

Digital & Decarbonation, *TOWARDS A WINNING DUO?*





Michaël TRABBIA
Chief Technology Officer, Orange

Climate change is affecting all of us. It is a worldwide challenge that requires an exceptional and urgent mobilization. The environmental objectives set by the Paris Agreement must be met.

We must therefore rethink our economic models and our consumption patterns. We also need to leverage our innovation to improve economic and social progress, while controlling carbon emissions.

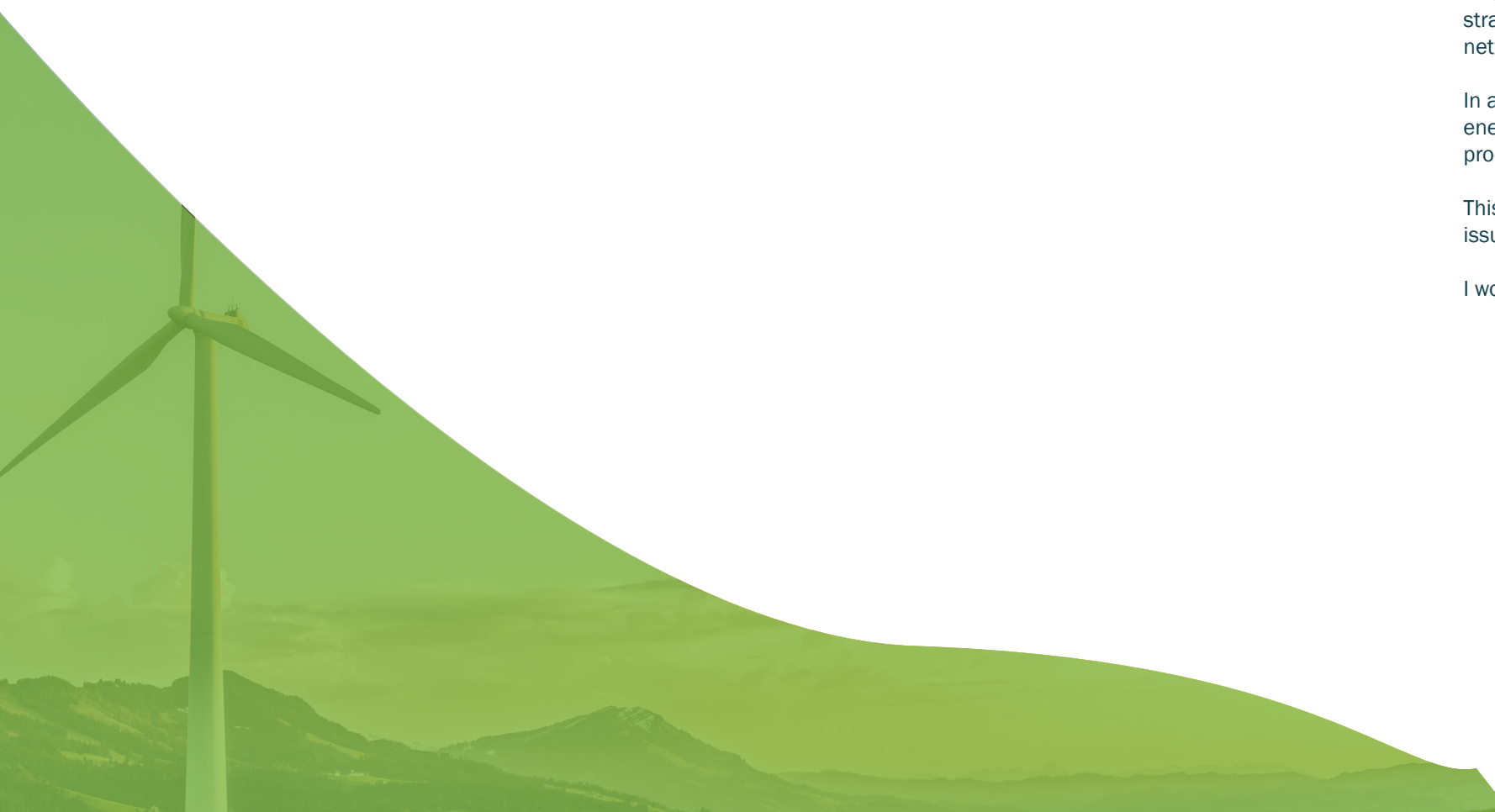
Solutions exist with modern technologies, especially with digital technology. Like any industry, even if it is limited, digital technology has a direct responsibility regarding GHG emissions, which must be voluntarily decreased to reach carbon neutrality. However, digital technology, while not pretending to solve everything, can also contribute to reducing the other sectors' 96% of CO2 emissions.

This is what we are committed to doing at Orange. Steering innovation with a positive impact is at the heart of our strategy and our commitments. To do this, Orange innovation is designed in an end-to-end and global approach: network management, products and solutions eco-design, supply chain and circular economy.

In addition, we are leveraging these solutions to support local authorities and businesses to achieve successful energy transitions, for example with collaborative remote tools, smart mobility solutions, connected territories, and process optimization solutions.

This new report, "**Digital and decarbonization, towards a winning duo?**", is another opportunity to highlight this issue.

I would like to thank all the players involved who contributed to this white paper and I hope you enjoy reading it.





Claire KHOURY
Chief Marketing & CSR Officer, Sofrecom

The challenges of **DECARBONIZATION**

The fight against global warming requires a profound economic and social transformation that must happen at all levels: State, companies, and citizens. This is one of the most pressing challenges if we are to meet our commitments to carbon neutrality.

One of the responses to climate change is decarbonization. This field of action, also known as decarbonization, refers to the range of measures implemented to **reduce the carbon footprint: by shifting from fossil fuels to less GHG-emitting sources**, but also through energy efficiency and greater sobriety.

In industry, decarbonation is a necessity for all companies to improve their competitiveness and meet environmental challenges.

Decarbonization objectives, i.e., the reduction of CO2 emissions, are gaining ground among manufacturers and are becoming criteria of choice for customers, namely energy efficiency, greener energy mix...

The issue is the intensity and pace of ecological change. Above all, it is a question of providing ourselves with the means for this change. It is a question of:

- Improving the efficiency of production and the energy efficiency of equipment and services, thus consuming less energy
- Modifying supply chains and relocating some production
- Developing tomorrow's technologies necessary for the proper functioning of industry and for the continuity of services offered
- ... and investing massively to establish the factories that will guarantee the production of these new products or devices close to consumers and markets

Decarbonization challenges linked to the company's development

By catalyzing an energy crisis of unprecedented proportions, the war in Ukraine has highlighted the awareness of the strategic nature of energy supply. The last few months have been revealing in many ways.

The challenges of decarbonization for manufacturers are technical, economic, financial, and social. The strategy that results from this must go hand in hand with the company's development, in addition to its digital transition, and be part of the decarbonized trajectory of its territory.

DECARBONIZATION OBJECTIVES
ARE GAINING GROUND AMONG
MANUFACTURER

Companies that organize themselves today by opting for investments and production processes that promote energy efficiency and, more broadly, decarbonation, should:

- Best preserve their competitiveness, and in particular the impact of CO2 emissions on the price of their products. Avoid the environmental obsolescence of their production tools
- Gain the trust of new customers with concrete evidence of their actions in favor of CO2 emissions reduction.

