

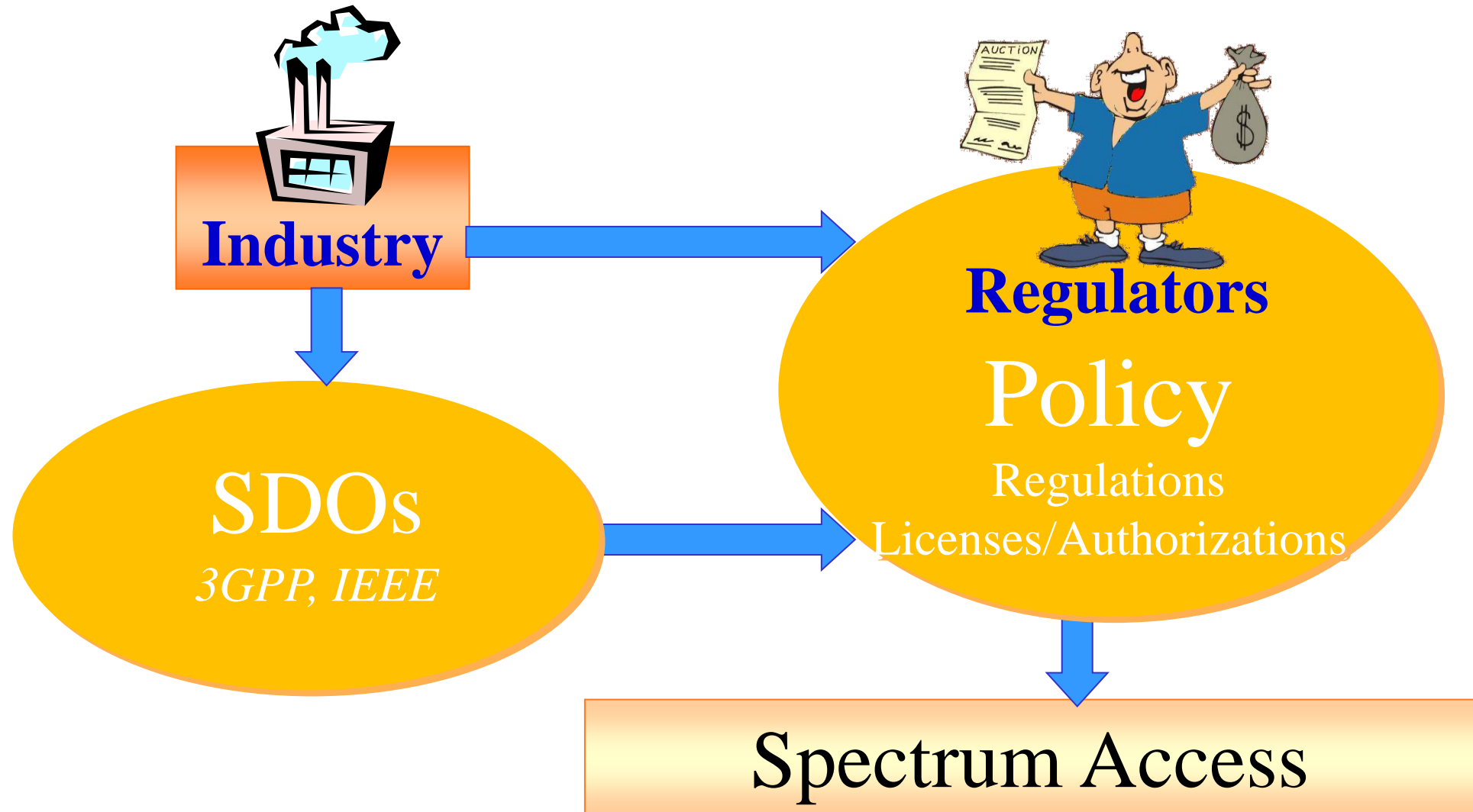
# International spectrum regulatory process

## 2023 World Radiocommunication Conference – 6 GHz Spectrum

**Date:** 14 September 2023

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# Overriding Objective: Spectrum Access



