

5G: AMERICA AT THE TIPPING POINT
A REPORT TO HOUSE AND SENATE MEMBERS
From Former Speaker of the House Newt Gingrich
May 6, 2019

I. OVERVIEW

The selection and allocation of specific bands of spectrum is the key to American victory in the race to 5G wireless capability. The United States is losing the 5G competition to China because we are allocating the wrong spectrum and using the wrong model.

- 1) **Coordinating and implementing an aggressive 5G strategy capable of overmatching the Chinese-Huawei effort will require a strong, clear Presidential Executive Order to bring all of government into one operational plan.**
- 2) **The specific bands of spectrum being allocated in the United States are critical to American success in the 5G competition.** The U.S. Government's decision of which bands to allocate will determine whether America can produce alternatives to Chinese equipment to sell around the world and whether the networks that U.S. carriers are building domestically have any long-term value.
- 3) **The spectrum currently being made available in the United States is *not the same* as the spectrum that other countries are making available.** This will leave the United States technologically isolated. Since American networks will be built with different equipment than the rest of the world will use and need to buy, other countries may be forced to install Chinese equipment by default as a result of the economies of scale.
- 4) **The spectrum being made available in the United States (millimeter wavelength) covers only short distances, and thus is poorly suited to cover rural America.** This means huge swaths of the country will never get 5G coverage and will lose major opportunities as a consequence of the government's poor choice of spectrum allocation.
- 5) **The spectrum that other countries are making available, sub-6 GHz, is owned in the United States by the Department of Defense (DoD).** If made available, this spectrum *will* cover large distances and *will* result in the production

of equipment capable of competing with Chinese alternatives. The DoD could easily make this spectrum available and solve all of the above problems.

6) The proposed policy is for the DoD to make this spectrum available to the private sector – not for the government – to build a network or spend money on implementation. There are two primary bands in question that are controlled by the DoD – the 3.1-3.55 GHz band and the 4.4-4.9 GHz band. The Department of Commerce is investigating what the 3.1-3.55 band is being used for but has only studied a minimal amount of the band. The 3.1-3.55 band in particular is a good candidate for being made available for commercial use.

7) The first key step is for an immediate request for information (RFI) from interested parties so the available range of options and participants can be brought to light and evaluated. This should be followed rapidly by a request for proposals (RFP) once the information and options have been assessed. On Friday, May 3, the National Spectrum Consortium issued a “Call for Technical Concepts” relating to, among other things, “Dynamic Spectrum Sharing” in the 5G context. This could prove to be an extremely important development. The Consortium was originally established by the DoD to “incubate new technologies to revolutionize the way in which spectrum is utilized,” so this CTC, which is equivalent to an RFI, is very timely. If the Consortium receives suitable responses and moves quickly toward a procurement following the CTC, it could provide the vehicle the Executive Branch needs to share the DoD’s sub-6GHz spectrum with a private 5G rollout nationally in the short term.

II. KEY STEPS

President Trump’s goals are exactly right.

The United States must achieve 100 percent 5G coverage for rural America as rapidly as possible and begin executing a serious implementation strategy by the spring of 2020.

The United States must develop a strategy to beat Huawei in technology and financing, so the next generation of worldwide internet (outside of China’s borders) will be based on principles of freedom and the rule of law.

Achieving these two great goals will require a national attitude and level of ambition similar to those of the Manhattan Project or the Apollo program.

These goals *do not* require a government-run program. In fact, a government-run program would be a disaster.

However, there are enabling steps that the government can take that will enable the United States to become the dominant leader in 5G as it was in 4G.

1. The Defense Department must free up a great deal of sub-6 spectrum so that the United States' 5G network is compatible with the rest of the world. We don't have to wait. The Defense Department RFI should come out immediately to see what alternatives the free market can come up with. Then, an RFP can follow once the various new ideas in the RFI are digested.
2. The FCC must open up its auction system to include alternative models and new players with new capital and new entrepreneurs. For too long the FCC and the large, bureaucratic, old telecoms have run an insiders' club oligopoly. It has failed, and it is presently failing to serve rural America. For 11 years, this outdated system has failed to design a winning strategy against Huawei. A new RFI should go out with the widest possible range of proposals and ideas being accepted for public scrutiny. For too long we have had a bureaucrat- and lobbyist-defined system of insider games in the telecommunications industry. It has served us badly in rural America and in the world market. It has also charged us more than we would pay in a genuinely competitive environment. (See Appendix III for an alternative model of wholesale competition.)
3. We need a 5G Implementation Council comparable to the National Space Council. Competing with China is going to take an all-of-government and all-of-society approach similar to that which President Trump and Vice President Pence have established for getting Americans back into space. The 5G Implementation Council should have a small staff but a lot of authority to implement its ideas. Its members should include public and private stakeholders including would-be stakeholders with real assets and new startups with bold ideas.
4. The new 5G system should be designed with electromagnetic pulse (EMP) hardening and powerful cybersecurity capabilities embedded in the system. It should also have secure, reliable communications even in the presence of unreliable networks. We must prepare for the reality that Huawei will still be operating in some countries, even if we are extraordinarily successful. The United States 5G effort is building for a generation, not for a quarterly report.

5. Congress should insist on a real strategy for rural America with deadlines and a real strategy for defeating Huawei. In addition, Congress should collaborate with the Trump administration and the private sector to identify laws that need changing so that we can win the competition against Huawei.
6. Congress should create a select committee to study all of China's activities. China is so large and energetic and has such intelligent and assertive strategies that the Congress needs to develop a much deeper understanding of the competition between our two civilizations.
7. Today, China is buying market share with heavily subsidized prices. The outcome will be catastrophic if we don't find a way to match or beat their prices. We may need to divert one-fourth of the foreign aid budget to matching Huawei's government subsidized prices in the third world and rethink the Export-Import Bank.
8. The Federal Trade Commission (FTC) should drop its suit against Qualcomm over chip patents and royalties. Congress should amend the law to make responding to Chinese competition an exemption for collaborating. We need an allied coalition to defeat Huawei which requires rethinking whether companies can work together if their goal is to defeat a Chinese government-sponsored assault on markets worldwide.
9. An aggressive program of patent protection and intellectual property protection must be implemented to eliminate the Chinese pattern of simply stealing the inventions of other countries. Huawei's research and development endeavors are strongly helped by theft. This must be stopped.

III. HOW TO MEASURE SUCCESS

By June 2020:

1. We will have begun construction for 5G network in rural America.
2. The United States and its allies will be successfully competing against Huawei in both quality and price.
3. We will have begun to develop an American 5G ecosystem.

If the above goals *are not* met, the United States will be one year closer to a Chinese-defined and totalitarian-controlled worldwide internet.

If the above goals *are* met, the United States will be leading the 5G competition against Huawei and will likely emerge victorious.

IV. STATEMENT OF PURPOSE

A number of House and Senate members have asked for my advice on 5G and the threat posed to America's future by Chinese companies, such as Huawei. I am writing a book on China that will be published in October. The more I study Xi Jinping and China's Communist system, the more certain I am that I don't want my grandchildren growing up in a reality defined by China's totalitarian world order.

The contest over 5G is the first great strategic competition in the struggle between our two civilizations. As of today, the United States is losing. The gap between Huawei and non-Chinese companies is growing so rapidly that within a few years, we may encounter a tipping point in which the Chinese penetration and saturation of markets enables China to define and dominate the internet and all wireless communications.

Imagine a world within a decade in which Chinese totalitarian rules are applied to the internet, your cell phone is monitored by Beijing, your search engine is censored by Chinese authorities, and your facial identity is tracked around the world and archived in China. This world is incredibly likely if we continue to be confused and disorganized in building a 5G internet system.

