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Report on the compilation of better practices that allow to improve the coverage and universalize the services and identify the development of models that allow to reduce the Digital Divide connecting those who are not connected in neglected or insufficiently attended rural areas

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**REPORT ON THE COMPILATION OF BETTER PRACTICES THAT
ALLOW TO IMPROVE THE COVERAGE AND UNIVERSALIZE THE
SERVICES AND IDENTIFY THE DEVELOPMENT OF MODELS THAT
ALLOW TO REDUCE THE DIGITAL DIVIDE CONNECTING THOSE
WHO ARE NOT CONNECTED IN NEGLECTED OR INSUFFICIENTLY
ATTENDED RURAL AREAS**

(Item on the Agenda: 4.1.4)

(Document submitted by the delegation of Colombia)

This document compiles the information received from 25 countries and organizations in the Americas to identify the development of models that allow to reduce the digital divide connecting those who are not connected in neglected or insufficiently attended rural areas. It contains three annexes, a list of possible actions to be taken by the countries (Annex 1); the document with a selection of documents related with the expansion and accessibility to broadband, bridging the digital divide, connectivity, national broadband plans, economic aspects, universal access and universalization funds, Sustainable Development Goals, etc., all of them focused either directly or indirectly with the rural environment (Appendix 2); and an annex with a list of countries with universal service funds (annex 3).

This document indicates a review about how the countries of the region have created their Universal Access Funds, how they are financed, where those funds receive the money from, how they are implemented and what their main barriers are.

At the same time, several regional programs on currently operative connectivity and rural access were identified, as well as what technologies are useful to connect such areas and what business and sustainability models currently exist.

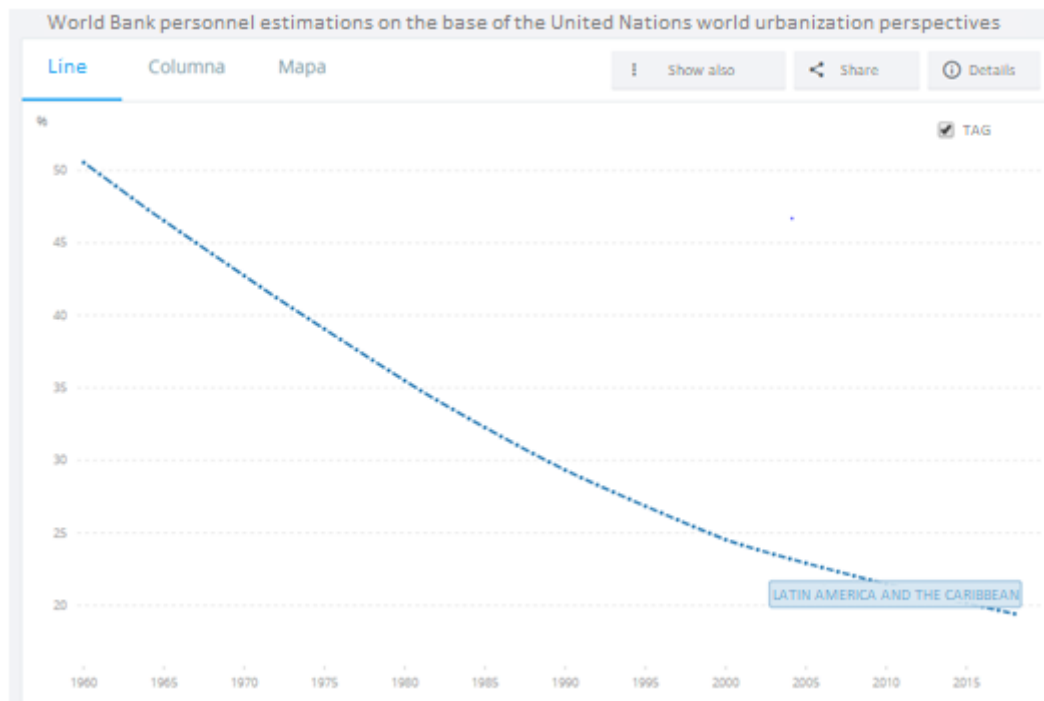
The document includes a gathering of Status Quo (Annex 2). Finally, the current management on the management of the spectrum for rural areas will be analysed.

NOTE: Document not translated by the Secretariat of CITEL.

Introduction

Latin America and the Caribbean has more than 600 million inhabitants. Although there is a tendency of reduction in the rural population, currently approximately 20% inhabits in rural areas (Graph 1).

Graph 1. Rural population in Latin America and the Caribbean. World Bank.



Regarding to connectivity, according to the International Telecommunication Union (ITU), 2019 marks the first complete year, when more than half of the world has started to participate online in the global¹. digital economy. It is a very important milestone, but also shows the incredible effort that should be done to connect la population pending to be connected.

The connectivity has positive effects in several aspects: a study by the Inter-American Development Bank (IDB)² estimated that an average increase in 10% in the penetration of broadband in Latin American and Caribbean countries caused an increase in 3.19% of the Gross Domestic Product (GDP) and 2.61% of the productivity. Another outstanding study along the same lines was conducted by Czernich, Falck, Kretschmer and Ludger, published in *The Economic Journal* in 2011. They found that in a sample of 25 OECD countries, an increase of 10 percentage points (pp) in broadband penetration accelerates yearly per capita growth by 0.9-1.5 pp. All the sectors are increasingly digitized and emerging technologies such as artificial intelligence promise a disruptive change in society.

Being connected is not a possibility, but a need of the countries to improve the situation of their inhabitants and be competitive in a globalized and digital environment³.

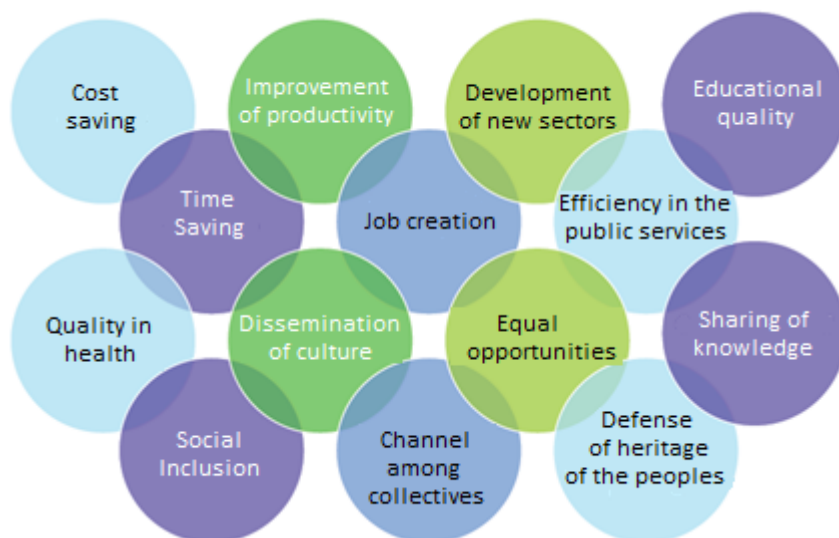
¹ https://www.itu.int/dms_pub/itu-s/opb/pol/S-POL-BROADBAND.20-2019-PDF-E.pdf

² Garía-Zaballos and Lopez-Rivas, 2012

³ Annual Report on the Broadband Development Index in Latin America and the Caribbean 2018. IDB.

The following graph shows some of the socio-economic benefits of the broadband according to the IDB⁴:

Graph 2. Benefits of Broadband. IDB 2018.



According to CEPAL, in 2019, 66.7% of the inhabitants of Latin America had an Internet connection, which represents a great challenge for the region of the approximately 3.5 billion people of the unconnected world population, 100 million are from the Americas region and 38% has a coverage in Latin America (hereinafter "LATAM" or Latin America "), but do not use the service⁵.

⁶In 2018, almost 23 million households, half of the households without an Internet connection, were located in the two lowest quintiles of the income distribution and the differences in connectivity between urban and rural areas are significant. In the region, 67% of urban households are connected to the Internet, while in rural areas only 23% of them are⁷.

This challenge is not only connectivity. According to the IDB Annual Report on the Broadband Development Index in Latin America and the Caribbean 2018, which analyses how the countries of the region are located in factors to promote the digital economy, the gap is evident regarding to countries of the Organization for Economic Cooperation and Development (OECD):

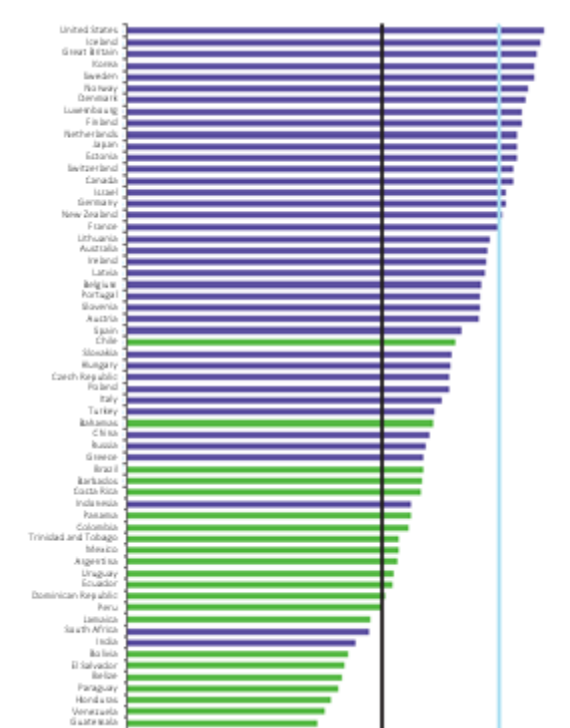
⁴ Annual Report on the Broadband Development Index in Latin America and the Caribbean 2018. IDB.

⁵ OVUM. Communication Regulation Workshop Presentation 2019.

⁶ OVUM. Communication Regulation Workshop Presentation 2019.

⁷ https://repositorio.cepal.org/bitstream/handle/11362/45938/4/S2000550_es.pdf

Graph 3: List of the 65 countries in the study, ordered according to their value in the IDBA 2018⁸



In this ranking, we find Chile as the reference of the region:

Graph 4. First 10 Latin American and Caribbean countries in the IDB Broadband Development Index in Latin America and the Caribbean 2018

Chile	5,66
Bahamas	5,35
Brazil	5,21
Barbados	5,18
Costa Rica	5,17
Panama	5,04
Colombia	4,99
Trinidad and Tobago	4,86
Mexico	4,86
Argentina	4,84

⁸ The lines denote three zones in terms of broadband development speeds: a linear zone (greater than 6.3), an inflection zone (4 to 6.3) and an exponential zone (less than 4). Retrieved from: https://publications.iadb.org/publications/spanish/document/Informe_anual_del_%C3%8Dndice_de_Desarrollo_de_la_Banda_Ancha_en_Am%C3%A9rica_Latina_y_el_Caribe_es.pdf

Specifically in terms of infrastructure, the IDB Broadband Development Index in Latin America and the Caribbean⁹ indicates aspects such as safe internet servers, existence of Internet Exchange Points (IXPs), public and private investment and the effectiveness of the access and universal service funds as “among the best results.”

Despite the progress in the coverage of internet in Latin America and the Caribbean in the last years, “45% of the Latin Americans does not have access to the services derived from the digital connectivity, such as telemedicine, online education, online government, and electronic banking among others. Only 4 of every 10 homes have a fixed broadband connection and the individual accesses to mobile internet do not overcome 50%. The access gap also has an expression at level of the low-income households and rural areas, persisting important asymmetries in the coverage of accessibility to digital services¹⁰.”

The lack of connectivity in rural areas also reflects loss of opportunities for agriculture, as it is impossible to take advantage of the agricultural precision technologies that require connectivity. According to a BroadbandNow study, if the United States invested between 35 thousand and 40 billion dollars in connecting the rural areas, the economy of such country would perceive more than 65 billion dollars annually¹¹.

In its study on “Community Networks in Latin America”¹², Internet Society explains: “20% of the Latin American population lives in rural areas, frequently isolated whose geographic conditions make difficult the development of infrastructures. Thus, the inhabitants of these zones, in addition to be disconnected from internet, suffer significant shortages in the access to a wide spectrum of basic services such as electricity, education, and health. The individuals who live in Latin American rural areas still lack adequate infrastructures, and most of those who are still not connected considers that the access to internet is too expensive or that internet is irrelevant. This scenario is increasing in rural communities with less than 2,000 inhabitants.”

If it is connected to those who are not connected, the digital gap would cause a higher inequality. Indeed, a recent study by Colombia’s National Planning Department (2018) found that increasing Internet penetrations by 50 percentage points and download speeds by 20 Mbps would lower the GINI index by up to 1.26%. The gap does not only refer to the non-connected people, but also includes those left behind the new innovation cycles or new technologies. Different technologies should co-exist if we want to close the digital gap. Nobody has the absolute solution to attend the problem of the lack of connectivity, reason why it is necessary to continue working in different technologies and understand that collaboration among diverse stakeholders is the key to find the answers.

As mentioned by the United Nations High Commissioner for Human Rights Michelle Bachelet, “the access to health, education, new technologies, green areas, and spaces without pollution represents increasingly an indicator in the way of distributing the opportunities and the welfare among the different groups of people and even among the countries.”

Of course, they are very important investments. It is estimated that 100 billion dollars in the next 10 years are required in order to have universal access in Africa¹³. It is relevant to boost such investments as soon

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https://publications.iadb.org/publications/spanish/document/Informe_anual_del_%C3%8Dndice_de_Desarrollo_de_la_Banda_Ancha_en_Am%C3%A9rica_Latina_y_el_Caribe_es.pdf

¹⁰ <https://www.caf.com/es/actualidad/noticias/2019/07/cerrar-la-brecha-digital-en-america-latina-y-el-caribe-depnde-criticamente-de-la-transformacion-de-los-fondos-de-servicio-universal/>

¹¹ <https://www.growingproduce.com/fruits/report-rural-broadband-investment-could-add-65-billion-to-u-s-economy/>

¹² <https://www.internetsociety.org/es/resources/doc/2018/redes-comunitarias-en-america-latina/>

¹³ <https://qz.com/africa/1731628/africa-needs-100-billion-to-for-universal-internet-by-2030/>

as possible. According to the OVUM, 75% of the investments in networks is made by the communication operators, giving significant weight to such operators, who continue to be a key factor in the connectivity process.

However, there are more actors who are joining in terms of connectivity and initiatives globally recognized as the ICT 2030 alliance of CITELE, the alliance of Huawei with Safaricom in Kenya or Ericsson in Myanmar¹⁴, as well as the program to connect the disconnected from the Association for Progress of Communications and even in the Americas region the creation of IpT Peru between the companies Telefónica, Facebook, IDB and CAF validate the possibility of working among all the stakeholders.

In the other hand, it cannot be assumed that all the regulators are the same nor that the connectivity programs may be replicated in the same way in all the countries. But it is possible to have certain general principles such as technological, regulatory innovation, as well as to identify new business models that help with the connection with the missing population.

To make connectivity viable for populations in rural and remote areas of the Latin American and Caribbean region, it is necessary to rethink the models created so far and to be based on innovative, open, collaborative and sustainable models.

We expect that this document is a useful tool for it to contribute to the elaboration of plans that help to connect the non- connected people in Latin America and the Caribbean, considering the needs and particularities of each country.

On the Universal Access Funds

The Universal Access Fund is a widely used tool to subsidize projects to expand connectivity infrastructure in low or unprofitable areas. The creation of such funds in the countries of the region occurred in different moments, being Chile and Colombia the first ones in 1994 and the rest of countries of the region did it after 2000¹⁵.

Some of the universal service funds were initially created for the universalization of fixed telephony, but over time they were adapted to the need for broadband. However, there are still countries (for example, Brazil) that FUST resources can only be used for fixed telephony.

Another challenge for universal access funds in the region is to ensure that the resources collected are used for specific communication objectives.

Various countries like: United States, Canada, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Peru, Dominican Republic, Grenada, Dominica, Saint Lucia, Ecuador¹⁶, Argentina, count with funds. On

¹⁴ Ericsson PSI en Myanmar. “Three-technology (2G, 3G and LTE), rural coverage site that uses three frequency bands and runs on less than 1 kilowatt of power (...) eliminates the need to have several radios in a coverage area, and instead uses one radio unit that connects three antennas together and provides high-quality coverage” “The solution name, Psi, comes from a Greek alphanumeric charter in the shape of a fork with three teeth, representing the one radio-three antenna set up”.

