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For Mobile Networks Too, Sustainability Is Key

As world leaders convened in Glasgow in early November 2021 for the 26th Conference of the Parties and pledged their support to measures aimed at averting the impending climate crisis, mobile network operators, device manufacturers, and service providers are joining in with efforts to create a more sustainable ecosystem. The measures range from increasing energy efficiency to reducing power consumption, with the goal of accelerating network carbon neutrality.

5G for a More Sustainable Future

On 20 September 2021, Qualcomm unveiled the report “Environmental Sustainability and a Greener Economy: The Transformative Role of 5G,” highlighting the many ways 5G technology can achieve critically needed sustainability benefits and calling for joint efforts by industry and government to accelerate 5G adoption.

The report finds that 5G can transform and positively impact industries across the globe by creating new products and processes that support environmental sustainability. Importantly, the report shows how 5G-enabled sustainability is an economic opportunity with major potential for increased revenues, profit margins, and productivity as well as a range of other business benefits. With 5G, industries and organizations can increase their overall sustainability and competitive advantage by significantly im-

DATA SCIENCE, DATA ENGINEERING, AND SOFTWARE ENGINEERING ROLES WILL GAIN TRACTION AS COMPANIES RELY MORE ON 5G.

proving greenhouse gas emissions, water usage, pesticide usage, and energy consumption.

The report calls for accelerated deployment of 5G networks and 5G use cases as well as enhanced investments in 5G technology leadership and a robust global semiconductor ecosystem to ensure these urgent sustainability advantages are realized sooner. The key findings from the report shows the rollout of 5G in the United States alone is expected to:

- create as many as 300,000 new green jobs by 2030. Data science, data engineering, and software engineering roles will gain traction as companies rely more on 5G.
- enable the reduction of 374 million metric tons of greenhouse gas emissions in the United States, which is equivalent to taking 81 million passenger vehicles off U.S. roads for one year.
- save 410 billion gallons of water nationwide, the equivalent of water usage in more than 4 million homes, by offering increased insight into usage patterns and leakage issues.
- reduce pesticide usage in the United States by 50% with unmanned aerial vehicles for remote sensing and spray application.
- increase fuel efficiency by 20% through optimized lane manage-

ment systems and traffic management systems enabled by cellular vehicle to everything.

Green Grids Empowered by the End-to-End 5G Time-Sensitive Networking Deterministic Network

On 29 September 2021, ZTE Corporation, China Mobile, and NR Electric jointly released the industry’s first end-to-end 5G Time-Sensitive Networking (TSN) deterministic network at the PT/EXPO China 2021. Supporting grid services such as grid-differential protection, the network accelerates the deployment of renewable energy sources including solar and wind energy while empowering green grids.

The “climate action” launched by the United Nations aims to promote economic prosperity while protecting the planet. In the power field, greenhouse gas emissions from thermal power generation are huge, and efficient use of clean and renewable energy sources such as wind and solar energy is an effective means to achieve “emission peak, carbon neutrality.” However, wind and solar energy supply are not stable due to factors like weather and location, which bring challenges to the integration of renewable energy into power grids.

To incorporate renewable energy into power grids more efficiently,

networks with deterministic latency must be used for real-time monitoring and scheduling to ensure secure and stable power grid operation. However, traditional 5G networks adopt best-effort scheduling mechanisms so the latency and bandwidth cannot be controlled to meet the requirements.

The end-to-end 5G TSN deterministic network can effectively solve the network latency and jitter problems caused by traffic conflicts. Combined with slicing technology and the separation of forwarding and control, the determinacy of the power grid is fundamentally guaranteed, and the security and stability of the power grid is assured. Moreover, the network, adopting wireless congestion control and scheduling algorithms, intelligent scheduling data forwarding, and queue management in the core network, is able to greatly reduce 5G end-to-end latency.

