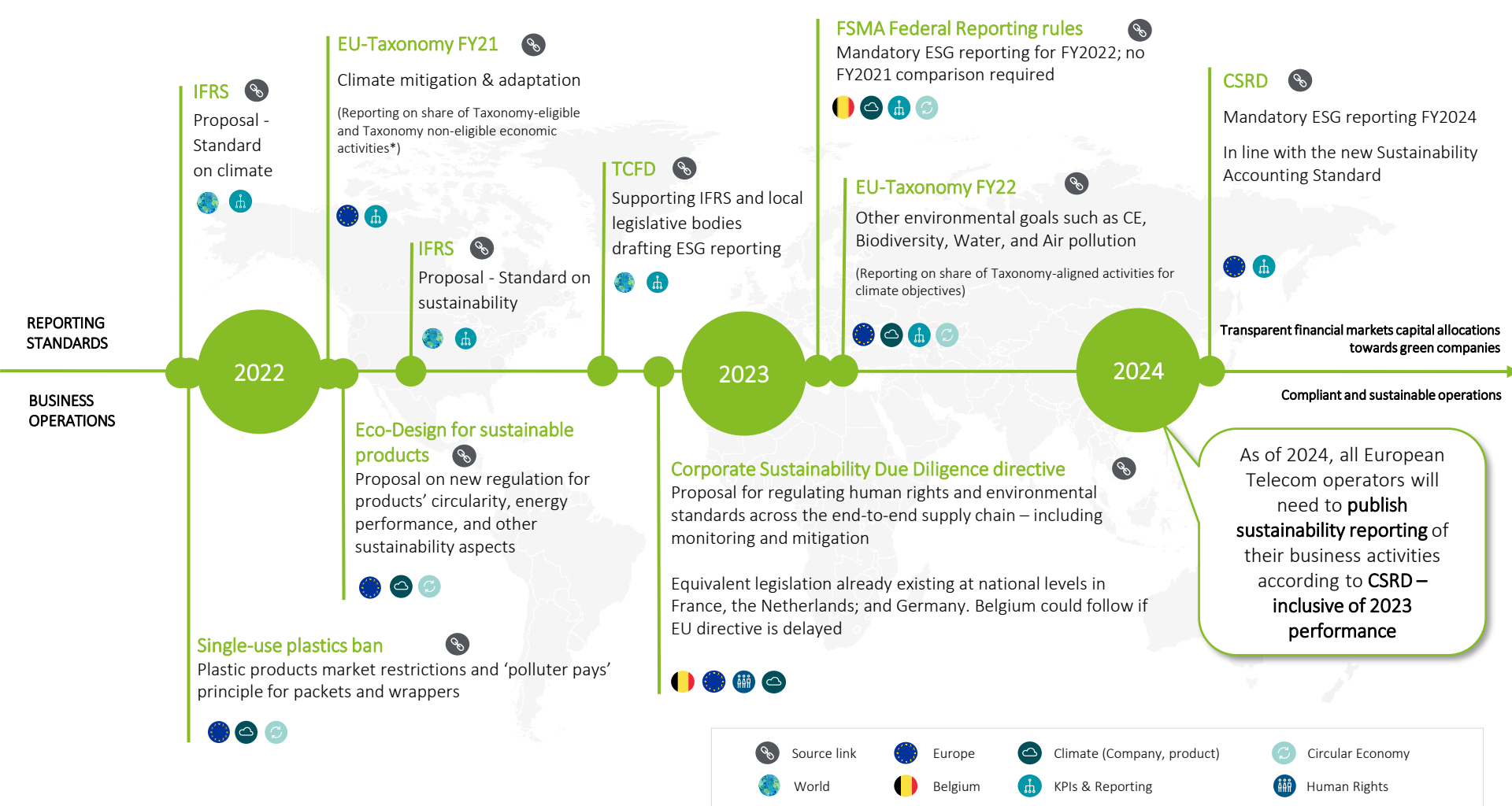


Society, especially the young generation, is expecting more from companies regarding their impact on society and the environment.

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

Sustainability landscape - Regulatory push (2/2)

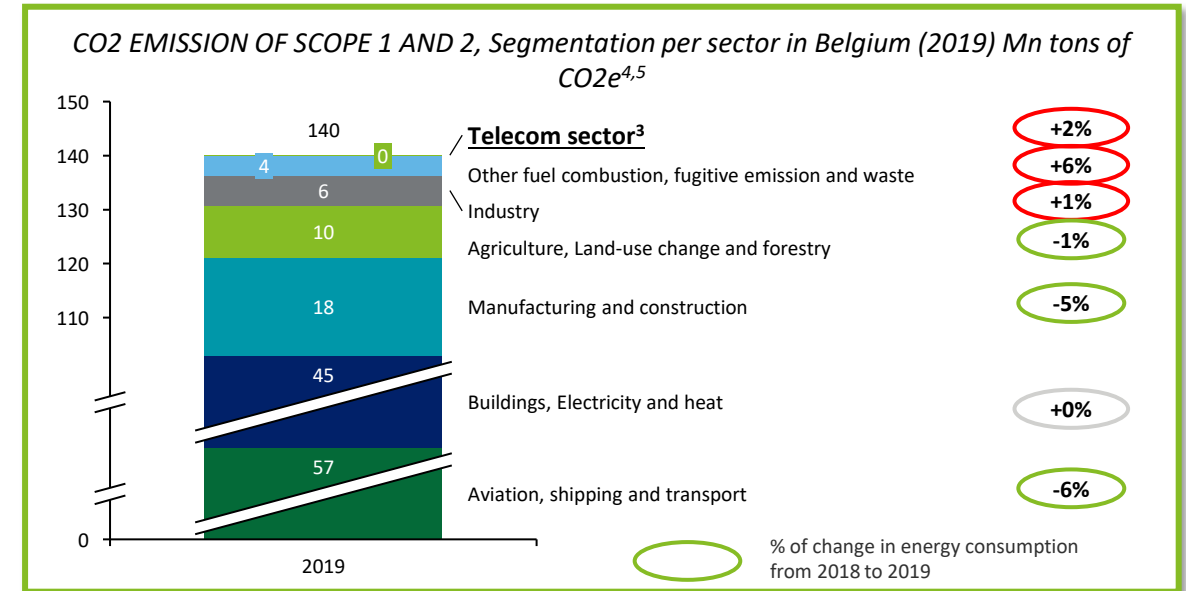
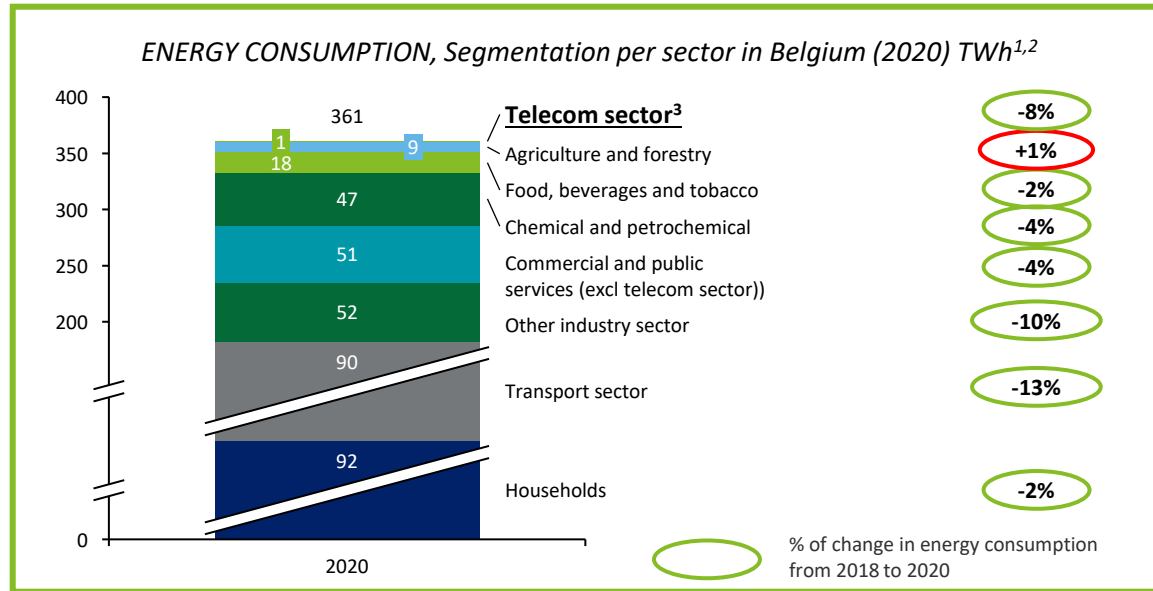
In addition to regulations, organizations and labels are supporting companies by providing sustainability guidelines and target-setting

Organization	Description	Relevance for operators	Label	Description	Obtention by BE operators
 <p>United Nations Global Compact^{1,2}</p>	<p>Non-binding pact to encourage businesses and companies to adopt sustainable and socially responsible policies and to report on their implementation.</p>	<ul style="list-style-type: none"> • Environment pillar <ul style="list-style-type: none"> › 3 principles are linked to this pillar¹. 	 <p>Ecovadis⁵</p>	<p>World's most trusted provider of business sustainability ratings.</p>	
 <p>The Sustainable Development Goals (SDGs)³</p>	<p>Collection of 17 interlinked global goals to have a better and more sustainable future for all</p>	<ul style="list-style-type: none"> • Relevant goals for Belgian telecoms in light of environmental efforts: <ul style="list-style-type: none"> › Affordable and clean energy › Responsible consumption and production › Clean water and sanitation 	 <p>Bcorp⁶</p>	<p>B Corp Certification is a designation that a business is meeting high standards of sustainability performance</p>	<p>No operator is certified</p>
 <p>Science-based targets (SBTI)⁴</p>	<p>Show companies how much and how quickly they need to reduce their greenhouse gas (GHG) emissions</p>	<ul style="list-style-type: none"> • Defines and promotes best practices in emissions reductions and net zero targets 2025 	 <p>ISO⁷</p>	<p>ISO have sustainability norms, such as the 14001:2015 that specifies the requirements for an environmental management system</p>	<p>No operator is certified</p>

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

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:

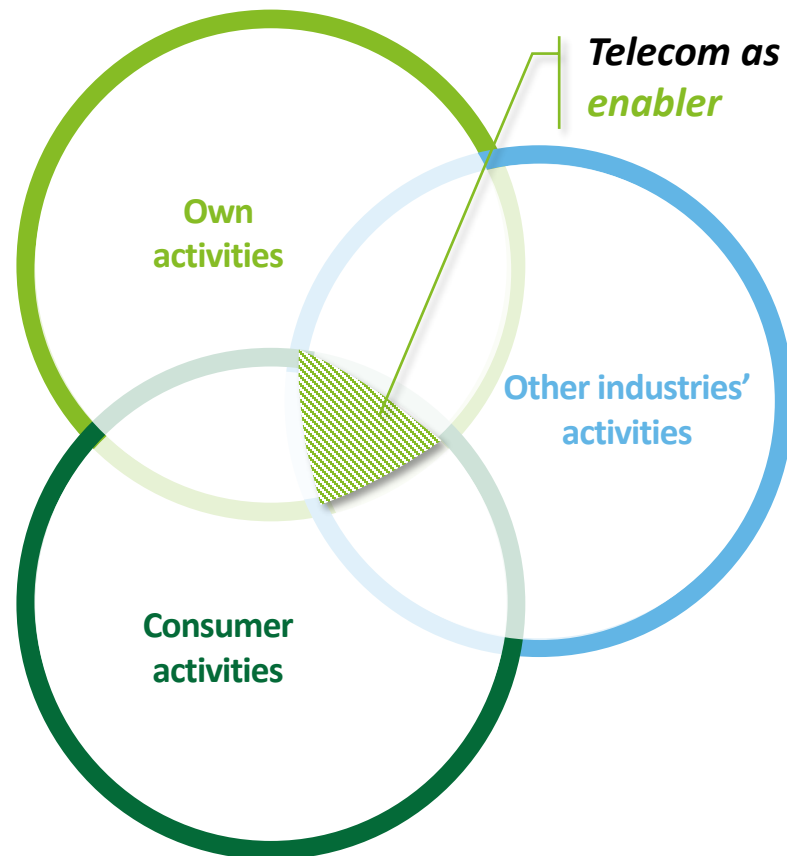
In 2019, the share of the Belgian telecom market out of the total Belgian CO2 emission equaled 0.04%. The telecom market is therefore not a driver of the Belgian CO2 emission. This percentage is explained by the fact that scope 2 emissions are remarkably low for the Belgian telecom market as compared 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)