# Drivers for Spectrum Regulatory Process

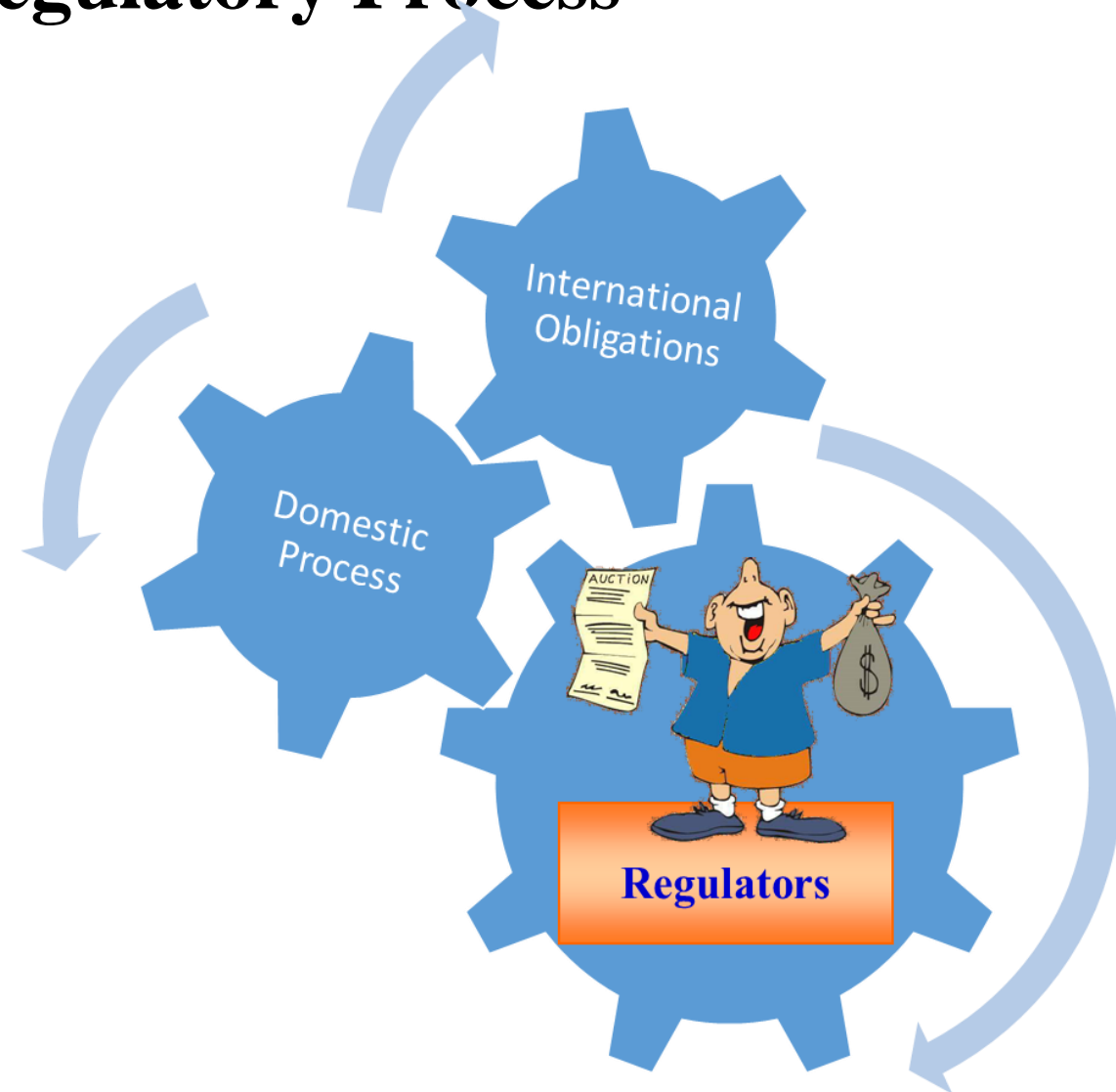
## Domestic Process

- Legislation (e.g., regulatory mandates)
- National priorities (e.g., economy, defense)
- Constituents' Advocacy

## International Obligations

- International treaties
- Bilateral Agreements

← Today's focus



# International Treaties Regulating Spectrum Access

- **ITU is the United Nations specialized agency for information and communication technologies – ICTs**