The Chinese penetration and manipulation of our free and open American system is happening now. It is not a distant, future problem. One Chinese app, TikTok, has already deeply penetrated the American teen market. TikTok and its Chinese version have been downloaded worldwide more than a billion times.¹

In addition to national security concerns, I am vividly aware of how underserved rural America has been by the old telecom companies and the Federal Communications Commission (FCC). I experience this neglect firsthand as I travel to visit my mother-in-law who lives in a small, Wisconsin town between two, 30-mile dead zones with no cell coverage.

The purpose of this report therefore grows out of the following two objectives:

¹ Ramli, David, and Shelly Banjo. "The Kids Use TikTok Now Because Data-Mined Videos Are So Much Fun." Bloomberg Businessweek. April 17, 2019. Accessed April 25, 2019. <https://bloom.bg/2VylLvT>.

1. Protect American national security interests, freedoms, and the law-based world order from Chinese encroachment and dominance, and;
2. Bring a fully-functioning modern telecommunications network to underserved rural America.

V. BACKGROUND

CHINA, 5G TECHNOLOGY, AND THE STRUGGLE FOR FREEDOM

The United States is engaged in our third great contest for the survival of our rule of law and freedom-based civilization. We are as unprepared for the new totalitarian Chinese challenge as we were in 1939 for Nazi Germany and Imperial Japan – and in 1946 for the worldwide challenge of the Soviet Union.

Just as those earlier contests required new thinking, new strategies, new institutions, new allocations of resources, and new creativity, the competition with totalitarian China will force all of American society to, as President Lincoln [said](#), “think anew and act anew.”²

Xi Jinping is General Secretary of the Communist Party, Chairman of the Central Military Commission, and President of the People’s Republic of China – in that order. We must understand that when dealing with China, we are not dealing with a government that parallels Western models. Referring to China’s leader as General Secretary Xi instead of President Xi gives a more accurate sense of what we are dealing with.

General Secretary Xi’s China is a Leninist totalitarian system in which the Communist Party, with nearly 90 million members (by comparison President Trump received 63 million votes), defines and enforces the acceptable behavior for 1.4 billion people.

Every institution in China is subordinate to the Communist Party. This includes the government and the military, which are also instruments of the Party. Chinese law requires companies to assist the Chinese government (and therefore, the Party and the military). There’s no true private sector in China.

Jeremy Hunt, foreign secretary of the United Kingdom, recently [stated](#):

² Lincoln, Abraham. "Second Annual Message." The American Presidency Project. December 01, 1862. Accessed April 25, 2019. <https://bit.ly/2GGvw2s>.

"We are right to have a degree of caution about the role of large Chinese companies because of the degree of control the Chinese state is able to exercise over them in the way that would not be possible if they were large Western companies.

"That doesn't mean to say that their role is automatically malign, but there are things like the 2017 law which requires all Chinese companies, whatever their ownership, to co-operate with Chinese intelligence services on any occasion."³

To trust Huawei is to trust the Chinese totalitarian system.

This point is critical, because China is engaged in an all-of-society competition with the United States in which every company will support every other company, and no company can survive if it ignores the Communist Party's demands.

China has an integrated effort on all fronts – using economic, diplomatic, military, political, and academic tactics – to advance its hegemonic ambitions at the expense of the United States. The South China Sea campaign, the Belt and Road Initiative, and the Huawei cyber-belt strategy are subordinate campaigns within a grand, long-term effort to establish global Chinese hegemony.

Huawei as a threat can only be understood within this totalitarian context of an all-of-society and all-of-government effort to re-establish China as the Middle Kingdom at the center of human affairs.

The introduction of 5G wireless technology is an opportunity for China to achieve a decisive advantage over all other nations – including the United States.

If Huawei wins the competition to implement 5G, an internet defined by totalitarian China will dominate the globe by 2030. The United States will have lost its place as the leading technological power, and American behavior around the world will be severely constrained by the existence of a Chinese-supplied and totalitarian-controlled communications and computation system.

This is not just my opinion.

³ Mikhailova, Anna, and Stephen Swinford. "Huawei Is Legally-obliged to Co-operate with Chinese Intelligence Services, Jeremy Hunt Warns." The Telegraph. April 28, 2019. Accessed April 29, 2019. <https://bit.ly/2GFgPeY>.

[According to](#) General Jim Jones, former U.S. national security advisor and NATO supreme allied commander:

“If China controls the digital infrastructure of the 21st century, it will exploit this position for its national security purposes and be capable of coercive leverage over the United States and allies.”⁴

Americans must understand that Huawei is massive. As Fred Kempe, president and CEO of the Atlantic Council, [writes](#):

“The danger is growing of two spheres of tech influence, with many Huawei customers arguing that the Chinese are offering far better prices, with direct and indirect subsidies, while providing better service and fielding more advanced equipment. The company now has 180,000 employees in 170 countries, 80,000 of whom are working in research and development. It [counts](#) 45 of the world’s biggest 50 wireless carriers as customers.”^{5,6}

Michael Chertoff, Keith B. Alexander & Timothy J. Keating In Real Clear Defense (May 4, 2019) reinforced this warning:

“Moreover, the global race to 5G is a future-defining geostrategic contest, and it’s well underway. Leadership confers not only the pole position on innovation but the ability to set the international norms and standards that will determine what the global future looks like. China knows that this is a Sputnik moment and is refining its strategy and accelerating its investments to seize it.

“According to the latest report from Forrester Research, China is best positioned to win the emerging global race to roll out 5G mobile infrastructure. A recent Deloitte study shows that China is outpacing the U.S.’ wireless infrastructure spend by \$8-10 billion since 2015. The net effect was summed up by the Defense Innovation Board, “China is on a track to repeat in 5G what happened with the United States in 4G.””

⁴ Jones, General James L. "Recommendations on 5G and National Security." February 11, 2019. Accessed April 25, 2019. <https://bit.ly/2tikXvi>.

⁵ Woo, Stu, Dan Strumpf, and Betsy Morris. "Huawei, Seen as Possible Spy Threat, Boomed Despite U.S. Warnings." The Wall Street Journal. January 08, 2018. Accessed April 25, 2019. <https://on.wsj.com/2IJAq0U>.

⁶ Kempe, Fred. "The Battle over 5G and Huawei Is the Biggest Test Yet for Trump's Approach for China." CNBC. February 23, 2019. Accessed April 25, 2019. <https://cnb.cx/2XIuJ6U>.

At stake is whether the world will adopt the Chinese model that harnesses 5G as a tool for espionage, economic pilferage, coercion, and authoritarian rule; or the U.S. and western model of using 5G as a platform for prosperity, human development and privacy protection. It's well known, but not sufficiently appreciated, that global market penetration of made-in-China 5G equipment is part of the country's Belt and Road Initiative. At the same time, Chinese law obligates the country's makers of this equipment to cooperate with national intelligence efforts.

All discussions of 5G policy must begin with the understanding that developing a successful program to outpace Huawei in technology, financing, marketing, and sustainment is a matter of life and death for American freedom.

As General Jones [warns](#)⁷:

“[T]his race, and its outcome, rises to the level of importance of such projects as the Manhattan Project and the ‘man-on-the-moon’ efforts of the 20th century. ... For countries who select the Chinese alternative and the consequences attendant to such a decision, the costs of reversal will increase exponentially as they proceed.”

This must be an American effort, not a Republican or Democratic effort, nor a liberal or conservative effort. Just as in 1939 and 1946, the American people will have to discuss, debate, and decide if we are to have a sustainable strategic response to this challenge to our survival as a civilization.

Huawei's aggressive tactics in the 5G sphere is the first test case in this new era of competition with China.

But it will be far from the last.