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

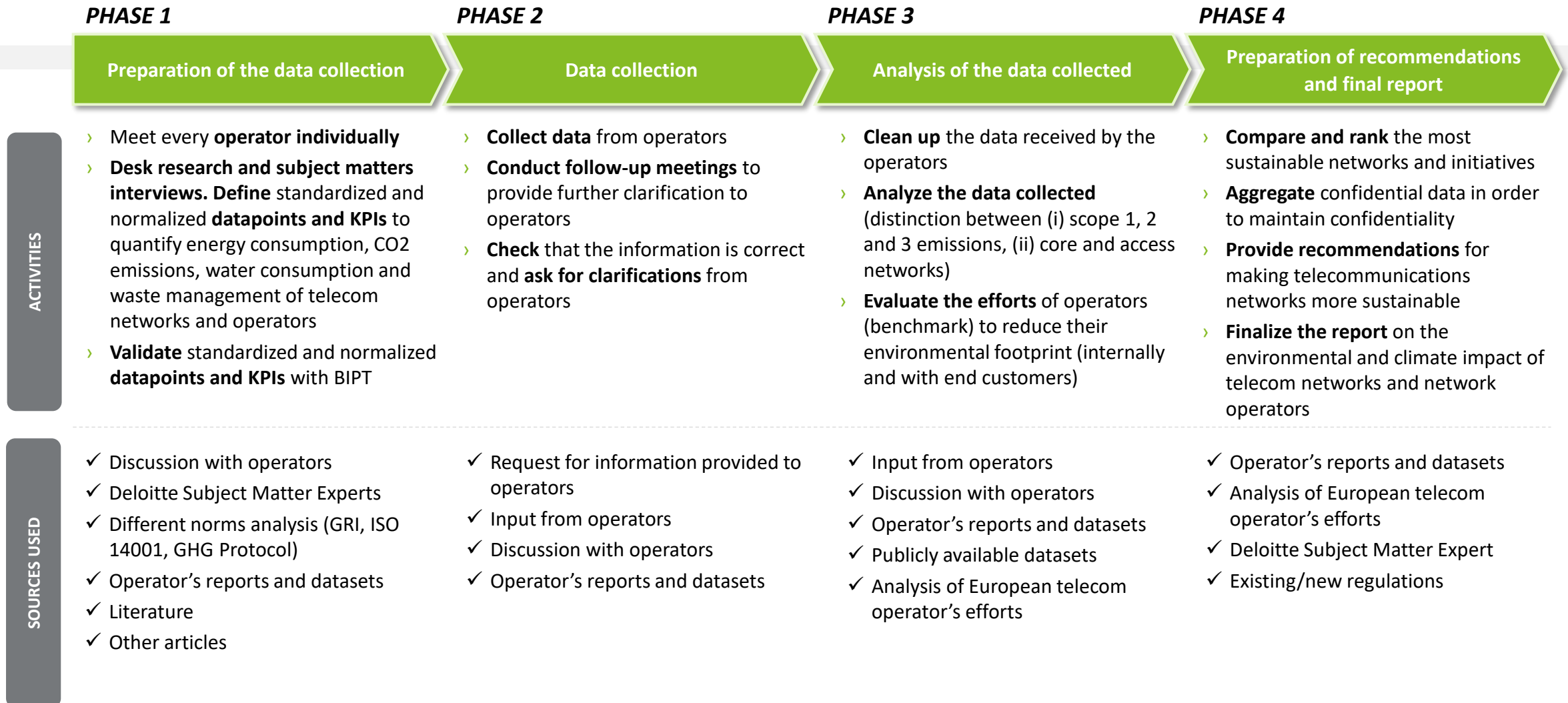


04

Research & analysis

Methodology

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



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 year³
- 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



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

Analysis takeaways

Based on the analysis, key takeaways have been identified



Energy consumption

- The Belgian telecom market has **reduced its energy consumption by 11%** between 2018 and 2021
- In 2021, **80%** of the energy used by the Belgian operators was **electricity**
- In 2021, **77%** of the electricity was **consumed by the network and 79%** of the energy **consumed was 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



CO2 emissions

- **CO2 emissions** of the Belgian telecom market **decreased by 38%** between 2018 and 2021
- **The Belgian telecom market was carbon neutral** in 2021
- In 2021, the Belgian players was **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**



Water consumption

- 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



Waste and recycling

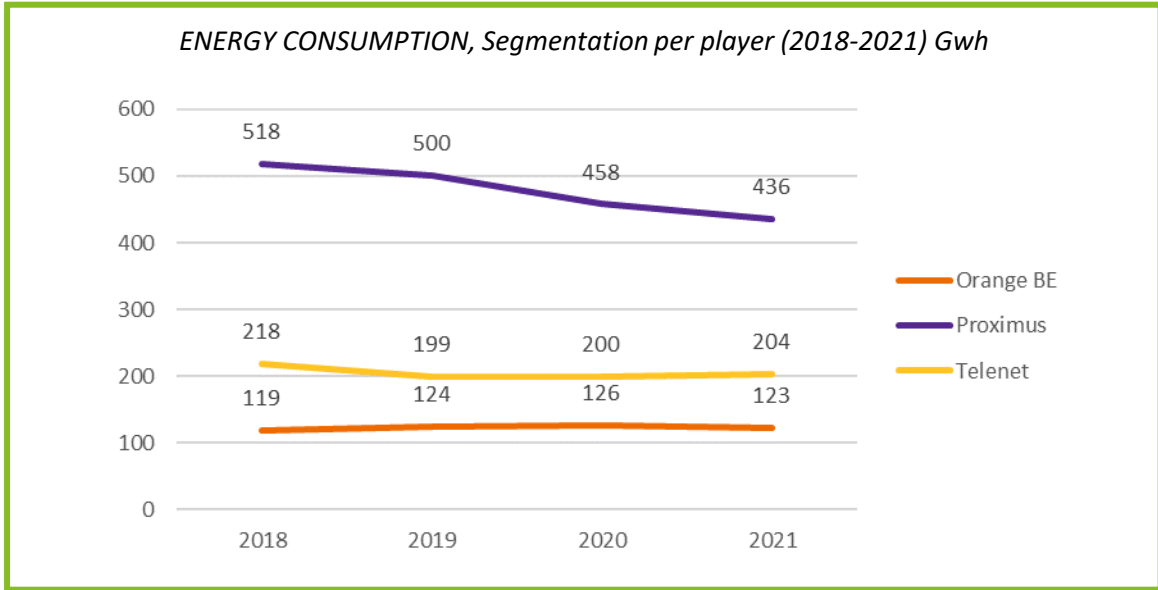
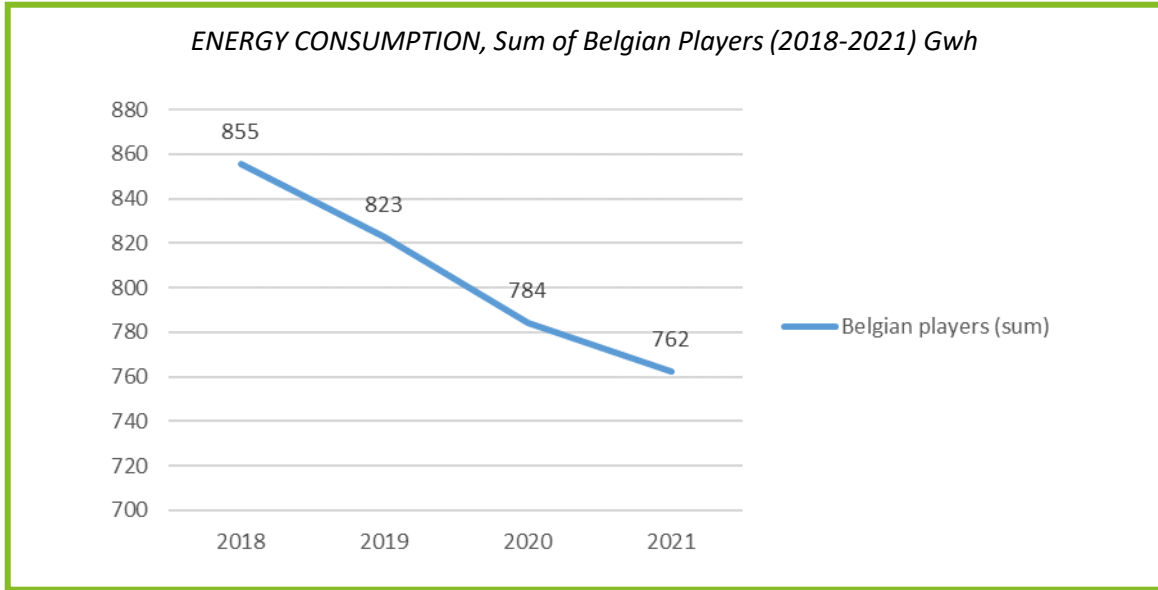
- **Waste generation** of the Belgian telecom market **decreased by 40%** between 2018 and 2021
- **The share of waste being disposed** by the Belgian operators **decreased** between 2018 and 2021, going from **19% to 16%**
- The **products diverted from disposal** of the Belgian telecom market **increased by 265%** between 2018 and 2021
- In 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

Sources: 1. Net zero refers to the amount of all greenhouse gases (GHGs) – such as carbon dioxide (CO2), methane or sulfur dioxide – that are removed from the atmosphere being equal to those emitted by human activity.

Data Analysis

Energy





The Belgian telecom market has reduced its energy consumption:

The total energy consumption of the Belgian telecom market decreased by 11% between 2018 and 2021, going from 855 Gwh to 762 Gwh

In comparison, the telecom electricity consumption represented 0.7% of the total Belgian electricity consumption in 2021¹

Electricity is the main source of energy consumption:

In 2021, electricity represents 80% of the energy consumed by the Belgian telecom market. The other 20% of the energy consumed is mainly fuel (diesel and petrol)

In 2021, 81% of the electricity consumed is renewable, however, this is mainly acquired renewable electricity, 2% is produced by the Belgian operators

Proximus consumes the most energy:

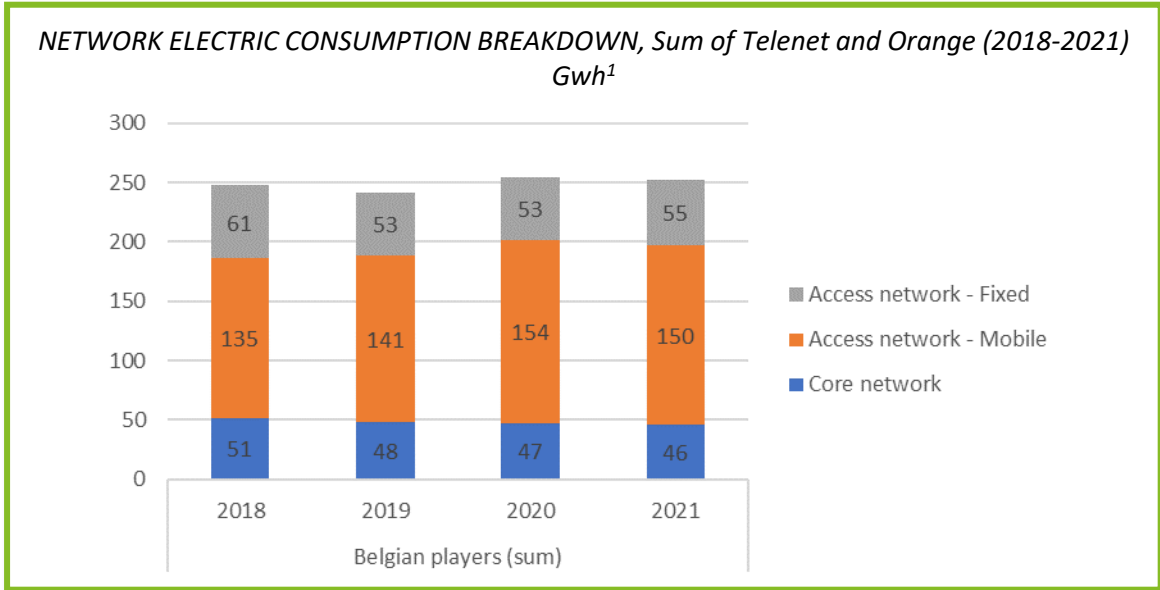
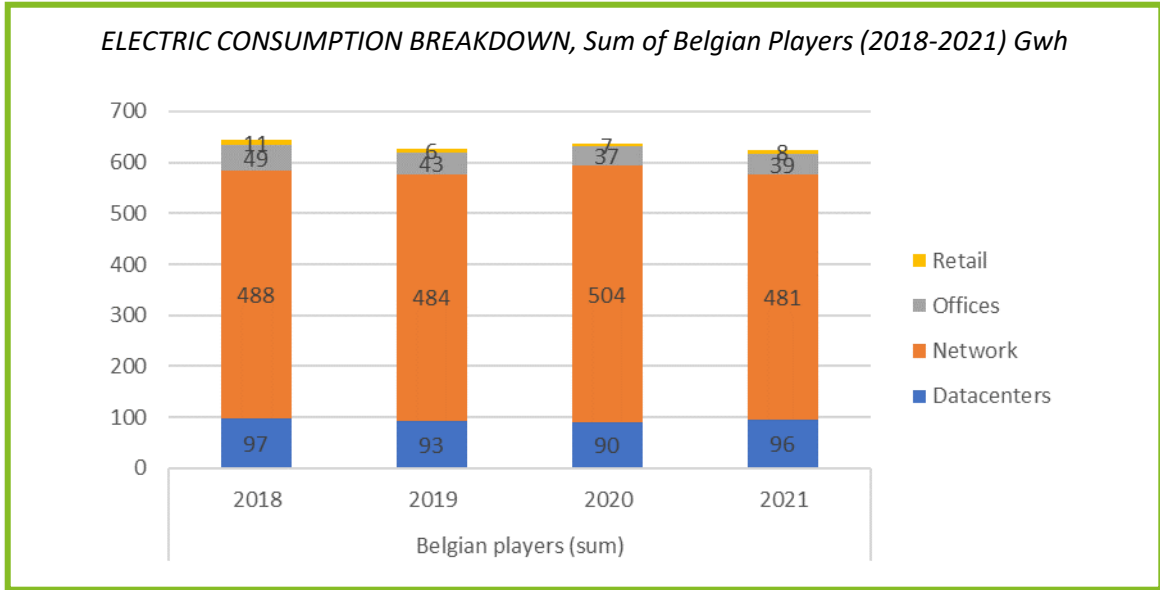
Due to its large network, 57% of the energy consumed in the market was consumed by Proximus in 2021, of which 75% was electricity. When analyzing the Gwh consumption per Mn € of revenue, the 3 players have similar values (0.081 for Orange and 0.078 for Proximus and Telenet)