In addition, technologies such as wireless dual-link, end-to-end frame replication and elimination as well as network dual tunnel are utilized to meet the demanding requirements for reliability of the power grid. And the industry's first TSN hardware acceleration card provides real-time traffic identification and forwarding, traffic shaping, and high-precision clock synchronization, which ensures that time latency, jitter, and time synchronization can meet the synchronization requirements of the sampling data on the differential protection device.

The 5G TSN deterministic network, replacing optical fiber cables, allows flexible access to the last mile and significantly reduces the cost of communication network constructions. 5G TSN can be widely used in power service scenarios such as grid-differential protection, power distribution automation, phasor measurement unit, and accurate grid load scheduling. Although accelerating the deployment of new energies such as solar and wind energy, it achieves efficient coordination of various types of energy resources, including wind, solar, water, thermal, and stor-

age to promote the strategic goal of emission peak, carbon neutrality.

Cellular Internet of Things for Micromobility

On 8 November 2021, Ericsson announced the release of a new report looking at how the cellular Internet of Things (IoT) can support micromobility, a growing mode of transport that has become a familiar sight in city centers worldwide. Self-service, shared lightweight electric bikes, and scooters [electric scooters (e-scooters)] offer people an affordable, accessible, and sustainable transport solution. The micromobility market is expected to experience double-digit growth in the coming years, with an estimated compound annual growth rate of 16% during 2019–2027.

The new Connected Micromobility study, conducted in collaboration among Ericsson, Arthur D. Little, mobile operator Arkessa, and micromobility operator Voi, outlines how micromobility companies can benefit from the cellular IoT to address safety challenges and optimize operations. If the cellular IoT is leveraged, micromobility operators can extend the life span of their fleet, accurately implement dynamic pricing with asset tracking, and optimize more cost-efficient service diagnostics and logistics. These three benefits can create an annual value of up to US\$460,000 for an e-scooter operator in a single city, using 1 million inhabitants and a fleet of 3,500 e-scooters as a baseline. In addition, with location-aware connected units, micromobility companies can set up safety zones by enforcing low speeds and recovering abandoned scooters.

According to the International Transport Forum, there are also sustainability benefits of micromobility. Replacing car rides with e-scooters can reduce carbon dioxide (CO₂) emissions by up to 61%. Increasing the life span of e-scooters can reduce CO₂ emissions by up to 33%, and reducing congestion in cities can cut CO₂ emissions by 6%.

“Cellular IoT is not only a stepping-stone for micromobility com-

panies to improve and optimize their offerings, IoT has benefits for consumers, cities, and the climate at large. By leveraging cellular connectivity IoT, we will see micromobility providers interact more with smart city infrastructure, and this is exciting to see,” says Kyle Okamoto, general manager IoT at Ericsson.

A Call to Build an Open Radio Access Network Ecosystem

A report calling for an Open Radio Access Network (O-RAN) ecosystem by five of the leading European telecommunications companies, Deutsche Telekom, Orange, Telecom Italia, Telefónica, and Vodafone, was published on 18 November 2021 [1]. Based on findings from independent telecom, media, and technology management consultants, Analysys Mason, it calls upon policymakers, European Union (EU) Member States, and industry stakeholders to collaborate and urgently prioritize O-RAN. This will ensure that Europe continues to play a leading role in 5G, and in the future, 6G.

Open, intelligent, virtualized and fully interoperable RAN (enabling more effective and efficient mobile communications) is essential if Europe is to meet its target of 5G for all by 2030. It will help drive stronger and more resilient supply chains and platforms as well as promote digital autonomy and continued technology leadership. New open and disaggregated architectures, software and hardware such as O-RAN, give operators the flexibility to extend 5G to more users in a cost-effective, secure, and energy-efficient way. This flexibility will stimulate greater innovation across industries in areas such as telemedicine and smart factories. However, if the EU is to maintain its competitiveness, technology leadership, and resilience, decisive action and collaboration is needed now. If it does not, Europe risks falling behind North America and Asia in the development and deployment of next-generation networks, according to the report.

