



Ward County, TX

Broadband is the Economic Development Tool of the 21st Century

How Broadband Opens Doors for a Majority-Hispanic Boomtown in West Texas

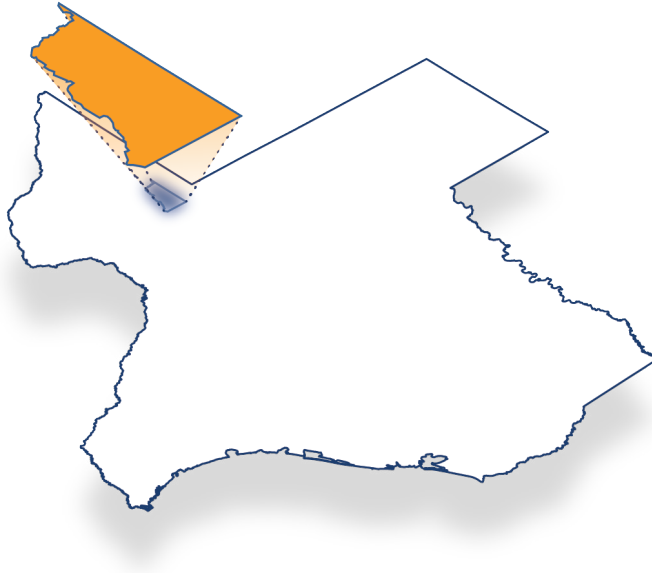


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**Regina Seo
Makada Henry-Nickie**

TEXAS

WARD COUNTY



11,745¹

Population

11.8%²

Population change 2010-2020

\$61,915³

Median household income

9.8%⁴

Poverty rate

796⁵

Nonemployer businesses

INTRODUCTION

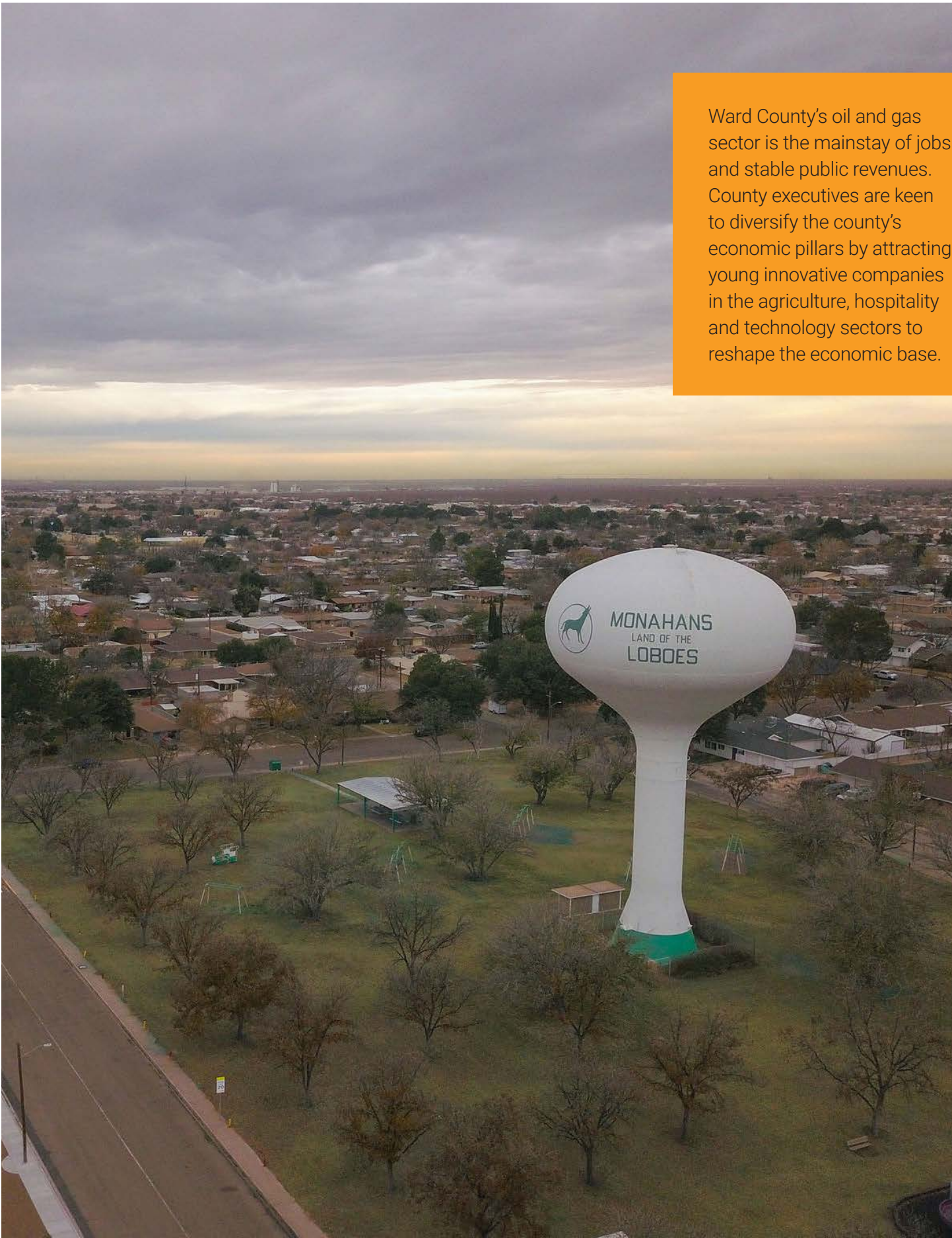
The discourse surrounding rural America largely revolves around white-majority areas in agricultural settings.