Proximus and Telenet are both reducing their energy consumption:

Proximus and Telenet decreased their consumption by 16% and 6% respectively from 2018 to 2021 while Orange slightly increased its consumption by 3% during the same period

Fuel consumption has decreased in the 3 companies. Proximus decreased its fuel consumption by 29%, Telenet by 18%, and Orange by 30% between 2018 and 2021

Source: 1. [IEA](#)



Insights and takeaways

The network is the main source of electricity consumption:

The telecom’s networks represented 77% of the electric consumption in 2021. The telecom’s network electric consumption decreased by 1% from 2018 to 2021.

Datacenters are the second source of energy consumption (15%) for the Belgian players, followed by offices (6%) and then retail (1%)

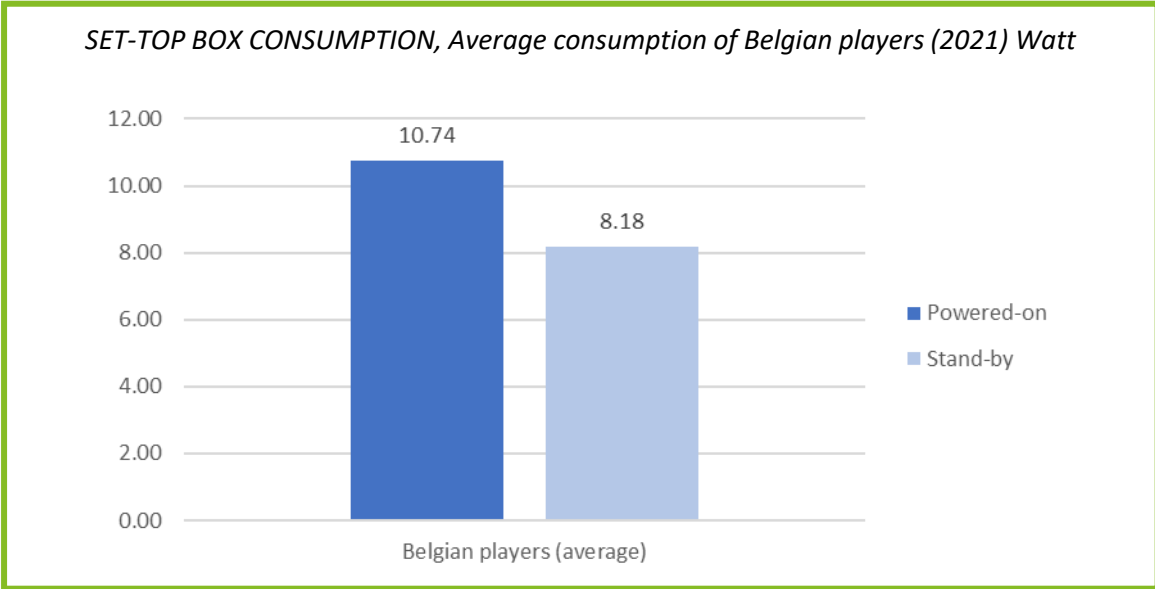
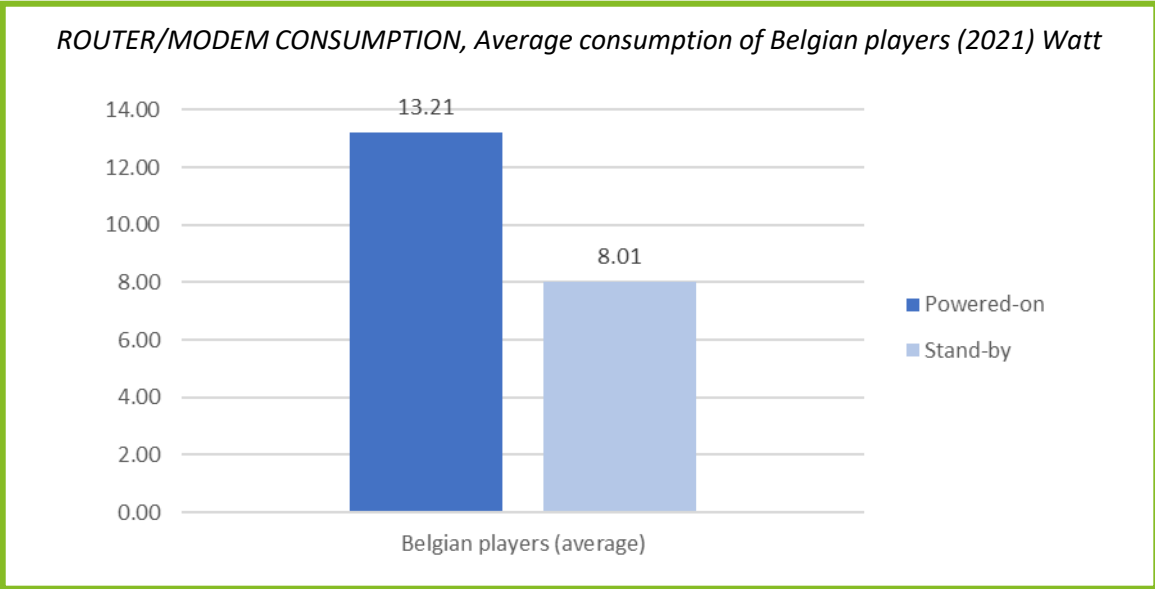
In 2021, the energy consumption distribution is similar for the three main players analyzed

Orange and Telenet’s access networks consume significantly more than their core networks:

In 2021, the access network, the part of the network that connects a subscriber to a system, consumed 3.5 times more electricity than the core network

Access network’s energy consumption increased by 5% between 2018 and 2021, while core network’s decreased by 10% in the same period

Note: 1. Proximus has been excluded from this analysis due to a lack of information

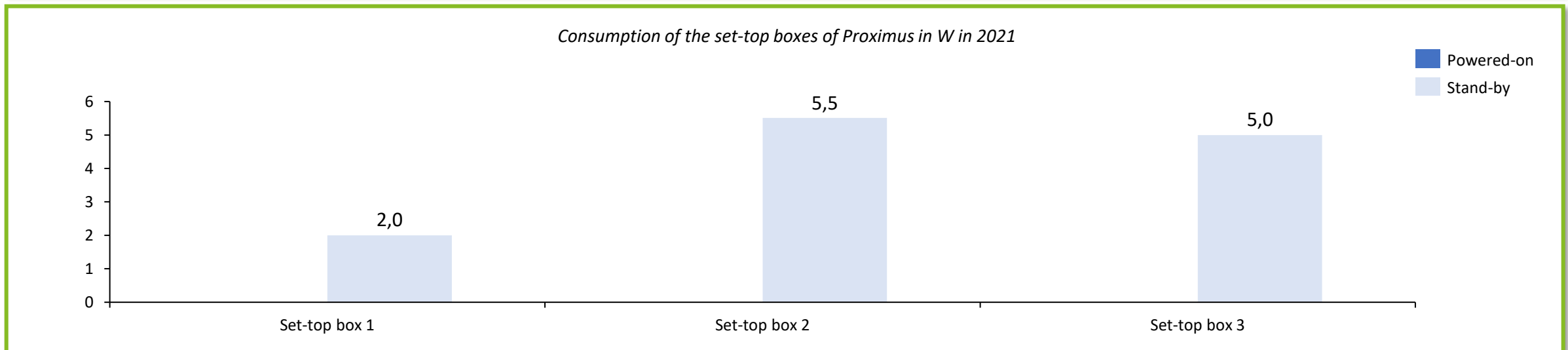
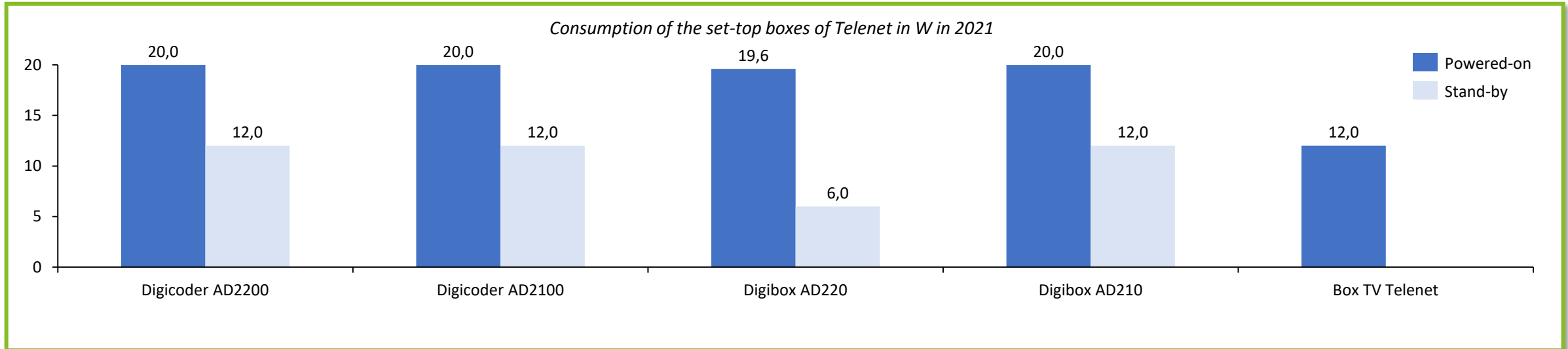