The report, “Building an O-RAN Ecosystem for Europe,” shows that

Europe currently has just 13 major O-RAN players, versus 57 for the rest of the world. However, many European players are at an early stage of development and have not yet secured commercial O-RAN contracts, while vendors from other regions are moving ahead.

“Policy in the U.S. and Japan, among other countries, already strongly backs O-RAN. The U.S. has earmarked more than US\$1.5 billion to fund O-RAN, and Japan offers financial incentives and tax benefits for companies which develop, supply, and deploy related equipment. While there are some positive examples at national level, for example, Germany, the EU as a whole is falling woefully short of providing the necessary support for O-RAN, putting at risk the future viability of a European ecosystem able to compete with other regions in the world,” said Caroline Gabriel, research director at Analysys Mason.

The report sets out the following five policy recommendations that can bridge the gap with other international regions to create a dynamic and vibrant ecosystem of European players that will underpin the mobile communications of tomorrow:

- 1) ensuring high-level political support for O-RAN; Europe needs to speak with a common voice and identify O-RAN as a strategic priority.
- 2) the European Commission creating a European Alliance on Next Generation Communication infrastructures and a road map for innovation, as it has done for th Cloud and Semiconductors.
- 3) policymakers providing funding and tax incentives to operators, vendors, and start-ups to support the development of European solutions along the entire O-RAN value chain, based on public-private partnerships, testbeds and open labs.
- 4) promoting European leadership in standardization; globally harmonized standards ensure openness and interoperability.
- 5) working with international partners to promote a secure, diverse,

and sustainable digital and information and communications technology supply chain.

Currently, European vendors are not present in all six major technology and service categories that comprise the O-RAN value chain, such as cloud hardware. Also, where they do have a presence, for example, in semiconductors, they are outnumbered by non-European players. Taking action to implement the report’s recommendations would elevate home-grown, smaller vendors and boost European leadership in this vital technology while having a positive impact on adjacent industries such as cloud and microelectronics.

5G Industrial Use Cases

On 6 October 2021, Ericsson reported that it is enhancing its 5G capabilities with the launch of an end-to-end solution that will guarantee the consistent low latency and high reliability demanded by time-critical applications and services for consumers, enterprises, and the public sector.

Ericsson is enabling time-critical communication through its new Critical IoT product—easily deployable as a software upgrade on public and private 5G networks—in wide and local areas on any 5G frequency band. Having deployed 5G networks globally with rollouts of enhanced mobile broadband and fixed-wireless access services, the new solution will allow communications service providers (CSPs) to further enhance experiences in real-time media use cases like cloud gaming and augmented reality/virtual reality (AR/VR) and unlock possibilities in remote control, mobility automation, and industrial control.

Apart from the estimated 2.5 billion mobile gamers across the world who will enjoy lag-free gaming experiences, the new solution will thrill all 5G users looking for immersive XR (extended reality) experiences. It will also benefit enterprises, industries, and public agencies where production processes or mission-critical services depend heavily on high-performance reliable connectivity.

Many emerging use cases are time-critical in nature, demanding the guarantee of consistent low latency and highly reliable performance, which is currently not possible in today’s 4G and 5G networks. The new solution is designed to address that need and deliver on the full promise of 5G.

Ericsson recently partnered with Deutsche Telekom and Telstra to show the benefits of low-latency low-loss scalable (L4S) throughput technology in reducing lag in an interactive cloud game. L4S is one of the new features in the time-critical communication toolbox. Ericsson has also reached a new milestone with MediaTek by proving that 5G can deliver 1-ms consistent low latency with 99.99% reliability in both uplink and downlink on the millimeter-wave band.

New White Paper on 5G Industrial Use Cases

On 6 October 2021, 5G Americas, the voice of 5G and LTE for the Americas, announced the publication of a new white paper [2], “5G Vertical Use Cases,” which provides a deep dive on the benefits, opportunities, and requirements for enterprise adoption of 5G.