WHAT IS 5G AND WHY DOES IT MATTER?

5G (fifth generation) wireless is an enormous technological improvement from 4G (fourth generation) wireless.

Advancements in 5G do not include just upgrading to a better antenna or better software. Rather, 5G creates an entirely new ecosystem of advanced technologies

⁷ Jones, General James L. "Recommendations on 5G and National Security." February 11, 2019. Accessed April 25, 2019. <https://bit.ly/2tikXvi>.

that will enable the Internet of Things, autonomous driving, surgery performed thousands of miles away, monitoring of sensors on a massive scale, virtual reality, and a host of other developments.

The implications of the capabilities that are associated with 5G are most clearly communicated on a sign by Samsung that says, “5G is to 4G as a computer is to a typewriter.”

With 4G networks, it takes six minutes to download a movie. With 5G, the download time drops to three seconds.

4G networks support only 4,000 devices per square kilometer, while 5G can support up to one million.

Critical for protecting America’s national security in the future, 5G networks will dominate the battle space for the military.

5G technology will also have security vulnerabilities and new capabilities as it increases wireless capacity and changes the way the physical and virtual environments interact. As much as the Internet of Things (IoT) has already transformed the modern threat surface, with 5G, we can expect a massive increase in the number of network-connected devices. 5G PP, a joint initiative between EU Commission and European ICT, projected 1000x bandwidth per unit area and 7 trillion connected devices. This, along with 5G’s nontraditional use of cloud, mobile, and IT networks, presents new security concerns, but the 5G architectures provide new capabilities for visibility and control to address these. One example is network slicing, a smart means of automated network segmentation to protect critical infrastructure systems. Another is increased home control, which can help detect network spoofing—a direct response to vulnerabilities found in 3G and 4G networks that could be used to intercept calls and texts. Cybersecurity is already one of the biggest issues in national security, if not the biggest; the United States should prioritize adoption of the most secure wireless technologies to avoid being left behind.

Additionally, 5G’s usage of sub-6 GHz wavelength spectrum will make it relatively easy to bring all of rural America into the 21st century information system.

VI. THE CURRENT CHALLENGE AND THE DESTRUCTIVE DELUSION

America has two significant interests in developing and implementing 5G technology. The first is to protect our national security interests by blocking the Chinese from defining and monopolizing the “Internet of the Future” as a worldwide instrument of totalitarianism. The second is to ensure that rural Americans get full access to 5G and are part of the emerging 21st century economy and technology spheres.

The recent 5G event held at the White House failed to achieve either of these goals.

A headline for *Fortune* reported, [“Forget Rural Internet – This Was the Real Agenda at Trump’s 5G Wireless Event.”](#)

The article’s author, Aaron Pressman, wrote:

“On the surface, President Trump and Federal Communications Commission chair Ajit Pai were promoting the schedule for a new spectrum auction and funds for extending faster Internet service to rural areas. But the auction, now slated to start on December 10, has been on tap for the ‘second half of 2019’ since last year. And the funds for rural Internet connections, which don’t have to use 5G technology or even wireless, were just an extension of a long-existing program.

...

“Of the other two supposed new announcements, analysts were unimpressed. ‘There is nothing particularly new or particularly interesting,’ New Street Research analyst Jonathan Chaplin wrote after the event ended. The timing of the auction ‘isn’t really even new’ and the rural fund will be ‘immaterial’ for major Internet service providers.

“The upcoming auction will cover airwaves in the high frequency bands of 37 GHz, 39 GHz, and 47 GHz. The FCC completed a 28 GHz auction last year and an auction of rights in the 24 GHz band is about to finish.

“The rural Internet fund, which Pai said would total \$20 billion over 10 years, would extend a 2011 program that is slated to expire after 2020. The expiring ‘Connect America Fund’ uses a portion of fees collected from consumers as part of the Universal Service Fund to promote Internet service in rural areas. Pai’s new ‘Rural Digital Opportunity Fund,’ which will have to be created through the usual FCC rule-making process, would use the same funds for much the same purpose.

“And the initiative won’t help spread 5G much if at all, as New Street Research advisor Blair Levin noted. ‘This really has nothing to do with 5G, which is designed to offer gigabit speeds,’ Levin wrote in a report on the event. The minimum speed for service backed by the new fund will be 25 megabits per second, ‘which means that networks that offer speeds 40 times less than 5G does will be eligible for the funding.’”⁸

In retrospect, it is clear the White House announcement was simply an effort to end the debate over how to implement 5G to protect the old order. However, its proposals were so irrelevant that it just drew more attention to the gap between China and America’s progress toward the implementation of 5G.

WHILE THE ANNOUNCEMENT WAS WRONG, PRESIDENT TRUMP IS RIGHT ABOUT 5G

President Trump [articulated](#) the correct goals for 5G during the White House event:

“It will transform the way our citizens work, learn, communicate, and travel. It will make American farms more productive, American manufacturing more competitive, and American health care better and more accessible.

...

⁸ Pressman, Aaron. "Forget Rural Internet-This Was Real Agenda at Trump's 5G Wireless Event." Fortune. April 12, 2019. Accessed April 25, 2019. <https://bit.ly/2W4jTYp>.

“5G networks will also create astonishing and really thrilling new opportunities for our people – opportunities that we’ve never even thought we had a possibility of looking at.”⁹

In his remarks, President Trump also emphasized the importance of a secure 5G network:

“Secure 5G networks will absolutely be a vital link to America’s prosperity and national security in the 21st century. ...

“5G networks must be secure. They must be strong. They have to be guarded from the enemy...”¹⁰

President Trump also asserted that 5G coverage needs to be extended to rural communities:

“[5G networks] must cover every community, and they must be deployed as soon as possible.

...

"As we are making great progress with 5G, we’re also focused on rural communities that do not have access to broadband at all. ...

“We’re working closely with federal agencies to get networks built in rural America faster and at much, much lower cost than it is even today.

...

“No matter where you are, you will have access to 5G.”¹¹

President Trump’s vision for a powerful and secure 5G network that serves all of rural America, and an American 5G system that successfully competes with and defeats Huawei is the right vision. It parallels his bold vision for a manned space program to the Moon and beyond that will ensure America’s leadership in space.

⁹Trump, President Donald. "Remarks by President Trump on United States 5G Deployment." The White House. April 12, 2019. Accessed April 25, 2019. <https://bit.ly/2Gyk8EI>.

¹⁰ Ibid.

¹¹ Ibid.

The difference between the space program and the 5G project is the leadership of Vice President Pence and the momentum fueled by the system built around the National Space Council. With President Trump's vision and Vice President Pence's leadership, a space program that is an all-of-government *and simultaneously* an all-of-society effort is beginning to really take shape. (See Appendix I for Vice President Pence's principles for driving change.)

There is no comparable leadership effort for 5G, and no coordinating system at an all-of-society and all-of-government level.

The dominant voices on 5G have been the old bureaucracy and the old corporations who reject change and cling to outdated perspectives. This has left rural America without broadband and cell phone coverage. And even 11 years after Huawei began its investments to dominate the internet and all global communications, the United States is still without a global strategy.

It is as though the trailblazing, entrepreneurial leaders have been excluded, and only the oldest, slowest, businesses and government bureaucracies have been allowed to plan for President Trump's vision for a powerful and secure 5G network. The result, unsurprisingly, has thus far been a disaster. This is why it's critical for an all-of-society and all-of government approach to implement 5G networks in America.

The government will provide information, guidance, and public momentum that will enable the private sector to provide the capabilities and implementation mechanisms to carry the project over the finish line.

Unfortunately, April's bureaucratic announcements during the White House 5G event were disastrous and a step in the wrong direction.