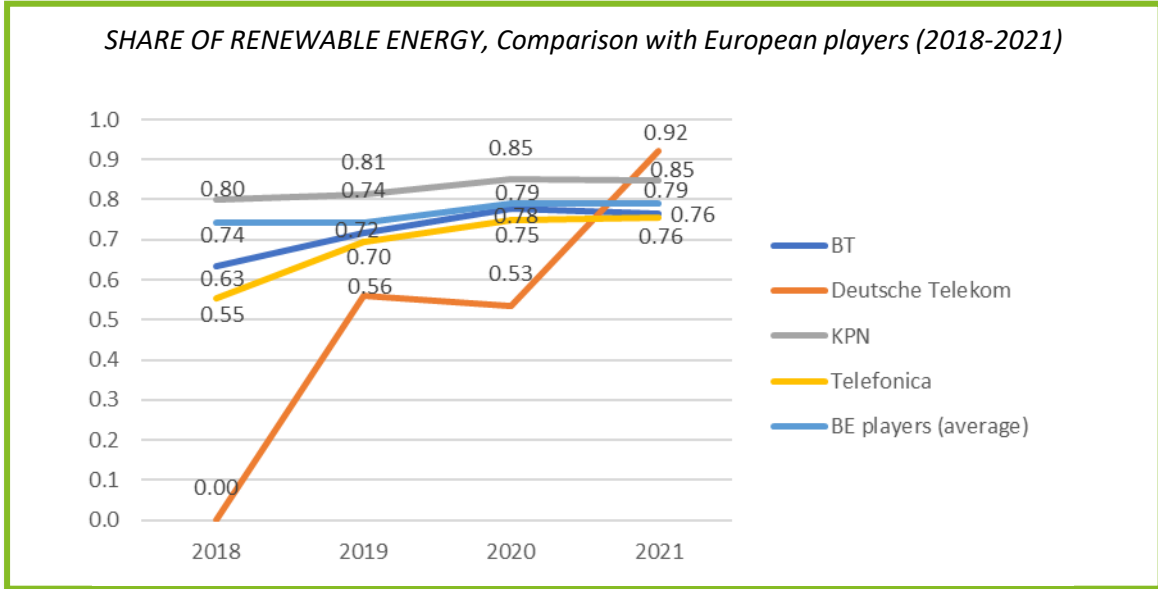
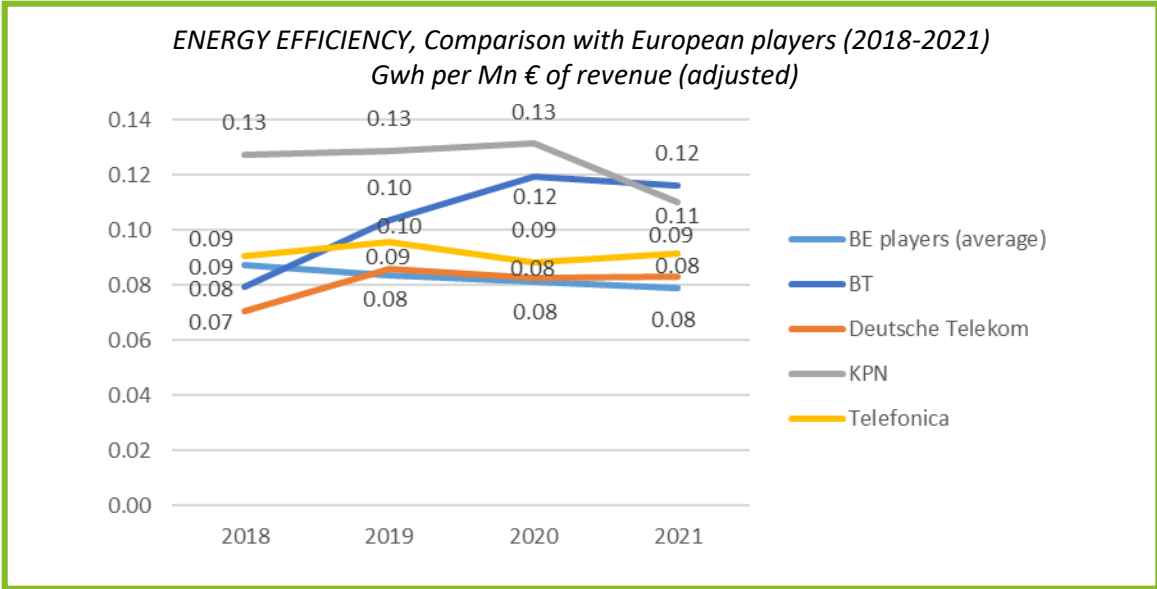
Insights and takeaways

On average, a powered-on router/modem consumes 13.21 watts:
 In 2021, the average consumption of the router/modem in Belgium in a powered-on mode was 13.21 watts while in a stand-by mode it consumed 8.01 watts. On average in 2021, a router/modem in a stand-by mode consumed 40% less than in a powered-on mode. However, a router/modem is not supposed to be turned off. On average in Belgium in 2021, if a router/modem was always in powered-on mode, it consumed 116 kWh in a year.

On average, a powered-on set-top box consumes 10.74 watts:
 In 2021, the average consumption of the set-top box in Belgium in a powered-on mode was 10.74 watts while in a stand-by mode it consumed 8.18 watts. On average in 2021, a set-top box in a stand-by mode consumed 24% less than in a powered-on mode.

Comparing the set-top boxes of the three players is difficult as the data provided is different for all players





Compared to a European benchmark, the Belgian telecom market is slightly more energy efficient:

In 2021, when analyzing energy consumption per Mn € of revenue, adjusted to reflect differences in pricing levels in the respective countries, the Belgian telecom market was the most efficient player, closely followed by Deutsche Telekom, Telefonica, KPN and finally BT

The Belgian players are in line with the European benchmark:

In 2021, the share of renewable energy consumed in the Belgian market (79%) was in line with the European market (from 76% to 92%)

This share of renewable energy purchased is mainly caused by the renewable electricity bought by the operators, especially as electricity represents 80% of the energy consumed in the Belgian telecom market, and as 98% of the electricity comes from renewable sources

The share of renewable energy is growing for the Belgian players:

In the Belgian telecom sector, the share of renewable energy increased by 6% between 2018 and 2021. This trend can be observed for the main Belgian players. However, only 2% of the energy consumed is produced by the operators

Initiatives and objectives (1/2)



		telenet	proximus	orange™
Goals	100% renewable electricity	Yes, by 2030	Yes	Yes
	Energy efficiency targets	Yes (Reduce electricity-intensity of the network by 15% per year, through to 2030 (in kWh/TB))	Yes (Internal)	Yes (Internal)
	Fuel reduction targets	No	Yes (Internal)	Yes
Initiatives	Consumption reduction in the network	<ul style="list-style-type: none"> ANTARCTICA program (renovating and renewing cooling systems in technical locations) Optimize power saving configuration 	<ul style="list-style-type: none"> Creating a more energy efficient network Replace technical buildings with a concept of compact units & outphasing technical buildings Outphasing of older technologies & copper 	<ul style="list-style-type: none"> Expansion of temperature and hygrometry ranges in technical rooms of ITN sites All core sites are equipped with latest high efficient 48VDC system
	Consumption reduction in the datacenters	<ul style="list-style-type: none"> ANTARCTICA program (renovating and renewing cooling systems DCs) Keeping the DCs up to date with the latest technology 	<ul style="list-style-type: none"> Creating more energy efficient DCs 	<ul style="list-style-type: none"> Free cooling in DCs Heat recovery in 1 core site and will be extended to 2 other sites
	Green mobility	<ul style="list-style-type: none"> Electrification of fleet and encouragement of alternative mobility 	<ul style="list-style-type: none"> Invest in more sustainable transportation Rule out fossil fuel in fleet by switching to renewables and incentivizing electrical vehicles 	<ul style="list-style-type: none"> Increase the number of electric or hybrid cars in the fleet and offer an incentive for commuting by public transport and bike 60% homeworking policy
	Consumption reduction in the offices	<ul style="list-style-type: none"> Relighting to led 	<ul style="list-style-type: none"> Topical efficiency projects 	<ul style="list-style-type: none"> Installation of low-energy light bulbs Contracted Veolia to manage, maintain & optimize the energy consumption in the offices
	Green electricity	<ul style="list-style-type: none"> Solar panel installations on office buildings (135MWh/year currently and increase to 290MWh/year at the end of the year) 100% of the directly purchased electricity is renewable 	<ul style="list-style-type: none"> Source greener and maintain 100% renewable electricity 	<ul style="list-style-type: none"> Photovoltaic & Solar panels on the roof Sign a Power Purchase Agreement in 2024 - Objective of a maximum consumption through a PPA from 2025-2026
	Other	<ul style="list-style-type: none"> Energy Savings Task Force that has been active since October 	<ul style="list-style-type: none"> Rule out fossil fuel in buildings by switching to renewables 	<ul style="list-style-type: none"> Working groups created to reduce our energy consumption

Note: The list of initiatives is a selection of initiatives in each of the topics

Initiatives and objectives (2/2)



GOALS OF BELGIAN AND EUROPEAN PLAYERS				
	Yes in 2021	Yes, by 2025	Yes, by 2030	No
100% renewable electricity				
Energy efficiency targets	Yes		No	
Fuel reduction targets	Yes		No	

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 difficultly 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.**

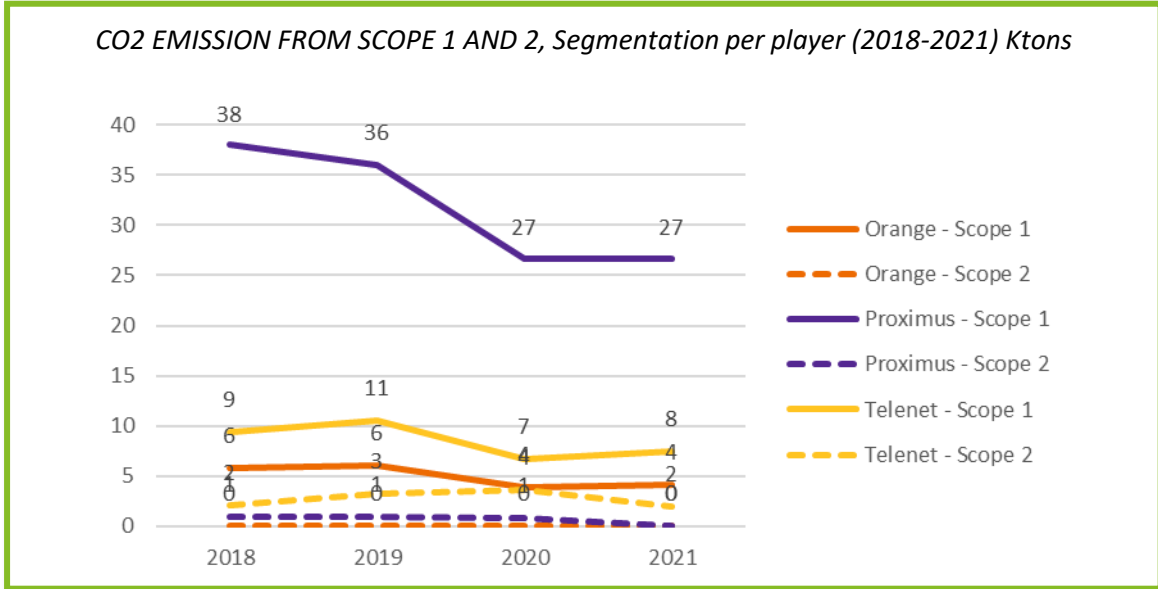
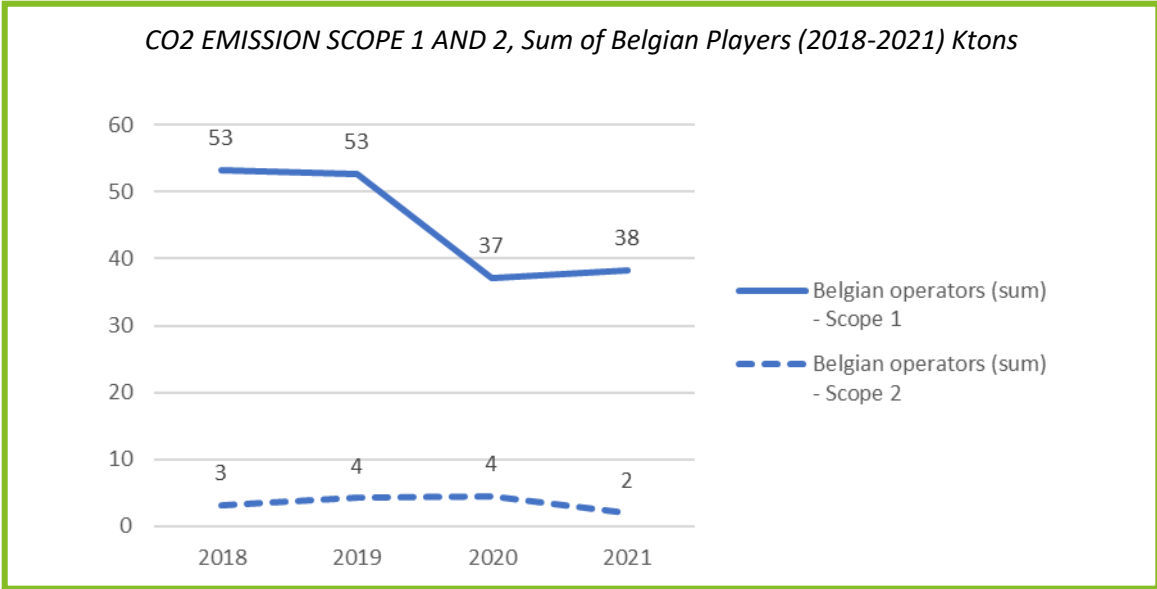
On-site sustainable solutions will continue to grow, but are not yet put in place by BE operators. Site level renewable solutions can involve a mix of wind and solar energies to power up the towers while lithium-ion batteries give an “offline” support when the former technologies can’t supply enough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

Data Analysis

CO2 Emission





The Belgian telecom market has reduced its CO2 Emission:

CO2 emissions from scope 1 and 2 from the Belgian telecom market decreased by 29% between 2018 and 2021, going from 56 Ktons to 40 Ktons. In 2021, the telecom CO2 Emission represented 0.65% of the Belgian CO2 emission.