The new white paper identifies how 5G offers numerous innovations, which make it very different from 4G LTE. These innovations include higher speed and enhanced connectivity through new spectrum, dedicated resource management with network slicing, highly reliable communication for latencies less than 10 ms, improved security, a distributed packet core that spreads core network functions to the network edge, and flexible service creation and deployment with a service-based architecture.

Additionally, the white paper clarifies the different factors that all decision makers should consider, irrespective of industry, including availability of spectrum, intended use of spectrum or “spectral determinism,” area of coverage over corporate buildings, cybersecurity needs, connectivity availability and reliability requirements, data sovereignty issues,

ease of use, and liability, responsibility, and ownership of network assets.

“5G Vertical Use Cases” looks at specific use cases in the following key industries:

- **Manufacturing:** perhaps the most opportunistic and demanding industry for wireless enhancements, which 5G promises to fulfill.
- **Mining:** which has been using 4G LTE technology for several years, offering numerous key lessons.
- **Utilities:** a huge, emerging sector where 4G LTE and 5G technologies can provide benefits at a tremendous scale.
- **Health Care and Education:** which offer immediate returns for better wireless connectivity due to the COVID-19 pandemic.
- **Gaming:** which can take advantage of unique aspects of technology, such as multiaccess edge computing (MEC) and AR/VR.

Setting the Pace in 5G

On 10 November 2021, Ericsson ConsumerLab released [3] “5G Pacesetters: Winning in the Eyes of Consumers and Growing Revenues,” the industry’s first consumer 5G market analysis to combine consumer satisfaction data with market facts, assessing the 5G maturity and market revenue strategies of 73 CSPs across 22 markets globally, based on 105 criteria.

Among its key findings is the fact that 5G pacesetters—the frontrunning CSPs currently driving the global demand for consumer 5G—are three times more likely to retain customers and almost twice as likely to grow average revenue per user (ARPU) and mobile services revenues compared to other CSPs. Furthermore, the report identifies the following four stages of 5G maturity:

- 1) **5G explorers:** those at the start of their 5G journey.
- 2) **5G potentials:** CSPs with satisfied consumers due to better-performing 4G networks but have not invested much in evolving 5G network and offerings.
- 3) **5G aspirational:** CSPs perceived as market challengers, aiming

high with 5G while striving to improve consumer satisfaction.

- 4) **5G pacesetters:** those who are more advanced in setting the pace on delivering best-in-class 5G coverage, performance, and innovation but still have room to improve even further.

5G Pacesetters, the one-in-five of the studied CSPs widely perceived by consumers to be the market leaders within the 5G consumer segment, are not necessarily market-share leaders nor incumbents in their local markets. They are characterized by best net promoter score in their markets as well by driving innovation by already offering on an average of three consumer 5G services such as cloud gaming, immersive video (AR/VR), and 5G fixed-wireless access. Although advanced 5G markets in Northeast Asia and North America account for the largest share of CSPs in the 5G pacesetter category, one third are in Europe.

The following are key 5G pacesetter insights:

- Fifty percent of 5G pacesetter-category CSPs increased ARPU by 1% or more year-on-year compared to a quarter of all other CSPs.
- Seventy-five percent of 5G pacesetters monetize 5G based on tiers of speed, quality of service, fixed-mobile convergence, or bundled content.
- 5G pacesetter-category CSPs have an average 5G population coverage of 75%, download speeds of 270 Mbps, and an average 5G availability of 14% or higher.
- On average, 70% of 5G pacesetter subscribers consider themselves to be a 5G market leader.
- Nearly 50% of the 5G pacesetter-category CSPs have already launched 5G fixed-wireless access.
- 5G pacesetter-category CSPs are the most proactive in implementing 5G standalone (SA) and MEC capabilities.

Based on market-leading strategic insights, the report suggests the different paths that CSPs can take to either emerge, or improve their position as, 5G pacesetters: build ex-

tensive coverage and communicate milestones; improve the marketing of 5G to gain perception leadership; extend coverage indoors and improve speed; explore 5G convergent offerings; provide home broadband on 5G Innovate with tariff plans by up-selling to higher-value 5G tiers; offer new, immersive services and experiences for consumers; and nurture ecosystem partnerships and programs for smartphones and beyond.