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¹⁴ <https://www.apc.org/en/project/connecting-unconnected-supporting-community-networks-and-other-community-based-connectivity>

¹⁵ In Colombia, the FSU has origin in Law 142 de 1994, its scope was extended by virtue of Law 1342 of 1999.

In Brazil, the FUST was created in August 2000 through Law 9998. In the Dominican Republic, the Fund for Financing Development Projects was created by virtue of Law 153-98.

¹⁶). In Ecuador with Resolution 394-18-CONATEL-2000, published in the Official Gazette 193 of October 27, 2000, the Regulation of the Fund for the Development of Telecommunications in Rural and Urban-Marginal Areas is issued, which includes the norms regarding the objective, scope,

the other hand, Guatemala has a Telephony Fund while Mexico and Uruguay do not count with funds of this type (see annex with OECD table on those who have universal service funds in the region).

The funds are normally created by law and are operated either by an entity linked with the organism responsible for the telecommunications in the country or by a trusteeship. In several countries, the one that operates the fund is not the same that performs the public policy or who supervises the financed projects.

The objectives and scope of the funds vary from country to country, some of these are:

- To facilitate the access of the rural and low-income areas to the electricity and telephony services.
- Offer access and universal telecommunications in places where the commercial telecommunications markets may be unable to provide such services in a financially viable way independently.
- To guarantee the accessibility of the basic and advanced telecommunications services.
- To expand the telecommunications services towards neglected areas.
- Promote Last mile projects.
- Offer mobile broadband services.
- Develop social programs for promotion of Education, Culture, Health, and Emergency Services, through the public telecommunications service providers.
- Include public voice telephony, access to internet, telecommunications services for schools, hospitals, and similar institutions, and for people with physical disabilities.
- To improve the productive, educational, government processes and the services to the citizens.
- Provide a georeferenced system and improvements to the emergency services.
- Give credits to SMEs for access to internet in areas of up to certain number of inhabitants.

Financing of the Funds

Regarding to financing, most of the Funds from the mentioned countries are financed by operators through payments, incomes, rates, fines, fees, payment spectrum; In the rest of the countries they are financed by donations, financial yields and general budget of the countries.

Likewise, some of them are financed through the provision of services implementing determined with programs in kind. A few cases have financing of international organisms (borrowing by the BID for example).

In the case of the Dominican Republic, the vast majority of the Fund's financing comes from the collection of a 2% tax on telecommunications bills. In other words, in this case the operator is the collector. but the one who finances the provision of the service is the citizen through a tax.

On the Connectivity Projects and Rural Access of the Countries

The cases analyzed include various ways of creating rural access and connectivity projects in the region; The Shared Network of Mexico is a public-private association (APP) for the design, installation, deployment, operation, maintenance and updating of a network of mobile telecommunications services.

definitions, purposes, administration and administrative structure, resources (including assignments made by CONATEL), programs and projects, granting of the concession, financing contract, disbursement of funds, supervision and coordination and cooperation with organizations National and international. It should be clarified that with the entry into force of the Organic Telecommunications Law in 2015, there is no longer the figure of a fund for universal service/access; only providers have an established 1% payment obligation (art. 92 of the Organic Law on Telecommunications).

¹⁶In Peru, in addition to rural areas, places of preferential social interest are also included

This network is wholesale in nature, that is, it markets all its services and capabilities to other dealers and marketers without discrimination. In said network, the task of infrastructure deployment is not the responsibility of the State; The responsibility lies with the private sector, under a PPP scheme.

It should be noted that the contributions of the Government of Mexico are manifested through the rights of use of 90MHz in the 700MHz band and a couple of wires of the fiber optic network of the backbone network. The spectrum is provided to the APP through the leasing arrangement, For its part, the Shared network. operator provides the financial, material (furniture and real estate), infrastructure and human resources, or of any other nature, as well as all the authorizations, permits, licenses and rights of way necessary for compliance of the Project in the national territory¹⁷.

Other countries (Colombia, Chile and Peru) chose the deployment of a Private Telecommunications Network or backbone networks with funds or support. For its part, Argentina developed a backbone network through a state operator.

Access projects vary from connecting educational centers, health establishments, public libraries, police posts and other State entities (Colombia, Guatemala, Honduras, Argentina, Uruguay among others), the creation of community Internet access centers (Colombia , Ecuador, Uruguay), the creation of free Internet access zones / Wi-Fi Zones (Panama, Chile, Colombia, Uruguay) until the delivery of terminals to students, or people in conditions of social risk, vulnerability or poverty and the support for access for people with disabilities (Colombia, Uruguay).

Other projects are carried out under public-private partnerships where private ones are selected through public bids.

Specific Projects

In Mexico, the Social Coverage Program (PCS), which was published in 2019, complies with Article 9 of the Federal Telecommunications and Broadcasting Law (LFTR), which establishes that it corresponds to the Ministry of Communications and Transportation (SCT) " plan, set, implement and conduct policies and programs for universal coverage and social coverage ”.

The PCS used Geographic Information Systems to map the localities that have Internet services and therefore identify those where their residents cannot contract this service, and later, using 6 criteria, prioritize the localities to which the service should be taken of Internet to reach a coverage of 95% of the population served..

Some of the criteria used by the program include localities that are furthest from Internet services, communities with high degrees of marginalization or indigenous groups.

Thus, of the almost 200 thousand localities in the country, nearly 100 thousand were identified without coverage, comprising 12.33 million inhabitants, and using the prioritization criteria, over 10 thousand were obtained, concentrating practically 7 million inhabitants. , which represent over half of the population

¹⁷ In the case of the shared network of MEX, the scheme is interesting: The investments, construction and operation of the network shared are the responsibility of the Private Partner Altán networks, which was selected by SCT through public bidding. On the public side, the Telecommunications Promotion Agency (PROMTEL) facilitates the use of the 700 MHz band under the leasing figure. Likewise, PROMTEL is responsible for the administration of the Contract and relies on the Technical Auditor and other entities to supervise the project. The spectrum assignment and the public-private partnership contract for the deployment and operation of the shared network has a duration of 20 years (2017-2037).

¹⁷ Ceibal plan for connectivity to schools

¹⁷ Ibirapitá Plan for digital inclusion for older adults with lower incomes.

without Internet service coverage. In this way, it seeks to optimize resources, focusing efforts on only 10.6% of the localities that do not have said service, but reaching more than half of the population that does not have it..

The PCS is a guiding instrument for the sector, where the Federal Telecommunications Institute (IFT), in accordance with the provisions of the LFTR, may establish the concessionaires obligations of geographic, population or social coverage and connectivity in public places; and the telecommunications and broadcasting concessionaires will be responsible for expanding the deployment of the networks under conditions of competition, also meeting their coverage and penetration commitments. .

Additionally, in Mexico the Annual Program for the Use and Exploitation of Frequency Bands (PABF) was established, under the responsibility of the (IFT) ¹⁸, seeks to make publicly known the availability of frequency bands for social use and channels with adequate spectrum for the provision of services for the community and indigenous communities. The State contributes with the frequencies by direct award and infrastructure and operation to the communities and social organizations.

In such country, the Federal Law on Telecommunications and Broadcasting¹⁹ that the concessions for social use grant the right to provide telecommunications and broadcasting services with non-profit cultural, scientific, educational or community purposes. This is composed of the community and indigenous concessions.

The concessions for social community use may be granted to civil society organizations that do not operate with profit purposes and are constituted under the principles of direct citizen participation, social coexistence, equity, gender equality and plurality.

The concessions for social indigenous use may be granted to the indigenous peoples of the country according to the alignments issued by the IFT and whose purpose is to promote, develop, and preserve their language, culture, and knowledge promoting their traditions, internal regulations and under principles that respect gender equality, allow the integration of indigenous women in the participation of the objectives for which the concession and other elements that constitute the indigenous cultures and identities are requested.

It is necessary to mention that the Federal Rights Law, in its Article 174-L, exempts the requests from social community and indigenous concessions, from the payment for study of its request and the issuance of the concession title or extensions of the concessions for the use or exploitation of frequency bands from the radio spectrum²⁰. The financing is private through communities and organizations with the contribution of the spectrum by the State.

By April 2020, the IFT had granted 375 new concessions for social, community, indigenous or public use, to provide broadcasting and telecommunications services ²¹.

On the other hand in Mexico, the reserve established in the GSM band gave rise to the first indigenous mobile phone network in the world that achieved to provide telephony services sustainably in highly and very highly marginalized localities of between 200 and 3,000 inhabitants in a pioneered way.

¹⁸Created in article 59 of the Federal Telecommunications and Broadcasting Law http://www.diputados.gob.mx/LeyesBiblio/pdf/LFTR_020419.pdf

¹⁹ http://www.diputados.gob.mx/LeyesBiblio/pdf/LFTR_020419.pdf

²⁰ <https://www.eleconomista.com.mx/opinion/Secretaria-de-Hacienda-concede-una-a-los-operadores-indigenas-20191027-0017.html>

²¹ Concesiones sociales otorgadas por el IFT (abril-2020): <http://www.ift.org.mx/industria/concesiones-sociales-otorgadas>

Currently, this network communicates 63 communities connected with 18 radio bases from the states of Oaxaca and Guerrero at affordable prices, benefiting 24 thousand inhabitants. It has promoted the arrival of internet and the training of indigenous technicians. Due to its characteristics, the network expands slowly but constantly, trying to satisfy the wide demand of services, as it is the only mean communication in of the cases of those localities.

Finally, in Mexico, the company “CFE Telecomunicaciones e Internet para todos” was recently created, a subsidiary of the Federal Electricity Commission (CFE). The entity will have its own legal personality and assets, whose objective is to provide and provide non-profit telecommunications services to guarantee the right of access to information and communication technologies, including broadband and Internet. To do this, on August 28, 2019, the IFT granted the single concession for public use to “CFE Telecomunicaciones e Internet para todos”, with which it will be able to begin to provide and provide telecommunications services.

In addition, CFE Telecomunicaciones e Internet para Todos will contribute with the programs and projects established by the Government of Mexico in the National Development Plan (PND) 2019-2024, as well as with the Social Coverage Program prepared by the SCT, which has the purpose of contributing to the achievement of social coverage, giving emphasis to the marginalized areas of the country, so that people, particularly those in vulnerable situations, have access to new technologies and have digital skills to close the digital divide and achieving levels of development are discrimination.

For its part, Argentina launched in 2010 the Argentina Connected Plan, the main axis of which was the construction of a 35,000 km fiber optic backbone network through the state operator ARSAT to provide wholesale services, allowing it to reach underserved areas or areas with unsatisfied demands. The plan has made it possible to deploy fiber optics in key parts of the national territory, such as National Route 40 that crosses the territory from North to South in its entirety, at the height of the Andes mountain range. Also the underwater interconnection between Santa Cruz and the island of Tierra del Fuego. Currently the network has more than 31,000 km illuminated and about 35,000 km laid; In 2020, new investments were announced to give continuity to this public policy.

The Connected Argentina Plan included other measures such as the installation of Knowledge Access Nuclei (NAC), with free public spaces that provide connectivity, training, workshops and cultural activities throughout the country. This initiative continues in force from the Digital Point Program. Another objective was to provide satellite internet connectivity in rural and border schools by the national State, which reached about 3,000 establishments as of December 2019. In parallel with the deployment of Digital Television, more than 12,000 antennas were installed satellite in rural and border schools.

Likewise, the Argentine State created the Conectar Igualdad Program, a digital inclusion policy at the federal level with the distribution of netbooks to students and teachers of secondary education, special education and teacher training institutes of the public system. The delivery of devices was accompanied by the development of digital content and didactic proposals through the Educ.ar portal of the Ministry of Education of the Nation. Between 2010 and 2015, more than 5,300,000 netbooks were delivered. In 2018 the Program was replaced by Aprender Conectados and since then the delivery of devices has been oriented towards educational establishments.

In 2020, the Connect Plan was announced, with important state investments and funds from the Universal Service to update and expand the aforementioned Federal Fiber Optic Network, develop the third telecommunications satellite of the ARSAT fleet and complete the deployment of Open Digital Television. The Argentine telecommunications satellites ARSAT-1 and ARSAT-2 were launched in 2014 and 2015 respectively and have nearly 90% of their capacity occupied. The third ARSAT-SG1 satellite will be a new

generation of high-performance technology with the aim of providing broadband services with coverage throughout the national territory.

Regarding the implementation of the Universal Service funds, in accordance with the provisions of Law 27,078, the main programs and projects aimed at rural areas and socially vulnerable sectors during recent years stand out:

Award of non-reimbursable contributions to finance the improvement of infrastructure networks for Internet access providers, SMEs and cooperatives for the provision of fixed broadband Internet access in towns with 2,500, 5,000, 10,000 and 35,000 inhabitants in different stages .

Access to satellite internet in small towns: it provides Internet access through free and free Wi-Fi in public places in 115 towns with less than 500 inhabitants, where there is no coverage with other technologies.

Access to ICT for older adults and women residing in rural areas, delivery of tablets via municipalities and through social actors in populations in situations of social vulnerability of the National Registry of Popular Neighborhoods (RENABAP).

Access to connectivity programs in poor neighborhoods and unfavorable rural areas, as well as investment in connectivity for the public sector in the areas of health, education, and security.

Also, in 2018, community networks were recognized as non-profit operators through the creation of the license with registration for the provision of the Value Added Service-Internet Access (VARC), to provide Internet access in rural areas, with little infrastructure and socially vulnerable sectors.

In Chile, the project “Telecommunications Connectivity for the Coquimbo Region” has the purpose of increasing the coverage and access to low-population density localities, but with productive focus of the region. Another interesting project in the project is that the different localities compete to achieve such connectivity.

The Brazilian Tax Incentive Plan²² allows to reduce or exonerate taxes on operations related with the Movement of Goods and Provisions of Interstate and Intermunicipal and Communications Transport Services– ICMS– in some Brazilian states such as Minas Gerais, Bahía, Espírito Santo, Ceará, Pernambuco e Mato Grosso, where the measure has been effective. In this project, the main actors are the Brazilian States (which offer the tax incentives) and telecommunications service operators and it is financed through tax incentives.

Likewise, the National IoT Plan of Brazil prioritized the use of IoT in the rural sector, along with the health, cities, and industries sectors. Another very interesting topics is that the National Telecommunications Agency (ANATEL) may substitute sanctions imposed to operators for obligations of deploying broadband.

On the other hand, the Structural Telecommunications Network Plan (PERT)²³, approved in June 2019, has the purposes of mapping the Brazilian areas without broadband, and present projects for the deployment of broadband in zones that still lack this service. The PERT is a guide for ANATEL with the purpose of extending broadband in Brazil. It is a long-term plan with annual updating and five-year review. The approval of the PERT is very recent (14/06/2019). The expectation of the sector is very positive, and the PERT will be very useful to direct the expansion of Broadband in Brazil.

²² <http://www.secti.ba.gov.br/modules/conteudo/conteudo.php?conteudo=14>

²³ <https://www.anatel.gov.br/dados/PERT>

In Uruguay, public policy is defined on the basis of the extension and universalization of access to telecommunications services, which are considered strategic for integration and social inclusion, for which investments in infrastructure have been promoted.

In this sense, Uruguay by Decree No. 144 of 2007 created the Program for Educational Connectivity of Basic Computer Science for Online Learning (Plan Ceibal), which consists of the distribution of laptops to teachers and students of state-run educational establishments, and in pedagogical training for its use in the educational environment, transforming the ways of teaching and learning. To this end, the Plan has achieved connectivity for 100% of the centers with a Wi-Fi network, more than 80% accessing broadband and the remaining 15% using narrowband.

Plan Ceibal connectivity is achieved through the state telecommunications company ANTEL using part of its infrastructure both the mobile network (3G-4G), as well as fixed radio links (Point-to-Point and Point-Multipoint links), as well as dedicated fiber optic.

The Uruguayan telecommunications market is one of mixed participation, with a state-owned company and private companies. Operators are active throughout the national territory, standing out with programs that provide internet access to low-income people (Universal Household Plan), including rural areas with wireless services (Rural Household Universal Plan), as well as other coverage service plans rural with wireless connection for more remote areas.