National sovereignty challenges

Regulatory power does not create sovereignty or capacity. It is an asset if it complements a massive and comprehensive industry support system. Indeed, the more companies are able to maximize resource efficiency, the more independent, competitive and sovereign they will be in a world where resources are becoming scarce and climate ambitions are increasing.

Being economically autonomous is therefore not only about reducing its trade deficit but also about reducing its environmental debt.

The declared ambition of States to transform, support and protect their industries, and to maintain their competitiveness on a global playing field, must not call for responses that are likely to trigger trade or diplomatic wars. It acts above all as a powerful reminder of the imperative need to seize the opportunity of this urgent transformation.

In the commercial or energy battle, as in the fight against climate change, we must surpass ourselves or bear the consequences.

Concrete actions to decarbonize

To meet the targets set, the industry sector must generate **20% energy efficiency gains** between 2010 and 2030, per ton produced. **Three main levers must be activated simultaneously or progressively to decarbonize the activity:**

- Energy efficiency: optimizing energy sources;
The energy mix: integrating renewable and recovered energies;
- Production efficiency and recycling: using less materials or more recycled ones.

From upstream to downstream, all industrial players are concerned. The more a value chain shares the objective of decarbonization, the better the results. It is the very principle of the circular economy.

The decarbonization effort we will make the day after tomorrow will be infinitely more costly than the one we are ready to make today.

To meet the targets set, the industry sector must generate

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between 2010 and 2030



Jérôme HENIQUE
CEO, Orange Middle East and Africa

Digital helps *DECARBONIZATION IN AFRICA*

As a partner in the digital transition of the 18 countries in the MEA zone where the Group is present, Orange is also an active partner in the energy transition of the African continent.

What are the decarbonization challenges that are specific to the African continent?

The African continent emits only 4% of the world's CO2 emissions. For instance, a resident at Burkina Faso for example emits 300 times less carbon than a European. However, Africa, which population will triple by the end of the century, is one of the continents that are most affected by climate change and this reality will, unfortunately, be exacerbated in the coming years. The impacts of this change are visible: fishing villages disappearing in Senegal, increasingly frequent storms in Madagascar, regular floods in Abidjan, and droughts which intensity is increasing in Morocco and Tunisia. Some regions of Africa, where agriculture and livestock are the main sources of subsistence for local populations, will become desert.

How do regulators face these challenges?

African governments have committed to reduce their carbon emissions, as part of the Paris Agreement, and ensure the energy transition to renewable energies. This transition requires huge investments, in addition to those related to the modernization and expansion of the electricity transmission and distribution networks. Regulators are therefore faced with the need to encourage investment in renewable energy while protecting national electricity operators who may view private players as competitors.

How is Orange MEA committed to overcoming these challenges?

Fully committed to this energy transition, Orange MEA supports countries in this challenge. Indeed, we are trying to attract investors in our markets to produce the share of renewable electricity we need to power our infrastructures.

We are therefore committed to reducing our energy consumption, making our infrastructure as efficient as possible, using renewable energy whenever we can. Our ambition is to reach 33% of renewable energy use by 2025. This is a real challenge in Africa, because in some countries, like Liberia for example, only 5% of sites are connected to the electricity grid. We must therefore act site by site to reduce the consumption of fuel for generators.

Another example is Botswana, where 100% of the country's electricity is produced from coal-fired power plants. For us, the challenge is twofold: energy sobriety combined with the choice of a less carbon-intensive, and therefore more sustainable, energy source. Of course, scope 3 (indirect emissions upstream and downstream of our activities) is also a priority.

One of our strong ambitions is to contribute to structuring the reconditioning/recycling sector in Africa. The circular economy exists natively there, with mobile terminals already having several lives. However, the management of this market is currently largely informal and does not generally include downstream waste reprocessing.

What actions are Orange MEA teams taking to achieve these ambitions?

Our teams measure and analyze the impact of our activities on the environment through regular calculations of scopes 1, 2 and 3. This carbon assessment feeds and guides the company's strategy to precisely target high-impact solutions.

Several types of actions are implemented:

- First, the solarization of our sites: more than 7,200 telecom towers are already solarized. We are going to continue and extend this system to all potentially adaptable sites. New sites for extending coverage are systematically examined for solarization. Our data centers, which are major consumers of electricity, have already been modernized to reduce our consumption and are solarized whenever possible. At the beginning of 2023, we commissioned the new solarization system for the GOS (Groupement Orange Services) data center in Abidjan and we will be solarizing others shortly.
- The deployment of fiber optics, as carried out in the Ivory Coast for example, is another asset to limit energy consumption in the face of the exponential increase in traffic. As a result, for 1 giga of internet consumed, a fiber customer will use 3 to 4 times less energy on the network than an ADSL customer.
- Energy efficiency in the broadest sense of the term remains a major focus for limiting the consumption of network equipment, but also our service sector buildings, stores and warehouses, through the deployment of intelligent solutions such as meters, sensors and display tools. These solutions allow us to adjust our consumption as closely as possible to our needs.
- As soon as regulations allow it, we look for partners to install and maintain solar farms and wind farms. This is already the case in Jordan where three solar farms cover 70% of our electricity needs in the country. Discussions have begun with energy regulators and national electricity producers in several countries.
- In addition, we are optimizing the management of freight logistics chains in order to reduce upstream and downstream Scope 3 carbon emissions.
- The use of reconditioned equipment in our networks, the setting up of terminal and telecom equipment reconditioning plants are also part of our actions and we are going to support the deployment of a reconditioning/recycling plant in Egypt with the support of UNIDO (United Nations agency

Finally, the appointment of Chief Climate Officers in all OMEA countries is a strong sign of commitment. They will lead the energy transition programs and, with the commitment of all our employees, will drive our ambitions in this area.



**AFRICAN EMITS ONLY
4% of the world's
CO2 EMISSIONS**



**+ 7 200
TELECOMS TOWERS
are already solarized**



Samia BENDALI-AMOR

IT Consulting and Services Department Director, Sofrecom

The strategic role of Governments in *DECARBONIZATION*

In 2015, historic decisions emerged from the UN's adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement to transform our planet into a sustainable world. However, geopolitical, economic and energy-related tensions are hampering the efforts of the ecological transition. Midway through the process, it is up to governments to provide new momentum.

In the summer of 2022, floods, droughts, heat waves and fires — and their disastrous consequences — sounded the alarm. Climate change is a tangible reality. More than ever, it threatens the future of the planet. To reach their objectives of carbon neutrality by 2050, countries must increase their efforts and drastically reduce their CO2 emissions.

Thinking about the ecological transition with the energy transition and the economic transition

The success of the ecological transition depends strongly on the energy transition, since energy is the source of the majority of greenhouse gas emissions. It is also dependent on the economic transition, since activities are based on this energy. It is essential to revisit the ways of consuming, producing, working and living together in order to meet the major challenges of climate change, the accelerated loss of diversity, the scarcity of resources and the increasing health risks linked to environmental pollution. Only the invention of a new virtuous, inclusive and sustainable economic and social model will allow for decarbonization.

Three levers

Faced with this major challenge, states and governments must pursue three operational objectives:

- Accelerate the use of **renewable energies**: Reduce dependence on carbon-based energies and gradually replace polluting energies with wind, solar and hydroelectric power.
- Promote **energy sobriety** and **responsible consumption**: Promote moderation in the production and consumption of products and resources, particularly energy. Promote energy efficiency.
- Develop a **circular economy** that creates local jobs and prioritizes short supply chains: reuse, repair, recycle and limit transportation.