Scope 1 is the main source of CO2 emission compared to scope 2:

In 2021, scope 1 represented 95% of the CO2 emission in the Belgian telecom market. The remaining 5% in scope 2 is generated by the non-renewable electricity

In 2021, the scope 1 CO2 emission was generated by fleet fuel (74%), heating (21%) and refrigerants (5%). As fleet accounts for the majority of CO2 emissions, the remarkable drop in CO2 emissions in 2020 can be driven by the corona health crisis, forcing people to commute less. Scope 2 represents the emission of electricity

Proximus emits the most CO2:

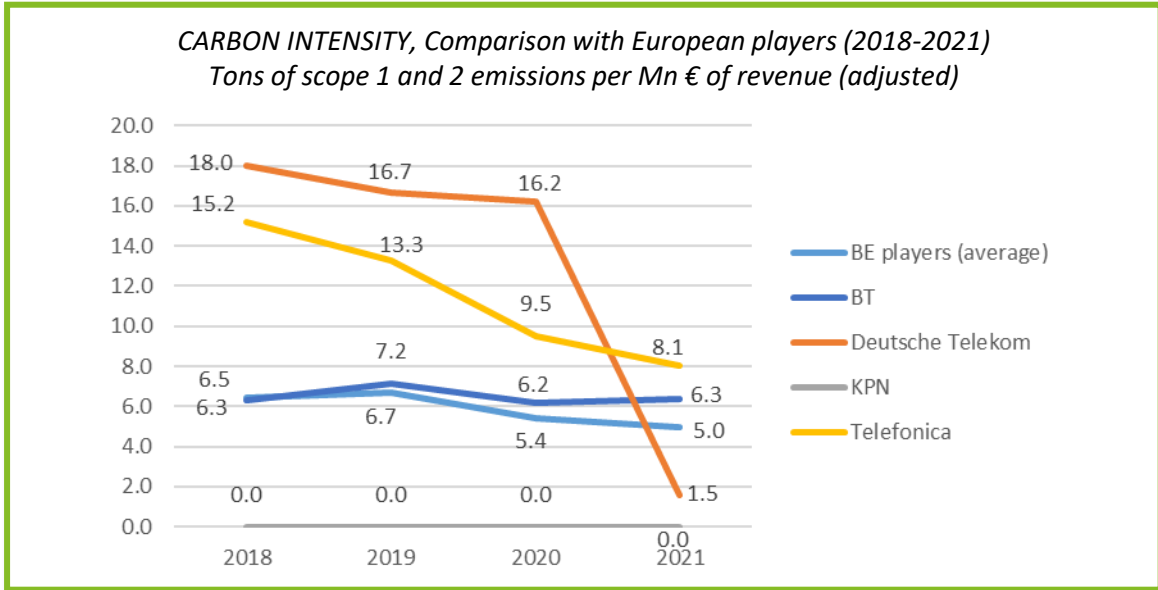
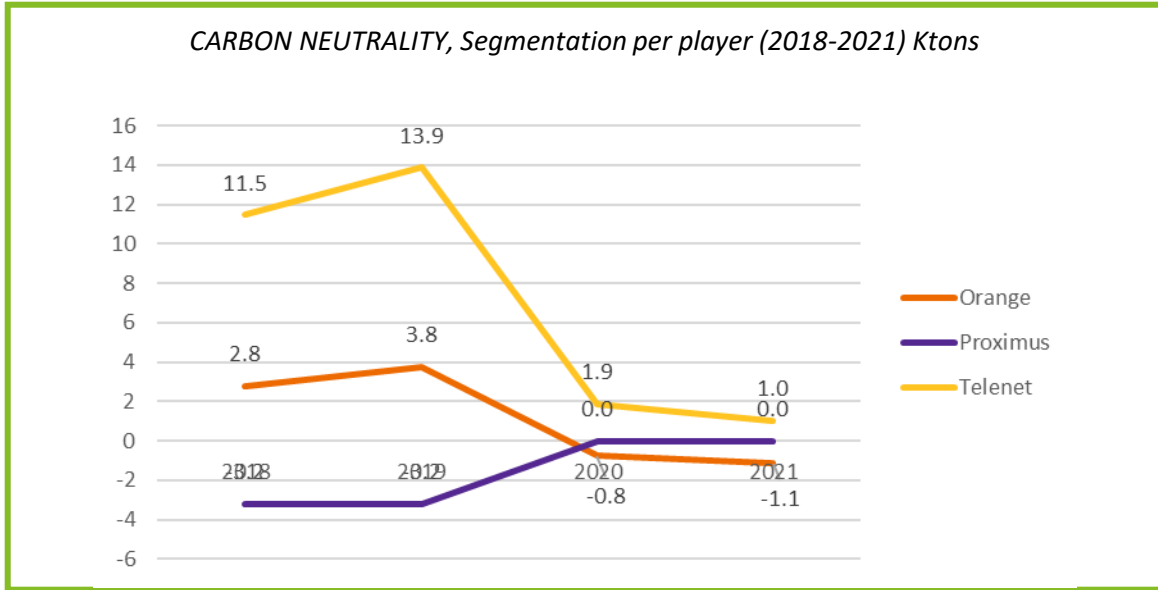
Given its larger network, larger employee base and thus larger fleet, Proximus emitted 66% of the CO2 in 2021 in the Belgian telecom market in 2021

Proximus managed to reduce its CO2 emission by -31% between 2018 and 2021, followed by Orange (-29%) and Telenet (-17%)

Orange managed to decrease its fleet fuel between 2018 and 2021 by -35%, followed by Telenet (-34%) and Proximus (-27%)

Proximus and Orange only emitted Scope 2 emission:

In 2021, Proximus and Orange had no scope 2 emissions as 100% of the electricity purchased was renewable



The Belgian market is carbon neutral:

The net carbon emission of the 4 Belgian operators was -0.11 Ktons in 2021. This is calculated by summing up scope 1 and 2 CO2 emissions and subtracting the carbon credits

Proximus has been carbon neutral since at least 2018, and was even carbon negative in 2018 and 2019, Orange has been carbon neutral since 2020. Telenet is not yet carbon neutral, but is doing efforts to become by decreasing their CO2 emissions

A note should be made that a growing number of experts challenge the effectiveness of carbon credits, as it does not deter people from abusing the environment. Another way to investigate this would be to analyze the way CO2 is purchased¹

Note: 1. [Energycx](#)

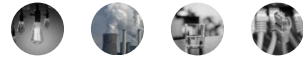
The Belgian players performing in line with European benchmark:

When dividing scope 1 and 2 emissions by the revenue in Mn €, adjusted to reflect differences in pricing levels in the respective countries, the Belgian telecom market was more efficient than BT and Telefonica but less than Deutsche Telekom in 2021

Deutsche Telekom went from the least to the most efficient player in a year:

Deutsche Telekom succeeded to divide their Scope 1 and 2 emissions 10 times in 2021. This is mainly driven by their switch from non-renewable to renewable electricity consumption

Initiatives and objectives (1/2)



CO2 EMISSION



		telenet	proximus	orange™
Goals	Net zero – Scope 1 & 2	Yes, by 2030	Yes, 95% of scope 1 by 2030 and 100% renewable electricity	Yes, by 2040
	Net zero – Scope 1, 2 & 3	Yes, by 2050 at the latest	Yes, by 2040	Yes, by 2040
	Carbon positive commitment¹	No	Yes	No
Initiatives	Emission reduction of Scope 1	<ul style="list-style-type: none"> • Electrification of fleet and encouragement of alternative mobility • POCs with more energy efficient power generation systems (HVO100; battery+gen-combo) 	<ul style="list-style-type: none"> • Invest in more sustainable transportation • Rule of fossil fuel in fleet & buildings 	<ul style="list-style-type: none"> • Increase the number of electric or hybrid cars in the fleet and offer an incentive for commuting by public transport and bike
	Emission reduction of Scope 2	<ul style="list-style-type: none"> • Purchase 100% renewable energy in Telenet controlled contracts 	<ul style="list-style-type: none"> • Source greener and maintain 100% renewable electricity 	<ul style="list-style-type: none"> • Installation of low-energy light bulbs • Photovoltaic and solar panels on the roof
	Emission reduction of Scope 3	<ul style="list-style-type: none"> • Introduce innovative, low-energy CPE • Work with local partners for CPE processing • use multimodal transportation for any long-distance transportation of CPE • Participate in last-mile city logistics projects 	<ul style="list-style-type: none"> • Supplier engagement program • Environmental sustainability by design by sourcing less & sourcing right 	<ul style="list-style-type: none"> • Re program and continuous improvement on waste management
	Compensation of the CO2 emission	<ul style="list-style-type: none"> • Invest in afforestation projects in Ecuador via Bos+ 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Supported mini-hydro plants in Liberia to avoid the use of polluting energy. • Financed an AGROFORESTRY project in Kenya and a project in Zimbabwe on the protection of the Kariba forest.
	Other	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • €2 donated to Natagora / Natuurpunt for each collected device. Long-term project managed by Natagora / Natuurpunt. The whole project aims at the reforestation of 100 hectares of land (outside compensation)

Note: 1. Carbon positive commitment is a commitment meaning that the balance of carbon emissions for a business entity falls below zero. This commitment is not in line with SBTi new net zero standard; The list of initiatives is a selection of initiatives in each of the topics

Initiatives and objectives (2/2)



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

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.