As I wrote in *Breakout*, during a time of change there are pioneers of the future and prison guards of the past. The White House event was a clear example of the lobbyists and bureaucrats who are prison guards of the past protecting their turf and self-serving vested interests at the country's expense.

The Defense Innovation Board's April 2019 [report](#), *The 5G Ecosystem: Risks and Opportunities for DoD*, captures how badly the old systems have failed. The report notes:

“The country that owns 5G will own many of these innovations and set the standards for the rest of the world. ... [T]hat country is currently not likely to be the United States.”¹²

This 31-page report is publicly available and cuts through all of the propaganda of the old telecommunications companies and their captive trade association, CTIA.

After all of the hype about how many small sites American companies are launching, this is the Defense Innovation Board’s assessment:

“China plans to deploy the first widespread 5G network, with its first set of sub-6 services becoming available in 2020. First-mover advantage will likely drive significant increases in their handset and telecom equipment vendors market along with their domestic semiconductor and system suppliers. As a result, Chinese internet companies will be well-positioned to develop services and applications for their home market that take advantage of 5G speed and low latency. As 5G is deployed across the globe in similar bands of spectrum, China’s handset and internet applications and services are likely to become dominant, even if they are excluded from the US. China is on a track to repeat in 5G what happened with the United States in 4G.”¹³

This warning was made even stronger by the recent announcement that the FCC would move ahead with an auction it proposed in September 2018, approved in December 2018, and plans to now hold in December 2019 – one year after approval. This 15-month process was the “fast track version” but really just highlights the slow pace of an overbearing bureaucracy.

However, the situation is much worse than slow scheduling. This auction will be for millimeter wave length spectrum. There are two things wrong with this proposal.

First, rural America needs sub-6 GHz medium wave spectrum to get the distance and penetration needed for coverage. Millimeter waves are much too short in reach and much too easy to disrupt. They are adequate for the Dallas Cowboys football

¹² Medin, Milo, and Gilman Louie. "The 5G Ecosystem: Risks & Opportunities for DoD." April 3, 2019. Accessed April 25, 2019. <https://bit.ly/2VrWR0L>.

¹³ Ibid.

stadium (one of the announced AT&T sites) but hopeless for the forests of Maine or to span across the distances of Montana. In one test, the millimeter wave antenna dropped off after 600 feet. How would that work in North Dakota or any rural area? Sub-6 GHz medium wave spectrum is needed. The Pentagon controls it, and the Pentagon's bureaucracy is crippling the entire American 5G effort.

T-Mobile Chief Technology Officer Neville Ray [wrote](#) how this millimeter wave spectrum will fail to bring coverage to all of rural America. He noted:

“Some of this is physics – millimeter wave (mmWave) spectrum has great potential in terms of speed and capacity, but it doesn't travel far from the cell site and doesn't penetrate materials at all. It will never materially scale beyond small pockets of 5G hotspots in dense urban environments.”¹⁴

Verizon CEO Hans Vestberg [advised](#) that when it comes to millimeter wave spectrum “We will need to remind ourselves, this is not a *coverage* spectrum.”¹⁵

If America's 5G spectrum is only useful in densely populated cities, it will be a profound betrayal of rural communities and will leave these forgotten Americans even further behind.

Second, the rest of the world is not inhibited by the Pentagon and is moving to sub-6 GHz spectrum. The Defense Innovation Board [explains](#) of the cost of focusing on millimeter wave spectrum:

“The question of spectrum allocation is at the heart of the 5G competition, for the spectrum band of choice, whether sub-6 or mmWave, impacts nearly every other aspect of 5G development. Spectrum bands in the 3 and 4 Ghz range dominate global 5G activity because of improved propagation (range) over mmWave spectrum, resulting in far fewer base stations needed to be deployed to deliver the same coverage and performance. Because large swaths of the sub-6 bands in the United States are not available for civil/commercial

¹⁴ Brodtkin, Jon. "Millimeter-wave 5G Will Never Scale beyond Dense Urban Areas, T-Mobile Says." *Ars Technica*. April 22, 2019. Accessed April 25, 2019. <https://bit.ly/2IWavSZ>.

¹⁵ Brodtkin, Jon. "Millimeter-wave 5G Isn't for Widespread Coverage, Verizon Admits." April 23, 2019. Accessed April 25, 2019. <https://bit.ly/2Gvd0Jb>.

use, U.S. carriers and the FCC (which controls civil spectrum in the US) are betting on mmWave spectrum as the core domestic 5G approach.

“U.S. carriers may continue to pursue mmWave, but it is impossible to lead in the 5G field without followers. Leadership in wireless networks requires the global market to subscribe to and build to the specifications of the leader’s spectrum bands of choice, as these 5G subcomponents and products will ultimately drive interoperability across networks. The rest of the world does not face the same sub-6 spectrum limitations as U.S. carriers, and is subsequently pursuing 5G development in that range. As a result, the United States may find itself without a global supply base if it continues to pursue a spectrum range divergent from the rest of the world.

“If the future 5G ecosystem adopted by most of the world is built on the sub-6 mid-band spectrum, the United States will also be faced with mmWave device interoperability challenges and sub-6 infrastructure security concerns. As sub-6 becomes the global standard, it is likely that China, the current leader in that space, will lead the charge. This would create security risks for DoD operations overseas that rely on networks with Chinese components in the supply chain. Even if the United States were to restrict use of Chinese equipment suppliers domestically, the United States is not a big enough market in wireless to prevent China’s 5G suppliers from continuing to increase market share globally, resulting in significant pressure on a declining set of vendors that would serve the U.S. market. These vendors will in turn be unable to invest R&D towards future 5G offerings due to decreasing market share, limiting the number of competitive products and depriving DoD and U.S. industries of better and cheaper global supply chains.”¹⁶

As Josh Rogin summarizes in the title of a *Washington Post* article, “[On 5G, the United States is building Betamax while China builds VHS.](#)”¹⁷

¹⁶ Medin, Milo, and Gilman Louie. "The 5G Ecosystem: Risks & Opportunities for DoD." April 3, 2019. Accessed April 25, 2019. <https://bit.ly/2VrWR0L>.

¹⁷ Rogin, Josh. "On 5G, the United States Is Building Betamax While China Builds VHS." *The Washington Post*. April 18, 2019. Accessed April 25, 2019. <https://wapo.st/2DzxkIZ>.

Despite the report by the Defense Innovation Board, the Pentagon has done nothing to free up 5G spectrum (of which it possesses an enormous amount). Also, the FCC has moved forward with a millimeter spectrum auction pretending that it will help rural America, when it is technologically impossible.

The defenders of the old telecoms and the FCC try to focus on 5G inside America, but this is simply impossible, and will have serious consequences. Scale is going to come from worldwide sales. Nortel, Lucent, and Alcatel were once powerful companies with excellent technology, but they couldn't grow to scale and were driven out. Intel just announced it is dropping out of the 5G chip business while Huawei is "open" to selling its 5G chip to Apple. Trying to defend a 5G strategy focused solely inside the United States is a hopeless denial of the economic realities of the modern world.

In the recent *Washington Post* [article](#), Rogin cites one administration official who said, "So we are winning a race that no one else is running to build a 5G ecosystem that no one else will use."¹⁸

Furthermore, if Huawei becomes the dominant provider of telecommunications equipment worldwide, American forces, American diplomats, and American companies will be operating in a sea of Chinese-controlled communication technology and infrastructure.

This is not a distant threat. Recently, *The Wall Street Journal* [reported](#) that AT&T is using Huawei in Mexico:

"AT&T doubled down on Huawei over the next four years as it upgraded the infrastructure it acquired to support 4G service. A senior AT&T executive in 2016 told an industry publication that the supplier's [performance was 'excellent.'](#) The company has estimated the price of replacing the Huawei electronics it has in Mexico and found the cost prohibitive, according to a person familiar with the matter.