ORANGE MEA IS TRYING TO ATTRACT
INVESTORS IN OUR MARKETS **TO PRODUCE
THE SHARE OF RENEWABLE ELECTRICITY**



Make the green and digital transformations a central part of government recovery plans

To succeed in this urgent and strategic transformation and to drive a global acceptance, states and governments have several roles to play:

- **Open fragmented government strategies.** The economic slowdown linked to the pandemic is conducive to resilience in building recovery. The necessary ecological and energy transitions add to the challenges of the digital transformation that governments have been launching for several years. They are an opportunity for states to develop a more inclusive and sustainable global economy. Indeed, it is no longer possible to think of these transformations as independent pieces. National strategies must integrate, within a single plan, the challenges and objectives of ecological, energy-related and economic transitions and consolidate them within the digital strategy. Digital technology is already recognized as a lever for success in the ecological transition, even though the sector's carbon footprint currently represents 3.8% of global emissions.

- **Steer, support and promote this transition to a sustainable world and its key success factors.** It is up to the States to be actors in the definition and implementation of the strategy, which must:

- * Promote the transition to all businesses, associations, donors and citizens.

- * Involve all public actors in the process, including elected officials and territorial agents.

- * Encourage and support citizen participation. For several years, very young actors have been mobilizing for the climate. Their initiatives are often more advanced than those of governments.

- * Encourage the development of skills in the field of green technologies.

- * Develop awareness and education actions for all, along with a culture of transformation and resoluteness.

- **Increase international cooperation.** The action of countries must be part of a "One Planet" vision and remain consistent with the commitments of the United Nations Development Program (UNDP), in particular the 17 SDGs adopted in 2015 by 193 countries. Indeed, developing countries and vulnerable countries are unfairly suffering the effects of climate change caused by the economic activities of developed countries. A universally supportive approach is essential to co-build a resilient, adaptive and responsible approach.

Financial and regulatory tools

To accelerate the transformation, governments have two tools at their disposal:

- **Financing.** In 2009 and again in 2015, developed countries committed to mobilizing \$100 billion per year to finance their climate action over the period 2020-2025. They also promised to commit funds to, in part, finance the actions of emerging and developing countries.

- **An incentivizing legal framework.** Structural regulations to support renewable energies and the circular economy have already proven their effectiveness. In France, for example, the ecotax, the end of the allocation of hydrocarbon exploration permits and the reimbursement of a portion of the cost of repairing a household appliance are encouraging companies and citizens to take the path of a virtuous and sustainable transition.

Insufficient and uneven efforts around the world

Sadly, the UN's Sustainable Development Report 2022, produced with the University of Cambridge, reveals that, for the second year in a row, the world is no longer making progress on the SDGs as measured by the Sustainable Development Goals (SDG) Index. The average score even declined slightly in 2021. The progress made since 2015 has been held back by the economic consequences of the COVID-19 pandemic and wars.

On the environmental side, energy-related CO2 emissions increased by 6% in 2021, reaching the highest level ever and reversing the historic pandemic-related drop in global emissions in 2020.

Developed countries have also failed to meet their commitment to finance climate action: in 2019, they paid only \$79.6 billion of the \$100 billion planned.

The need for acceleration and global mobilization

There is now a 50% risk of exceeding the threshold of a 1.5°C average temperature increase, set for 2030! Halfway through the process, countries must redouble their efforts and commitments to make this major transition a success in a context of great uncertainty and human insecurity. A quarter of the world's population lives in a country in conflict. The health crisis and the war in Ukraine have accentuated the food crisis, the shortage of resources and the debt of developing countries. Inflation is here. To overcome the resistance to change, governments will have to: work for peace and strengthen international cooperation around shared objectives; commit to a more ambitious plan for financing the global ecological transition; rely on green technological innovations to find solutions; define rigorous governance to measure progress; and get all actors on board.



Carlo Maria ROSSOTTO

Global Lead Upstream, Telecom, Media and Technology, IFC

Catalyzing private sector investments for CLIMATE & DIGITAL CONNECTIVITY

As a member of the World Bank Group, and the largest private sector-focused institution in the developing world, IFC promotes inclusive and sustainable economic growth with a three-pronged climate agenda: adopting industry norms and standards with its clients and partners, driving climate innovation, and mobilising capital from banks and third-party partners through their catalytic investments.

Where do sustainable development and addressing climate change fit into IFC's mission?

Advancing sustainable development and addressing climate change are fundamental aspects of IFC's mission. As a member of the World Bank Group and the largest institution focused on the private sector in developing countries, we promote inclusive and sustainable economic growth. We create markets for businesses to thrive and improve people's lives by investing in impactful projects, mobilizing additional investors, and providing technical advice and guidance to ensure that local communities share in the benefits. Our work contributes to the World Bank Group's twin goals of ending extreme poverty and promoting shared prosperity.

But achieving these goals cannot happen without a prioritized focus on climate change. According to the Intergovernmental Panel on Climate Change, the push to limit global warming to 1.5 degrees Celsius will likely be out of reach by the end of this decade, unless we take drastic action to cut emissions. Emerging markets—given their huge development needs and growing energy demand—will be the most heavily impacted by climate change. In fact, some estimates suggest that 1.2 billion people could become climate refugees by 2050, many of them from developing countries.

Herein lies a major economic opportunity, one that can promote environmentally and socially responsible growth, strengthen communities, and create jobs across a wide range of sectors. Our research shows that climate business could generate US\$23 trillion in investments, create 213 million jobs, and achieve 4 billion tons of CO2 reduction in developing countries.

**DIGITAL TECHNOLOGY IS ALREADY
RECOGNIZED AS A LEVER FOR SUCCESS
IN THE ECOLOGICAL TRANSITION**



How do you integrate this focus on the climate transition with overall economic and financial performance, and specifically in your digital and telecom investments?

IFC’s overall strategy is aimed at developing new business and investment models that will drive the climate transition, such as Sustainability-Linked Finance—a series of financing instruments that incentivize companies to pursue ambitious climate and social goals. The telecom sector offers significant potential here. For example, in Poland, IFC recently invested 435 million zloty (US\$99 million equivalent) in the 2.67 billion zloty-denominated sustainability-linked bond issued by Polsat, the country’s largest media and telecom operator. This will support the company’s strategic shift to renewable power, with the goal to source 30 percent of energy from renewable sources by 2026. We are extremely proud of this ground-breaking transaction—our first sustainability-linked bond in the telecom sector.

Another great example is a US\$70 million financing package to Communication and Renewable Energy Infrastructure (CREI*), in the Philippines. In addition to securing better coverage and optimal allocation of high-speed mobile networks, and in line with the national climate objectives, this project will lead to significant greenhouse gas (GHG) savings.

What are IFC’s climate priorities for the coming years?

Our climate agenda falls under three umbrellas. First, we are working with our clients and partners toward the adoption of norms and standards for the industry that embrace sustainability and climate considerations. A good example of this is IFC’s cutting-edge building certification system, EDGE, which paves the way for a comprehensive package of economic, financial, and fiscal incentives for developers, financial institutions, and consumers. Rack Centre has become the first data center operator in the EMEA region to receive EDGE certification.