- allocate global radio spectrum and satellite orbits
- develop the technical standards that ensure networks and technologies seamlessly interconnect
- strive to improve access to ICTs to underserved communities worldwide

- ***3 main sectors***

- Radiocommunication
- Standardization
- Development



Today's focus

- ***ITU provided a forum for radiocommunications since 1906 when the limited nature of spectrum was recognized and the first Radio Regulations (RR) were approved***

## **International Treaties Regulating Spectrum Access**

- ***ITU Radio Regulations -- treaty-level document on use of radio spectrum***
  - ***International rights and obligations - radio waves don't stop at the borders***
    - ✓ ***Every country has a sovereign right to control and benefit from spectrum access within its territory***
    - ✓ ***Every country has an obligation to abide by provisions of the treaty (i.e., Radio Regulations)***
- ***Radio Regulations are periodically revised by the World Radio Conference (WRC)***
  - ***treaty-level forum***
  - ***WRC-23, WRC-19, WRC-15, WRC-12, WRC-07, WRC-03....***

## *World Radio Conference (WRC)*

- **WRC agenda is defined by treaty**
  - Agenda for WRC-23 was adopted by WRC-19 based on proposals of administrations
  - Agenda for WRC-27 will be adopted by WRC-23 based on proposals of administrations
    - ✓ ITU Council will finalize WRC-27 agenda two years before the conference
- **WRC considers Proposal to modify the international spectrum treaty**
  - Only Member States or Regional Organizations (i.e., groups of States) can make proposals for consideration by the conference

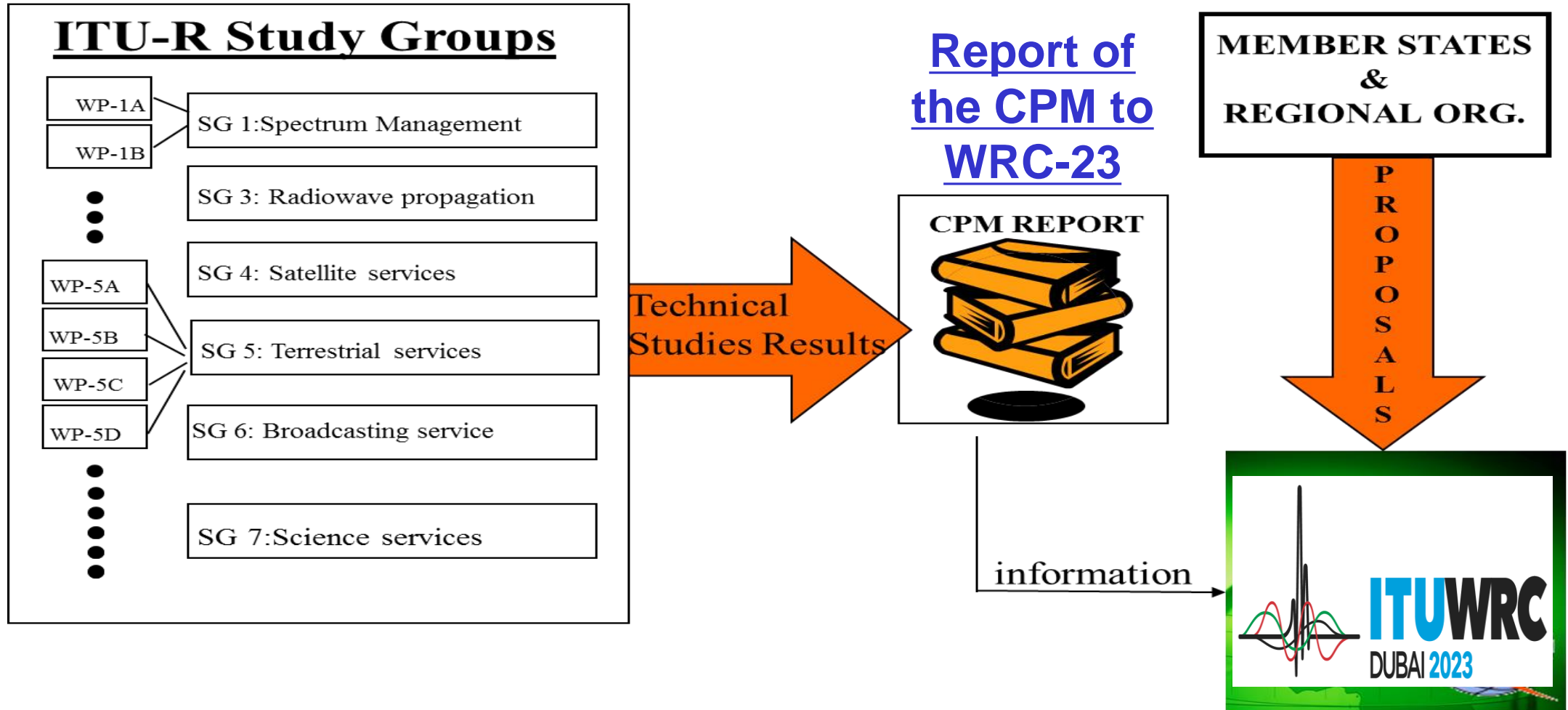
## World Radiocommunication Conference 2023 (WRC-23)