...

¹⁸ Ibid.

“When AT&T’s Mexican headquarters moved into a glassy tower finished in 2016, Huawei moved into a satellite office a floor away to stay close to its client.”¹⁹

Meanwhile, according to a headline in the [Financial Times](#): “German regulator says Huawei can stay in 5G race. Agency defies US call for ban on Chinese group provided it abides by data secrecy rules.”

The article [notes](#):

“Germany’s telecoms regulator has given the clearest signal yet that equipment maker Huawei will not be excluded from the buildout of the country’s superfast 5G network, despite fierce pressure from the US to shut out the controversial Chinese supplier for security reasons.

“Jochen Homann, the president of the Bundesnetzagentur, or federal network agency, told the Financial Times in an interview: ‘The position the Bundesnetzagentur takes is that no equipment supplier, including Huawei, should, or may, be specifically excluded.’”²⁰

U.S. strategic operations in the former communist bloc of Eastern Europe are also under threat as China’s 5G Western domination continues. On April 16, [Reuters reported](#) that Poland would not seek to exclude Huawei from its 5G networks, despite the fact a former Huawei employee is under investigation for espionage against Poland.²¹ The United States is currently [negotiating a deal](#) to establish an American military base in Poland – an outpost the Poles see as a deterrent to Russian aggression.²²

Where Huawei’s 5G is deployed, Chinese surveillance technology follows. When China Telecom’s consortium was awarded the third telco license in the Philippines, Huawei [swooped in](#) to offer a “Safe Manila” CCTV camera system, deploying

¹⁹ FitzGerald, Drew. "The U.S. Wants to Ban Huawei. But in Some Places, AT&T Relies On It." The Wall Street Journal. April 16, 2019. Accessed April 25, 2019. <https://on.wsj.com/2UlnSOD>.

²⁰ Buck, Tobias. "German Regulator Says Huawei Can Stay in 5G Race." Financial Times. April 14, 2019. Accessed April 25, 2019. <https://on.ft.com/2GIPjV5>.

²¹ Koper, Anna, and Joanna Plucinska. "Poland to Hold off Blanket Ban on Huawei 5G Gear Due to Cost Concerns." Reuters. April 16, 2019. Accessed April 25, 2019. <https://reut.rs/2ZyFQ49>.

²² Jacobs, Jennifer, Justin Sink, Nick Wadhams, and Marek Strzelecki. "Poland and U.S. Closing In on Deal to Build ‘Fort Trump,’ Sources Say." Bloomberg.com. April 16, 2019. Accessed April 25, 2019. <https://bloom.bg/2XicJfF>.

more than 12,000 cameras with advanced facial recognition software built in.²³ The United States had just signed an enhanced cooperation agreement with the Philippines on its military presence in the island-nation. Though the project was eventually refused, Huawei and China are astoundingly quick to offer surveillance systems in countries where a major strategic American military presence exists. How can we protect our troops and our interests if Chinese surveillance technology is built on Chinese-powered networks?

VII. CONCLUSION

The case for American-led 5G deployment is a critical matter of national security and should be seriously and urgently addressed. The state or entity that controls 5G will define the essential digital infrastructure of the future. Consequently, if an aggressive actor controls this technology globally, it will have dangerous implications for the United States.

Additionally, 5G is essential for developing the economic and technology spheres of rural America. Currently, there is a significant lack of coverage across rural America. There has been an obvious failure to bring the same level of technological connectivity that exists in urban areas to rural communities. With 5G, we have the opportunity to correct this error, and bring both rural and urban communities in America into the new digital age.

There are clear steps that must be taken to bring 5G to market that will protect America's national security, connect rural America, and ensure the United States' leadership in this industry. The government must provide the leadership and encouragement, while the private sector must install and deploy the necessary, cutting-edge technology. If we fail to implement this all-of-government and all-of-society effort to deploy 5G securely and efficiently, we are risking a totalitarian, Chinese controlled technological future. The time to act is now, and the level of urgency for successfully completing this effort cannot be overstated.

APPENDIX I: CHANGING THE BUREAUCRACY – VICE PRESIDENT PENCE'S PRINCIPLES FOR DRIVING CHANGE

²³ Mandhana, Niharika. "Huawei's Video Surveillance Business Hits Snag in Philippines." The Wall Street Journal. February 20, 2019. Accessed April 25, 2019. <https://on.wsj.com/2IGriKB>.

These principles are based on the Vice President's [speech](#) to the National Space Council in Huntsville that I summarized in a recent [op-ed](#).²⁴ They also apply to 5G implementation.

Principle I: Establish a big goal and then stick to it.

“Failure to achieve our goal to return an American astronaut to the Moon in the next five years is not an option.”²⁵

Principle II: Be prepared to reach outside of the traditional bureaucracy to new, entrepreneurial, private companies if it is necessary to get the job done.

“[W]e’re not committed to any one contractor. If our current contractors can’t meet this objective, then we’ll find ones that will. If American industry can provide critical commercial services without government development, then we’ll buy them. And if commercial rockets are the only way to get American astronauts to the Moon in the next five years, then commercial rockets it will be.”²⁶

Imagine that the principle of turning to new suppliers and new companies was applied across the federal government to get faster, better, more efficient, and less costly solutions in health, in learning, and in every aspect of the federal government. Imagine a Defense Department that was this aggressive in reaching beyond the old supplier base to new entrepreneurs.

Principle III: Be willing to change the bureaucracy, rather than abandon the goal.

“[W]e will call on NASA not just to adopt new policies but to embrace a new mindset. That begins with setting bold goals and staying on schedule.”²⁷

²⁴ Gingrich, Newt. "Mike Pence's 5 Rules for Effective Government." Fox News. April 6, 2019. Accessed April 25, 2019. <https://fxn.ws/2ISINqt>.

²⁵ Pence, Vice President Mike. "Remarks by Vice President Pence at the Fifth Meeting of the National Space Council." The White House. March 26, 2019. Accessed April 25, 2019. <https://bit.ly/2UYxgwU>.

²⁶ Ibid.

²⁷ Ibid.

Vice President Pence recognizes that a new mindset has to replace the absence of new money. A new mindset is often necessary because more money poured into failing systems simply leads to more expensive failures.

Principle IV: Be determined to change the bureaucracy in fundamental ways.

“NASA must transform itself into a leaner, more accountable, and more agile organization. If NASA is not currently capable of landing American astronauts on the Moon in five years, we need to change the organization, not the mission.”²⁸

This principle can and should be applied to virtually every aspect of the federal bureaucracy.

Principle V: Urgency must replace complacency.

“What we need now is urgency. ... But it’s not just competition against our adversaries; we’re also racing against our worst enemy: complacency.”²⁹

Vice President Pence’s principles should be applied throughout the federal government and would be good principles for Congress to apply in conducting oversight. Moreover, a lot of governors and mayors could apply them to their levels of state and local government.

These five principles clearly apply to developing and implementing a 5G strategy that will ensure American success.

APPENDIX II: THE SCALE OF THE CHINESE EFFORT TO BECOME A GLOBAL HEGEMON

It is impossible to consider Huawei in isolation.

Huawei is simply one piece of an impressively large and complex Chinese effort to create worldwide capabilities that will first rival and then surpass the American-led system that has dominated the planet since 1945.

At home, China possesses the world’s largest market. It can domestically absorb huge volumes of cell phones, tablets, laptops, etc. It has steadily built a mutually

²⁸ Ibid.

²⁹ Ibid.

reinforcing series of companies (often in collaboration with the People’s Liberation Army and the supportive financing of government-directed banks and funds).