A New Radio-Frequency Filter for Beyond 5G and Wi-Fi

On 20 October 2021, Qualcomm announced its bulk acoustic wave (ultraBAW) RF filter technology for bands up to 7 GHz, an innovation that builds on the company’s modem-to-antenna solution, which is driving high-performance 5G and connectivity systems across wireless product segments.

Radio-frequency (RF) filters isolate radio signals from the different spectrum bands that phones use to receive and transmit information. The new Qualcomm ultraBAW RF filter technology will enable both 5G and Wi-Fi solutions to access spectrums up to 7 GHz, delivering high performance at higher frequencies. Access to sub-7-GHz spectrums will enable next-generation mobile devices and laptops as well as numerous solutions for automotive, the IoT, and industrial applications to benefit from 5G and Wi-Fi coexistence, leading to enhanced performance and power efficiency indoors and outdoors.

Asia-Pacific’s First Live 5G Femtocell

Nokia and TPG Telecom announced on 26 October 2021 that they have deployed the Asia-Pacific region’s first 5G femtocell in a live network. Using Nokia’s modular 4G/5G Smart Node, the solution allows operators to provide their customers with superior indoor 5G coverage from a dedicated femtocell.

Nokia Smart Node is a dedicated indoor solution providing increased coverage and capacity and can be

easily scaled from single to multiple units to meet the customer's indoor coverage requirements. Delivering high-quality coverage, low latency, and reliability, the solution provides solid 4G and 5G connectivity for the demanding use cases expected by TPG Telecom's enterprise customers. The plug-and-play capabilities also make it easy to set up, which keeps installation costs to a minimum. Nokia Smart Node can be wall, ceiling, or desktop mounted.

Nokia Smart Node supports traffic management by reducing core network load and optimizing macro resource allocation. It delivers uncongested, high-throughput network performance with existing secure authentication, and provides a secure connection and subscriber identity module-based authentication to assure the quality required in mobile networks. It is future-proof and supports both non-SA and SA 5G deployments. TPG Telecom will be rolling out Nokia's Smart Node solution to selected enterprise customers in the coming months.

AWS/PCS Dual-Band Massive MIMO Radio

On 26 October 2021, Samsung Electronics Co., Ltd. announced the commercial availability of its Advanced Wireless Services (AWS)/Broadband Personal Communications Service (PCS) dual-band massive multiple-input, multiple-output (MIMO) radio, further expanding its comprehensive lineup of massive MIMO solutions. The new radio is one of the industry's lightest dual-band radios, supporting both AWS and PCS spectrums. AWS and PCS are important midband spectrums, offering a good mixture of coverage and capacity. By combining them into a "one-box" solution, mobile operators gain a simplified approach to capacity extension.

As the lightest and most compact AWS/PCS dual-band massive MIMO radio available on the market, Samsung's new radio stands out for its ability to deliver high output power (320 W) in a small form factor. It is equipped with the company's latest

AWS AND PCS ARE IMPORTANT MIDBAND SPECTRUMS, OFFERING A GOOD MIXTURE OF COVERAGE AND CAPACITY.

system on chip and built to improve network capacity and coverage while decreasing its power consumption and radio size. This will enable operators to reduce their radio footprint, the weight placed on towers, and installation time, helping to drive faster rollouts and operational efficiency.

ETSI Looking at Reconfigurable Intelligent Surfaces

On 4 October 2021, ETSI announced the launch of a new Industry Specification Group on Reconfigurable Intelligent Surfaces (ISG RIS). The group was created to review and establish global standardization for RIS technology. An RIS is a new type of system node leveraging smart radio surfaces with thousands of small antennas or metamaterial elements to dynamically shape and control radio signals in a goal-oriented manner. The technology will effectively turn the wireless environment into a service, inspiring a host of new use cases. These include enhancing key performance indicators for various systems such as coverage and capacity as well as enabling new applications, including localization and sensing. As an example, an RIS can reconfigure the radio environment to sense human posture and detect someone falling, a very useful application for elder care. An RIS, thanks to its associated characteristics, is expected to serve as a key technology in future wireless systems, including 6G.