## World Radio Conference (WRC) Process

- Several thousand engineers, lawyers, diplomats and business executives from up to 160+ countries met for four weeks to consider, discuss and agree on revisions to the Radio Regulations (RRs)
  - 6047 proposals to revise RRs were submitted to WRC-15
- Proposed revisions were adopted in the Final Acts of the Conference
  - WRC-15 Final Acts – 448 pages
- Final Acts are approved modifications to international Radio Regulations – international treaty



# ITU Preparatory Process for WRC











## Regional preparation for WRC-23

**Under the terms of ITU Constitution, WRC decisions are based on majority (one country = one vote)**

**Recognized Regional Groups formulate multi-country proposals to WRC (six recognized groups)**

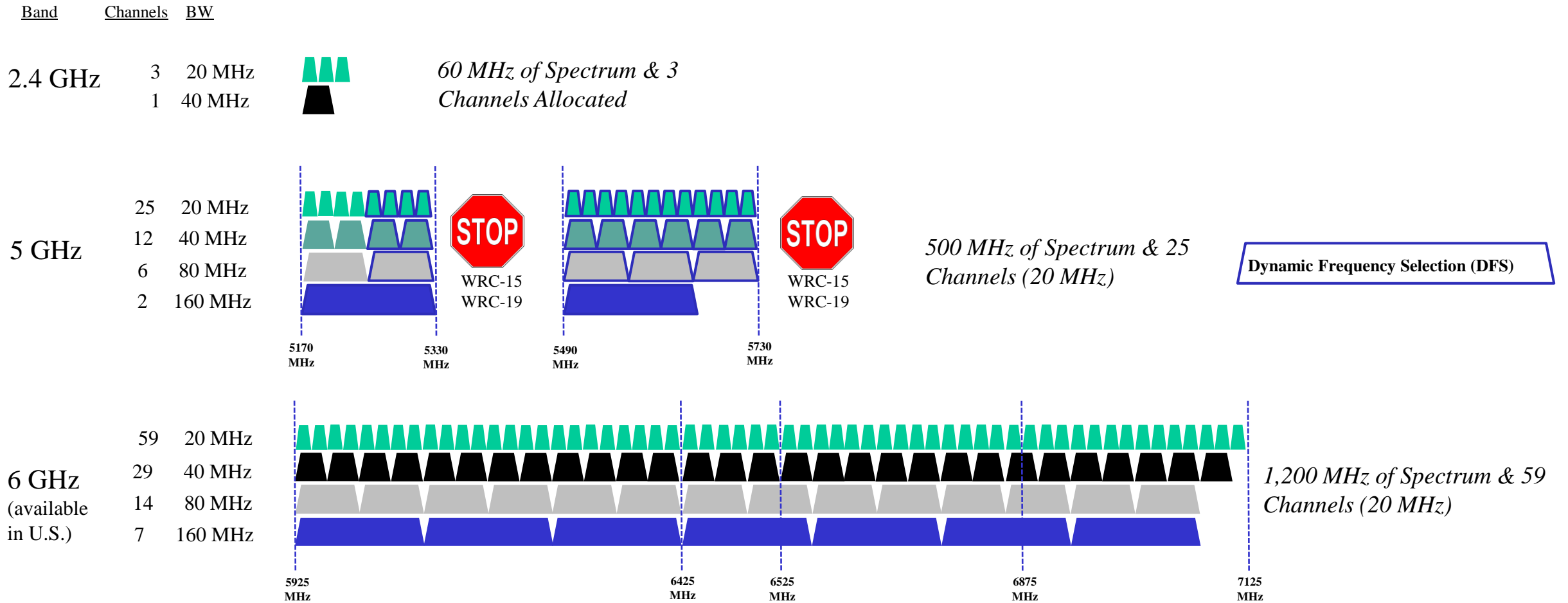
 <p><u>Asia-Pacific Telecommunity (APT)</u></p>	 <p><u>Arab Spectrum Management Group (ASMG)</u></p>	 <p><u>African Telecommunications Union (ATU)</u></p>	 <p><u>European Conference of Postal and Telecommunications Administrations (CEPT)</u></p>	 <p><u>Inter-American Telecommunication Commission (CITEL)</u></p>	 <p><u>Regional Commonwealth in the Field of Communications (RCC)</u></p>
<p>38 Countries</p>	<p>20 Countries</p>	<p>46 Countries</p>	<p>46 Countries 27 EU Members</p>	<p>34 Countries</p>	<p>10 Countries</p>