CLIMATE BUSINESS
could generate
USD\$ 23 TRILLION
IN INVESTMENTS



Poland: Goal to source
30% OF ENERGY from
renewables by 2026



Philippines:
USD\$ 70 MILLION
financing package
to CREI*

Second, we are facilitating climate- and sustainability-related innovation. For example, IFC engages in a wide range of products to support Blue Finance, an emerging area in Climate Finance focused on contributing to economic growth, improved livelihood, and the health of marine ecosystems. And third, we are mobilizing capital from third-party banks and partners through our catalytic investments. We played an instrumental role in the first Green Bonds issued in countries like Georgia and Egypt, thereby providing confidence to other investors and enabling their participation.

In our interconnected world, how can we leverage synergies among infrastructure sectors?

There is tremendous cross-sectoral potential in synergy between digital infrastructure and technologies and traditional infrastructure. There is even a new term – InfraTech – use of technology to improve the quality of infrastructure assets and delivery of infrastructure services. And IFC has been actively engaging in this space.

For example, IFC has been developing a project (currently at the feasibility stage) that deploys a fiber network inside water treatment facilities in Latin America. Such networks already exist in some developed European countries. We are introducing this solution to emerging markets as it has great potential to reduce civil engineering costs while promoting fiber connectivity. In Brazil, we are working with water and waste management company Sanepar to deploy fiber inside their sewer network. This will expand network reach outside big cities, again, delivering better connectivity to underserved areas.

Cloud technologies are another great example of synergies between digital and other infrastructure sectors. IFC clients and sustainability-focused energy operators such as ENGIE, Enel and EDF have invested heavily in cloud technologies in their own operations and in promising business ventures. EDF Pulse Ventures, the company’s venture capital arm, has invested in technologies such as software-as-a-service (SaaS), IoT and cybersecurity.

In the meantime, telecom are also exploring new business models, going beyond traditional capex requirements, considering investments in cybersecurity, IoT, cloud, and solar energy—as Orange did with the solar farms in Jordan.

What are the unique opportunities and challenges for emerging markets, particularly for African countries?

Africa has enormous natural resources in solar and, in some countries, hydroelectricity. But the region still faces substantial shortages in financial and human capital. We need to partner with the private and public sectors to create an enabling environment that will attract additional investment and co-create solutions that will stimulate market growth. We also must heighten a focus on small and medium enterprises (SMEs), which are the core of emerging market economies. IFC is working to address these challenges, with initiatives aimed at developing new business opportunities with early-stage investments and other de-risking mechanisms. We have a long track record of supporting SMEs in Africa. Among our main areas of focus should be supporting Africa’s talented and ambitious tech entrepreneurs, who are constantly introducing new products and services that are addressing climate change, boosting community resilience, and increasing the use of digital technologies. They represent an exciting force for change and future growth on the continent.

Climate business could achieve

4 billions

tons of CO2 reduction in developping countries

OUR STRATEGY IS AIMED AT DEVELOPING
NEW BUSINESS AND INVESTMENT MODELS
THAT WILL DRIVE THE **CLIMATE TRANSITION**

REGULATORY CHANGES

accelerate, and more and more players are involved

Since 2015, new regulations on the reduction of carbon emissions have increased the pressure on a growing number of companies. Soon, in France, SMEs with more than 250 employees will have to publish an environmental, social and governance (ESG) report like large enterprises.

1990

Creation of the **GHG Protocol**, an international standard for the accounting and reporting of greenhouse gases (GHG) emitted by companies.

2000

Creation of the **Carbon Disclosure Project (CDP)**. The organization published data on the environmental impact of the largest companies.

2001

Publication of a guide to scopes: the birth of **scope 1** (a company's direct emissions) and **scope 2** (a company's indirect emissions linked to energy).

2004

Ademe develops a **carbon assessment methodology**

2006

Launch of the **ISO 14064** standard. It describes the specifications and guidelines applicable, at the level of organizations or projects, for the quantification and declaration of GHG emissions and removals (Scopes 1 and 2)

2010

The **French National Environment Commitment Act, known as Grenelle II**, establishes the principle of a generalized regulatory GHG assessment (**BEGES**) for a certain number of actors.

2011

Addition of **Scope 3** (all other indirect emissions linked to activities upstream and downstream of those of the company: transport, products purchased, products sold, etc.) in the **GHG Protocol**. The "**Bilan Carbone ®**" accounting tool and method become a registered trademark.

2013

The launch of the **ISO 14069** standard. It describes the principles, concepts and methods related to the quantification and reporting of direct and indirect GHG emissions.

2014

The European Non-Financial Reporting Directive (**NFRD**), transposed into French law in **July 2017**, introduces the obligation of an Extra-Financial Performance Declaration (**EFPD**) for large companies. Based on the principle of materiality, a tool that identifies and prioritizes CSR issues, the company defines the most significant risks for it, details the policies implemented to address them, and then the results using KPIs (key performance indicators).

2015

The Law on Energy Transition for Green Growth specifies the constraints on the periodicity of the BEGES, on sanctions and on publication. The launch of the Science-Based Targets initiative (**SBTi**): born of collaboration between the **Carbon Disclosure Project (CDP)**, the **United Nations Global Compact (UNGC)**, which offers companies a framework for commitment to sustainable development, and the research organization **World Resource Institute (WRI)**, **SBTi helps companies** reduce their GHG emissions. The **Paris Agreement**, ratified by 55 countries in 2016, limits the rise in global warming to 1.5° by 2050.

2019

The **Energy and Climate Law (LEC)** expands the scope of reporting GHG emissions on Scope 3. Since **July 2022**, all companies with more than 500 employees, public institutions with more than 250 employees, local authorities with more than 50,000 inhabitants, and government departments have been required to include significant Scope 3 emissions in their BEGES.

2021

Adoption of the **European Corporate Sustainability Reporting Directive (CSRD)**, which will replace the NFRD from **January 1, 2024**. The CSRD requires the publication of an environmental, social and governance (ESG) report alongside the financial report. It introduces the concept of double materiality: the need to assess the impacts of the company on its environment and of the environment (drought, floods, etc.) on its activities. It will be progressively extended to all companies meeting 2 of the 3 criteria: more than 250 employees, a turnover of at least 40 M€ realized in Europe, and a balance sheet greater than or equal to 20 M€.

As part of implementing the CSRD, EFRAG, the European Financial Reporting Advisory Group, has published the first set of 13 thematic non-financial standards, called ESRS. One of them is climate change (biodiversity and ecosystems).



How companies can meet **DECARBONIZATION CHALLENGES?**

Operators, like all companies, are under increased pressure not only from investors, but also from customers, partners, employees and consumers regarding their sustainable commitments. While more solutions are yet to be created, many already exist. Organizations no longer have a choice: they must accelerate their organizational, technological and cultural transformation.

To integrate environmental impact at every stage of its activity, from internal processes to the marketing of products and services, an operator has several options.

Evolving corporate governance and policies

Rethinking governance, policies and operating procedures inside and outside the company can add the environmental dimension to daily activities.