An RIS can be implemented using mostly passive components and, as such, the cost to produce, deploy, and operate it may be lower compared to fully stacked cells relays. An RIS can potentially be deployed for both indoor and outdoor usage, including offices, airports, shopping centers, lamp posts, and advertising billboards, and may take any shape

or be integrated into objects. Additionally, the characteristics of an RIS may result in low energy consumption, making it a sustainable, environmentally friendly technology solution. An RIS can be configured to operate at any part of the radio spectrum, including frequencies from sub-6 GHz to terahertz, and may use tools from artificial intelligence (AI) and machine learning (ML) to enable system operation and optimization.

Although extensive research efforts continue around RIS (also known as *reflecting intelligent surface*, *large intelligent surface*, *smart repeater*, and *holographic radio*), global standardization of RIS remains in its very early stages. ETSI's new ISG will work toward defining use cases, covering identified scenarios, and clearly documenting the relevant requirements with a view to pave the way for future standardization of the technology. The kickoff meeting was held on 30 September 2021. Arman Shojaeifard from Interdigital was elected chair of ISG RIS, Richie Leo from ZTE and Prof. Marco Di Renzo from the French National Centre for Scientific Research were elected vice chairs.

New Specification for Zero-Touch Network and Service Management

On 13 September 2021, ETSI announced the release of three major specifications and reports developed by its Zero-Touch Network and Service Management (ZSM) group, which was formed with the goal to define a future-proof, end-to-end operable framework, along with solutions and core technologies to enable zero-touch automation of emerging and future networks and services/slices. The first specification, ETSI GS ZSM 003, defines an architecture blueprint and solutions for zero-touch management and orchestration of end-to-end, cross-domain network slicing, supporting both fulfillment and

assurance processes. Network slicing spans different technological domains, from user equipment through, for example, the access, transport, and core networks, to the application. The specification leverages existing industry specifications, stitches them together, and provides a federated solution. The alignment and leverage of synergies across various standardization bodies is essential to enable the delivery of end-to-end network slicing that can satisfy the requirements from vertical industries and the demands of network operators.

Next, ETSI GS ZSM 009-1 specified “governance” services that allow the creation, execution, and lifecycle management of a closed loop as well as the steering of its behavior. A closed loop enables the continuous optimization and adaption of network and resource utilization as well as automated service assurance and fulfillment. Advanced ML and AI can empower the closed-loop operation. The specification provides capabilities that support coordination, delegation, and escalation between closed loops to ensure intelligent, consistent, and coherent operation. The alignment and leverage of this document horizontally and vertically by the 3rd Generation Partnership Project and O-RAN is essential to ensure cross-use cases, cross domains, cross planes, interoperability, unified and consistent closed loops, and cognitive operation.

The threat surface in the ZSM environment is extensive due to the openness of the ZSM framework and the nature of the related, emerging technologies (e.g., AI/ML, the data lake, and cloud-native applications). Thus, the third specification, ETSI GR ZSM 010, identifies potential security threats related to the ZSM framework and solutions, and proposes mitigation options that should be considered by ZSM specifications to ensure that the automated processes are secured and deliver the intended business outcomes. The report introduces countermea-

sures and potential requirements to address the threats and risks. A related, normative specification work (ETSI GS ZSM 014) has commenced. Security is essential in the establishment of confidence in the automation process, and its adoption.

World Radiocommunication Conference 2023 Dates Announced

Following a consultation with its member states around the world, the International Telecommunication Union (ITU) confirmed on 25 October 2021 that the next World Radiocommunication Conference 2023 (WRC-23) will take place between 20 November and 15 December 2023. The conference, where governments, regulators, and industry gather to update the ITU Radio Regulations, will take place in one of the main cities of the United Arab Emirates, either Abu Dhabi or Dubai.