# Unlicensed Spectrum in 6 GHz

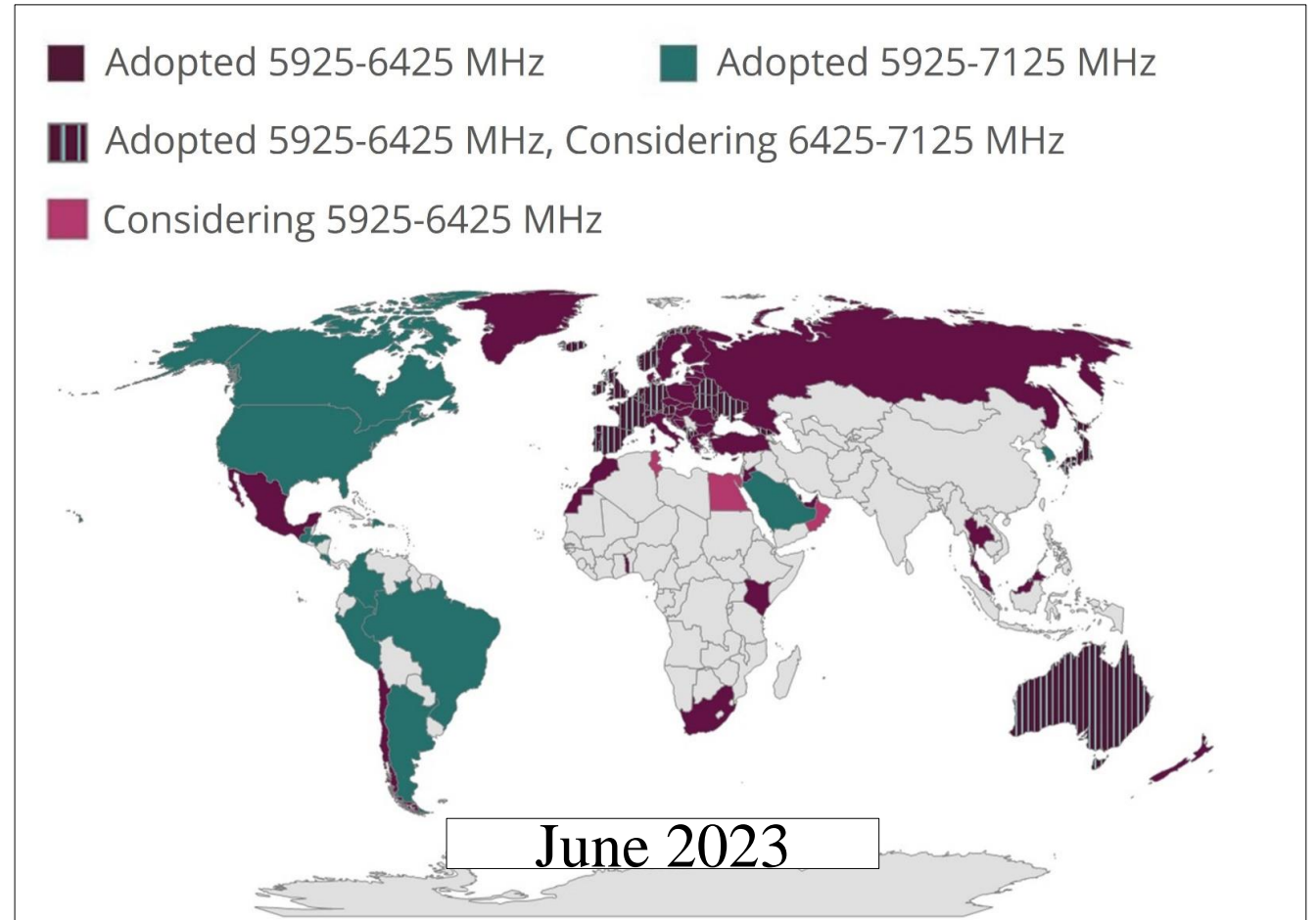
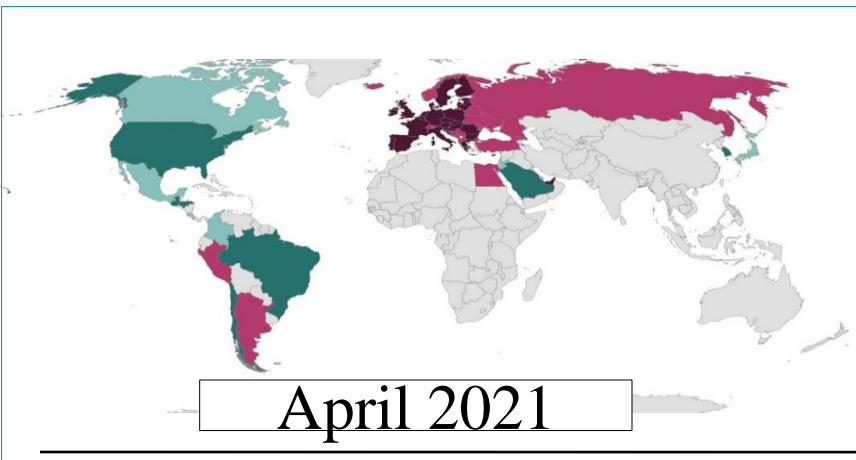
**WRC-23 Agenda Item 1.2**