- **Implement environmental performance indicators.** The first step is to make a concrete commitment to accurately and regularly measure its carbon footprint on the three perimeters (scopes 1, 2 and 3): energy consumption and the entire purchasing chain. This evolution requires the implementation of environmental performance indicators in the same way as financial indicators and at all levels of decision-making within the company (purchasing, legal teams, technical teams, sales teams, etc.) to ensure that the environmental component is present in every decision taken.
- **Orienting external purchasing and internal consumption policies towards sobriety.** There are several solutions available to operators, which are not yet widely adopted: prioritize the purchase of reconditioned equipment or services rather than new ones, and set up a circular economy system; choose low-energy consuming equipment; extend the life of the equipment and avoid its automatic renewal; size purchases according to real needs in order to buy less and better.

- **Getting the company to consume as closely as possible** to its needs is another relatively easy lever to control. For example, lowering the heating temperature by a few degrees or increasing the air conditioning temperature in offices are simple measures with a strong impact on decarbonization.

- **Include energy price/carbon cost volatility in new contracts.** The war in Ukraine has changed the situation in Europe. The exponential increase in the price of energy weighs considerably on the profitability of offers. An offer that is profitable in 2023 may no longer be in 2025 or 2030. The challenge of the transformation will be to include this volatility of energy prices/carbon costs at all levels of an offer and a contract, in the context of responses to technical and commercial requests for proposals and calls for tender. This implies being able to accurately measure the impact of the cost of energy on the continuity and profitability of the business over the medium and long term.

- **Promote low-carbon offerings to customers**, such as data rationalization solutions.

- **Rethinking the way it remunerates its business activities** in order to move towards more sustainable models, such as the sharing of equipment.

Initiate a technological transformation

Technology transformation is another path to accelerate the decarbonization of one's business:

- **Use more efficient equipment:** equipment that consumes less energy, is made from recycled materials, is reconditioned, and has an extended life span.
- **Putting equipment on standby when not in use.**
- **Use passive and active infrastructure sharing** (RAN Sharing) to avoid duplicating infrastructure in the same geographical area. Addressing this issue of sharing requires close collaboration with competitors. An entire ecosystem, not just one or two companies, will have to be transformed.



- **Opt for renewable energy solutions**, especially in a geography such as Africa. These solutions can be deployed either on a large scale (solar farms, windmills, biomass) or on a smaller scale (self-generation, 100% solar low-tech solutions) in order to avoid using carbon-based electricity or fuel oil in landlocked and remote regions. In Guinea Bissau for example, less than 10% of the country is connected to electricity. The use of diesel-powered generators is prevalent. The issue of transforming energy supply methods to move towards cleaner energy is therefore a major challenge.

- **Digitize activities with a high carbon impact to reduce its footprint**: using the cloud, and in particular the hyper scale (the data center of tomorrow) instead of traditional data centers, considerably reduces energy consumption, and therefore the carbon footprint.

- **Relying on Big Data solutions** that will allow managing simultaneously and precisely all the company's activities and to follow, on short time scales (over a month or a quarter), all these indicators in order to identify very quickly the drifts and to take the right decisions.

Supporting a necessary cultural transformation

All these strategic, operational and technological changes are modifying the behavior and interactions of teams. It will therefore be necessary to:

- **Organize an increase in teams' skills on environmental issues through training**. On the one hand, this will involve raising awareness among teams who are not familiar with the challenges of reducing the carbon footprint, as this issue is generally linked to CSR; on the other hand, it will be necessary to encourage the collection of KPI data.

- **Set up a team dedicated to decarbonization** to raise the awareness of teams over time, lead them and constantly rethink the models.

- **Create partnerships with specialists to be up-to-date with new trends** that require a lot of expertise in certain areas. In Africa, for example, energy service companies

called ESCOs provide operators a range of energy solutions with the goal of achieving savings. Modernizing sites by maximizing the use of renewable energy and efficiency comes at a cost. It can be a challenge in itself. Entrusting this modernization to specialized players makes sense to focus CAPEX on the company's core business and opt for "as a service" business models with partners (Full OPEX).

The challenges linked to these transformations will lead to the creation of new professions. They will affect every employee of the company. It is therefore essential that the transformation is a company project and not a subject solely for the CSR teams. The challenge is to infuse the decarbonization process into the core of the company.

Data to leverage a *DECARBONIZATION STRATEGY*

Faced with the challenges posed by ecological, energy and economic transitions as well as the regulatory changes regarding organizations' sustainable reporting, the management of environmental, social and governance (ESG) data plays an increasingly strategic role in steering their decarbonization objectives. The new dynamic of convergence between the extra-financial and financial reporting of companies will be transformative.

This pressure responds to a need: companies must improve, "doing their part" in the same way as the State and citizens to participate in the objectives of the Paris Agreement. To achieve this, the role of data is strategic in ensuring that the projections developed by the company allow it to set ambitious and achievable decarbonization targets. The role of data is therefore critical in prioritizing the most emitting activities and establishing efficient long-term management.

The strategic role of data management in steering decarbonization objectives

A detailed accounting of the non-financial data related to the company's activities is the basis for the quality of information that organizations with more than 500 employees must communicate to the French public authorities, according to the Grenelle II law. These regulatory requirements on the reporting of greenhouse gas emissions converge with the growing expectations of external stakeholders, including customers, investors, rating agencies, etc.

¹Greenhouse Gas Emissions Report

²Les opérateurs télécoms face au défi de leur empreinte carbone | Les Echos

New challenges in managing carbon accounting data

Companies face different challenges depending on their size. Those subject to the BEGES¹ are required, since January 1, 2023, to quantify and report their Scope 3 emissions. These indirect emissions, linked to the company's upstream and downstream activities, generally represent a very large part of its carbon footprint. For an operator, it often represents more than 70% of its greenhouse gas emissions² !

TECHNOLOGY TRANSFORMATION
IS A PATH TO ACCELERATE THE
DECARBONIZATION OF ONE'S
BUSINESS



Accounting for Scope 3 poses significant challenges to the company.

- It forces the company to work on its entire value chain, on which it depends, to reduce its indirect emissions. At the same time, it offers a unique opportunity to bring together a large number of stakeholders, some of whom have different levels of maturity and sensitivity to the challenges of decarbonization: purchasers, suppliers, employees, customers, etc.

- In order to account for its greenhouse gas emissions, the company must also choose the appropriate method and framework with which to build this accounting. Several reference frameworks exist: the GHG Protocol³, which was a pioneer in defining and formalizing Scope 3; the Bilan Carbone®; and the ISO 14064 standard, based on the GHG Protocol . These choices of method do not prevent ongoing questioning and evolution in order to refine the way carbon is accounted for over time. For example, the unit on which to base measurements is a fairly recurrent question: physical data (volumes, weights and distances) or monetary data, which is often already captured by finance? These trade-offs generally depend on the very existence of the data and the gradual development of a data collection culture that requires step-by-step progress.

- Another choice concerns the tool or tools used to collect and calculate emissions. This is essential to facilitate the collection, consolidation and dissemination of source data, especially since the arrival of Scope 3 will considerably increase the amount of data to be collected.

- Another revolution at the European level is the arrival of the "Corporate Sustainability Reporting Directive" (CSRD), which, in France, will replace the "Non-Financial Reporting Directive" (NFRD), as of 2024, but whose concrete application is still unclear. The CSRD extends the requirements of the NFRD, which apply to companies with more than 250 employees. It aims to clarify the content of extra-financial reports by detailing the information that these companies must publish on the subjects of sustainability and climate change and the evaluation of their impact on the environment and society. Standards, developed by EFRAG⁴, are expected to further standardize reporting by explaining these requirements and what companies should actually publish.