On the other hand, it is worth noting that Uruguay has a digital policy embodied in the Uruguay Digital Agenda, which is presented as a tool that integrates and monitors priority initiatives to advance the digital transformation of the Uruguayan State. So far, Uruguay has created four digital agendas. All of them have a common thread and were built from the previous one. The first two (2006-2008 and 2008-2010) focused on institutionalization and the creation of the foundations; the third (2010-2015) inaugurated a period of expansion and deepening of the priorities that were already set; and the fourth agenda, which is in force today, advances in the digital transformation of Uruguay.

The Uruguay Digital Agenda is the document where the development initiatives of the Information and Knowledge Society in the Public Administration are established, prioritized, articulated and disseminated through a vision of national scope, accompanied by monitoring and sustainability mechanisms that ensure its continuity and projection. It constitutes a tool to continue advancing in the digital transformation in an inclusive and sustainable way, with the aim that more Uruguayans can access the benefits of the Information Society on equal terms. In this sense, the objectives of the Agenda are the following: (i) develop inclusive digital skills, (ii) use innovation for social well-being, (iii) make strategic investment in infrastructure, (iv) create digital economy and innovation for competitiveness, (v) intelligently manage environmental and emergency information, (vi) promote Local Government, (vii) strengthen Integrated and Intelligent Government, (viii) offer confidence and security in the use of digital technologies, and (ix) produce national statistics related to ICT.

It is worth noting that the Agenda is aligned with the country's strategic development objectives, as well as with the United Nations Sustainable Development Goals (SDG), seeking to expand innovation in transformative processes and deepen the access and use of ICTs. Likewise, it is interesting to highlight that it is structured around four pillars: (i) Social policies and inclusion: digital technologies in the transformation of the opportunity structure. (ii) Sustainable economic development: building a competitive digital economy. (iii) Government management: innovation in the relationship between citizens and the State. (iv) Governance for the Information Society: enabling framework to promote its social appropriation.

Regarding the commitments and goals to achieve sustainable economic development by 2020, Uruguay established to reach 65% of the country's households with fiber optic Internet connection (FTTH) coverage, 90% of households connected to the Internet. by broadband, and 65% of LTE coverage in the national territory. Likewise, it decided to increase the total bandwidth capacity to cover the current and future demand for Internet connectivity and international communications in the country with its own infrastructure, ensuring greater independence and security of the same, through the construction of submarine cable systems that they connect the country with the region and the world. In the same way, it established the need to optimize the use of the national radioelectric spectrum and have new bands in order to facilitate the development of telecommunications services. Finally, he highlighted the development of connectivity infrastructure and management platforms that facilitate the deployment of applications based on the Internet of Things.

Likewise, it is worth noting that Uruguay also has the Ibirapitá Plan that seeks to include retirees from all over the country. To do this, it provides a free tablet with an interface specially developed to be intuitive and friendly. It also conducts training workshops and makes available the necessary support for the user experience to be successful.

Finally, a National Digital Literacy Plan is being developed and the telecommunications infrastructure for precision agriculture and smart rural communities is being used for responsible and sustainable agricultural production, beyond the fact that bovine traceability has been implemented for more than ten years.

In Dominica, community emergency telecommunications projects have been implemented in neglected rural areas of the country and in zonas that do not have any way of communication and resistance to the severe climate conditions. These projects are mainly aimed at improving the service provision and the communication to the highest amount of citizens as possible in case of any natural climate incident, as well as providing emergency communication services to neglected rurales communities after any natural disaster and secondly, aimed at training the local inhabitants in the mitigation of disasters and use of emergency communications equipment.

For its part, the United States has the Universal Service Fund (USF): the principle by which it is recognized that all Americans should have access to communication services, has been the basis that governs the mandate of the Federal Communications Commission (FCC) since its inception. In 1934, Congress created the FCC for the purpose of making fast and efficient radio and telecommunications services available to Americans, nationally and internationally, with adequate facilities and at reasonable prices. With the entry into force of the Communications Act of 1996, six principles were established by which the FCC would establish policies for the preservation and advancement of universal service. These principles establish that the services must be of quality and be within the reach of the consumer, offering fair, reasonable and affordable rates. Likewise, consumers in all regions of the country should have access to telecommunications and information services, including advanced telecommunications, such as high-speed broadband, and information services, that are reasonably comparable to services provided in urban areas and reasonably comparable rates. The FCC established programs to increase access to such services for consumers living in rural and remote areas, for low-income consumers regardless of location, and to provide greater access to high-speed broadband in schools, libraries and rural health centers of the country. As a result, today the Universal Service Fund (USF) provides support through four programs established and directed by the FCC: the High Cost Program (also known as the Connect American Fund or CAF); the Lifeline program; the Schools and Libraries (E-Rate) program; and the Rural Health Care Fund.

The USF is funded through contributions from telecommunications providers, which are calculated based on a percentage of the amount they charge their residential and business customers for interstate and international calls. In September 2020, the programs reached 128,147 schools and libraries, 9,050 rural health centers, 8.1 million households eligible for the Lifeline program, and 1.2 million households in High

Cost Areas. The FCC is responsible for the overall management and oversight of the USF, including all public policy decisions. The Universal Service Administrative Company (USAC) manages operations for the four USF support mechanisms.²⁴

In 2011, the FCC began to implement important reforms to the High Cost universal service program, these reforms resulted in the creation of the CAF and the Mobility Fund. CAF was established with a budget that would not exceed \$ 4.5 billion for six years. The CAF is designed to ensure that consumers in rural, remote and high-cost areas have access to modern communications networks capable of providing voice and broadband services, both to fixed and mobile networks, at rates reasonably comparable to those of urban areas. The program meets this goal by allowing eligible service providers serving in these areas to recoup some of their costs through the use of the federal USF. Most CAF programs have specific requirements and standards for speed, latency, and monthly usage allowances.

In 2018, the FCC offered a basic financing model for long-distance telephone companies (known as price cap carriers), on a state-by-state basis, in certain neglected High Cost areas with limited services, in exchange for offering voice and broadband services to a specified number of locations, in eligible areas. Second, this support was provided, in those areas where support was rejected in the first stage, and in some other neglected High Cost areas with limited services, located in the territories of the maximum price service providers; the support was allocated through the reverse CAF Phase II auction. Service providers that competed to receive CAF II funds, included: electricity cooperatives, wireless Internet service providers, cable operators, telecommunications operators, and a satellite company. At the end of the auction, 103 contestants obtained \$ 1.49 billion during 10 years to provide voice and fixed broadband services to more than 700,000 rural locations in 45 states. In addition, through this fund, the FCC worked with New York State to provide nearly \$ 67 million for rural broadband deployment in combination with \$ 220 million from the state.

In early 2020, the FCC established the Rural Digital Opportunity Fund (RDOF), which, through a two-stage reverse auction mechanism, would allocate up to \$ 20.4 billion over 10 years to expand the broadband in rural areas without service. The Commission expanded eligibility for this program in territories of service providers with price cap carriers that remain without service, with broadband speeds of 25 Mbps download data and 3 Mbps for data upload, including areas that were not awarded in the CAF Phase II auction. RDOF is based on the successful CAF Phase II auction model. RDOF intends to allocate up to \$ 16 billion in Phase I to support census blocks, which, according to data collected by the FCC, clearly show that they are not served by the 25/3 Mbps broadband service. , RDOF will seek to allocate at least \$ 4.4 billion in Phase II for unserved localities in partially served census blocks and in areas that did not receive funding during Phase I.²⁵

The Mobility Fund was part of the reform that the Commission carried out to the High Cost universal service program that the Commission carried out in 2011. The Phase I Mobility Fund Auction allocated up to \$ 300 million in one-time support , along with an additional \$ 50 million for the Phase I Tribal Mobility Fund, to operators that committed to providing advanced mobile voice and broadband services in areas where such services were not available. The winners of the auction committed to provide 3G services within two years or 4G services within three years from the award of the support. The Phase I Mobility Fund would have provided up to \$ 4.53 billion in available support over 10 years for mainly rural areas that lacked 4G LTE services and did not have subsidies. However, recognizing the technological changes in wireless mobile telephony, in April 2020, the FCC adopted a Notice of Proposed Rulemaking requesting comments on the Commission's proposal to replace Phase II of the Fund for Mobility with the 5G Fund for Rural

²⁴ USAC was first established in 1997 as an independent, competitively neutral entity to temporarily administer the USF.

²⁵ See Report & Order- Rural Digital Opportunity Fund: <https://docs.fcc.gov/public/attachments/DOC-361785A1.pdf>

America. Through a competitive reverse auction mechanism, this fund would make available up to \$ 9 billion with the goal of bringing 5G mobile broadband services to rural areas of the country.²⁶

In September 2019, the Commission approved almost \$ 950 million in Phase 2 funds to finance the Uniendo a Puerto Rico and Connect USVI program, which were established to improve, expand, and strengthen communications networks in Puerto Rico and in the United States Virgin Islands that were damaged and destroyed during the hurricane season in 2017. To achieve these goals, the Commission allocated more than \$ 500 million, over a ten-year period, to provide financing for fixed broadband in Puerto Rico. In addition, more than \$ 180 million was allocated, over a ten-year period, to provide financing to fixed networks in the US Virgin Islands. Financial support for fixed broadband is granted through a competitive process, in which the service providers committed to providing service to all locations, in each covered area that has reinforced networks to deal with storms and even gigabit speeds. Applications were accepted until September 3, 2020. As part of these efforts to promote quality voice and broadband in the territories, the Commission authorized \$ 237.9 million to expand, improve and strengthen the mobile broadband networks in Puerto Rico and the US Virgin Islands, including First Service Funding Targeted Specifically for 5G Deployment.²⁷

In addition, the Commission has continued its efforts to reform USF's High Cost programs for smaller local phone companies known as “rate-of-return carriers”. On December 12, 2018, the Commission adopted offer review models for rate-of-return operators receiving funding through a basic model as well as new offering models for rate-of-return operators currently receiving historical support based on 2018 “unlimited claims” (which will increase annually based on inflation); and other measures to mitigate the regulatory burden on providers and encourage efficient use of universal service support. In August 2019, the Commission authorized more than \$ 4.9 billion in support of rate-of-return operators to maintain, improve and expand broadband in rural areas over the next decade. This support will guarantee broadband access for approximately 455,000 homes and businesses served by 171 operators in 40 states and territories, including more than 44,000 localities in indigenous territory.²⁸

To ensure that consumers who live in rural areas have access to the same high-quality networks as those who live in urban areas, the FCC strives to strike the right balance between ensuring the effective use of universal service funds and, by at the same time, provide the flexibility that providers need to address the practicalities of network deployment in particular circumstances.

For example, in October 2019, the FCC adopted performance requirements with the goal of establishing a uniform framework to measure the speed and latency performance of operators deploying fixed broadband networks for underserved consumers living in rural areas; At the same time, the existing requirement in the High Cost universal service is maintained, under the CAF program, through which the operators that receive support must perform quarterly speed and latency tests. The FCC also made specific modifications to the testing procedures designed to provide additional flexibility to minimize the burden of testing for service providers and their customers. The deployment obligations of each fund will determine when the operators of each fund must begin network performance testing. For example, affected service providers who participated in CAF Phase II had until July 1, 2020 to begin testing and must report test results by July 1, 2021.²⁹

²⁶ Managing and distributing Universal Service Funds in the United States, ITU, 2019. Available at: [1/327 \(Rev.1\)](#) also citing <https://www.fcc.gov/mobility-fund-phase-ii-mf-ii>)

²⁷ Wireline Competition Bureau Authorizes Stage 2 Mobile Support for Certain Providers Participating in the Uniendo a Puerto Rico Fund and the Connect USVI Fund, Public Notice, 35 FCC Red 6321 (WCB 2020).

²⁸ News Release, FCC, FCC Authorizes Support for Broadband in Over 44,000 Tribal Homes and Businesses Nationwide (Aug. 22, 2019), <https://docs.fcc.gov/public/attachments/DOC-359226A1.pdf>.

²⁹ Managing and distributing Universal Service Funds in the United States, ITU, 2019. Available at: [1/327 \(Rev.1\)](#) also citing See USAC Performance Measures Testing: <https://www.usac.org/high-cost/annual-requirements/performance-measures-testing/>

In this sense, the FCC's actions are aimed at ensuring that service providers maintain their responsibilities towards consumers, taxpayers and towards the USF funds granted by the FCC, and at the same time, comply with the performance of the network, which they have promised to provide. Furthermore, the flexibility built into these actions allows operators of all sizes and technical capabilities to meet testing requirements, without incurring unnecessary costs, and ensuring compliance with their responsibilities. The FCC continues to reform universal service policies to encourage greater investment and access to new voice and broadband services, promote the expansion and adoption of these services, improve efficiency and avoid unnecessary expenses in the implementation of government programs.

Canada is highlighted by its Connectivity Strategy, which not only commits efforts of the Ministry of Innovation but also from the Ministry of Economic Development and has the participation of federal, provincial, and territorial entities. The strategy has the purpose of offering connectivity 50/10 (to download 50 Mbps and load 10 Mbps); to 90% of the Canadians by 2021, 95% of the Canadians by 2026, and the Canadians who have difficulties to reach it by 2030.

The implementation of this strategy is based on an associative scheme, under the leadership of the Government of Canada, who provides the financing and financial support; likewise the private sector, the internet service providers and other stakeholders, who are also called to support and contribute with resources to close the broadband gap and achieve the objectives established in this strategy.

An interesting point of the strategy of Canada is the “investment for impact” focus, where its programs will be sequenced y aligned and the superposition will be minimized with the investments of the partners and the investments aimed at areas where there is a limited commercial case for the investment of the private sector. Furthermore, the Government will consider the availabilities of open access, that allow the smaller and independent telecommunications providers to rent space in the existing infrastructure of the biggest providers, often to favorable wholesale prices, to guarantee that the benefits of the investments are maximized.

The connectivity infrastructure projects under this strategy are aligned with the following principles:

- The projects are developed using different networks and technologies.
- The service accessibility and service, connecting the needs from different users, such as schools, hospitals, and companies, along with opportunities to reach the necessary highest speeds in the future;
- To promote agile and connected solutions to the local needs, specially to the rural communities;
- To commit the provincial, territorial, and local governments to achieve jointly the national objectives;

Additionally, the Broadband Fund of the Canadian Radio and Television and Telecommunications Commission consists of US \$ 750 million.

On the other hand, in Colombia, after the National Optical Fiber Project -PNFO-, awarded in 2011 and two years later, the National High Speed Connectivity Project (PNCAV)³⁰, for those places where it was technically impossible to have optical fiber, and with the aim of promoting the digital inclusion of the rural communities, the Ministry of ICTs has proposed to offer 11,000 solutions of public access to internet, through the implementation of two projects described below.

³⁰ Declared of strategic importance via document CONPES 3769 of 2013.

Through the Sustainable Universal Access initiative, the ICT Fund contributes with the resources required to finance the installation and entry into service of 1,000 solutions of access, with an investment of \$27 billion Colombian pesos (approximately 7.3 billion U.S. dollars), and the awarded network and service provider of the bid will be responsible for leveraging the operation and maintenance of the infrastructure for 21 months. The beneficiaries may Access freely to the connectivity of the Wi-Fi zones and the operator will be free to trade additional services. At the end of the contract, the implementor will have the property on the infrastructure, stimulating with it, the continuity of its business model. The installation of all the solutions concluded in December 2019.

This is how the Ministry of ICTs proposes to promote the sustainability of access to internet, in such a way that the rural communities do not depend on the public offer cycle. For such reason, the technical and financial viability criteria for the project guided the selection of the 1,000 communities to be benefited complying with the requirements to attract the private investment, from three conditions: (i) a low difficulty of access (estimated from the type of transportation available to the site, its frequency, and the time of displacement from the rural community to the county seat); (ii) the belonging of these rural communities to big cities of the country, and (iii) the availability of electric inter-connection.

Furthermore, the Digital Center Project is composed of the connectivity offer through WiFi solutions for 9,410 populated centers, characterized for having a significant difficulty of geographic access, distributed in the 32 departments of the country. The installation will be mostly carried out in official educational institutes that lack connectivity and the term of operation is expected within 10 years.