*Is IMT deployment feasible in 6425-7125 MHz?*

# Unlicensed mid-band spectrum



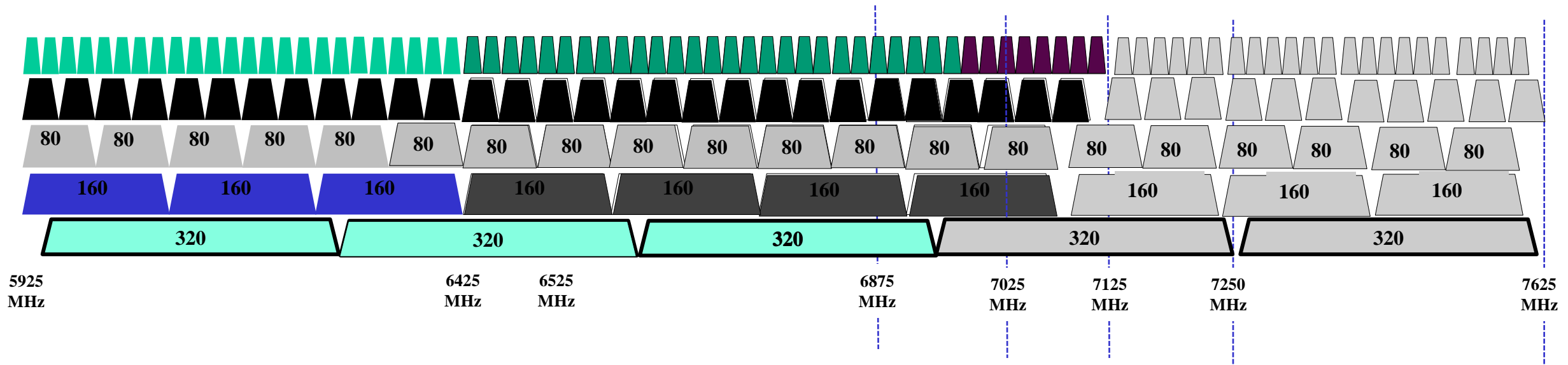
# Unlicensed access to 6 GHz: progress 2020-2023