Data reliability, a key issue

Faced with these developments, the reliability of ESG data is becoming a central issue, whereas it often remains a pain point, especially in large groups aggregating numerous data elements from several more or less independent entities and often working in different regulatory contexts. To ensure the reliability of data, it is necessary to make the top of the company resonate with the field.

- It is up to the general management to set a clear framework, an agreement, that gives all employees visibility regarding the data to be prioritized with respect to the strategy, their definition and a common calculation method. ESG data is infinitely variable, and the company cannot calculate everything. It must define and prioritize relevant, accessible, readable and comparable indicators that reflect the history and vision it wishes to share with its stakeholders.

- On the ground, it is important to ensure that the data exists, that the people likely to collect or consolidate it are identified, that the collection methods work and that the tools guarantee reliable feedback.

Employees will have to be trained to maintain this permanent interaction between headquarters and the operational and technical teams in order to develop a data culture within each entity.

Convergence towards ESG and financial reporting

The CSRD also introduces the concept of double materiality. It requires companies to take into account the impact of climate change on the company in the same way as the company's impact on the environment. This is a highly transformational approach that few companies have yet really integrated. It indicates a dual need: the need to decarbonize in order to reduce its impact on the environment, which has already been taken into account, and the need to adapt its infrastructure and activities to avoid the financial risks associated with climate change. It directly introduces the notion of the financialization of ESG risks, particularly those related to climate change, which were not really taken into account until now.

³created in by the WBSCD and the WRI

⁴European Financial Reporting Advisory Group (EFRAG)

⁵Accounting adapted to the Renewal of the Environment.

Faced with these requirements, companies are undertaking profound changes to evolve their accounting methods by integrating non-financial aspects. Some of the most advanced companies have already begun to test integrated methods such as the CARE⁵ model of triple sustainable accounting, developed by researchers and based on a strong sustainability approach. Based on the idea that no capital can be substituted for another, this method integrates financial, ecological and even human aspects into the accounts, completely integrating financial and socio-environmental issues. As a sign that a real transformation is underway in the ecosystem, the IFRS Foundation (International Financial Reporting Standards), which develops accounting standards to ensure the transparency of financial markets, is also working on this dynamic convergence, which is bringing finance teams closer to CSR teams.

The emergence of new roles, new professions and new skills

This need to integrate financial and non-financial data requires a significant collaborative effort to develop a robust global model. Indeed, financial data and CSR data have often not been designed to converge. Finance and CSR teams have different benchmarks. Depending on the position of CSR in the organization, in large groups, many of these departments may still interact very little. Bringing together the financial and extra-financial dimensions is a real challenge but also an opportunity to infuse CSR into the company. It is a real paradigm shift that will allow CSR to integrate sustainability requirements into the core of the business model. The search for greater resilience in the face of climate change and the consideration of the financial risk posed, for example, by the depletion of resources are ESG issues that can push a company to develop a circular economy policy. These developments are seen in a very concrete way in the requests from operational teams to develop management KPIs that combine financial and ESG dimensions, such as CO2, clearly demonstrating the transformation that is taking place.

The need for close collaboration and coordination between CSR and finance teams is leading companies to create new roles such as "Sustainable Finance Manager." Other positions will also become more important: extra-financial analysts, governance analysts, ESG managers, purchasing and responsible sourcing managers, and all the professions in charge of carbon issues, particularly Scope 3, reporting and biodiversity.

The increase in regulatory requirements that lead companies to manage their growth in close relation to environmental issues, including decarbonization, and the geopolitical context of the energy crisis linked to the war in Ukraine place CSR (still often considered a secondary component of company strategy) firmly at centerstage.

The demands of various external stakeholders are leading to profound transformations that organizations must manage within a short timeframe. The success of these transformations depends above all on the company's ability to establish and maintain proximity between the various departments, particularly finance, CSR, strategy, risk, etc. These transformations also require a global mobilization of the value chain to build decarbonization models that will embrace all the components of the activities in order to sustainably transform the business models.

Adoption of the **European Corporate Sustainability Reporting Directive**

2021

THE RELIABILITY OF
ESG DATA IS BECOMING
A CENTRAL ISSUE



Véronique GUIBERT
CSR Director, Orange Innovation

Bringing together *INNOVATION & DECARBONIZATION*

The telco sector is facing two challenges: to continue innovating in order to integrate new technological breakthroughs while taking into consideration the increasingly pressing and restrictive issues of decarbonization. Here is an overview of the levers that operators can activate...

How can telcos meet the environmental challenges ?

Operators have a dual economic and ESG (environmental, societal and governance) equation to solve. Orange Group ambition is to reach net zero carbon by 2040. Its CSR strategy aims to make this commitment compatible with the need to continue investing in innovative technologies and the growth of digital uses. Following a strategy validated by the SBTi (Science-based-Targets Initiative), we are committed to reducing our emissions in scope 1, scope 2, which accounts for just over 1Mt CO₂eq for Orange, and now scope 3, which represents over 80% of the Group's emissions.

What are the Orange Group's main actions to reduce its emissions on scopes 1 and 2?

We continue to optimize our Green ITN program launched more than 10 years ago. Based in particular on optimizing the energy efficiency of our networks and the use of 50% renewable energy in all our geographies, this program has generated 630 kt of CO₂ savings in 2021, i.e., an annual reduction of 20% of the Group's emissions, with equal use, despite major investments, especially in France.

Throughout the world, we are solarizing technical sites: in Jordan, three solar farms cover 70% of the electricity production required. In the Ivory Coast, a photovoltaic facility covers 50% of the daytime consumption of the data center that manages to host and operate services for 18 Orange subsidiaries in the OMEA region. In 2025, a photovoltaic farm will cover 20% of the energy needs of our satellite telecommunications site in Bercenay-en-Othe in the Aube region of France, which is equivalent to the energy consumption of 700 homes and a saving of 100 tons of CO₂ per year.

What about scope 3?

Since last year, we have been using an evaluation model that is very different in the sector, because it takes into account physical flows and not just financial flows: equipment and equipment capex.

We are leveraging the circular economy by working with the ecosystem to make it more virtuous: Orange co-founded, with 4 European operators, the Eco Rating index to measure the sustainability of a smartphone. Today, 8 operators in 35 countries in Europe, Africa and South America, and 22 manufacturers support this initiative! The challenge is to manufacture smartphones that are more economical in terms of natural resources, and in particular rare materials (copper, gold, lithium) in a context of tension. We are also accelerating the sale of refurbished terminals in order to meet our sales targets, which must not exceed a carbon budget set annually.

On the network side, we have launched an internal platform for buying and selling refurbished network equipment as part of the Oscar program.

We are eco-designing our products, such as our boxes, and also our software services, using an eco-design skills center created within the Innovation department.

To know where to act, the Innovation and Group teams have created a methodology to assess the impact of each offer and service. In the BtoB market, we are developing tools based on IoT, sensors and AI to help companies decarbonize or save resources with a sustainable business approach.

How does innovation embrace the decarbonization challenges?

Our ambition is to be "CSR by design". The role of the CSR department is to drive a cross-functional dynamic. To help all the experts know and understand the issues, the impacts, and the orders of magnitude, I have launched several actions.