The technical dimensioning of the initiative took as references, the data on the behavior of the traffic per hour and the concurrence factor in the peak hours, observed during the implementation of the rural access projects implemented in the past. In this way, the need of the internet service under real consumption conditions was established, fixing minimum and maximum capacity thresholds. Once exhausted the in situ data assigned for the month, the operator will be free to trade the access. The investment intended for the ITC Single Fund to the financing of the project (CAPEX and OPEX) increases to \$ 2,138 billion Colombian pesos (approximately \$ 557 million U.S. dollars).

Under the same order of ideas, the government of the Republic of Panama, under the framework of Law No. 59 of 2008 and its amendments, has carried out multiple projects, through the Universal Service and Access Advisory Board, which It is chaired by the National Authority for Government Innovation (AIG), and supported by the National Authority for Public Services (ASEP), the Ministry of Social Development (MIDES) and the National Secretariat for Science, Technology and Innovation (SENACYT). These four members are in charge of analyzing and approving the projects that will be financed with funds from the Fund for Universal Service and Access, which should be aimed at improving coverage and universalizing telecommunications services, especially in those rural areas that are still they do not have access to these services. These projects include:

- National Internet Network: This project has made it possible to establish free Wi-Fi Internet connection access points with a speed of 2 Mbps for the end user in sites of public interest.³¹
- Rural Mobile telephony projects: Project framed in the 2020 Digital Agenda, consists of investment projects developed by the National Government in conjunction with private companies to bring coverage to remote communities in the country.³²
- 100% digital coverage project: This project will offer quality, scalable and efficient connectivity to rural and remote communities as a fundamental tool to reduce the digital gap. Based on this, the Transforming and Connecting Darién Project is started.³³

³¹ <https://innovacion.gob.pa/rnipanama/>

³² <https://innovacion.gob.pa/guna-yala-primera-comarca-conectada-a-telefonía-movil/?csrt=908659528220464753>

³³ <https://innovacion.gob.pa/autoridad-nacional-para-la-innovacion-gubernamental-destaca-logros-institucionales-en-100-dias-de-gestion/?csrt=908659528220464753>

It should be noted that Panama's 2020 Digital Agenda summarizes future development plans with an approach based on the use of technology to improve the quality of life of Panamanians, in order to reduce the inequality gap and provide them with the benefits of the digital age to the entire population, especially those who have not yet obtained these benefits ³⁴

In the case of Ecuador, as of the creation of the Telecommunications Development Fund (FODETE from the Spanish) in 2000, the regulatory instrument underwent some modifications ;, thus, in the Regulations of the Fund for the Development of Telecommunications in rural and urban areas marginal areas issued with resolution 105-04-CONATEL-2009, the concept of marginal rural and urban areas was expanded, stating that it is considered as part of these “all educational centers, state medical care centers, non-public social development organizations. profit, that do not have the services defined in the Universal Service Plan or in which these are considered insufficient; prioritizing the sociological area called periphery used in national population censuses ”.

With the contributions of the providers of telecommunications services, public and private, the FODETE projects were financed. Subsequently, with the issuance of the Organic Law on Telecommunications on February 18, 2015, in articles 90 to 92 the Universal Service Plan is created, maintaining the contribution of the providers

With the created figure, the basic form is lost, and it becomes a general contribution to the State budget, with universal service projects and programs granted based on the Organic Law of the national public procurement system; Obligations may be established for telecommunications service providers, in their enabling titles, based on or by application of the Universal Service Plan, which will state the services that make up the universal service and the geographical areas for their provision.

Article 88 of the Organic Law of Telecommunications, establishes that the Rector Ministry of Telecommunications will promote the information and knowledge society for the integral development of the country; and should guide its actions to the formulation of policies, plans, programs and projects aimed at, among other aspects:

1. the Guarantee the right to communication and access to information.
2. Promote universal access to telecommunications services; especially, in marginal urban or rural areas, in order to ensure adequate coverage of services for the benefit of Ecuadorian citizens.
3. Promote the efficient establishment of telecommunications infrastructure, especially in marginal urban and rural areas.
4. Seek Universal Service.
5. Promote the development and mass use of information and communication technologies throughout the national territory.

For its part, Peru, through the Ministry of Transportation and Communications (MTC), through the Supreme Decree that modified various articles of the Regulation of Law No. 29904, Law for the Promotion of Broadband and Construction of the National Fiber Optic Backbone Network , approved by Supreme Decree No. 014-2013-MTC, which established the purpose of the State to promote the development, use and massification of Broadband throughout the national territory (urban and rural), both in supply and in the demand for this service, promoting the deployment of infrastructure, services, content, applications and digital skills as a means that favors and facilitates the social and economic inclusion of rural areas. In that sense, the MTC, according to the powers given in article 7.4 of the

³⁴ <https://innovacion.gob.pa/descargas/2019/12/agenda-digital-2020-visual.pdf>

aforementioned law, formulated twenty-one (21) Regional Projects "Installation of Broadband for connectivity and social development"

In line with the aforementioned, the National Telecommunications Program (PRONATEL) of the MTC, ordered the resumption of 14 telecommunications projects, which benefit more than 2 million Peruvians in rural areas and of preferential social interest, within the framework of the phases of economic reactivation in the context of the health emergency. These are regional connectivity and social development projects that promote the use of public telecommunications services, essential for citizens to improve their quality of life, through access to education, health and safety services through the Internet of high speed. In this regard, the regions of Cusco, Lima, Puno, Moquegua, Tacna, Junín, Amazonas, Ica, Pasco, Huánuco, La Libertad, Arequipa, San Martín and Áncash, through which high-speed internet will be installed in 7,658 public entities, between schools, health centers and police stations.

The reactivation of these activities is carried out once the companies have presented, in this case to PRONATEL, the "Plan for the surveillance, prevention and control of COVID-19 at work", which must be prepared within the framework of the "Guidelines for health surveillance of workers at risk of exposure to COVID-19" approved by the Ministry of Health. Once the aforementioned plan has been evaluated and approved, we proceed with the registration in the Integrated System for COVID-19 (SICOVID-19) of the Minsa, within a maximum period of two business days.

Regarding the regional projects of Huancavelica, Apurímac and Ayacucho, it is important to note that they began operation in 2019 and provided telecommunications services normally since the beginning of the pandemic, currently benefiting more than 495 thousand inhabitants and 2,109 public institutions. On the other hand, due to the high rate of Covid-19 that is registered in Lambayeque, the connectivity project that is being developed in this region will resume once the adequate sanitary conditions are in place for the restart of activities in this area of the country.

In this sense, the strategy defined by the MTC is to take advantage of the existing private networks and increase the beneficiary localities, applying the execution mechanisms provided through Legislative Decree No. 1480, approved within the framework of the state of health emergency.

On the other hand, Peru has the innovative regulatory figure of the rural mobile infrastructure operator (OIMR), which was created by the Peruvian State to facilitate the access and transport of mobile telecommunications to rural areas, where mobile operators with network (OMR) do not have their own infrastructure. In this regard, the OIMR does not have its own end users, numbering or allocation of radio spectrum for mobile public services. Its infrastructure consists of at least one base radio that allows the provision of mobile services after interconnection with mobile network operators. To date, the MTC has six OIMRs registered, for example, the best known is Internet para Todos.

On the Connectivity and Rural Access Projects of the Other Actors of the Ecosystem

It is necessary to highlight that not only the operators have initiatives related with connectivity. We find increasingly more actors interested in decreasing the digital gap. We will see some examples below.

FACEBOOK

Facebook has an agnostic focus on the technological subject. That is, that as a developer and promoter of technology for connectivity, does not privilege any particular technology, but supports and promotes those solutions that are more viable and adequate for each market or environment. The company works jointly with ISPs, operators and local entrepreneurs to boot projects in this field.

Through its rural connectivity program, Facebook is investing with service providers to close the digital gap and connect millions of people in the world through the development of rural wideband infrastructure, innovating business models, tools, technology, and policy frameworks.

Currently, the enterprise has ongoing tests in 9 markets with 8 network operators to extend the scope and accelerate the expansion of the wireless broadband networks to the rural areas through innovating models and sustainable and scalable technologies.

The company has developed different connectivity projects such as "Internet para Todos EN Peru", and supported the development of technologies or developments, such as Magma, Express Wi-Fi or HAPS.

Internet for All. Through open technology developments, this company offers wholesales services in the rural zones of Peru. In the operation of its infrastructure, software solutions developed by Facebook are used to increase the efficiency of the network.

Express Wi-Fi. Facebook develops technological advances that allow the Wi-Fi networks to become an alternative for solving connectivity. Like in the above-mentioned cases, the company works jointly with ISPs, operators and local entrepreneurs to boot projects in this field.

TELEFONICA

In some countries, coverage of rural areas by Telefónica has been carried out within the framework of compliance with the obligations included in the spectrum acquisition processes. But in any case, the challenge of extending connectivity to rural areas or areas with low population density is still relevant in Latin America, which is why in recent years it has launched different initiatives that developing new operating and business models allow the viability of business cases of services provided in rural areas.

Among the projects already launched, we should be mentioned the "Internet for All" project launched in Peru.

IFA – Internet for All

Internet For All (IFA) is a company created in 2019 by Telefónica del Peru, Facebook, IDB Invest and CAF, whose objective is to close the digital gap in Peru which was 6 million Peruvians, and deploy 4G internet access to the most remote areas of the country.

IFA is based on an open, collaborative and sustainable model, which enables the deployment of disruptive technologies for the deployment of infrastructures to provide 4G mobile services in areas where the traditional deployment of mobile internet has been limited by geographic, technological and economic complexities. IPT's advanced mobile technology deployments are more efficient than traditional deployments and interoperable with any network in the country. IPT's business model is based on the development of networks and infrastructures that are made available to mobile operators through wholesale agreements.

Peru was chosen as the first country in developing the concept and the IFA operations due to there was already a regulation that facilitated the business model established (existence of the figure of the Rural Mobile Infrastructure Operator) and the investments in the development of infrastructures of access to the mobile telecommunications.

IFA officially started its operations in May 2019 and has been established in Peru as a Rural Mobile Infrastructure Operator (OIMR). Through a wholesale model, it offers all mobile operators in the market the possibility of leasing their telecommunications infrastructure, so that they offer their services and thus connect more Peruvians.

Until August 2020 (15 months from the start of its operation), IPT has reached an agreement with two mobile operators with a network and has benefited more than 1.6 million Peruvians in 10,000 population centers. In addition, IPT has recently signed an agreement with the company Gilat, responsible for operating the regional networks in Huancavelica, Apurímac and Ayacucho, said agreement will allow IPT to bring mobile internet to more than half a million people in more than 3,000 rural communities with the deployment of more than 400 4G sites during 2020.

Loon

Loon LLC, an Alphabet company, has developed a network of high-altitude balloons that fly in the stratosphere and provide Internet access to unconnected and underserved populations. Loon works with mobile network operators to expand coverage to served and underserved communities, supplement existing networks, and provide rapid coverage after natural disasters.

Loon partners with mobile network operators in each country where it operates to help expand their networks to reach served and unserved areas within the markets they serve. Each Loon balloon payload contains an LTE base station that connects users to the local mobile operator's network. Unlike cell-on-wheels or satellite technologies, each Loon balloon can provide connectivity over an area of 11,000 km², including rural, remote and other difficult-to-service areas (such as islands, mountains, jungles, etc.), directly connecting to an end user's existing 4G smartphone without the need for any additional equipment. Utilizing advanced time-space software-defined networks (TS-SDN) and machine learning-powered navigation technologies for over 1 million stratospheric flight hours, Loon has refined its service to better serve end users in areas served and unserved.

Loon's service has been particularly effective for disaster preparedness and recovery in rural areas. In 2017, when El Niño floods devastated parts of northern Peru, Loon worked with Telefónica in Peru to provide Internet connectivity to those in need in an area of more than 40,000 km². In 2019, when a magnitude 8.0 earthquake struck Peru, the two companies were again able to provide emergency connectivity. In partnership with AT&T and T-Mobile, Loon's high altitude wireless broadband systems also helped provide connectivity to 250,000 people on the island of Puerto Rico after Hurricane Maria, a storm that significantly affected the communications infrastructure of the island³⁵.

VIASAT Community Internet

Starting in 2018, global satellite operator Viasat pioneered the 'community Wi-Fi' model, which leverages a commercially successful methodology to connect the disconnected, particularly in areas that had long been considered uneconomic for operators. terrestrial. This is because the marginal costs of additional satellite ground stations are low and the increased capacity of next-generation High Performance Satellites (HTS) has reduced the cost of data at rates affordable for low-income consumers.

³⁵ See, e.g., Comments of Loon LLC, WC Docket No. 18-143, Federal Communications Commission (July 26, 2018).

In general, the community Wi-Fi model involves creating a large area Wi-Fi network that runs on satellite broadband. Additional modules can be added, such as a router, a tablet to generate access tokens for users, and a local cache to store useful content, such as e-government forms or educational videos. Users have access to fast broadband speeds, allowing them to stream HD video, video chat, and participate in a complete online experience. This model creates the ability to reach millions of people in both urban and rural settings, without depending on government funding.

The technical architecture of the Community Wi-Fi installation is relatively simple. A satellite antenna is attached to the storefront or other suitable location. Then it is wired to a modem and router inside the store. It is connected to a tablet that is used to generate the pin codes, provide technical diagnostics, and other administrative functions. A powerful Wi-Fi antenna is attached to the outside of the tent, allowing coverage in a radius of between 200 and 500 meters. Users connect to the WiFi network, enter their network access pin code and start browsing. Most users have their own devices or share them among family members. In some markets, other entities may subsidize the devices. This has the advantage of being a one-time position, making it easy to budget for government programs.

Viasat is working to expand access to work as a mesh network for the entire community, as well as expand coverage within the home. An external hard drive can be connected to the network to enable locally cached content; This is typically static content, such as educational videos or e-government forms, and can be updated during off-peak periods. Also, in certain markets a VOIP phone is attached, allowing the community to also have cheap phone service.

This program is within short distance of 1.8 million people in Mexico who previously did not have access to connectivity in their communities of origin and, in many cases, traveled long distances to access the Internet. The program has also been tested across Viasat-2 coverage and is expected to be expanded to cover many Central American and Caribbean countries in 2021-2022. Community WiFi will be expanded and deployed globally with the ViaSat-3 (VS3) constellation from 2021.

In addition, Viasat has established an alliance with Telebras in Brazil to expand the Community WiFi model with SGDC-1 and in early 2020, this alliance began connecting thousands of communities throughout Brazil with the goal of connecting millions of Brazilians who currently are not connected.

The communities Viasat's Community Internet targets tend to be cash-based with consumers making small purchases. Many do not have banking services: through trials in Mexico, Viasat confirmed that these communities operate on a completely cash-based system, with no banks present in their immediate vicinity. Therefore, it was important to establish a prepaid model that meets consumer demands while ensuring commercial viability. Consumers in Mexico pay around US \$ 0.50 (fifty cents) for an hour of unlimited data, which is purchased at a point of sale, usually in a general store where they are used to buying products. The store owner becomes a local reseller and point of contact, often providing first-rate technical support. A logistics network is also required to recover funds, as well as local companies to install and provide advanced technical support for the sites. Typically, most of the revenue stays in the country, between the local representative (store owner), the technical partner and local taxes.

In most of the communities served by this program, consumers have their own devices. They simply traveled to nearby communities to access the Internet, at a cost of time and money for transportation. For these consumers, Community Internet has saved them money and given them greater flexibility, as the service is accessible 24 hours a day, 7 days a week. However, these users are familiar with the technology, but on a different level than we might assume. For example, in many developed countries, it could be assumed that an inexperienced Internet user could limit himself to emails for online communication. This is not the case with these users - many of them "skip" these services and trust WhatsApp, social networks, etc. for communicating. The main exposure to connectivity that most of these

people receive is probably buying a prepaid plan on their smartphone in a nearby city that has a cell tower. Aside from these differences, their usage patterns are not unusual - usage is primarily from social media, streaming media like YouTube, and HTTPS browsing traffic.

COMMUNITARY NETWORKS

The community communications networks are non-profit collective management networks with community purposes. They are projects where the communities themselves make the decisions and are in charge of the operation of last (or first) mile networks.

These "first mile" networks in most cases are based on TVWS, mobile services and Mesh Wifi.

At world level, the community networks are used in several parts of the world such as Znzeleni³⁶, Mucambinda³⁷, Tanzania³⁸, Nepal³⁹, and Pakistan⁴⁰.

Some of the several Latin American cases of community networks to be highlighted are:

Rhizomática and Telecomunicaciones Indígenas Comunitarias A.C.