For more info see [Countries Enabling Wi-Fi in 6 GHz](#)



# WRC-23 AI 1.2 (6425-7025 MHz in R1 and 7025-7125 MHz Global)



**IEEE recently identified 7125-7250 MHz spectrum as necessary for IEEE 802 technologies**

Longer-term: access up to 7.625 GHz to enable fifth 320-megahertz channel

# References

**Global economic value of Wi-Fi® to reach \$5 trillion in 2025**

Wi-Fi® worldwide economic value has grown beyond expectations

In 2021, the global economic value provided by Wi-Fi will reach \$3.3 trillion USD and is expected to grow to almost \$5 trillion by 2025, according to a new study commissioned by the Alliance.

This growth represents a 100 percent increase from the 2018 value of \$1.66 trillion to the projected value in 2025, underscoring Wi-Fi's critical role in economic activity across the globe.

The study, developed for Wi-Fi Alliance by economists at Telecom Advisory Services, focused on 15 economies: Australia, Brazil, Colombia, France, Germany, Japan, Mexico, New Zealand, Poland, Singapore, South Korea, Spain, the United Kingdom, and the United States, as well as an estimate for the European Union.

The economic value of Wi-Fi for each economy studied was developed by assessing secondary factors, plus global developments that have impacted the Wi-Fi industry—including the growing adoption of 5G and growth in streaming services, smart cities, and cloud-based computing. The study also considers public regulatory agency announcements in value estimates, covering the spectrum allowing Wi-Fi use in all 1200 MHz of the 6 GHz band and measures the economic benefits that Wi-Fi provides.

**Wi-Fi 6 and 6 GHz band bring new opportunities, economic resilience**

Due to its [proven reliability](#), Wi-Fi has proven to be a [key driver of digital resilience](#) and innovation during the COVID-19 pandemic. The study reveals that the industry-wide support for Wi-Fi growth and development is essential to continue realizing the benefits Wi-Fi technology provides. By the end of 2021 there will be 16.4 billion Wi-Fi devices in use. Market penetration in 2021 will grow to 2.2 billion devices in 2025, including nearly 500 million Wi-Fi 6E products which are capable of operating in the 6 GHz band. Wi-Fi 6E and access to the 6 GHz band enables a suite of advanced applications, such as augmented reality, self-driving cars, cloud gaming, and intensive telepresence—the combined effects of which could exponentially increase Wi-Fi value in years to come.

**Defining and quantifying economic value of Wi-Fi**

Economists combined calculations based on key factors listed below for each economy to develop the economic value, as reported in USD. Data values for each country and the European Union were determined; the economic value represents a global value of Wi-Fi.

Country	2021 (billions USD)	2025 (billions USD)
Australia	135	140
Brazil	115	120
Colombia	115	120
France	115	120
Germany	115	120
Japan	115	120
Mexico	115	120
New Zealand	115	120
Poland	115	120
Singapore	115	120
South Korea	115	120
Spain	115	120
UK	115	120
USA	115	120
EU	115	120
<b>Total</b>	<b>3300</b>	<b>4900</b>

Wi-Fi Alliance

## Wi-Fi Economic Value Highlights

**Wi-Fi®: sustainable connectivity**

As the world looks to curb energy usage, Wi-Fi® can make individuals and organizations more efficient

With fuel prices climbing and the climate changing, prioritizing energy efficiency is crucial for individuals and organizations alike. As rising fuel prices impact travel and energy costs, corporations are seeking digital solutions, such as video conferencing and smart building technology, supported by Wi-Fi, to become more energy efficient.

Wi-Fi enables people to hold timely and efficient business meetings digitally, rather than in person, reducing travel and therefore energy consumption. High-resolution video calls and extended reality (XR) services can enable executives to participate in production and investment transactions, such as oilfields and contacts on the other side of the world. Wi-Fi can also enable greater automation, reducing the need for workers to be onsite each day, using the fuel usage associated with commuting.