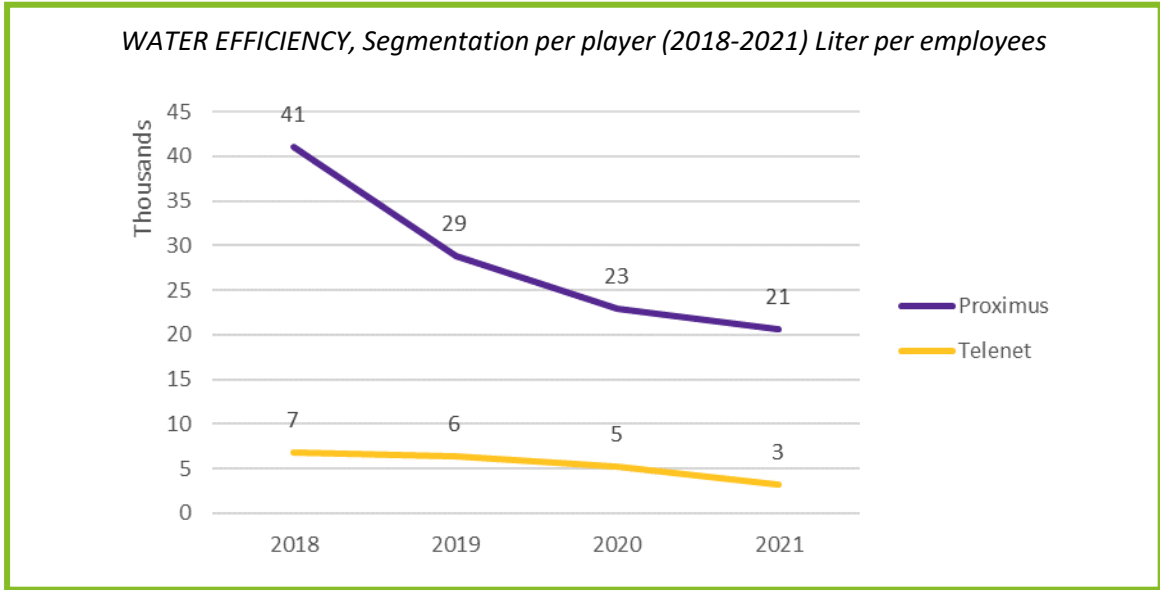
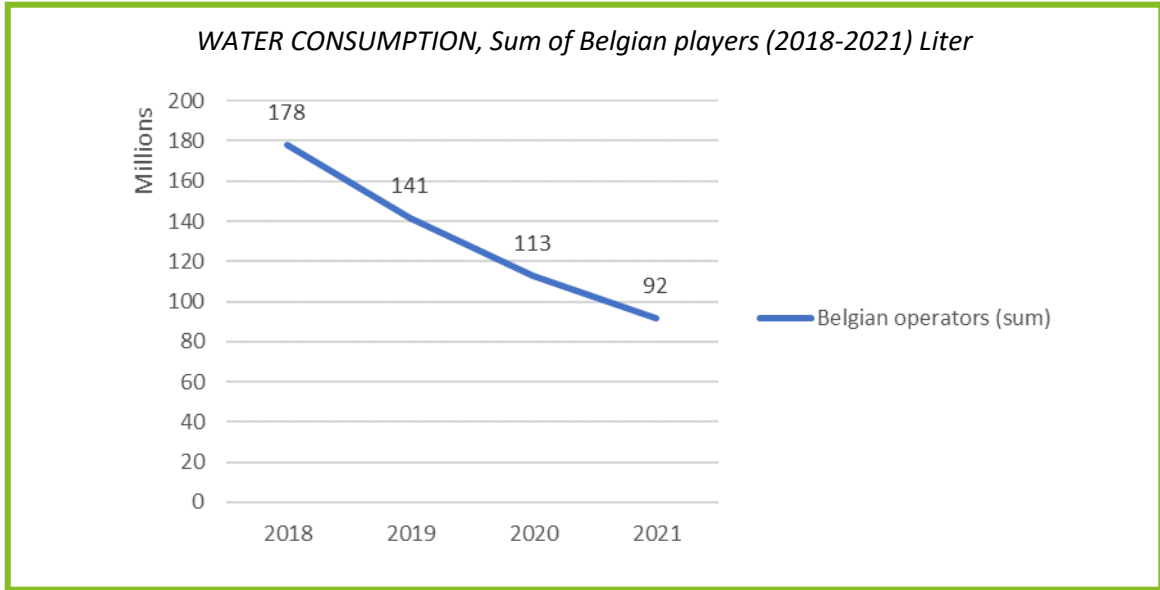
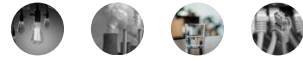
Other initiatives are in place to reduce **scope 3 emissions**, with supplier programs and local partnerships that are put in place by all the operators. Telefonica for example is developing a Supply Chain program encouraging strategic suppliers to set science-based targets and reduce their GHG emissions.

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.

Data Analysis

Water





Insights and takeaways

The Belgian telecom market has been reducing its water consumption:

The total water consumption of the Belgian telecom market decreased by 47% between 2018 and 2021, going from 178 Mn liters to 92 Mn liters

In 2021, based on Telenet’s data, 53% of the water was used in their offices, 19% for their datacenters, and 28% in other locations

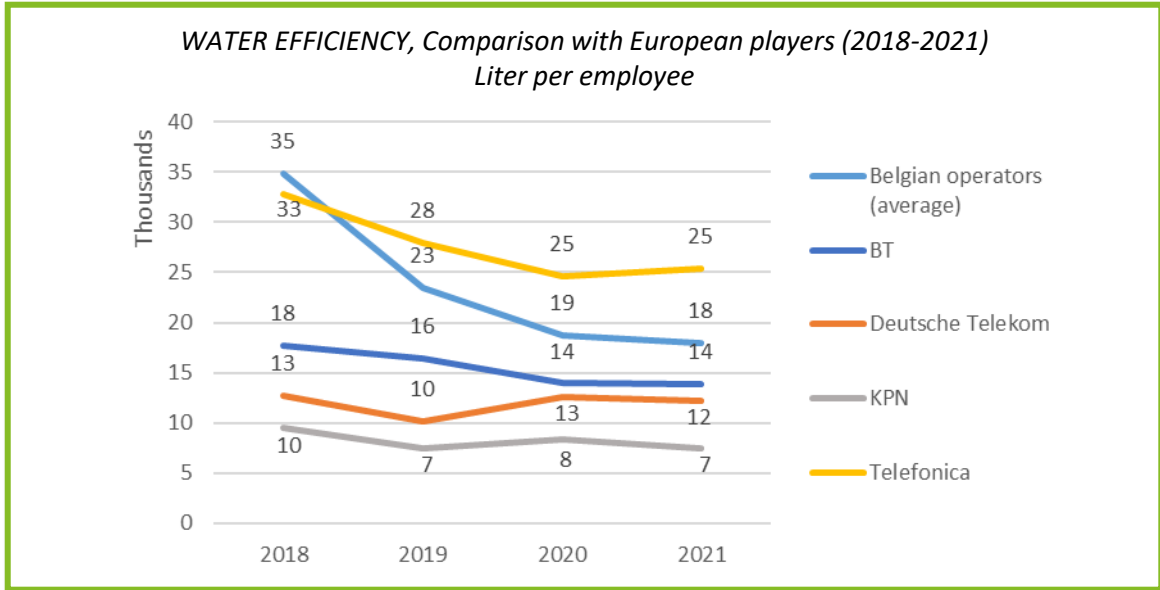
As the water consumption dropped by 47% between 2018 and 2021, the water consumed by Mn € revenue and by employees followed the same decreasing trend

A significant water efficiency difference exists between Proximus and Telenet:

In 2021, Proximus consumed 85% of the water consumed by the Belgian telecoms

When analyzing the water consumption per employee, Proximus consumed 7 times more water per employee than Telenet in 2021

When analyzing the water consumption per Mn € of revenue, Proximus consumed 6 times more water per employee than Telenet in 2021

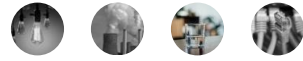


The Belgian market is performing in line with the average of the European benchmark:

When looking at the ratio of water consumption per employee, the Belgian average was more efficient than Telefonica but less than KPN, Deutsche Telekom and British Telecom in 2021

When analyzing the decrease of this ratio from 2018 to 2021, the Belgian operators had the highest decreased (-47%) followed by Telefonica (-23%), KPN (-22%), BT (-22%) and Deutsche Telekom (-4%)

Initiatives and objectives (1/2)



WATER



Goals	Commitment to reduce water consumption	telenet	proximus	orange™
Initiatives	Reuse of rainwater	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Topical projects when renewing/renovating spaces 	<ul style="list-style-type: none"> • Reuse of rainwater at the headquarter
	Reduction of the water consumption in the offices	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Water reuse system in headquarter reduce the water consumption
	Reduction of the water consumption in the datacenters	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Free cooling system in all core sites reduce water consumption
	Other	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Dry Cleaning car service proposed to employees (punctual action as a test)

Note: The list of initiatives is a selection of initiatives in each of the topics

Initiatives and objectives (2/2)

GOALS OF BELGIAN AND EUROPEAN PLAYERS		
	Yes	No
Commitment to reduce water consumption		

Insights and takeaways

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

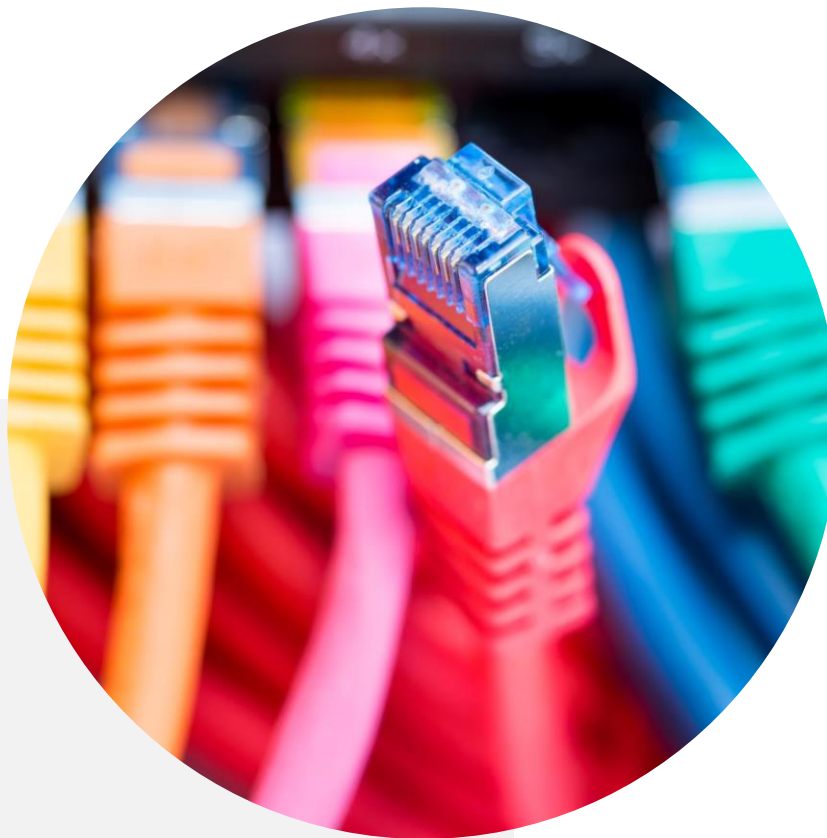
Most operators, including in Belgium, have initiatives in place to reduce the consumption, but those remain rather limited compared to other preoccupations. Example of initiatives are the increased usage of rainwater or reuse of water.

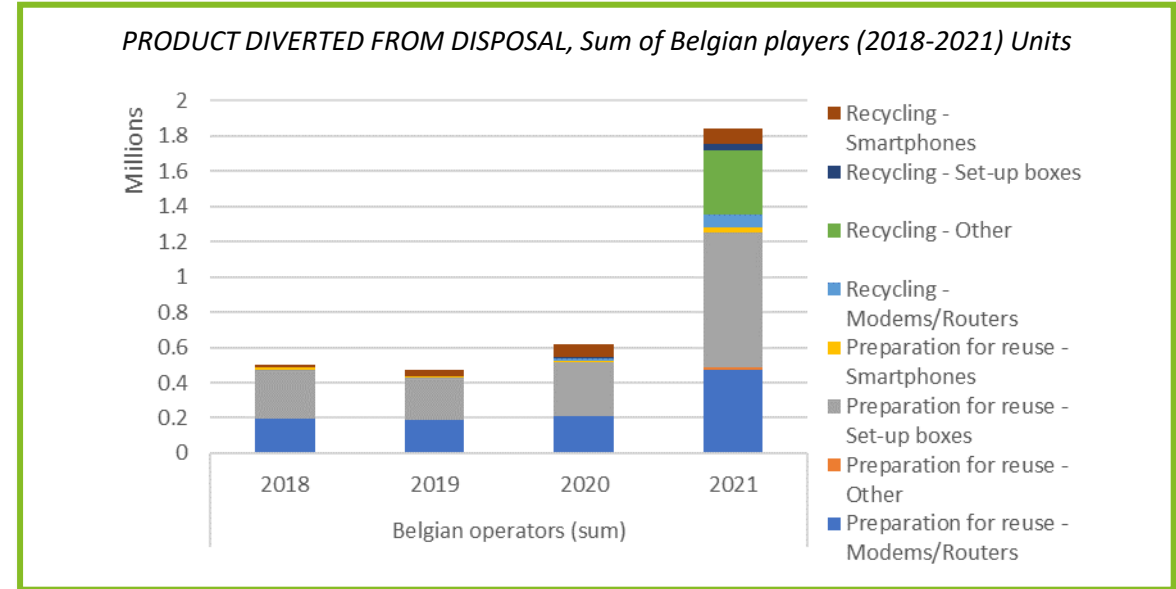
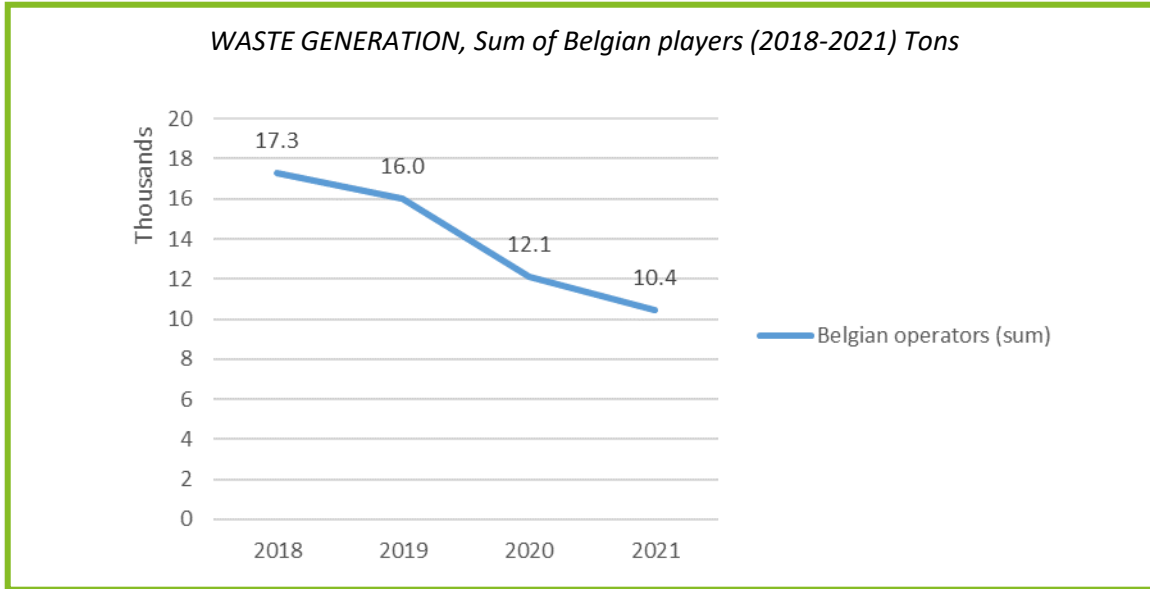
Water usage of data centers is one of the larger aspects of water consumption (when cooling is done by water and not air). One can work on the water reduction but also on reusing the heat that is generated for local heating.