- **Awareness-raising initiatives:** climate fresks followed by workshops to co-construct actions; an awareness-raising module on orders of magnitude; a "CSR morning" with the participation of external specialists, for example, an expert on the energy purchasing market.

- **The development of a cross-functional CSR roadmap,** based on KPIs, which gives visibility to initiatives and facilitates capitalization. Many of our innovation projects include decarbonization issues: The implementation of a Logistics Flow Observatory to help public authorities and carriers understand where and how they can act; quantum computers as opportunities to improve carbon footprint; nanocomputers as highly modular solutions that can run not on battery power but on solar power, while guaranteeing computing power; AI as a lever to reduce impact, better understand, pilot remotely, predict a fault, optimize monitoring mechanisms with a particular focus on its frugality...

- **Systematic life cycle assessments** to evaluate the carbon cost of any new technology or initiative, from manufacturing to waste management.

- **Sharing initiatives to monitor actions and encourage best practices:** for example, we have created the EAP (Energy Action Plan) application for Orange countries. This tool offers a catalog of action levers to reduce energy consumption, based on the country's energy mix and maturity. EAP allows each country to see and share what other countries are doing.

How is the Orange Innovation CSR department helping to drive these changes?

When I assumed my role, in order to help our employees to plan ahead, to encourage support and to bring people together, I formulated the CSR strategic priority for Innovation, in line with the Group's Engage 2025 strategy: "Making the Group's CSR challenges a lever for innovation and differentiation".

This shared "banner" clearly raises the question of the resilience of our business model: it leads us to question ourselves on a daily basis about the implementation of a sustainable business model in the face of the energy crisis, the increasing scarcity of resources, tougher regulations, pressure from the general public, requests for help from companies, etc. In order to keep this priority at the heart of our activities, we showcase it at all our events (trade fairs, conferences, etc.).

In addition, I invite counterparts from other large groups to speak at conferences to encourage an opening to the outside world.

I strongly believe in promoting initiatives, commitments and results to create a viral dynamic. To do this, I rely on a network of facilitators and ambassadors on the sites. I organize CSR breakfasts attended by the Director of Innovation. Every week we publish a CSR article in the Orange Innovation newsletter.

It's not so much a matter of convincing but of inspiring. In an Innovation department, employees are curious and open to change. Thanks to simple KPIs that everyone can understand and see, attitudes are changing.

OUR GREEN ITN NETWORK
GENERATED **630 kt OF CO₂**
SAVING IN 2021



Davy LETAILLEUR, Head of IT & Network business Unit, Sofrecom
Alexandra KARTACHOVA, Head of Market Intelligence
Rémi SFEZ, Business Manager
Antoine DELOBEL, Senior Consultant



Which options to decarbonize THE DIGITAL SECTOR?

The digital sector emits between 3.8% and 4% of global GHG emissions*. With the foreseeable growth in usage, its impact will worsen. Each technological transition is an opportunity to improve energy efficiency and innovate to reduce the carbon impact from start to finish. Here's a look at some of the solutions already in place or under study.

cooling using humidified air. Another possibility is to reuse the waste heat generated by the cooling of all the IT equipment to heat homes, but this requires the adaptation of existing heating networks. Finally, the deployment of 400-volt DC power supplies guarantees better efficiency than 220-volt AC or 48-volt DC power supplies. On the measurement side, there is a modeled solution for analyzing data center consumption based on AI, which can be used to manage resources and improve PUE.

Softwarization and virtualization: operators are increasingly relying on virtualized solutions in the public cloud and hosted in hyper-efficient data centers. This "as a service" approach avoids investing in physical machines that generate carbon emissions that they would have to account for. The public cloud is therefore an exciting solution for reducing the carbon footprint. Edge computing is another solution for the transformation towards a more digital and less physical world. This network of mini-data centers, storing and processing data as close as possible to the infrastructure, minimizes bandwidth requirements and reduces transmission costs. A better compromise exists between hosting frequently requested data as close to the user as possible and centralizing other data in a cloud.

*<https://www.blogdumoderateur.com/numerique-emet-gaz-effet-serre/>

³ Source Unicef : <https://data.unicef.org/topic/child-protection/birth-registration/>

Technical solutions marketed in an "as a service" (aaS) model: The possibility of putting the intelligent antennas of the 5G network into deep sleep mode is an innovative feature, as is "slicing": the possibility of dividing the network into virtual slices offering different qualities of service depending on needs (reliability, bandwidth, latency). This management of shared networks consumed on demand, known as "Network as a Service" (NaaS), is based on Data AI technologies that capture and centralize the information needed to optimize consumption.

Sharing networks and platforms: In the spirit of Towercos, such as Totem, Orange's European subsidiary, sharing passive mobile infrastructures between several operators, such as FTTH fiber networks, is virtuous for the environment: it avoids the construction of new infrastructures while allowing operators to bring connectivity and services everywhere. This mutualization can go as far as sharing assets, such as power supply infrastructures (including green energy) and telecommunications equipment, such as RAN sharing in the field of mobile network access. Orange has signed agreements to this effect in Poland, Romania, Spain and Belgium. Overall, all the solutions for sharing passive/active infrastructures, equipment, terminals and open collaborative platforms are beneficial to the environment because of their circular nature, allowing for more efficient use of assets and better control of life cycles by the manager.

The gradual phase-out of 2G and 3G technologies: each transition from one network generation to another brings a gain in energy efficiency. This issue has been integrated into 5G since its conception. Even if its deployment requires the activation of many frequencies, which makes it more energy-consuming in absolute terms than 4G, its better energy efficiency means that it consumes less per unit of throughput (bit/s). This efficiency will be limited at the start of the deployment due to the low filling of the activated capacities. But once the network is ramped up and signal processing is optimized, efficiency will be at its peak. Therefore, at the end of the deployment of a 5G SA network, it will be in the operator's interest to decommission its 2G and 3G networks to avoid a stacking of energy-intensive technologies. Orange, for example, has confirmed that it will phase out its 2G and 3G technologies in all the countries in which the Group operates in the European Union between 2025 and 2030.

Intelligent management of networks and consumption: Already, solutions such as IoT smart meters are helping to reduce energy bills and contribute to decarbonization ambitions. Thanks to Big Data Energy Services, it is possible to retrieve and analyze large volumes of data and traffic, to identify, for example, an overly generous power supply or to detect anomalies.

Producing electricity from renewable energy sources

In order to free itself from fossil fuels, the telecom sector is betting on solar energy with the construction of photovoltaic farms that can cover 20–70% of electricity needs, depending on the geography. However, in terms of life cycle analysis, the electricity produced from photovoltaic panels is not carbon neutral; this is because the manufacturing and management of the end-of-life of the panels are energy intensive. As for wind power, it proves effective only for powering mobile sites on buildings over 50 meters. Very few sites are therefore eligible.

Looking ahead, digital technology could have a role to play in the implementation of electricity storage solutions based on renewable energies, such as backup batteries for data centers. Such solutions do not yet exist for reasons of technological maturity and the profile of the French energy mix based on nuclear power, but flexible storage systems driven by digital technology are avenues to explore in order to move towards greater decarbonization.

Engaging in the circular economy

The digital sector is resource-intensive. The circular economy is the cornerstone of reducing its carbon emissions, particularly in Scope 3.