China is rapidly crowding out foreign companies that were once dominant. Where necessary, China has simply stolen intellectual property and violated patents. The result is a Chinese base of operations that gives its leading companies enormous resources in competing with traditional free enterprise companies. Unless a better strategy is developed, the West will simply have all of its significant technology companies hollowed out and then absorbed or bankrupted (note Intel’s withdrawal from the 5G chip market as a recent example).

Outside of China, the Chinese initiative is equally bold and comprehensive.

The Belt and Road Initiative is the general title of an amazing range of activities around the world. The development of the internet and both wireless and wired communications is simply one aspect of the larger Belt and Road Initiative.

A clear statement of the importance of communications in Chinese thinking came in March 2015 when the communist government [published](#) “Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road.”

Issued by the National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce of the People's Republic of China, with State Council authorization, it announced:

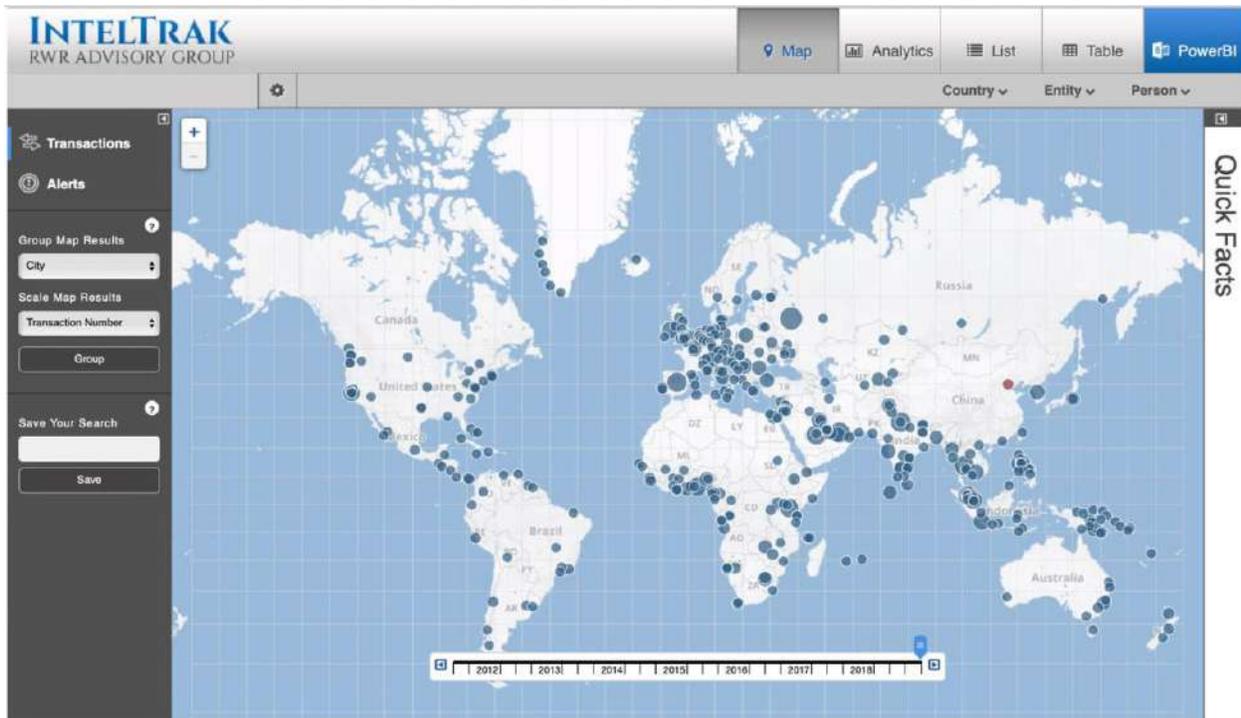
“We should jointly advance the construction of cross-border optical cables and other communications trunk line networks, improve international communications connectivity, and create an Information Silk Road. We should build bilateral cross-border optical cable networks at a quicker pace, plan transcontinental submarine optical cable projects, and improve spatial (satellite) information passageways to expand information exchanges and cooperation.

...

“We should push forward cooperation in emerging industries. In accordance with the principles of mutual complementarity and mutual benefit, we should promote in-depth cooperation with other countries along the Belt and Road in new-generation information technology, biotechnology, new energy technology, new materials and other

emerging industries, and establish entrepreneurial and investment cooperation mechanisms.”

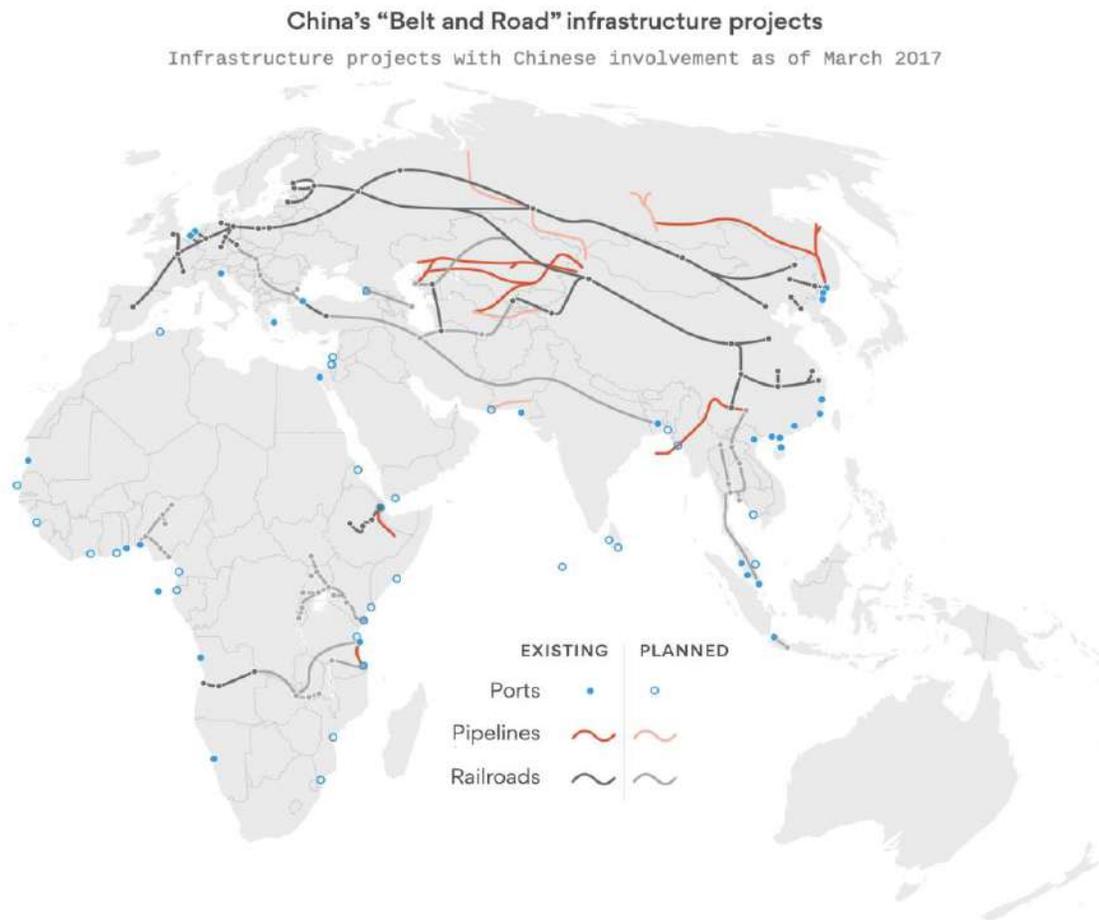
A successful American 5G strategy must be designed to match the scale and aggressiveness of the Huawei-Chinese government-Communist Party system.