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.

Data Analysis

Waste & recycling





The Belgian telecom market has been reducing its waste generation:

Waste generation of the Belgian telecom market decreased by 40% between 2018 and 2021, going from 17,300 tons to 10,400 tons. Examples of waste are network waste (cable, antennas, etc.) and non-network waste (modems, smartphones, etc.)

Waste disposed¹ generation in the Belgian telecom market decreased by 47% between 2018 and 2021, going from 3,200 tons to 1,700 tons. Moreover, 16% of the total waste was disposed in 2021

Waste diverted from disposal¹ generation in the Belgian telecom market decreased by 38% between 2018 and 2021, going from 14,100 tons to 8,800 tons

The number of products diverted from disposal increased between 2018 to 2021:

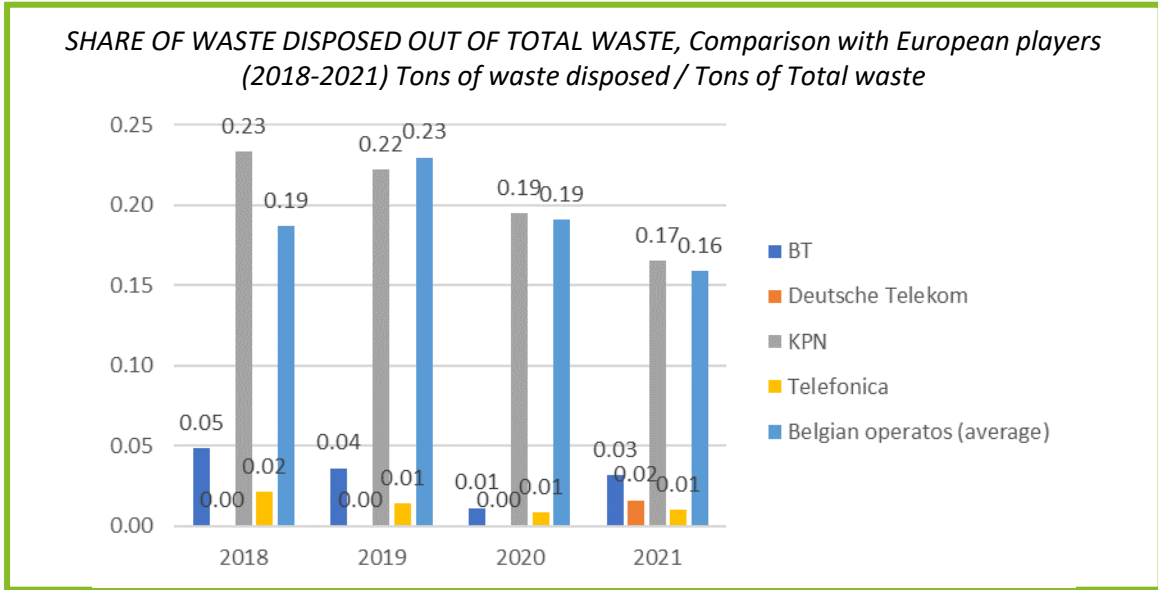
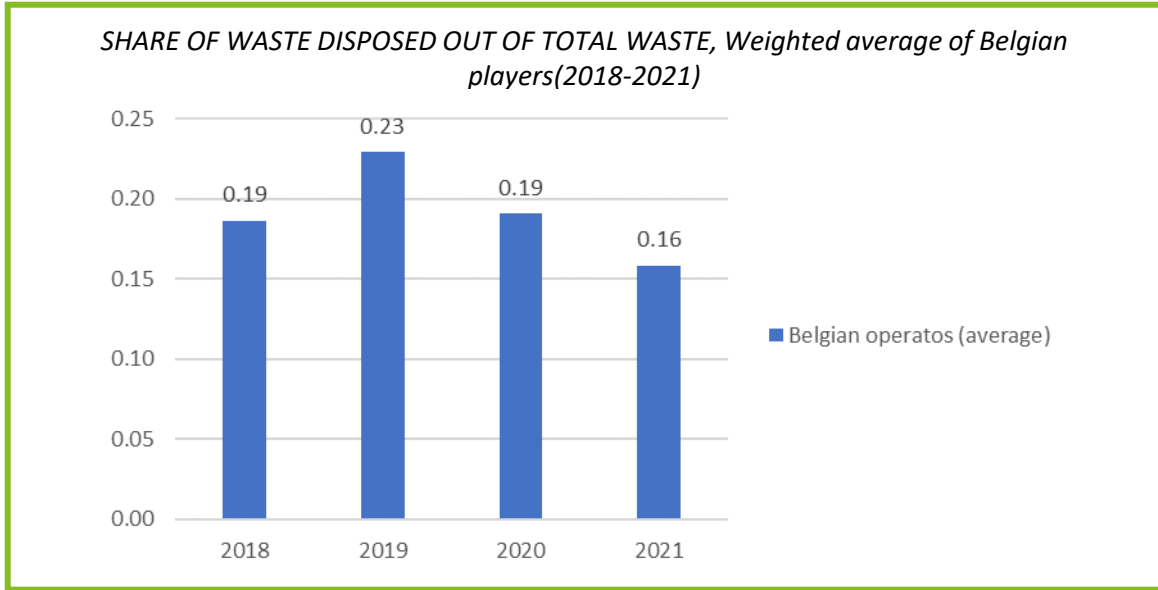
The products diverted from disposal of the Belgian telecom market increased by 265% between 2018 and 2021, going from 500 thousand units to 1.8 Mn units

One major cause of this increase is the fact that Telenet only reports the 2021 value. When excluding Telenet from this analysis, the number of products diverted from disposal increased by 114% from 2018 to 2021. This number seems more representative of the actual increase in products diverted from disposal

Preparation for reuse is the preferred option to divert products from disposal:

In 2021, 79% of the products diverted from disposal were prepared for reuse. These products were mainly set-top boxes (58%) followed by modems and routers (39%)

Note: 1. Waste disposed is the waste that is discarded, thrown away or destroyed. It is the opposite of waste diverted from disposal, which happens when for example recycling or refurbishing waste.



The Belgian players decreased the share of waste disposed:

The share of waste being disposed by the Belgian operators decreased from 2018 to 2021, going from 19% to 16%

The Belgian market lags behind the European operators :

In 2021, the share of waste disposed out of total waste was 16% for the Belgian operators. When comparing with the European benchmark, KPN had a similar share of disposed waste (17%), while the other three European players report on a remarkably lower share of disposed waste (between 0.01% and 0.03% of total waste)

Except for DT, all players analyzed were able to decrease the share of disposed waste out of total waste between 2018 and 2021

Note: 1. Waste disposed is the waste that is discarded, thrown away or destroyed. It is the opposite of waste diverted from disposal, which happens when for example recycling or refurbishing waste.

Initiatives and objectives (1/2)



		telenet	proximus	orange™
Goals	All waste reused or recycled	No	Yes, by 2030	No
	Waste reduction commitment for circularity	Yes	Yes	Yes
Initiatives	Reduction of the waste generation	<ul style="list-style-type: none"> Replace cardboard and plastic cups with reusable cups (HQ -> Billie Cup) Laptops-as-a-Service Organize reverse-logistics to improve circularity through collaboration with social profit organization Vlotte (IMSIR bvba) 	<ul style="list-style-type: none"> Sustainable way of delivering parcel to consumers and stores On-site refurbishment of modems in Courcelles Eco-design of CPE Offering refurbished phones Smartphone as a service model Network repair Network sharing 	<ul style="list-style-type: none"> Re program: promotion of refurbished mobile devices Repair service proposal in all shops Promote Eco-Rating initiative Introduced <u>OSCAR, an internal marketplace</u> to reuse existing equipment in our infrastructure
	Increase in the percentage of waste diverted from disposal	<ul style="list-style-type: none"> Recollect CPE via lease-only model & penalization of no-return Donate obsolete IT equipment and furniture to schools and good causes 	<ul style="list-style-type: none"> Proximus shops and online shop offer customers refurbished smartphones as an alternative to new devices Recycling of CPE's & network equipment Reuse of refurbished CPE's 	<ul style="list-style-type: none"> Reuse and recycle modems and set-top boxes returning from customers (Out of use partnership). Refurbishment of mobile device (Back2Buzz partnership).
	Other	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> NA 	<ul style="list-style-type: none"> Increase efforts on waste management Incentives for our salespeople in shops to collect devices €2 donated to Natagora / Natuurpunt for each collected device. Long-term project managed by Natagora / Natuurpunt. The whole project aims at the reforestation of 100 hectares of land (outside compensation)

Note: The list of initiatives is a selection of initiatives in each of the topics

Initiatives and objectives (2/2)

GOALS OF BELGIAN AND EUROPEAN PLAYERS				
	Yes in 2021	Yes, by 2025	Yes, by 2030	No
All waste reused or recycled				
Waste reduction commitment for circularity	Yes		No	

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”.

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 all 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.



05

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 regulations¹

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 \(europa.eu\)](https://eur-lex.europa.eu/)


Zoom on recommendations for operators (1/4)

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





ENERGY

 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.

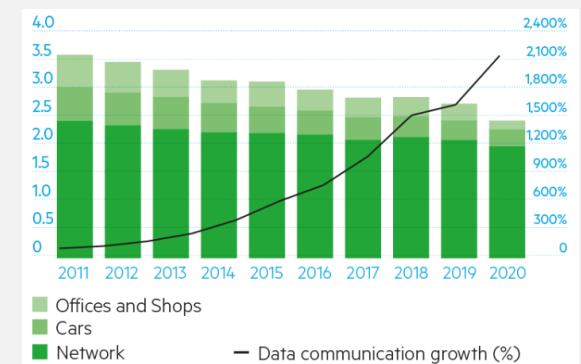
 It will be important for telecom operators to **optimize their renewable energy mix.** When looking at the longer term, there is a case to be made for operators to switch towards own energy production, in addition to purchasing green energy through Power Purchase Agreements (PPA), which some Belgian 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.

Use case

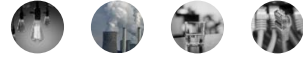
While data traffic is growing, KPN's energy consumption is not.

More than 90% of the electricity is used by KPN's fixed and mobile networks. The data traffic on their networks is growing, on average, by 40% per year. KPN is managing to expand its network without the need for more energy.¹



Zoom on recommendations for operators (2/4)

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



CO2 EMISSION



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.

Use case

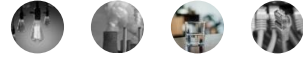
Telefonica's Eco Smart services help businesses become more efficient and at the same time decarbonise the economy



The solutions are based on Telefonica's connectivity, 100% renewable and low in emissions, as well as on the Internet of Things technologies, the cloud, big data and Artificial Intelligence, with the aim of reducing energy and water consumption, CO₂ emissions and promoting the circular economy. They are being used by both cities and companies of various sizes in the key sectors, including tourism, industry, logistics and distribution, retail and banking.¹

Zoom on recommendations for operators (3/4)

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



WATER



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.