Rhizomatica⁴¹ is a non-profit organization dedicated at increasing the access to the wireless communication and information and communication technologies, mainly in rural and indigenous populations, where it is difficult to provide services for the providing companies. Rhizomatica works with communities in Mexico, Brasil and Ecuador. In Oaxaca, it collaborates with Telecomunicaciones Indígenas Comunitarias A.C. in the implementation, maintenance, and operation of the mobile telephony GSM. As mentioned above, this network currently communicates 18 localities of the states of Oaxaca and Guerrero at accessible prices, benefiting 24,000 inhabitants. It has boosted the arrival of internet and training of indigenous technicians. Due to its characteristics, the network expands slowly, but constantly, trying to satisfy the wide demand of services, as it is the only mean of communication for most of the localities.

AlterMundi

AlterMundi⁴² is a Non-Governmental Organization based in Argentina, which promotes the creation of community wireless networks in small towns. Through its Free Quintana Project (based on the town José de la Quintana, Córdoba Province), it teaches the small communities of Córdoba to build their own community digital networks. Thus, it is possible to carry internet in places where commercial providers cannot reach and also give them the tools required for self-management.

Likewise, AlterMundi has participated in the creation of LibreRouter, which is an open source hardware Wi-Fi router designed from zero for community networks.

Colnodo

³⁶ <http://www.internetsociety.org/resources/doc/2017/supporting-the-creation-and-scalability-of-affordable-access-solutions-understanding-community-networks-in-africa/>

³⁷ <http://www.internetsociety.org/blog/2018/12/murambinda-works-community-engagement-workshop/>

³⁸ <http://www.internetsociety.org/blog/2018/04/piloting-use-tv-white-space-community-networks-rural-tanzania/>

³⁹ <http://www.internetsociety.org/wp-content/uploads/2017/10/W4C-NepalReport-201605.pdf>

⁴⁰ <http://www.internetsociety.org/resources/doc/2018/a-pilot-community-network-in-pakistan-online-supplementary-education-and-its-impact/>

⁴¹ Páginas web: <https://www.rhizomatica.org/> y <https://www.tic-ac.org/>

⁴² <http://www.altermundi.net/> y <https://librerouter.org/>

Asociación Colnodo⁴³ is a Colombian non-profit organization founded in 1994 with the aim of facilitating communications, exchange of information and experiences among the Colombian organizations at local, national, and international level through low-cost electronic networks. The topics of interest are governability, democracy and citizen participation, sustainable development, democratization of knowledge, communication for development, digital inclusion and strategic use of communication and information technologies for development, democracy, and participation.

Since 2017, Colnodo has been working with the community of the municipality of Buenos Aires, Cauca department (where several communication needs and a severe lack of technological services were found) to provide connectivity services and implement a community network that operates autonomously with local services and Internet access.

Likewise, in May 2019, Colnodo signed an agreement with the Ministry of Information Technologies and Communications-MinTIC, whose purpose is to define a sustainable rural community telecommunications model through a pilot that serves as an experience to construct memories, establish recommendations, overcome difficulties and evaluate the possibility of performance in other rural areas of Colombia.

Colnodo has been working with the community of the municipality of Buenos Aires, Cauca department (a territory where several communications needs and a high technological service deficit were found) since 2017; with the aim of providing connectivity services and the implementation of a community network that works autonomously with local services and access to internet.

El Cuy, Argentinian Patagonia

The Argentine Patagonia is characterized by having large areas of uninhabited territory. To the north of this region is the province of Río Negro, in the center of which is El Cuy, a town with about 400 inhabitants. In this region (where extreme weather conditions and low income affected the development of the Internet) there were no mobile or fixed services available. Today, the city manages (through a cooperative of the settlers) a self-sustaining and self-deployed community network that was implemented with the support of the Internet Society and the Argentine Internet Chamber (CABASE)⁴⁴

Pu‘uhonua Waimanolo, Hawai‘i

This LTE-based network (in an effort coordinated by the Internet Society and its local chapter, with the support of Bai Cells, HawaiianTel, the Havaian state government, and the University of Washington) is Hawai‘i's first independent community broadband network. in the town of Pu‘uhonua O Waimanalo on the island of O‘ahu. This community managed broadband network has a great impact since it brought affordable and reliable access to the Internet in a remote region and opens access to the limitless opportunities that the Internet often provides to its users.⁴⁵

First Mile Connectivity Consortium

Across Canada, First Nations are building broadband systems and using them to serve their communities through the **First Mile Connectivity Consortium**. Outside the main centers, many remote and rural First Nations remain

⁴³ <http://www.colnodo.apc.org/>

⁴⁴ <https://www.internetsociety.org/es/news/comunicados-de-prensa/2019/armaron-una-red-comunitaria-de-internet-para-conectar-un-pueblo-de-400-habitantes-de-la-patagonia/>.

⁴⁵ <https://www.internetsociety.org/blog/2019/10/these-are-our-first-roadways-internet-access-and-self-determination-in-puuhonua-o-waimanalo/>.

underserved. The experiences of early adopters of these tools and systems help create new opportunities for those beginning their first-mile broadband connectivity journey. The First Mile website is a place to share best practices and lessons learned ⁴⁶

COMMUNITY NETWORKS IN DOMINICAN REPUBLIC

Although the community networks are not being implemented as indicated by the theory, these are being implemented in Dominican Republic under the low-cost WISP scheme; using a non-licensed spectrum (2.4 and 5.8 GHz). Many of these companies operate in the most rural areas in the country and operate in mixed legality scenarios.

The companies that are operating at the provincial level are micro-companies that expand the coverage of traditional providers, reaching rural and marginalized areas. Given that these companies are not adequate to the current legal framework, the *Instituto Dominicano de Telecomunicaciones* (INDOTEL) has initiated a process of adaptation at the national level, trying to normalize the legal situation of these companies, so that they are duly authorized to provide telecommunications service at the national level.

In the case of the Wi-Fi Networks Project, 1,080 WiFi Networks were installed nationwide. Said facilities were negotiated with the providers Altice, Claro and Wind, and they are responsible for assuming 100% of the cost of installation, operation and maintenance for a period of 3 years. Altice, Claro and Wind are responsible for 600, 350 and 130 Wi-Fi Networks respectively. INDOTEL is responsible for the selection of locations, and provides support in the management with local governments. Providers, where applicable, expanded their existing fiber optic networks to cover assigned WiFi locations, these networks include the last mile.

Main Identified Obstacles

Of the information received, it was possible to identify the main obstacles for the success of the program in rural and remote areas. Undoubtedly, the barriers to the installation of supporting telecommunication networks infrastructure is one of the most named. Among the main obstacles of this type, the following stand out:

- The lack of harmonization or contradiction between national, state and / or municipal regulations;
- The lack of predictability of deadlines for the granting of permits for the construction and installation of infrastructure;
- The absence of a regulatory framework that promotes and facilitates the voluntary sharing of infrastructure.
- Lack of knowledge among communities regarding health matters and the infrastructure to be installed.

Different governments have reviewed and updated their regulations and procedures to serve as an adequate stimulus for the development of the telecommunications network, guaranteeing a sustainable deployment for both the point of view of the land-use planning and access to other services.

Some examples are:

- the establishment of clear applicable standards for the issuance of installation and construction permits, including regulations associated with positive silence;

⁴⁶ <http://firstmile.ca/>.

- the elimination of obsolete regulation, a topic that will be analyzed in depth in the regulation chapter;
- the use of sites and public goods such as poles, lighting columns, transport stops, fronts and roofs of buildings, among others, for the installation of infrastructure.

Measures such as sharing and taking advantage of existing infrastructure bring multiple benefits to improve connectivity in rural or low coverage areas:

- reduce site search and installation times;
- reduce installation costs, creating incentives for operators to settle in those areas;
- they reduce energy consumption and, consequently, the environmental footprint;
- avoid duplication of infrastructure and optimize its use, allowing a more visually ordered deployment;
- They facilitate competition between operators and, consequently, promote the greatest offer of services at the lowest cost for users.

Another barrier identified is the costs associated with the universal access projects for rural areas, which at the same time, have had a growing participation in the investment resources from Universal Funds, which establishes a concern on their financial sustainability.

Several countries of the region have a difficult relationship with the local governments, the permits from the authorities (territorial, environmental), the previous consults, the indentureships, and the administrative processes for the use of vacant sites as barriers.

Some cases highlight the outdated and inconsistencies in information to identify the most effective places to deploy infrastructure. Therefore the mapping initiative of Brazil is very interesting for monitoring.

Even some countries indicate poor conditions in the service provision centers, that in some cases have avoided the installation of the equipment.

An additional barrier in countries such as Brazil is that the law only allows the use of the fund in the fixed telephony services, although currently the most required service it's broadband.

Other additional challenges identified were how to migrate the oldest technologies (for example, 2G) to other more advanced technologies and how to achieve the continuity of the plans and projects after the changes of government.

Finally, the need of eliminating the obsolete regulation that generates difficulties in the implementation of connectivity projects in the rural and remote regions, topic that will be analyzed in detail in the chapter about regulation.

Rural Technologies/New Business Models/Sustainability

There are different ways of connecting the rural areas. Although it is important to know such technologies, it is recommended to analyze the relevance of the available technologies case by case. Some of the technologies identified are:

- Deployment of optical fiber.
- Wired and wireless local networks.
 - Mobile 2G, 3G, LTE in combination with fiber transport network.

- 5G.
 - 5G cannot be the solution for remote communities.
 - 5G has capacities that are more associated with things than people.
 - 5G requires high costs for the deployment.
 - It is important to reorganize the spectrum in low and medium bands for the adequate deployment of 5G.
 - The highest implementation challenge is the density of antennas per sq km.
 - 5G in its first 5 years is going to reach 1.9 billion subscribers.⁴⁷
 - The strongest impact in the different sectors of the economy given by 5G will be caused by its low latency.
 - The 5G technology is the first one that is being developed in a mature market.

Other types of transport network through links, models with microcells and low-cost technologies such as open BSC or network management systems that allow communities to operate their own cellular network such as RAI⁴⁸
- Satellite services. The satellite technology has existed for decades, but its cost has avoided its massification. It seems that the market will be reactivated with more stakeholders.

Additionally, advances in satellite technology, such as the development of high-performance satellite services (HTS), dramatically accelerate the deployment of broadband in different communities. HTSs are next-generation satellite technology, capable of delivering great performance compared to previous systems. This advanced technology has the potential to enable new models of affordable connectivity, especially for underserved areas

- Traditional satellite providers.
- O3B.
- One Web.
- Space X: Starlink represents the ambitious SpaceX plant to create an interconnected network of up to 30,000 satellites to transmit high-speed internet to the consumers anywhere in the world. It has already made two launches successfully (with 60 satellites each one).
- Community networks: Community networks use low-cost wired and wireless technologies under common property infrastructure models, which allow a community to operate its own network, in fiber they work with GPON networks, in Wi-Fi wireless networks such as (Libre Mesh and Libre Router) and GSM (Open BSC)
- Wi-Fi networks with power variation options (2.4MHz, 5MHz y Wifi6 where available).
- WiMax.
- WISP.
- Technologies developed by Facebook to increase network efficiencies.
- Magma technology (Facebook): open code software platform of Facebook that contains tools necessary for the operators to deploy and extend mobile networks in no connected or sub-connected areas.
- HAPS (High Altitude Platform Stations): Facebook also promotes the development of connectivity technology through HAPS. Currently, the enterprises have tried successfully the connectivity technology through these platforms, while strategic partners develop the aeronautic technology required to implement this solution.

⁴⁷ <https://www.gemalto.com/latam/telecom/inspiracion/5g>

⁴⁸ https://wiki.rhizomatica.org/index.php/System_Architecture

- Stratospheric balloons. Loon takes advantage of advances in materials science, atmospheric modeling, automatic learning, communications systems and others to use stratospheric balloons to connect both served and unserved areas. To connect users, a wireless Internet signal is transmitted to the nearest globe from a ground station integrated with Loon's partner network. That signal is transmitted through a mesh of balloons and then connected via LTE to users' standard wireless mobile phones.
- Open RAN.
- TV White Spaces (“TVWS”).
- LoraWAN.
 - LoRa is a wireless technology like Wi-Fi, Bluetooth or LTE. It uses modulation in radio frequency (as AM or FM does).
 - LoRaWAN™ is a specification for low power networks and wide area networks, the Low Power Wide Area Network is designed specifically for low power consumption devices that operate in local, regional, national, or global scope networks.
 - The LoRaWAN standard network aims at characteristic requirements of Internet of Things, such as safe two-way connections, low energy consumption, long communication scope, low data speeds, low transmission frequency, mobility, and location services.
 - The LoRaWAN technology in Brazil has a coverage of 35% and it is aimed at reaching 85% in 2020 (Fabien Migneret).
 - LoRaWAN has a pilot related with safety and intelligent cities in Envidado.
 - There is a wide range of vertical markets to be developed, thanks to its flexible configuration and use of unlicensed spectrum.
- Hermes High Frequency in Emergency and Rural Multimedia exchange System, is a technology developed for remote communities using HF as backhaul and WiFi or GSM for last mile⁴⁹.

Regulatory Aspects

The communications regulator plays a key role in the closure of the digital gap. It requires an innovating regulator who knows in detail the tendencies of the sector, who aligns the regulation with the evolution of the digital environment and boosts investment and is flexible.

Likewise, it requires that such regulator takes measures adapted to the reality of those areas and rationalizes the rules to accelerate the transition to modern wideband networks, may include:

1. Reviewing the rules on access to the poles and public service ducts, which may be an expensive and slow barrier for the implementation of wideband.
2. Reviewing the rules that delay unnecessarily or even avoid that the companies replace the copper with fiber and that delay the interruption of the technologies of the 1970s in favor of the services that use Internet Protocol technologies (IP).
3. Accelerating the migration of 2G networks to more modern networks.
- 3.4 Review local rules at the municipal and departmental levels that hinder the rapid deployment of fixed and mobile networks, provide reasonable administrative time for resolution to the operator and reasonable costs for installation permits.
4. Analyzing the possibility of having regulatory sandboxes in terms of connectivity (as the Colombia case that will later be analyzed later).
5. Clear rules on traffic and space contamination associated with satellites
6. Spectrum policies adapted to the rural areas (more details in the spectrum management section for rural areas).

⁴⁹ <https://www.rhizomatica.org/hermes/>

7. Establishing tax incentives for the investments and differentiated taxation for the services in rural areas.
8. Adopt light policy and regulatory regimes, as well as spectrum sharing databases to accommodate innovative backhaul connectivity (eg HAPS, NGSO satellites, and fixed terrestrial wireless) in millimeter wave bands to reach rural users. For example, self-coordinated light licensing regimes have proven particularly successful in promoting efficient use of E-band spectrum in the United States, a model that could be replicated elsewhere.
9. Simplify the licensing process for satellite VSATs (very small aperture terminals) by offering a general license for VSAT terminals, rather than requiring a separate license for each terminal (VSATs are essential for connecting homes, businesses and medical and educational facilities in rural areas).

Below are some regulatory cases that highlight these characteristics.

UNITED STATES

In the United States, the FCC adopted the 5G Fast Plan (“5G FAST Plan”) which aims to promote innovation and investment in the communications industry, enabling advanced communications that will be essential for all people and industry segments, including transportation, agriculture, healthcare, manufacturing, and education⁵⁰.

The 5G FAST Plan includes three key components: 1) driving more spectrum to market; 2) updating the infrastructure policy; and 3) modernization of outdated regulations. The FCC has made additional spectrum available for 5G services in the high, mid and low bands, continuing its approach whereby spectrum is available for all uses and technologies.

Additionally, the FCC has accelerated the deployment of wireless facilities by eliminating regulatory barriers to infrastructure deployment. These actions included streamlining the wireless infrastructure location review process, addressing the conduct of some state and local governments that slowed and increased the costs of wireless infrastructure deployments, and modernizing federal historic preservation and environmental reviews of wireless deployments.

In turn, the FCC also modernized outdated regulations to promote the wired backbone of 5G networks and the deployment of fiber optics for backhaul.

PERU

In Peru, the Congress created the Rural Mobile Infrastructure Operator (“OIMR”) in 2013⁵¹, when adopted measures to strengthen the competence in the market of public mobile telephony services. The OIMRs deploy network installations and operate in rural areas and places of social interest where no mobile operator has previously deployed. The mobile network operators (“OMRs”) extend their networks to these areas through the contracting of the use of the installations of physical OIMR networks.