The above map created by [RWR Advisory Group](#) provides insight to the scale of Chinese efforts. Visualizing Huawei’s immense global footprint reinforces the necessity of and urgency for an American strategy to counteract China’s worldwide efforts.³⁰

³⁰ "IntelTrak." RWR Advisory Group. Accessed April 25, 2019. <https://bit.ly/2XKkGhL>.

However, when crafting an American strategy, we cannot look only at China's efforts directed toward 5G. Rather, we must examine the totality of China's global ambitions and understand how they collectively work together and reinforce one



Adapted from a Mercator Institute for China Studies [map](#); Map: Lazaro Gamio / Axios

another.

For example, the above map, courtesy of [Axios](#), shows the expansive projects already underway or planned under China's Belt and Road Initiative.³¹

³¹ Gamio, Lazaro, and Erica Pandey. "The Staggering Scale of China's Belt and Road Initiative." Axios. January 19, 2018. Accessed April 25, 2019. <https://bit.ly/2IYDwNZ>.



Additionally, the above map from CSIS’s [Asia Maritime Transparency Initiative](#) depicts the South China Sea and China’s outposts in the Paracel and Spratly Islands. The red dashes indicate China’s nine-dash line, which is the ambiguous border of China’s maritime claims. The various rings indicate the expected or observed regional military projection capabilities that China is now able to deploy based on their aggressive militarization and claimant strategy in the South China Sea.³²

³² "Chinese Power Projection Capabilities in the South China Sea." Asia Maritime Transparency Initiative. Accessed April 25, 2019. <https://bit.ly/2DQ0oKn>.



Furthermore, using data provided by the [Confucius Institute Headquarters](#) (Hanban), this map shows all countries across the world that host at least one or more Confucius Institute and/or Confucius Classroom.³³ Through partnerships with local institutions, Confucius Institutes and Classrooms are aimed to provide educational resources and opportunities for foreigners. The curriculum focuses on Chinese language and culture but is tightly controlled through oversight by the Communist Party. These efforts serve as an important part of China's projection of soft power worldwide.

Looking at just one of these maps is sobering, but when we look at all of them together, a much more threatening picture emerges. In the first map, we see Huawei's (China's) attempt to control the telecommunications industry, possibly equipping China with global surveillance capabilities and the ability to disrupt or silence communications worldwide. Taken in concert with the Belt and Road Initiative map, we see how connecting Asia and Europe through Chinese-led and Chinese-financed projects expands China's influence and has the potential to expand their control over critical infrastructure and trade routes. Simultaneously, looking at the South China Sea map, we see China's efforts to take control over important sea lines of communication and resources, diminish US influence in the region, and project their military power beyond their land-based borders. Lastly,

³³ "About Confucius Institutes." Hanban. Accessed April 25, 2019. <https://bit.ly/1G9bCDM>.

with the widespread global establishment of Confucius Institutes and Confucius Classrooms, we see institutions welcome Chinese financing to further promote and advance an image of China that is controlled and accepted by the Communist Party.

These assertive strategies are not happening independent from one another. They are happening simultaneously and are all working together to supplant the American-led system and further project China toward global hegemony.

By examining the totality of China's initiatives and ambitious objectives, it becomes clear that survival as a free country will require an American strategy that will include an all-of-society and all-of-government effort.

For example, in terms of the competition for 5G, while implementation should be done by the private sector, a great deal of basic research, procurement, security, and regulation will inevitably be conducted in the government sector. The ecosystem of ARPANET morphing into the internet, a decade or more of DARPA investment helping create modern computing, or NASA requirements for miniaturization leading to revolutions in our ability to produce smaller devices, are examples of public-private collaboration that enabled the United States to lead the world in innovation for more than 70 years.

A similar approach will be necessary if the Chinese bid for hegemonic dominance is to be defeated.

APPENDIX III: COMPETITIVE WHOLESALE MODELS AS AN ALTERNATIVE DELIVERY SYSTEM FOR IMPLEMENTING 5G

THE CURRENT SYSTEM'S LIMITATIONS

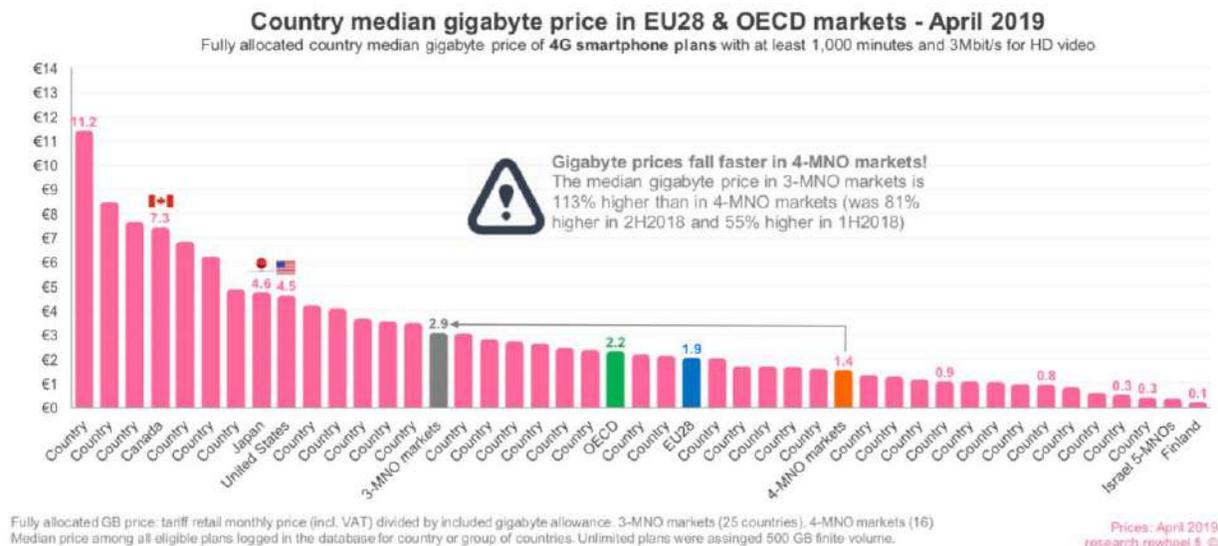
In the current system, the government auctions off spectrum that the highest-bidding company then uses to build a network. Though still subject to stringent government rules, the auction winners are the license holders of these networks and have the option to contract with other companies to use part of their networks. However, the license holders ultimately set the price and build their networks to optimize their own profits. This incentivizes the license-holding winners to set the highest possible price for wholesale customers and to only build out networks in urban areas with the largest customer bases.

At the present time, there are only four nationwide carriers in the U.S. and two of them – T-Mobile and Sprint – are trying to merge. If this merger is successful, it would leave only three nationwide American wireless network operators.

This limited competition creates an oligopoly rather than an intensely competitive system.

Unsurprisingly, the more mobile network operators (MNOs) that compete in the market, the lower the price for consumers. According to a 2019 report by Rewheel, the median gigabyte price of 4G smartphone plans in EU28 and OECD markets is lower in 4-MNO markets compared to 3-MNO markets. However, with more competition, 5-MNO markets offer the lowest median price for consumers. As made evident in the below chart, US prices are a “*universe apart*” compared to other 4-MNO and the Israeli 5-MNO markets. Prices for US consumers are also *even higher* than the median price for 3-MNO markets. The report notes:

“The median smartphone plan gigabyte price in ... the US was 15 times higher than median prices in 4-MNO competitive large European markets.”³⁴



The exorbitant prices are also reflected in US 4G mobile and wireless home broadband plans. According to the Rewheel report:

³⁴ Rewheel Report

encourage network build outs in areas that the nationwide carriers are disinclined to serve. There are a few successful regional carriers, however, for the most part, these rural license holders become economic vassals of the “Big 3-4” and become dependent on them for roaming agreements. Additionally, rural license holders find themselves subject to punishing disparities in the roaming prices that they can charge and are charged in turn by the nationwide operators. Issuing rural spectrum licenses has helped, some, in those few places with successful local operators, but they are very much the exception.