The eco-design of future networks is a major focus: Orange Innovation has put carbon efficiency at the heart of its eco-design approach for 6G.

Transforming linear business models into circular models involves: a responsible purchasing policy that challenges suppliers to integrate life cycle analysis of equipment from manufacturing to waste management; extending the life of equipment; working with the entire ecosystem to reduce the footprint...

In a forward-looking vision, blockchain could enable better management of the life cycle of each piece of equipment and identify solutions for infrastructure management and maintenance. These embryonic solutions are currently being put in place. Similarly, digital twins in the metaverse with tests in digital format could help reduce the carbon footprint in the long run.

Optimizing the energy efficiency of infrastructures

While 79% of the digital impact is related to terminals, data centers contribute more than 16% and networks about 5% (ADEME-ARCEP 2022 study). Several solutions exist to improve the efficiency of energy consumption and the way equipment is operated.

Eco-efficient data centers: the equipment, platforms, information systems and applications hosted by data centers are a major source of electricity consumption, as is air conditioning, which plays a key role in their operation. The eco-efficiency of a data center is measured by its PUE (Power Usage Effectiveness). Some emerging technologies, allowing natural cooling and air conditioning, significantly reduce this PUE: free cooling using fresh ambient air, liquid cooling by immersing equipment in water or adiabatic

THE **CIRCULAR ECONOMY** IS
THE CORNERSTONE OF REDUCING
THE CARBON EMISSIONS
OF DIGITAL SECTOR



CONCLUSION

Decarbonation refers to any policy introduced to decrease the carbon footprint and give priority to lower GHG emission sources. Decarbonization involves technical, economic, financial, and societal issues.

While striving for decarbonization is an imperative, it is not an easy process to achieve.

Massive digitization of different business sectors and the growing needs for data processing are in full compliance within the necessity of decarbonating economies, a common fact for all industries. It's a race between the growing needs of businesses and an improvement in energy efficiency or carbon footprint reduction of the digital sector's products.

In fact, the new technologies can help to significantly reduce the carbon footprint of all industries thanks to the improved efficiency of corporate digitalization processes.

Digital technology and related innovations are an essential tool to accelerate decarbonization, optimize energy use and promote more enlightening decisions.

This challenge of digital as a solution to decarbonization starts at the product design stage. It consists of designing ever more efficient equipment while maintaining high energy efficiency. It requires the commitment of public actors to implement favorable and incentive policies and regulations to drive change, but also a strong engagement of the private sector to continue innovating and evolving.

Digital and decarbonization challenges are therefore closely linked.

About Sofrecom

Sofrecom, an Orange subsidiary, has developed over 50 years a unique know-how about operator businesses, making it a world leading specialist in telecommunications consultancy and engineering.

Its experience of mature and emerging markets, combined with its deep understanding of the structuring changes affecting the telecoms market make it a valued partner for operators, governments and international investors.

In recent years, over 200 major players in over 100 countries have entrusted strategic and operational projects to Sofrecom: transformation and optimization, technological modernization, innovation and development.

Sofrecom assists its customers' digital transformation, boosting their operational performance and service differentiation, thanks to a highly innovative approach to customer experience, FTTH, 5G, DATA/IA, Green issues, Digital Innovation, e-government or IT hosting & Cloud strategies.

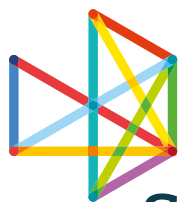
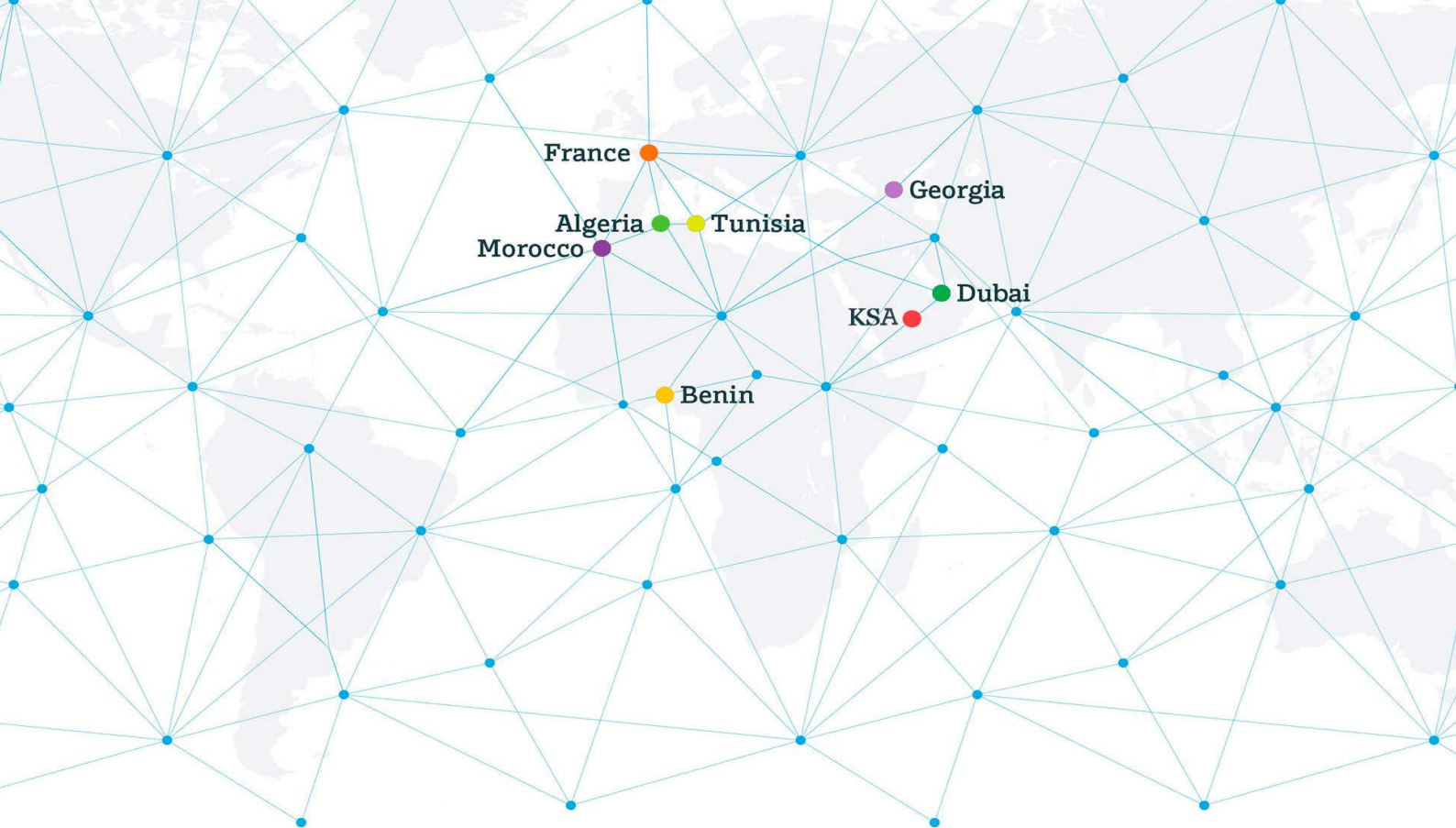
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