Use case

Sustainable datacenters can use the heat to reduce the consumption of the surrounding buildings



In the Green Energy Park of Zellik, the first stone was laid of a brand-new data center, the first green one in our country. In such a center, servers are placed together and cooled to enable our internet traffic. The developers, including the Vrije Universiteit Brussel and the UZ Brussel, will use the heat from the servers and rainwater to manage the building as sustainably as possible.¹

Zoom on recommendations for operators (4/4)

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.

Use case

“Device-as-a-service” Model used at Deutsche Telekom



Striving to ensure compatibility with a circular economy is one of the focal points of Deutsche Telekom corporate responsibility strategy. They have a refurbishment rate of over 97% thanks to the switch to a device-as-a-service model. This model allows a better collection, exchange and repairment of devices.¹



06

Appendix

Appendix

Glossary



Glossary (1/2)

Glossary of the terms used in the report

- **Access network:** An access network is a type of network which physically connects an end system to the immediate router (also known as the “edge router”) on a path from the end system to any other distant end system.¹
- **Carbon Neutral:** Carbon neutrality means having a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks. Removing carbon oxide from the atmosphere and then storing it is known as carbon sequestration.² The formula used in this report for the carbon neutrality is: Scope 1 + Scope 2 – carbon compensation (incl carbon credits).
- **Carbon credits:** Carbon credits, also known as carbon offsets, are permits that allow the owner to emit a certain amount of carbon dioxide or other greenhouse gases. One credit permits the emission of one ton of carbon dioxide or the equivalent in other greenhouse gases.³
- **Carbon compensation:** Carbon compensation is an approach which consists in implementing projects to reduce or capture and sequester carbon in another location after having attempted to reduce CO₂ emissions in one location. These projects can involve energy efficiency, renewable energy production, or even reforestation.⁴
- **Core network:** A core network is a telecommunication network's core part, which offers numerous services to the customers who are interconnected by the access network.⁵
- **CO₂e:** CO₂e is the abbreviation for 'carbon dioxide equivalent.' CO₂e is used to measure and compare emissions from greenhouse gases based on how severely they contribute to global warming. Metrics for CO₂e would show how much a particular gas would contribute to global warming if it were carbon dioxide.⁶
- **GHG protocol:** The Greenhouse Gas Protocol (GHGP) is an organization that was formed through a partnership between the World Resources Institute and the World Business Council for Sustainable Development. It helps companies to reduce their greenhouse gas emissions by setting standards to help them manage their emissions.⁷
- **GRI:** GRI (Global Reporting Initiative) is the independent, international organization that helps businesses and other organizations take responsibility for their impacts, by providing them with the global common language to communicate those impacts. We provide the world’s most widely used standards for sustainability reporting – the GRI Standards.⁸

Glossary (2/2)

Glossary of the terms used in the report

- **ISO norms:** ISO is the International Organisation for Standardization, founded in 1947, that establishes standards for businesses and organisations in 163 countries worldwide.¹
- **Non-network waste:** Non- network waste means all the waste that are generated by a telecom company but is not related to the network (eg. offices waste, laptops, smartphones,...).
- **Network waste:** Network waste are waste generated by a telecom company related ton the network (eg. antennas, cable,...).
- **Net zero:** Net zero is similar in principle to carbon neutrality but is expanded in scale. Net zero refers to all greenhouse gases being emitted into the atmosphere, such as methane (CH4), nitrous oxide (N2O) and other hydrofluorocarbons.²
- **Renewable energy:** Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed. Sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us.³
- **SBTi:** The SBTi is a partnership between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World Wide Fund for Nature (WWF). Science-based targets show companies and financial institutions how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change.⁴
- **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 1.⁵
- **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 2.⁵
- **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 3.⁵
- **Waste disposed:** Waste disposed is the waste that is discarded, thrown away or destroyed. It is the opposite of waste diverted from disposal.
- **Waste diverted from disposal:** Waste diverted from disposal is the waste that is recycled or refurbished. It is the opposite of waste disposed.

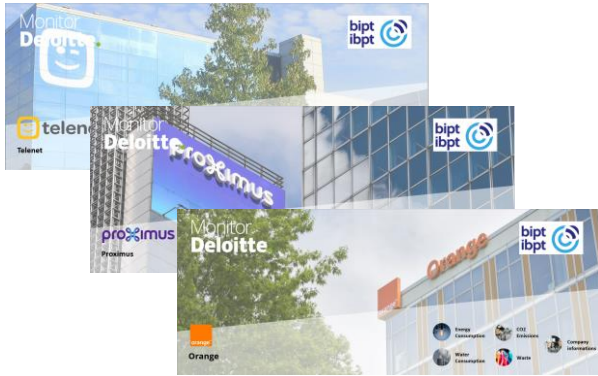
Appendix

Methodology for data analysis



Methodology for data analysis - Input

1 Input from the Belgian operators



A list of **standardized and normalized datapoints and KPIs** that quantify **energy consumption, CO2 emissions, water consumption, waste management** and **company information** of telecom networks and operators was created and validated by the BIPT.

This list of datapoints and KPIs was created **based on different existing norms** (GRI, ISO 14001, GHG Protocol,...) **and discussion with Deloitte Subject Matter Experts.**

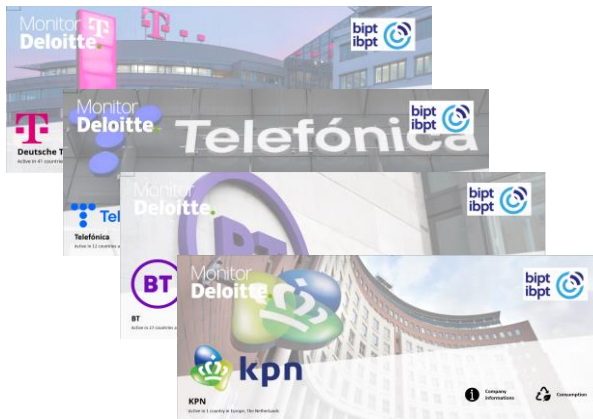
The four telecom operator shared their available data for all these datapoints and KPIs. As **Voo** had limited data available, it has been **excluded from the analysis.**

The scope of the data request covers the period **2018 to 2021.**

For the Belgian operators, clients are defined as:

- I. The unique number of business and residential subscribers and the number of wholesale lines for the fixed number
- II. The total active simcards and the total active light+full MVNO sim cards for the mobile number

Input from the annual reports of the European operators



In order to benchmark the Belgian operators with the market, a **set of four European publicly listed telecom operators** has been selected and analyzed. The selected operators are all active in markets close to Belgium and are KPN, British Telecom, Deutsche Telekom and Telefónica.

The list of standardized and normalized datapoints and KPIs created for the Belgian operators has been **shortened for the analysis of the European operators.** This list was populated by datapoints and KPIs extracted from the **annual reports** and the **ESG reports** of the European companies.

The scope of the data request covers the period **2018 to 2021.**

For the European operators, the number of clients refers to the number reported in the **annual reports**

2 Calculation sheets for the 4 topics



Energy consumption



CO2 emissions



Water consumption



Waste and recycling

Datapoints and KPIs

Energy Consumption:

Absolute value: Energy consumption [GWh].

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

Energy efficiency:

Revenue based: Total energy consumption [GWh] divided by revenue [Mn of €].

The Belgian market refers to the weighted average of the values from Telenet, Proximus and Orange.

Share of renewable energy:

Renewable energy consumed: Renewable energy consumed [GWh] divided by total energy consumed [GWh].

The Belgian market refers to the weighted average of the values from Telenet, Proximus and Orange.

Network electric consumption breakdown:

Absolute value: Network electric consumption [GWh] of the fixed access network, the mobile access network and the core network.

Electric consumption breakdown:

Absolute value: Network electric consumption [GWh] of the network, datacenters, offices and retail.

Modems/routers and set-top boxes analysis:

Absolute value: Power [Watt] of a modem/router or a set-top in powered-on or stand-by mode

2 Calculation sheets for the 4 topics



Energy consumption



CO2 emissions



Water consumption



Waste and recycling

Datapoints and KPIs

CO2 Emission:

Absolute value: CO2 emission [Ktons of CO2].

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

Carbon intensity:

Revenue based: CO2 emission [Ktons of CO2] divided by revenue [Mn of €].

The Belgian market refers to the weighted average of the values from Telenet, Proximus and Orange.

Carbon neutrality:

Absolute value: (Scope 1 emission [Ktons of CO2] + Scope 2 emission [Ktons of CO2]) – Carbon credits compensation [Ktons of CO2].

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

2 Calculation sheets for the 4 topics



Energy consumption



CO2 emissions



Water consumption



Waste and recycling

Datapoints and KPIs

Water consumption:

Absolute value: Water consumed [Liter of water].

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

Water efficiency:

Employee based: Water consumed [Liter of water] divided by the number of employees [number of employees].

The Belgian market refers to the weighted average of the values from Telenet, Proximus and Orange.

2 Calculation sheets for the 4 topics



Energy consumption



CO2 emissions



Water consumption



Waste and recycling

Datapoints and KPIs

Waste generation:

Absolute value: Waste generation [Tons], Waste diverted from disposal [Tons] and Waste disposed [Tons]

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

Product diverted from disposal:

Absolute value: Number of product [Units] diverted from disposal.

The Belgian market refers to the sum of the values from Telenet, Proximus and Orange.

Waste diverted from disposal is the waste that is reused, refurbished or recycled.

Share of waste disposed out of total waste:

Percentage: Waste disposed [Tons] divided by the Total waste [Tons].

The Belgian market refers to the weighted average of the values from Telenet, Proximus and Orange.

Waste disposed is the waste that is discarded, thrown away or destroyed.

Methodology for data analysis - Country adjustment for the “per Mn € of revenue” ratios

Objective

In order to consider that telecom services are more expensive in Belgium than in the rest of Europe, the “per Mn € of revenue” ratios are adjusted in function of the pricing level of a representative convergent product (combining fixed and mobile services) in the respective countries, as observed in the pricing benchmark study of the European Commission. E.g., in 2021 the price of the cheapest representative triple-play product (profile: 100-200 Mbps, fixed voice and one mobile subscription comprising GB of data) amounted to 57.91€ PPP in Belgium, whereas it was sold in Spain for 34.11€ PPP. E.g., when looking at the energy efficiency ratio [GWh/Mn€], Belgium is up to 67% more efficient than the average of the European players. With broadband price-index of 57.91€, on average, Belgium operators are also the most expensive meaning they offer less service (data, call, ...) per euro than other countries. Taking this into account Belgium is still the most efficient player but the difference with the average of the European players decreased to 27%.



Data

Two inputs are used for this adjustment:

1. The data (GWh, tons of CO₂, liters of water, tons of waste and revenue) provided by the Belgian and European operators
2. The differences in pricing levels in the respective countries¹:

	UK	DE	NL	ES	BE
2018	0.56	0.58	0.91	0.63	1
2019	0.78	0.75	0.94	0.73	1
2020	0.86	0.65	1.03	0.61	1
2021	0.86	0.68	0.98	0.59	1



Method

Calculation:

Multiplying the unit (GWh, tons of CO₂, liters of water, tons of waste) per Mn € of revenue by the broadband price-index in each of the countries.

Example: (for the energy efficiency ratio)

The GWh per Mn € of revenue per country multiplied by the broadband price-index in each of the countries

1. *Telefonica in 2021:* 0.16 [GWh/Mn€] multiplied by 0.59 [% compared to Belgium] = 0.09 [GWh/Mn€]
2. *Deutsch Telekom in 2021:* 0.12 [GWh/Mn€] multiplied by 0.68 [% compared to Belgium] = 0.08 [GWh/Mn€]



Assumptions

1. This method excludes the international sales
2. This method assumes broadband price-index equals to the price-index for each company in that specific country

Source: 1. own calculations, based on: *For 2021:* EC report Mobile and Fixed Broadband Prices in Europe 2021 + for UK: BIPT pricing benchmark 2021; *For 2020 :* EC report Mobile and Fixed Broadband Prices in Europe 2020 + for UK: BIPT pricing benchmark 2021; *For 2019 :* EC report Mobile and Fixed Broadband Prices in Europe 2019; *For 2018 :* EC Report Mobile Broadband Prices in Europe 2018 and EC report Fixed Mobile Broadband Prices in Europe 2018. Prices are adjusted to reflect difference in purchasing power (PPP = Purchasing Power Parity).



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