If this auction system continues to be utilized, the development of 5G systems will make the current gap between urban and rural America even greater. If the 5G systems are rolled out first in the cities, then every advantage of speed, latency, and capacity will accrue to urban businesses and urban lives, while the technological development of rural areas falls even further behind.

The current efforts to use taxpayer subsidies to lure telephone companies into rural areas are slow, cumbersome, and ineffective. The subsidies provide money to the established companies, but ultimately, have had little impact since the financing has not had success in providing full coverage for rural America. Currently, there is no plausible plan for covering all of rural America with 5G in a timely way.

5G will enhance distance learning, distance medicine, autonomous vehicles, data dense systems of monitoring manufacturing and agriculture. Under current plans, all of these advantages will be made available to urban areas, while rural areas will struggle economically and technologically and find it impossible to progress at the same rate.

WHOLESALE AS A CONCURRENT SYSTEM

Introducing wholesale as a concurrent system could potentially be the most powerful structural change for 5G’s rollout that would have enormous impact on rural areas.

In a wholesale model, carriers and others engage in a continuous process of bidding for usage of network capacity using prices based on market principles. Supply and demand – not the spectrum license holders or network owners – set the price and the market is continuously open to all wholesale bidders with equal rights of access.

The idea is not to replace or eliminate the existing carriers, or force them onto a single, mandatory wholesale network. Rather, a wholesale network would operate concurrently with and alongside both the current and future networks of the carriers.

A wholesale system allows multiple service providers to share the same capital investment. It lowers the cost per user and per bit of data produced, and by maximizing the use of the capital investment, it makes it more profitable to expand coverage rapidly and widely to service less populated areas.

RESISTANCE TO CONSIDERING A WHOLESAL MODEL

The mention of a wholesale market for bandwidth seems to alienate and anger long-time supporters of large telecommunications companies. The hostility to even thinking about adding wholesale to our wireless ecosystem seems to pervade both big companies and their bureaucratic regulators.

Part of the resistance to a wholesale model may be the threat of a crash in the prices that heavily indebted companies can charge their customers. It may be impossible to sustain the debt burden of companies such as AT&T if the price of connectivity drops substantially.

Furthermore, the big telecommunications companies make plenty of money in urban America and are happy to take taxpayer money to slowly, gradually, develop rural America. They don't seem to feel the economic and social costs of rural America lagging behind in technological access and connectivity.

THE NATURAL GAS AND ELECTRIC DISTRIBUTION WHOLESAL SUCCESSES

In other industries, wholesale structures work very well. As a result, the intense refusal of the telecommunications bureaucracy and big corporations to discuss a wholesale approach is puzzling.

In fact, in both the electricity and natural gas markets, competitive wholesale systems have developed and resulted in dramatic declines in cost and remarkably greater shared usage of capital investments.

Consider just a few examples of the impact of the wholesale system on the cost of electricity.

For example, citing data from a joint Cleveland State University and Ohio State University study, electricity policy manager and senior fellow Devin Hartman at the R Street Institute writes:

“Since 2011, the study found \$15 billion in consumer savings in Ohio and projected comparable saving through 2020.”

This price-lowering effect of increased competition in this industry extends beyond Ohio’s borders. Hartman [further notes](#):

“The economic advantages of markets have culminated in rates trending in opposite directions in monopoly and restructured states. From 2008 to 2016, the weighted-average price of electricity in monopoly states increased 15 percent, while it decreased 8 percent in restructured states. This national trend holds true in the Midwest.”³⁶

The impact of competition has exactly the effect that a free market advocate would expect. Citing the study “The Evolution of the Revolution: The Sustained Success of Retail Electricity Competition,” Cheryl Kaften reports in *Energy Manager Today*:

“Competition-era price trends in the customer choice jurisdictions have been more favorable to customers than price trends in the 35 traditional monopoly regulation jurisdictions (“monopoly states”), with average electricity prices falling against inflation in customer choice jurisdictions, but far exceeding inflation in monopoly states; and

“Customer choice jurisdictions, as a group, have outperformed monopoly states in generation, attracting billions of dollars of investment in new, more efficient generation; and resulting in higher capacity factors than in monopoly states and parity in resource adequacy to meet load.”

Moreover, the competition in the electricity industry actually grew out of the success of a similar pattern in the natural gas market. As a National Renewable Energy Laboratory report in 2016 stated:

³⁶ ELECTRICITY COMPETITION EXCELS IN THE MIDWEST by Devin Hartman. R Street shorts October 2016

“Deregulation of the natural gas industry also increased the impetus for electricity deregulation. The decline in real wholesale and retail natural gas prices in the late 1980s and early 1990s was attributed to the deregulation and introduction of competition in the natural gas industry. . . . In the mid-1990s, states began to look at competition as a way of increasing the electric power industry’s efficiency and lowering electricity rates. By April 2001, 24 states had passed legislation related to electricity market restructuring. . . .

“As of July 2015, 14 states have broad-based customer access to competitive retail markets.”

Looking at the successes and lessons learned in these two industries will be essential as we think through how to efficiently and effectively deploy a 5G network.

BUILDING OUT THE SYSTEM

It is important to note that it would be too radical to impose a wholesale telecommunications system as a replacement for the entire current model. A replacement therefore is not being suggested.

However, it is possible to have a wholesale provider existing side-by-side with the current oligopolists. Then the competition would attract smaller carriers, startups, and new distributors using a wide range of innovations.

Just as the electric wholesale model grew and developed in part to accommodate solar, wind, and other power sources, a wholesale model for 5G could potentially liberate customers from the current oligopoly and oligopolistic pricing. Large buildings could form their own co-op and buy network capacity through the wholesaler. Large companies that use a lot of data, such as FedEx, UPS, or major trucking companies, might form purchasing systems to buy through the wholesaler.

There are major private investors indicating that there is a clear willingness to invest billions in a new, competitive, carrier neutral, wholesale network. As a result, it is evident that a new 5G network based on this model can be built in the private sector with no government subsidies.

Instead of government subsidies, the detailed records of the competitive bidding process would allow the wholesale network to pay authorities a royalty in perpetuity. This in turn would create a stream of revenue far greater than that which is received from the current system. Additionally, because the wholesale system is so much more efficient at using spectrum, it could provide low-cost (and in some cases no cost) 5G services to the federal government in perpetuity.

If the prospect of launching a nationwide wholesale network all at once is simply too much for the bureaucratic mindset, an interim step would be to offer individual states or regions the opportunity to develop a wholesale network.

A governor who was offered a privately-financed 5G network that would put his or her state a decade or more ahead of others might agree that this is a big breakthrough for his or her home state.

A governor who could tell all of his or her constituents in rural areas that they would have 5G coverage before most of the big cities in America would receive a significantly positive response.

If the Federal Communications Commission is unwilling to propose the framework for a nationwide wholesale network, it should at least authorize such a network for states who come and request to have it installed by private companies.

IF IT FAILS

The construction of a wholesale network would be privately funded with a bonded guarantee of completion, including in rural areas.

If the wholesale network failed to generate sufficient revenue after it was completed, it would still be a state of the art 5G network, and the entire system could be sold to traditional telecommunications companies or to other entrepreneurs.

Ultimately, there is no downside risk from trying this innovative approach to speed up the development of a 5G system.