⁵⁰ See the FCC’s 5G FAST PLAN <https://www.fcc.gov/5G>

⁵¹ <https://www.osiptel.gob.pe/repositorioaps/data/1/1/1/par/ley-30083-fortalecer-competencia-servicios-moviles/ley-30083-fortalecer-competencia-servicios-moviles.pdf>
http://portal.mtc.gob.pe/comunicaciones/concesiones/registros/documentos/Movil_Rural/DS_004-2015-MTC.pdf

Indeed, the OIMR model was regulated by the Ministry of Transport and Communications in 2015, in order to create an alternative that encourages investments in the deployment of infrastructure in rural areas and places of preferential social interest to provide telecommunications services and increase the penetration of mobile services in rural areas where it is not economically efficient for mobile concessionaires to deploy their own networks.

Colombia

On the other hand, in Colombia, several initiatives that impact positively the connectivity in the country are being implemented. On the one hand, the Communications Regulatory Commission is in the process of implementing a *Regulatory Sandbox for Innovation in Communications Services*, with the purpose of promoting connectivity in the most remote areas of the country. We expect to have the sandbox structure and the operational phase in 2020, which is initially expected to take two years. It will be an experimentation space that will allow the enterprises to test products, services, and original solutions under the supervision of the regulator⁵².

Moreover, the same regulator is elaborating a road map to accelerate the technological migration of the mobile technologies to 4 and 5G networks and in 2020 updated the Good Practices Code for the Deployment of Infrastructure, which seeks to be a supporting and consultation tool to the local administrations in this regard.⁵³

In addition, the National Development Plan 2018-2022 created an incentive so that the local authorities promote the actions required to eliminate barriers to the deployment of infrastructure for the telecommunication service provision. Those who carry out such actions will be included in a list of potential candidates to be benefited with the obligations to make that the Ministry of ICTs may impose the mobile telecommunications networks and services providers, as a mechanism to extend the coverage of telecommunications services. The Communications Regulatory Commission will be responsible for confirming whether the barriers were already lifted.

Mexico

In Mexico, the IFT seeks to implement and carry out a regulatory prospect in accordance with the best international practices, for which, in August 2020 it submitted to Public Consultation the Project of "Roadmap of the Federal Institute of Telecommunications 2020-2024", the whose main objective is to structure a strategic framework for the IFT, defining a regulatory Roadmap for the 2020-2024 period, in accordance with the best international practices; strengthen the key elements in the strategic planning

⁵² The Regulatory Sandbox for innovation in connectivity will be developed in 4 phases:

- Application: The CRC will gather the comments and through a general administrative act that will have the conditions and forms to apply to the Sandbox. (it is estimated to do it in two moments during 2020, the CRC will answer the request in 15 working days).
- Evaluation: the CRC will evaluate and propose indicators to measure the potential success of the project within the Sandbox.
- Experimentation: the CRC will communicate the selected projects and publish particular administrative acts detailing the exceptions made to every project selected.
- Exit: the CRC will publish a final report on the cohort with the conclusions and results of the Sandbox application. Depending on the results, those successful projects will provide the solution within the general regulatory framework, or whether the results do not evidence significant benefits for the users or the deployment in the general framework requires unfeasible modifications, the project will be considered as failed.

⁵³ <https://www.crcm.gov.co/es/pagina/infraestructura#conceptos-acreditacion>

processes, proposing the strategic objectives, institutional strategies and regulatory lines of action that the IFT will follow in the next five years, and publicize this Roadmap so that all interested in it, have a better understanding of said exercise and, based on this, make their comments, opinions or contributions to this regulatory body that will strengthen the document.

From this perspective, the Roadmap proposes an institutional strategy for a planning horizon of five years, which also recognizes the growing importance of the broadcasting sector in the context of the digital ecosystem and in the way in which it must face the challenges that come with the era of digital transformation. This implies adapting to technological and cultural changes and even to the transformation of the information consumption trends of audiences, in order to maintain validity in the face of new generations.

In this sense, through various regulatory actions, one of the objectives of this Roadmap is to help the broadcasting sector develop in conditions of efficiency, quality, **coverage** and competition, always taking care of the effective exercise of freedom rights. of expression and access to the information of the hearings. In this context, and in line with international trends registered in countries with a high degree of advancement in ICT, the IFT sees the need to adapt to this new environment and adopt a Roadmap with a comprehensive regulatory approach that includes in its broad sense the dynamic development of the digital ecosystem.

In particular, Regulatory Action Line (LAR) 1.3.2 of the document seeks to "Identify and analyze alternative schemes in the allocation of the radioelectric spectrum in a flexible, efficient, competitive and non-discriminatory way" by means of which, as an example, As an alternative, it expresses white spaces and how these could operate last-mile connectivity services for rural areas and connections between sensors (M2M) for telemetry or remote monitoring services, among others.

Management of the Spectrum for Rural Areas

Introduction:

One of the biggest existing challenges in various countries of the Region of the Americas is to connect the rural and most isolated areas; however, to connect these zones, it is necessary to think in an innovative way and mainly when the topic is spectrum.

The spectrum is a limited and finite resource, reason why the countries establish different strategies for its assignment. However, a more efficient use of spectrum may help to close the digital gap among the urban and rural zones⁵⁴.

According to the GSMA⁵⁵, a policy aimed at improving the coverage in rural areas should create incentives so that the mobile operators invest in network infrastructure when: 1) making available a sufficient amount of spectrum 2) following a road map established; 3) allowing the secondary trading of the spectrum; 4) using technologically neutral licenses, and 5) establishing moderate reserve prices in the spectrum auctions.

Moreover, the modernization of the spectrum management may allow that the community networks and the small operators connect the disconnected people.

Spectrum for Rural Areas in Latin America: Current Situation.

⁵⁴ <https://policyimpactpartners.com/wp-content/uploads/2019/10/Enhancing-Connectivity-Through-Spectrum-Sharing.pdf>

⁵⁵ <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/02/Enabling-Rural-Coverage-Spanish-February.pdf>

ARGENTINA:

The exclusive use of the band frequencies between 450 and 470 MHz was approved in Argentina in August 2018⁵⁶ for the data transmission service provision, access to wideband internet and wireless telephony service in rural across the country.

The Ministry of Modernization, through Resolution 506/2018⁵⁷, attributed the frequency band between 450 and 470 MHz with primary category for the fixed and mobile service provision for wireless access systems (voice/ data) in localities with less than 100,000 inhabitant who are outside the radius of 180 kilometers from the City of Buenos Aires.

The resolution establishes a work schedule for the awarding of frequency bands at demand for fifteen years and in case of existing more than one stakeholder, there will be a public contest in which Telefónica, Telecom, Movistar, Personal, and Claro cannot participate.

In July 2019⁵⁸, the opening of envelopes presented for the Public Contests for granting the frequency band between 450-470 MHz, following the information on the offers made was carried out. Currently, the Evaluation Commission and pre-awarding is evaluating the previous admissibility conditions for the offerers.

BRAZIL:

450 MHz Project in Rural Areas: use of 450 MHz in rural areas across the national territory por through obligations foreseen in Auction Notice N° 004/2012/PVCP/SPB-ANATEL⁵⁹.

In Auction Notice N° 004/2012/PVCP/SPB-ANATEL⁶⁰, there are goals for attending the rural areas through the 450 MHz frequency bands. The winner will bring voice and data to zones located up to 30 (thirty) kilometers away from the limits of the Basic Fee Area (ATB) of the municipalities.

The policy was made under the rules referred in Notice N° 004/2012/PVCP/SPB-ANATEL, reason why the operators finance the investment in exchange for the use of 4G and 450 Mhz frequencies.

The winning operators of Notice N° 004/2012/PVCP/SPB-ANATEL should finance the voice and data service provision through 450 MHz.

The Managing Board recently decided (04/06/2019) that the operators may substitute the 450 MHz frequency for satellite technology, as a request by the operators affirming that there was no suitable equipment in the market to operate in 450 MHz.

CANADA:

⁵⁶ <https://www.argentina.gob.ar/noticias/habilitan-frecuencia-para-que-internet-llegue-mas-zonas-rurales>

⁵⁷ <http://servicios.infoleg.gob.ar/infolegInternet/anexos/310000-314999/313930/norma.htm>

⁵⁸ https://www.enacom.gob.ar/banda-de-450-mhz_p4248

⁵⁹

<http://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=287817&assuntoPublicacao=null&caminhoRel=null&filtro=1&documentoPath=287817.pdf>

⁶⁰

<https://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=287817&assuntoPublicacao=null&caminhoRel=null&filtro=1&documentoPath=287817.pdf>

In Canada, its connectivity strategy⁶¹ foresees regulatory measures related with spectrum, following the main points discussed in the policy:

“Access to spectrum opens up opportunities to use mobile wireless, fixed wireless and satellite technologies to connect the hardest-to-reach Canadians. Without access to spectrum, the technology needed to connect rural and remote Canadians would be prohibitively expensive. Making additional spectrum available is an important part of addressing the increasing demand by Canadians for wireless connectivity. In Spectrum Outlook 2018 to 2022⁶², the Government of Canada sets out a five-year plan to release enough spectrum to help service providers meet this demand. Any changes to the use and allocation of spectrum will take into account the need to support and encourage connectivity for rural and remote communities across Canada. When making additional spectrum available, the Government of Canada establishes rules that advance Canada’s spectrum and telecommunications policy objectives. Those objectives include reliable and affordable, high-quality telecommunications services in both urban and rural areas in all regions of the country. For example, in November 2018 the Government proposed a new policy allowing smaller geographic areas or tiers for spectrum licences, an approach that will make auctioned licences more affordable for smaller providers. The Government also has spectrum conditions of licence that support service in rural and remote areas. In addition, ISED is examining the secondary market for spectrum, where service providers get spectrum access not from ISED directly, but from an existing licensee of that spectrum, to explore improvements to how this market functions. These efforts are designed to help improve access to spectrum in rural areas.”

700 MHz Auction⁶³:

The bidding in the 700 Mhz wireless spectrum commercial auction began on January 14, 2014 and ended on February 13, 2014. Ten companies participated in the auction and 97 out of 98 licenses were awarded to 8 of those participants, for a value total of 5.270 million dollars.

Following this auction, at least four providers in each region of the country will be able to offer Canadians, including those in rural areas, wireless services enhanced with the latest devices. Due to high adoption rates for tablets and smartphones, there has been an exponential growth in demand for next-generation wireless services, such as TLETs (Long Term Evolution). The 700 Mhz low-frequency licenses were highly valued by the bidders, as this spectrum is suitable for providing such services.

Based on the 700 MHz spectrum auction in Canada⁶⁴ the following requirements were established for the rural deployment:

When the license has licences for two or more paired 700 MHz spectrum blocs in a licence area, or has access to two or more paired 700 MHz spectrums in a licence area, whether directly or indirectly, the licensee should deploy the 700 MHz spectrum:

- a. to cover 90% of the population of its HSPA fingerprinting from March 2012, within five years after the issuance of the initial 700 MHz license; and*
- b. to cover 97% of the population of its HSPA fingerprinting from March 2012, within seven years after the issuance of the initial 700 MHz license.*

CHILE:

⁶¹ https://www.ic.gc.ca/eic/site/139.nsf/eng/h_00002.html

⁶² <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11403.html#s5.1>

⁶³ <https://www.canada.ca/en/news/archive/2014/02/700-mhz-spectrum-auction-process-results.html>

⁶⁴ <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10572.html>

Complete file in PDF: [https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapi/Licensing_Framework_MBS_700_MHz_Band.pdf/\\$file/Licensing_Framework_MBS_700_MHz_Band.pdf](https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapi/Licensing_Framework_MBS_700_MHz_Band.pdf/$file/Licensing_Framework_MBS_700_MHz_Band.pdf)

The spectrum contests methodology has been used in the spectrum contests for 4G in 2600⁶⁵ and 700 MHz⁶⁶ bands, whereby there is no direct payment for the awarded spectrum but the awardee operator should assume investment commitments in determined terms to provide services to rural areas, schools, roads and routes.

Among the conditions that the operators should comply to have the 700 MHz⁶⁷ spectrum, in addition to the technical project proposed by each one, SUBTEL included that these should provide mobile telephony and data transmission connection with internet access to more than 1,200 localities in isolated zones and close to de 500 municipal and subsidized schools. The combination of commitments and coverage proposed in the technical proposals of the operators contribute that Chile currently has a high 4G service penetration.

COLOMBIA:

According to the regulatory framework of Law 1341 of 2009, there is no differential policy for spectrum in rural areas that favor the development of infrastructure in these zones. Nevertheless, with the approval of Law 1978 of 2010 or the ICT Sector Modernization Law ⁶⁸, which has been recently sanctioned by the President of the Republic, there is a possibility of establishing bands exempt from the payment of considerations for social programs of the State that allow the extension of coverage in rural areas.

Regarding to the economic compensation due to the granting or renewal of the permit for the use of the radio spectrum, the new Law establishes that such compensation may be partially paid, up to 60% of the total amount, through the implementation of obligations to hold, that will be previously authorized by the Ministry of Information and Communication Technologies, according to the regulation defined in this regard, to extend the quality, capacity, and coverage of the service, with benefits the vulnerable and poor population, or in remote areas, in public schools located in rural areas and other official institutes such as health facilities and public libraries, as well as provide emergency networks.

On the other hand, the process of assigning permits for the use of spectrum in the 700 MHz, 1900 MHz and 2500 MHz bands for IMT mobile land services was carried out in December 2019. One of the key aspects in this process is the provision of mobile service in unserved rural areas, taking advantage of the propagation characteristics of the 700 MHz band. As a result of the auction, 3,658 locations in the country's 32 departments will have mobile coverage for the first time and municipal capitals with less than 100,000 inhabitants (about 90% of all capitals in the country) will undergo technological updating as part of the obligations acquired by the assignees of spectrum use permits in the 700 MHz band.

Regarding to the use of White Spaces, the National Spectrum Agency (ANE) established the use conditions⁶⁹ for the TV white space devices (TVWS). The free spectrum attributed for TV service between 470 MHz and 698 MHz may be used to provide connectivity in rural areas. The regulation establishes the technical and operational parameters for the use of such spaces to avoid interferences with other services. Colombia is the first Latin American country with a modified spectrum regulation, allowing the TVWS to be used for the wideband connectivity in a non-licensed scheme.

⁶⁵ https://www.subtel.gob.cl/images/stories/apoyo_articulos/concurso_4g/bases_2600_refundido.pdf

<https://www.subtel.gob.cl/inicio-concesionario/llamados-a-concurso/concurso-2-6/>

⁶⁶ https://www.subtel.gob.cl/images/stories/apoyo_articulos/concurso_700/bases_700.pdf

<https://www.subtel.gob.cl/inicio-concesionario/llamados-a-concurso/700-mhz/>

⁶⁷ <http://brechacero.com/wp-content/uploads/2019/07/WP-MULTIBANDA-30-jul-2019-ES.pdf>

⁶⁸ http://micrositios.mintic.gov.co/ley_tic/pdf/ley_tic_1978.pdf

⁶⁹

https://www.ane.gov.co/images/ArchivosDescargables/Normatividad/Planeacion_del_espectro/Resolucion461de2017.pdf?s=ECBB13543DFC8D247D10716041B16BB03C57B599

COSTA RICA:

The radio spectrum management regulation and policies are of national application. A differentiated treatment is not applied in rural zones, although it is possible to perform radio spectrum assignments per geographic zones, without referring specifically to rural zones.

For example, the non-exclusive spectrum assignment for terrestrial microwave radio links or for satellite resource, allows the reutilization of that spectrum based on the directionality of the communication beams. Likewise, the channels used for narrow band communication networks supported by the mountainous topography of the country, its reutilization is possible in different geographic zones.

However, Costa Rica lacks a specific or differentiated policy/regulation for rural areas.

ECUADOR:

In Ecuador, the Expansion Plan obligations established in the concession contracts of the SMA (Advanced Mobile Service), are aimed at more important road axes that reach rural areas in some cases, but its implementation does not bring any advantage to the operator. It is important to highlight that despite these obligations apparently do not bring advantage for the operator, it is also true that the operator also gains subscribers when its coverage is higher. In topics of emergency attention and trade, in some cases, it is more advantageous for the operator to be the only one that works in a high traffic road. This also causes that the credited establishes certain preference for the operator that better signal has across the country. Thus, the operator with the highest coverage in roads may also be the operator with a higher number of subscribers. This correlation has been identified in several studies made in terms of mobile service.