Wi-Fi plays a key role in enabling the Internet of Things (IoT), can be used to remotely control and monitor a wide range of electronic equipment from process and air conditioners to heavy machinery and production robots. The enabling organizations to detect when energy is being wasted and adjust their processes accordingly. Wi-Fi connected sensors can also generate usable data that can then be used to optimize a building's heating and cooling operations. [Wi-Fi 6E](#) is designed to support large numbers of simultaneous connections, making it the ideal technology to collect real-time data from environmental sensors.

**Wi-Fi: the sustainable solution for connectivity**

Digital technologies are striving to be as energy-efficient as possible, and Wi-Fi is the top choice for reliable, high-power connectivity. France's Agency for Ecological Transition (ADEME) has launched a campaign<sup>1</sup> to encourage France citizens to use Wi-Fi rather than 4G, and the agency notes that using Wi-Fi reduces CO2 pollution 23-fold. Similarly, mobile operator Orange France<sup>2</sup> will remind customers to switch to using Wi-Fi at home during periods of peak energy consumption.

An inherently low-power technology, Wi-Fi is the most efficient way to provide high-speed connectivity within homes and buildings. Wi-Fi technology makes extensive use of low-power, cognitive radio techniques, such as spectrum sensing, spectrum sharing, and adaptive transmission.

Wi-Fi signals don't need to travel long distances to reach users because they rely on indoor routers, rather than outdoor base stations. They will continue an ever-tighter consideration as builders add more automation.

Wi-Fi Alliance

## Wi-Fi Sustainability highlights

**Wi-Fi®: affordable connectivity for all**

The inherent strengths of Wi-Fi® deliver digital inclusion at a low cost

With the total number of internet users worldwide estimated to grow from 3.9 billion in 2018 to 5.3 billion in 2023, global economies and societies are becoming increasingly digital. However, connectivity is not consistently available to everyone. By relying on inexpensive cellular devices to access the internet, in conjunction with high monthly data fees, low-income communities are at risk of being excluded from the connectivity that has become an essential component of daily life. Through economies of scale and utilization of unlicensed spectrum, Wi-Fi provides affordable, secure connectivity to millions of users.

**Sharing Wi-Fi within communities**

Wi-Fi allows dozens of community members to share a single broadband internet connection, making the service more affordable for each individual. As such, Wi-Fi is the preferred source of internet connectivity for millions of people around the world, as it also enables the sharing of devices. In Africa, for example, where only 33% of individuals were using the internet in 2021 (compared to 67% of individuals worldwide), sharing broadband through Wi-Fi will be one of the most efficient ways to bring more people online.

Community Wi-Fi services across the developing world are experiencing exponential growth, bringing more and more people online. There will be nearly 425 million public Wi-Fi hotspots worldwide by 2025, up from 169 million hotspots in 2018, according to forecasts by Cisco<sup>3</sup>.

In rural areas, attempting to bury fiber in rugged terrain can present logistical challenges, and utilizing Wi-Fi in these regions is a cost-saving alternative. For example, the developed over 4000 public Wi-Fi hotspots since 2020, creating a robust infrastructure that allows residents to access crucial services like telemedicine, remote learning, and government services, in rural India.

Given the challenging economics of serving far-flung communities, it is vital that each broadband connection is shared as widely as possible. In South Africa, the 4500 residents of the remote rural community of Marston can pay a small monthly fee to access a Wi-Fi-based community network. The Starbuck's Networks project installs and maintains a dozen solar-powered Wi-Fi mesh network stations that are mounted on and inside houses around Marston to cover an area of 80 square kilometers.

In rural Ireland, Galway County Council has installed 40 Wi-Fi hotspots under the EU's WiFi4EU program, which promotes free access to Wi-Fi connectivity for citizens in public spaces, such as parks, squares, public buildings, libraries, health centers, and museums in municipalities throughout Europe. From Keweenaw, California.

Wi-Fi Alliance

## Wi-Fi Affordability highlights

**TELECOM ADVISORY SERVICES**

New York - Buenos Aires - Madrid - Bogota

**COVID-19 AND THE ECONOMIC VALUE OF WI-FI**

December 2020

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## COVID-19 and Wi-Fi