Held every four years for a period of four weeks, the World Radiocommunication Conference is mandated to update the Radio Regulations, the sole international treaty governing the use of RF spectrum and satellite orbits.

“The COVID-19 pandemic has proven the essential nature of digital technologies and services,” said ITU Secretary-General Houlin Zhao. “Yet challenges persist in efforts to connect the other half of the world’s population by 2030. ITU Member States will use WRC-23 to pave the way for new, more innovative ways to connect the world using both terrestrial and space-based communication technologies.”

The preparatory process for WRCs involves extensive studies and preparatory discussions among stakeholders from governments, regulatory authorities, network operators, and equipment suppliers to industry forums and spectrum users at national, regional, and global levels. The multistakeholder approach enables consensus building, which is essential to ensure that the WRC fosters a stable, predictable, and universally applied regulatory environment that promotes the pro-

vision of, and future investment in, radiocommunication services that are free from harmful interference.

Bridging the Digital Divide

On 20 September 2021, the ITU announced the launch of the Partner2Connect Digital Coalition to foster meaningful connectivity and digital transformation in the world’s hardest-to-connect countries. These include least-developed countries (LDCs), landlocked developing countries, and small-island developing states, groups facing specific development challenges and designated for priority assistance in pursuit of the United Nations-backed Sustainable Development Goals for 2030.

The world’s 46 LDCs are struggling to extend connectivity to all their citizens, even as pandemic conditions push economic, educational, and social activities increasingly online. Although Internet coverage and affordability are gradually improving in some LDCs, only 25% of people across all LDCs have started using the Internet. Another 50% are, theoretically, able to access the Internet but are not using it, according to the latest data on Internet connectivity worldwide.

The Partner2Connect Digital Coalition aims to create a platform for global leadership to mobilize commitments, resources, and partnerships, and implement solutions and projects to drive digital transformation. The leaders from government, international organizations, and the private sector as well as youth representatives gathered from across the globe in a virtual launch meeting, sharing their visions of advancing connectivity to drive socioeconomic development.

Coalition actions will focus on four key areas: connecting people everywhere, empowering communities, building digital ecosystems, and incentivizing investments. Each focus area will be supported by a working group.

In related news, on 26 October 2021, Verizon Communications’ Project Kuiper, an advanced low-Earth

orbit (LEO) satellite network from Amazon, announced a strategic collaboration to develop connectivity solutions for unserved and underserved communities. As part of the collaboration, Project Kuiper and Verizon have begun to develop technical specifications and define preliminary commercial models for a range of connectivity services for U.S. consumers and global enterprise customers operating in rural and remote locations around the world.

Project Kuiper is an initiative to increase global broadband access through a constellation of 3,236 satellites in LEO around the planet. The system will serve individual households as well as schools, hospitals, businesses, and other organizations operating in places where Internet access is limited or unavailable. Amazon has committed an initial US\$10 billion to the program, which will deliver fast, affordable broadband to customers and communities around the world.

Connecting unserved and underserved communities in the United States, the partnership seeks to expand coverage and deliver new, customer-focused connectivity solutions that combine Amazon's advanced LEO satellite system and Verizon's wireless technology and infrastructure. To begin, Amazon and Verizon will focus on expanding Verizon data networks using cellular backhaul solutions from Project Kuiper. The integration will leverage antenna development already in progress from the Project Kuiper team, and both engineering teams are now working together to define technical requirements to help extend fixed-wireless coverage to rural and remote communities across the United States.

This partnership will also pave the way for Project Kuiper and Verizon to design and deploy new connectivity solutions across a range of domestic and global industries,

from agriculture and energy to manufacturing and transportation. The Kuiper system is designed with the flexibility and capacity to support enterprises of all sizes. By pairing those capabilities with Verizon's wireless, private networking and edge-computing solutions, the two will be able to extend connectivity to businesses operating and deploying assets on a global scale.

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