The Universal Service Plan of October 2018⁷⁰, contemplates a series of incentives and general conditions to promote the deployment of telecommunications infrastructure and decrease in the digital gap, among them:

- Fees for use of differentiated frequencies for rural areas;
- Implementation of paired sites, in such a way that, whether one of them is located in a rural area, the two sites would pay as a rural area;
- The 4G or superior smallcell technologies will have 0 fees;

It is important to indicate that none of these policies has been implemented so far due to the projects that allow to reach defined goals are still being developed. The Universal Service Plan is focused on the Advanced Mobile Service, and the increase in the internet access service density, through new optical fiber networks. In the first case, the extension of coverage will start in mainly rural areas, and in the second one, it is expected to reach the highest number of cantons with presence of fiber, and from this, to extend the last mile networks with the aim of attending zones with little or no attention.

UNITED STATES:

In the United States, for example, in 2019 the FCC created the Rural Tribal Priority Window (TPW) in the 2.5 GHz band as part of the reorganization of the 2.5 GHz band for 5G. The TPW gives indigenous communities the opportunity to request unallocated spectrum over their lands. The first application to acquire spectrum at TPW was a unique opportunity for indigenous entities federally recognized as eligible to obtain access to up to 117.5 MHz of spectrum in the 2.5 GHz band. The window opened on February 3, 2020 and the FCC received more than 400 requests from indigenous entities throughout the country. Another example is the shared commercial use of the 3550-3700 MHz band (3.5 GHz band). The Commission established the Citizen Broadband Radio Service and created a three-tier access framework

⁷⁰ <https://www.telecomunicaciones.gob.ec/wp-content/uploads/2018/11/Plan-de-Servicio-Universal.pdf>

to accommodate band sharing. Access will be dynamically managed by an automated frequency coordinator, known as the Spectrum Access System (SAS), and the SAS will coordinate operations between users at different authorization levels in the 3.5 GHz band: Incumbent Access, Priority Access and General Authorized . Access (GAA). The GAA level is licensed, by rule, to allow open and flexible access to the band for the widest possible group of potential users. GAA users can operate in the 3550-3700 MHz band. The Commission auctioned Spectrum Priority Access licenses in 2020, using small license areas (counties) to encourage participation from a large number of potential licensees, including Electric cooperatives and rural telecommunications providers serving rural America to help provide broadband in underserved areas. Like the 2.5 GHz band spectrum, this mid-band spectrum is well suited for deployment in rural areas. The regulatory framework allows open and flexible access to the band for small, rural and tribal providers, who can also access this spectrum through the use of GAA, which does not require a license ⁷¹

In addition to maximizing the use of spectrum, the deployment of network infrastructure is a key element for high-speed connectivity. Consequently, the FCC has also taken steps to accelerate the deployment of wireless facilities by removing regulatory barriers on infrastructure deployment, including in rural and tribal areas. These actions included streamlining the wireless infrastructure location review process; address the inefficient behavior of some state and local governments that delayed and irrationally increased the costs of wireless infrastructure deployment; and the modernization of federal historic preservation rules and environmental reviews for the deployment of wireless networks.

In 2017, the FCC established the Broadband Implementation Advisory Council (BDAC) to provide recommendations on how to accelerate the implementation of broadband by reducing regulatory barriers to investment in infrastructure. The BDAC is intended to provide an effective means for stakeholders to exchange ideas and develop recommendations for the FCC, which in turn will enhance the FCC's ability to carry out its legal responsibility to encourage the deployment of broadband for all. Americans. Since the creation of BDAC, the FCC has adopted several key recommendations that include ways to incentivize regulatory coordination between federal, state, and local governments. Currently, one of BDAC's working groups is focused on increasing investment in broadband in low-income communities. This work points to opportunities to improve both the deployment and adoption of broadband connectivity in low-income areas, as well as to remove barriers involving the cost of service, the cost of equipment, and digital literacy and inclusion.

MEXICO:

In Mexico, the radio spectrum is considered as a public domain good of the Nation and according to the established in Article 134 of the Political Constitution of the United Mexican States, is an economic resource of the State.

The Economic resources, as assets owned by the Nation, are subject to concession in exchange for a consideration for their use, exploitation and exploitation, in terms of article 28 of the Constitution and article 100 of the LFTyR. On the other hand, the same Law establishes that the IFT will guarantee the availability of the frequency bands of the radioelectric spectrum or network capacity for the Federal Executive for national security, connectivity of public places and social coverage, for such purposes, they will be granted in a manner direct, without consideration, with preference over third parties, the necessary public use concessions.

In the same way, the second paragraph of article 98 of the LFTR contemplates that orbital resources for social coverage services must be guaranteed by the IFT, which will grant directly, without consideration, with preference over third parties, the concessions for public use necessary for such effects. for a period of up to 20 years and irrevocably.

⁷¹ <https://www.fcc.gov/rural-tribal-spectrum-opportunities>

In this sense, in the Mexican legislation, the payment for the total value of a spectrum band is divided in two:

1. Compensation for the granting of the concession (“glove”)
 - Established in LFTyR’s Article 100, it is the winning amount in bidding in new concessions.
 - It is applicable to Telecommunications and Broadcasting.
2. Annual rights
 - Established in Chapter XI of Title II of the Federal Rights Law (LFD).
 - These are collected for concept of use and exploitation of the spectrum used in telecommunications.
 - The broadcasting is exempt, as they pay in kind with times in favor of the State.

The sum of the two above mentioned concepts is the total value of the spectrum value.

Derived from the above, the compensation for the granting of the concession or “glove” is established by the IFT, **which is not collected as observed in the case of Social Concessions, including those for indigenous communities**, nevertheless, the payment of rights for concept of use and exploitation of the spectrum used in telecommunications is defined by the Congress of the Union (Legislative Power).

Regarding to the rights, all the spectrum users should pay the quotes for use or exploitation established in the LFD, except for the exempt cases provided in the Law, which so far include broadcasting, this is per television and radio.

On December 9, 2019, the Decree amending, adding and repealing various provisions of the Federal Law on Rights was published in the Official Gazette of the Federation (DOF), which adds, among others, article 239 reads the following:

*Article 239.
Radio spectrum concessionaires for telecommunications services for indigenous social use that have no relationship or commercial, organizational, economic or legal ties with radio spectrum concessionaires for commercial use that generate direct or indirect influence on the administration or operation of the concession. , will be exempt from payment of the rights for the use of the radioelectric spectrum provided for in this Chapter.
For the purposes of accessing the benefit provided in the preceding paragraph, the holders of the concessions, during the fiscal year prior to which the payment corresponds, shall not incur the grounds for revocation established in section XIV of article 303 of the Federal Law on Telecommunications and Broadcasting, otherwise the amount of the corresponding right must be covered. In the case of new concessionaires of the radioelectric spectrum for telecommunications services for indigenous social use, the requirement set forth in this paragraph will not be applicable during the first fiscal year of validity of the corresponding concession.*

The above shows a great advance in this field to incentivize and guarantee the access to the information technologies for the towns and indigenous communities in fair conditions.

On the other hand, Section IV of Article 79 contemplates the secondary use figure referred to the faculty by the IFT of granting authorizations for the use and exploitation of the radio spectrum frequency bands, for secondary use, as indicated below:

Article 79. To carry out the public bidding procedure referred in the above article, the Institute will publish the respective call in its internet webpage and in the Federal Official Gazette. The public bidding bases will include at least:

I. ...

IV. The frequency bands subject to concession; its use patterns and geographic zones in which may be used; and the power in the case of broadcasting. In its case, the possibility that the Institute authorizes the secondary use of the frequency band at issue in terms of this Law;

It is necessary to mention that the Concession Titles contemplate the reservation of rights by the IFT to grant other authorizations for the use and exploitation of the frequency bands subject to the radio spectrum concession or their proportions for secondary use, having protection against harmful interferences.

Similarly, it should be noted that, according to the Guidelines for the Granting of the Certificate of Authorization, for the Use and Exploitation of Frequency Bands of the Radioelectric Spectrum for Secondary Use, the IFT must consider the social benefit aspect in the designation of the spectrum for secondary use.

Likewise, the IFT is obliged to issue, no later than December 31st of each year, the Annual Program for the Use and Exploitation of Frequency Bands (PABF) with the radio spectrum frequency bands that will be the subject of bidding. or that may be assigned directly and will contain, at least, the services that can be provided through said frequency bands, their category, modes of use and geographic coverage.

For example, in 2015⁷², the Mexican regulator modified its frequency plan to separate 2 x 5 megahertz of 800 MHz band spectrum for "social" use. By 2019, the PABF establishes the frequency bands that may be assigned for social use: 824-849/869-894 MHz band.

To qualify in a licence for indigenous social use, the requesters should demonstrate that the spectrum will be used to provide service to communities of 2,500 people or communities located **in an indigenous region or designated priority zone**. The bold IFT reforms have already given rise to the concession of new community networks and concessions. The non-profit organization Telecomunicaciones Indígenas Comunitarias A.C., for example, depends on the licence for social purposes to develop community networks in indigenous regions around Oaxaca, México, zones that have generally had little interest among the operators established.

PANAMA:

Regarding the use of the spectrum in rural areas, the minimum fees to pay for the use of the frequencies transmitted in the Panamanian territory are calculated based on the value of a unit called the Radioelectric Spectrum Use Rate (UER), established in the National Plan of Attribution of Frequencies (PNAF), for this, a zoning of the different areas of the country was adopted, in order to favor with a lower rate those areas with less dense use of frequencies to promote the development of telecommunications infrastructure in these remote areas of the country⁷³

Additionally, Article 12 of Law No. 59 of 2008, establishes that the radio links of communications that are used in the deployment of projects developed with money from the Fund for Universal Service and Access, will be exempt from paying the annual fee for the use frequencies, which contributes greatly to the development of projects of this type.

⁷² https://www.internetsociety.org/wp-content/uploads/2018/05/Unleashing_Community_Networks_Innovative_Licensing_Approaches_2018-05-09_ES-LA.pdf
<https://www.internetsociety.org/wp-content/uploads/2018/11/2018-Redes-Comunitarias-ES.pdf>

⁷³ https://www.asep.gob.pa/?page_id=13116

PERU:

Since 2011, the public tenders tendered in Peru raised a total of more than \$ 1,189.3 million in the 900 MHz, 1900 MHz, 700 MHz and 1.7 / 2.1 GHz bands, with which the sector proposed to benefit more than a thousand localities and 13 provinces with mobile coverage and more than four thousand schools with internet. It is estimated that half a million Peruvians from 5,818 localities will benefit from voice and data services as part of the investment commitments obtained from the public tenders of the AWS - 3 (1.7 / 2.1GHz) and 2.3 GHz frequency bands that promotes the Ministry of Transport and Communications (MTC).⁷⁴.

With the purpose of promoting the rural connectivity development, the Ministry of Transport and Communications (MTC) published in 2018⁷⁵ a modification to the payment regime for the use of the radio spectrum that allows the mobile operators to substitute a percentage of their payment in exchange for a commitment of expanding the service in rural areas that lack mobile coverage or migrating services from 2G to 4G.

Obligations in Licences:

The Peruvian Government has incorporated the rural coverage and the access obligations in the license terms associated with their recent spectrum auctions.

For example, in the contract of 2013 between Telefónica and the Peruvian Government⁷⁶ to renew the spectrum licenses, the following obligations related with the rural connectivity were included:

- Mobile coverage in 2327 localities with more than 400 pops;
- 559 social accesses to internet in 259 localities;
- Social fee price for prepaid mobile telephony for social program beneficiaries;
- Free social internet access (satellite) in 661 poorer districts and 396 tambos (rural development and distribution centers).

Another successful measure was the establishment of the frequency band reordering regulations. In effect, in 2018, the reordering processes of the 2.3GHz and 2.5 GHz bands were carried out, to optimize, organize and improve the distribution of existing assignments, allowing the deployment of more networks and better services. This Reorganization process involves the application of three mechanisms: (i) the quantification of the rights of use, (ii) the distribution of frequencies, and (iii) the determination of the value of the Resulting Obligations, for the operators with concession in said bands. These resulting obligations have been translated into broadband Internet connectivity to educational institutions with minimum contracted speeds of 40 Mbps, speeds to be increased every two (2) years; as well as the connectivity of weighing and / or toll stations within the country with minimum dedicated speeds of 10 Mbps, speeds to be increased every two (2) years⁷⁷

On the other hand, the MTC established the methodology for measuring the efficient use of the radioelectric spectrum, in fact for more than 20 years it had been applying a methodology that over time did not allow to objectively establish the use of the radioelectric spectrum and the efficiency in the same at different levels of disaggregation or capillarity. Consequently, it was considered that the radioelectric spectrum should be better used at the subnational level; hence, it is important to have monitoring schemes for their use at a provincial level of disaggregation. The MTC published on April 2, 2019 in the Official Gazette El Peruano Ministerial Resolution No. 234-2019-MTC/01.03, "Standard of Goals for the Use of

⁷⁴ <https://www.gob.pe/institucion/mtc/noticias/51313-concursos-publicos-de-bandas-de-frecuencia-beneficiaran-a-medio-millon-de-peruanos>

⁷⁵ <https://busquedas.elperuano.pe/normaslegales/decreto-supremo-que-modifica-el-literal-a-del-numeral-2-del-decreto-supremo-n-003-2018-mtc-1609584-2/>

⁷⁶ https://portal.mtc.gob.pe/comunicaciones/concesiones/renovacion_telefonica.html

⁷⁷ http://portal.mtc.gob.pe/comunicaciones/concesiones/reordenamiento_frecuencias.html

the Radioelectric Spectrum applicable to Public Telecommunications Services except for the Carrier Service provided through point-to-point links and for satellite services”. The approved methodology aims to establish spectrum use measurement parameters that yield objective results regarding the current situation regarding the use of the radioelectric spectrum at the level of each province, determining the efficient or inefficient use of the radioelectric spectrum in the area of the same. In this sense, the proposed methodology is fundamental to encourage better use of the spectrum, through the promotion of services in underserved areas, rural areas and places of preferential social interest, through the deployment of infrastructure and technological improvement that allow the provision of networks and services with greater spectral efficiency and/or the latest technological generation to offer more and better services to users.

The Peruvian Congress created Law No. 30083 that creates the Rural Mobile Infrastructure Operator (“OIMR”) in 2013 and subsequently the Ministry of Transport and Communications (MTC) regulates through Supreme Decree No. 004-2015-MTC⁷⁸⁻⁷⁹. Regarding with the use of spectrum, the OIMRs do not have their own spectrum assignments, neither numbering resources, nor final users, the service to the final OMR users is provided using the spectrum assigned of the associate OMR.

DOMINICAN REPUBLIC:

In Dominican Republic, there is a differentiated cost for the Use Rights (DU) of the frequencies used in 10 provinces, with the express purpose of boosting the investments in telecommunications systems in low development areas. In that sense, the General Radio Spectrum Use Regulation, approved through INDOTEL’s Managing Board Resolution No. 128-04⁸⁰ and modified by Resolution No. 034-2020⁸¹; establishes among other things, the radio spectrum Use Rights (DU) calculation method, which includes in its Article 4.7.9, a social incentive factor (Fi) for the development of the telecommunications.

URUGUAY:

Regarding spectrum management, in Uruguay, according to the Regulation of Administration and Control of the Radioelectric Spectrum Decree No. 114/003 of March 25, 2003, it is established that frequency assignments for the specific use of the radioelectric spectrum will be made, associated with the provision of a telecommunications service or the installation and operation of its own radioelectric network. In this sense, the Licensing Regulation Decree No. 115/003 of March 25, 2003 for Telecommunications services, establishes the categories of licenses according to the type of service offered and granted by the Executive Power. In short, there is no regulation in this legal system that establishes a specific or differential treatment for spectrum in rural areas.

However, Uruguay has developed levels of connectivity in rural areas that allow the support of plans such as Cattle Traceability and Connectivity in study centers. According to the ECLAC report, the difference in connectivity between rural and urban households in Uruguay is, on average, less than 20 percentage points. According to data from the Continuous Household Survey for 2019, 54% of households in rural areas had a broadband connection (mobile and/or Fixed), while in towns with 5000 inhabitants or more in the interior they reached 64 % and in the capital 78%.

Conclusions

⁷⁸ <https://busquedas.elperuano.pe/normaslegales/aprueban-el-reglamento-de-la-ley-n-30083-ley-que-establece-decreto-supremo-n-004-2015-mtc-1269849-6/>

⁷⁹ <https://www.osiptel.gob.pe/repositorioaps/data/1/1/1/par/ley-30083-fortalecer-competencia-servicios-moviles/ley-30083-fortalecer-competencia-servicios-moviles.pdf>

http://portal.mtc.gob.pe/comunicaciones/concesiones/registros/documentos/Movil_Rural/DS_004-2015-MTC.pdf

⁸⁰ <https://www.indotel.gob.do/media/8295/resoluci%C3%B3n-no-128-04.pdf>

⁸¹ <https://indotel.gob.do/media/6270/23-resoluci%C3%B3n-no-205-06.pdf>

We should be innovative in all the senses: at regulatory, technological level, in the administration of the Universal Access Funds, as well as in the spectrum management.

Without a doubt, there is still a long way to go, but now we have a lot of technological possibilities to face such way, and the experience of several countries of the region may be very useful to decrease the gap in the region.

There is no single formula to achieve rural connectivity, various factors must be considered by the countries in the formulation of public policy and definition of a regulatory framework favorable to rural areas. The model to achieve it must encourage innovation, collaboration and investment by the actors involved. For this, it is necessary to guarantee the existence of a differentiated regulation dedicated to rural areas, which encourages any interested actor - regardless of their size - to participate in the challenge to close the connectivity gap in remote areas.

ANNEX 1 INVENTORY OF POSSIBLE ACTIONS

An inventory of possible actions to be taken related with connectivity in unserved or underserved rural areas is presented below. It is necessary to clarify that it is not an exhaustive list nor is binding for any country. It simply seeks to be a list of better practices that every country may be analyzed depending on its environment and that of course will be analyzed in the framework of the CCPI. CITEI Permanent Consultative Committee I: Telecommunications / ICT (PCC.I)

Seeking to promote a collaborative focus as a rural connectivity development tool in the region, the following options are offered:

1. Promote the use of universal service funds or aid funds for connectivity projects aimed at rural, remote or underserved areas and provide facilities to enable access to all types of operators.
2. Encourage and support the implementation of business models that encourage the entry of new economic agents and promote their financial sustainability.
3. Encourage discussions in the countries of the region to study fiscal measures that favor connectivity.
4. Rural connectivity policies should prioritize technologies and projects that demonstrate sustainability, efficiency and speed of implementation in rural areas.
5. Encourage investment, whether public, private or in public-private partnerships, as well as infrastructure partnerships and sharing in rural areas.
6. Promote local innovation ecosystems, as well as technology appropriation strategies in rural areas.
7. Encourage the participation of small operators and community operators to serve areas not covered through specific licensing measures, access to essential infrastructure and programs to promote social coverage.
8. Promote cooperation and the elimination of barriers to the deployment of infrastructure between central governments and local governments to solve the issue of permits and rights of way.
9. Promote the creation of Good Practice Manuals on the deployment of infrastructure, and harmonize local requirements and regulations.
10. Periodically review the regulations applicable to rural connectivity to respond quickly to specific connectivity demands and needs in rural areas.
11. Adapt the minimum standards of quality, speed and continuity of service in rural communities.
12. Promote specific incentives for rural areas (investments, fees, taxes, etc.).
13. Permanently measure the progress of projects to promote connectivity, publish them systemically and continuously; measure the impact and make any necessary corrections.

14. Promote the development of a connectivity mapping system that identifies the places where infrastructure and connectivity is installed.
15. Create a regulatory environment that encourages innovation and investment for technological development, analyzing the entire technological offer of connectivity according to the needs of each country.
16. Study the advisability of operators allocating all or part of contributions for universal access and service funds to rural connectivity projects defined by connectivity policies, according to the needs of each country.
17. According to the policies of each country, promote the idea that companies that have deployed connectivity in rural areas could be exempted from the obligation to contribute to the universal access and service fund.
18. Try to achieve lower prices with the help of government support (tax breaks or specific tax reductions on demand) or other types of transfers and incentives to eliminate cost overruns.
19. Study the possibility of establishing differentiated tax incentives for rural areas (investment, fees, contributions, etc.)
20. Regulators should allow the flexible use of light duty bands, including E-Band, for innovative terrestrial and non-terrestrial wireless backhaul networks serving underserved and underserved areas.

Beyond Connectivity

Introducing connectivity to non-connected or rural zones is not enough. It is necessary to complement the connectivity strategy with ICT appropriation strategies.

Possibilities in Terms of Use of Spectrum

Moreover, the following are options that may be analyzed by the Pan-American governments when formulating their spectrum policies for remote or rural areas:

- To make spectrum available in low bands (Sub-1GHz) for rural areas;
- To extend the range of frequencies designated for license exempt use, particularly in 5 GHz and 6 GHz bands under a governance that allows a better use of the additional spectrum.
- To reduce the fiscal and administrative spectrum costs (initial price and use rates) in the rural areas;
- To allow the exchange of payments for spectrum in grants or renewals for investments in rural areas;
- To allow the secondary spectrum use.
- To analyze alternative assignment foci.
- To consider an increase in the power levels allowed for the case of directional antennas with wi-fi for fixed backhaul, as the probabilities of interference of the highly directional communications are reduced.
- To consider the use of TVWS (TV White Spaces) as a secondary service in rural areas;
- To allow spectrum sharing and spectrum pooling in rural areas.

- To analyze the possibility of enabling the use of 24 GHz, 60 GHz (V band), and 71 GHz (hereinafter E band) bands without license for small operators and community networks to provide quality connectivity similar to the used for fiber;
- Support IMT services using high altitude platform stations as mobile base stations in unattended and unattended areas
- Consider simplifying the licensing process for the deployment of telecommunications infrastructure in rural areas, avoiding unnecessary legal and regulatory requirements that act as a barrier to market entry for new players.
- To make simpler and more accessible the vocabulary and language employed in administrative and technical documents used in the spectrum management.
- To reduce the cost of the micro-wave links in rural areas.
- To facilitate the use of non-used available spectrum in rural areas;
- To privilege accessible transport fiber programs for small rural operators.
- To extend free-use frequency bands and promote the reorganization and ordered coexistence of WISP
- Spectrum exchange: it allows the remote communities to have access to the non-used spectrum (assigned to another stakeholder) to build local networks.
- Spectrum assignment through geolocation spectrum database (e.g. North America):
 - Reuse of the satellite spectrum wherever possible.
 - DB of geographic location of TVWS whenever possible.
- Light licenses: To promote the non-used spectrum license for "social purpose" (e.g. TVWS in Mexico).
- To allow the spectrum exempted from license (Wi-Fi) to modify the signal power limits to reach longer distances.
- Tax exemption for contributions to return links: the companies established (telecommunications companies, wideband promoter, etc.) have government financial incentives to build infrastructure for return links in remote and neglected areas.
- To boost that the rural areas have communities involved in solving the problem.
- Make millimeter wave spectrum available, including in the E-band, in a flexible and light-licensed way, using a dynamic database to enable hybrid backhaul connectivity between terrestrial and non-terrestrial networks serving rural areas.

For the implementation of better practices for the development of connectivity in remote and rural areas, diverse Recommendations and Resolutions have been established, some of them are:

- **Recommendation UIT - D19** of the World Telecommunication Development Conference (WTDC) of the International Telecommunications Union (ITU), “Telecommunications for rural and distant areas” recommending:
 - (...)
 - 2. in the framework of the infrastructure development planning of the remote and rural areas, it is important to evaluate all the technologies available in the market, considering regulatory environment, geographic conditions, climate, costs (capital and operational costs), capacity of maintenance and exploitation, sustainability, etc., based on the results of the in situ studies and the community needs;
 - 3. the community access to ICT installations and services is particularly important in the rural and remote areas. The local entrepreneurs, with the support of diverse initiatives, may adopt business

models that achieve the financial and operational sustainability. The installations, when necessary, may also receive support by the Universal Service Funds, as they are an essential component for the rural communications;

(...)

6. it is important to train and contract local technical experts for the success of the ICT services and applications in the rural and remote zones, reason why it is necessary to pay attention to training, exchange of information, and collaboration in the maintenance of installations, with the purpose of reaching sustainability and feasibility;

7. it is necessary to boost the adoption of wideband technology;

(...)

10. it is important to consider the small community and non-profit operators, through the adoption of appropriate regulatory measures that allow them to have access to basic infrastructure in equitable conditions, in order to provide wideband connectivity to the users in rural and remote areas and take advantage of the technological advances;

11. it is also important that the administrations, in their radio spectrum and license concession planning activities, consider mechanisms to facilitate the wideband service provision in rural and remote zones by the small and non-profit community operators;

- **Resolution 268** of the Inter-American Telecommunications Commission (CITEL) establishing coordinated actions for its instrumentation such as:

- Documentation, systematization, and dissemination of experiences on results of the instrumentation of the recommendation.

- Support for the instrumentation of pilot projects.

- Identification of regulatory aspects in terms of appropriate spectrum for the instrumentation of the recommendation.

- Support for the design of policies and regulation that allow to reach the objectives of such recommendation.

All the policies measures, strategies and suggestions implemented in this document are based on the previous liberalization of the telecommunications service as a political option to make effective the telecommunications/ICTs rights that belong to all the inhabitants of the member states.

However, it should be noted that the option of avoiding the problems of the natural failures of market in the coverage of all is also valid and effective through the permanence of the universal public service logics or in those countries whose historical, economic, demographic, and social conditions allow their re-institutionalization.

The option of giving satisfaction of rights to the public investment may and should guarantee a universalist perspective of rights: that is, that all citizens enjoy the same possibilities of access and use regardless of gender, ethnicity, religion, socio-economic condition, or geographic location, with a decommericalized perspective of rights. In Latin America, this model has been demonstrated as particularly successful, if considering any statistics elaborated by the International Communications Union. But, in several national levels, it is not an economic and juridically feasible option, depending on the conditions in which the liberalization of the market has been carried out.

APPENDIX 1
OECD TABLE ON UNIVERSAL SERVICE IN THE REGION

Universal service funds in the LAC region

Universal Service Funds in countries from the LAC region							
Name of the fund and website	Acronym	Financed through (% of operators income)	Budget estimation		Date	Legal framework	Responsible entity
			Country currency	USD million			
Argentina Fondo Fiduciario del Servicio Universal www.enacom.gov.ar/acercal-servicio-universal_p73f	FFSU	1%	ARG 2.068 billion	220	2000	Reglamento General del Servicio Universal 558/2008	ENACOM
Bahamas Universal Service Fund http://www.arcababamas.bs/consultaboes.php?cmd=search&cat=29	USF	Proportionate	-	-	2013	Communications Act 2009	URCA
Barbados Universal Service Fund www.telecoms.gov.bb/website/index.php?option=com_content&view=article&id=35&Itemid=138	USF	Proportionate	-	-	-	Telecommunications Act 2001	Prime Minister
Belize Universal Service Fund www.puc.bz/index.php/publications/telecom-sector/telecom-laws-of-belize/acts-140-belize-telecom-act/file	USF	Levy to be determined	-	-	2002	Telecommunications Act 2002	PUC
Bolivia Programa Nacional de Telecomunicaciones de Inclusión Social http://www.comunicacion.gob.bo/?q=20151209/20103	FRONTIS	Fees, licences, contributions	-	-	2011	General telecommunications law	MOPSV
Brazil Fundo de Universalização dos Serviços de Telecomunicações www.planalto.gov.br/ccivil_03/leis/1998.htm	FUST	Variable, determined by presidential decree	BRL 16.5 billion	4	2000	Law N. 9.998/2000	ANATEL
Chile Fondo de Desarrollo de las Telecomunicaciones www.subtel.gob.cl/	FDT	National Budget	CLP 87 759 billion	125	1994	Law Decree 1762	SUBTEL
Colombia Fondo de Tecnologías de la Información y las Telecomunicaciones www.mintic.gov.co/portal/604/ed-propertyvalue=6777.html	FONTIC	Fees, licences, contributions 5%	COP 12 000 billion	3.9	2009	Article 58, law 1450	MINTIC-FONTIC
Costa Rica Fondo Nacional de Telecomunicaciones http://www.sutel.go.cr/pagina/que-es-fonatel/	FONATEL	1.5%	CRC 128 billion	239	2008	Law No.8642	SUTEL
Dominican Republic Fondo de Desarrollo de las Telecomunicaciones http://indotel.gob.do/indotel/fondo-para-el-desarrollo-de-las-telecomunicaciones/	FDT	2%	DDP 397 million	8.8	1998	General Telecommunications Law resolution No. 24-10	INDOTEL

Country	Fund Name	Acronym	Financing	Year of creation	Legal framework	Responsible entity
P e r ú	National Telecommunications Program, includes innovations on what was previously the FITEC. Its creation is based on the need to have a more efficient and dynamic organizational model both in the projects financed by FITEC (in its capacity as the Universal Access Fund, which remains intangible according to its substantive regulations) and in the projects in matters of communications.	PRONATEL	(1%) percent of the income invoiced and received from the provision of telecommunications services	2018	TUO of the Telecommunications Law (Supreme Decree No. 013-93-TCC)	MTC

Universal Service Funds in countries from the LAC region

	Name of the fund and website	Acronym	Financed through (% of operators income)	Budget estimation		Date	Legal framework	Responsible entity
				Country currency	USD million			
Ecuador	Fondo de Desarrollo de las Telecomunicaciones www.telecomunicaciones.gob.ec/pla-de-acceso-universal-y-alfabetamiento-digital/	FODELTEL	1%		7.6	2000	Special Telecommunications Law No. 2000-4	MINTEL
El Salvador	Fondo de Inversión en Electricidad y Telefonía www.finet.gob.sv/institucion/marco-institucional/informes/normativa/1821-ley-de-finet	FINET	Fees, licenses, contributions	-	-	1998	Ley del Fondo de Inversión Nacional en Electricidad y Telefonía	FINET
Guatemala	Fondo para el Desarrollo de la Telefonía	FONDETEL	Spectrum auctions	GTQ 114 million	14.6	1996	Telecommunications General Law, Decree No. 94-96	FONDETEL-MCIV
Jamaica	Universal Service Fund http://www.usf.gov.jm	USF	Lay to be calculated	JMD 11.97 billion	10.1	2005	Telecommunications Act	MTEM-USF
Mexico	Fondo de Cobertura Social de Telecomunicaciones www.sct.gob.mx/filad/min/_migrated/content_uploaded/LB_COBERTURA_SOCIAL_FONDOS_01.pdf	FONDOS	Federal Resources	MXN 13 753 million	0.814	2002	Fidelcomis 2058 and 2059	CSIC-SECON
Nicaragua	Fondo especial de Inversión de Telecomunicaciones y servicios postales www.telcor.gob.ni	RITEL	2%	-	-	2003	Executive Decree 5-2006	TELCOR
Panama	Fondo para el Desarrollo de Proyectos de Servicio y Acceso www.innovacion.gob.pa/descargas/acceso_universal_Resolucion_No_6.pdf	FOPSA	1%	PAB 10 million	10	2010	Law 59 from 2008	AIG-ASEP- Junta Asesora de Servicio y Acceso Universal
Paraguay	Fondo de Servicios Universales http://www.conatel.gov.py/	FSU	1%	Amount is not fixed	-	1999	Telecommunications Law	CONATEL
Peru	Fondo de Inversión en Telecomunicaciones www.ftel.gob.pe	RITEL	1%	-	70	1993	Telecommunications Law	MTC-FITEL
Suriname	x	x	x	x	-	x	Telecommunications Act 2000	MinTCT-TAS
Trinidad and Tobago	Universal Service Fund https://tatt.org.tt/	USF	-	-	-		Universal Service Framework	TATT
Uruguay	x	x	x	x	-	-	x	x
Venezuela	Fondo de Servicio Universal www.conatel.gob.ve/servicio-universal/	FSU	1%	-	-	2011	Ley Orgánica de Telecomunicaciones	CONATEL

Note: x = not applicable; - = absolute zero.