While rural areas have higher white populations (74.8%) compared with urban populations (57.8%), rural America is becoming more diverse, with the Hispanic and Latino populations driving most of its growth.⁶ Among 72 majority-Hispanic rural counties, 23 counties (31.9%) have a dominant oil and gas industry that provides more than 10% of total employment.⁷ Oil and gas economies, especially in rural settings, face unique challenges in dealing with population churns and economic volatility associated with the extractive economies' exposure to price volatility. Rural extractive economies often lack the institutional support and infrastructure to weather the ups and downs of boom-bust cycles. Rural policies must therefore cater to major industries beyond agriculture, and they should not be solely left to the U.S. Department of Agriculture (USDA), as they currently stand. A comprehensive national rural strategy must be a coordinated effort across the relevant agencies, including the Department of Energy, Department of Labor, and the Department of Transportation, in addition to the USDA, taking into account the heterogeneous composition of rural residents, communities, and industries. See Pipa and Geismar (2020) for a discussion on modernizing U.S. rural policies.⁸

Ward County is a majority-Hispanic (53.7%) rural county with a population of 11,658 situated in western Texas. It lies in the center of the Permian Basin, the country's most productive oil and natural gas basin, alongside Ector County and Midland County. In 2021, Ward produced 44.8 million barrels of oil, earning a spot as the 9th largest oil-producing county in the Basin. According to Collins (2021), the Permian Basin has largely evaded the *resource curse* that arises from conflict, lack of local political accountability, fiscal mismanagement, and corruption. However, physical infrastructures remain strained due to the excessive demands brought on by large population inflows—housing shortages, road safety, water and sanitation systems, and quality schools and hospitals. The negative impacts of this *subnational resource curse* are more pronounced in the rural parts of the basin, including Ward County.⁹ Nearby counties in urban spaces, such as Ector County and Midland County, have been more readily able to create and support community infrastructures through robust local institutions and corporate engagement.

However, Ward County stands out against other rural minority communities in the way they've leveraged broadband and technology to attract businesses and retain workers. The Monahans Chamber of Commerce, keenly aware of the possibilities that broadband can offer, has completed the first stage of building out an eight-mile ethernet ring of fiber-optic cable that will bring reliable high-speed broadband to the city's businesses, schools, and hospitals.¹⁰ Teresa Burnett, executive director of the Monahans Chamber of Commerce, recognizes broadband as the economic impetus of the 21st century that will stimulate growth for Ward County. Reliable access to high-speed internet allows the county to implement better technology in its leading oil and gas industry, attract new businesses from other industries, and contribute to building a better community infrastructure to support and retain population inflows.



Ward County's oil and gas sector is the mainstay of jobs and stable public revenues. County executives are keen to diversify the county's economic pillars by attracting young innovative companies in the agriculture, hospitality and technology sectors to reshape the economic base.




Broadband is a necessity, not a luxury. Broadband is the number one economic project tool in America. It connects us. It ensures we can develop the technology so we can keep doing what we do.

Teresa Burnett
Executive Director
Monahans Chamber of Commerce





ODESSA MONAHANS



Odessa College has been pivotal in creating on-ramps for residents to good-paying jobs in Ward County's emerging job sectors. Odessa College is committed to growing a locally anchored workforce to reduce the Ward County's dependence on imported workers from outside the Permian region.

WARD COUNTY'S DEPENDENCE ON THE OIL AND GAS INDUSTRY

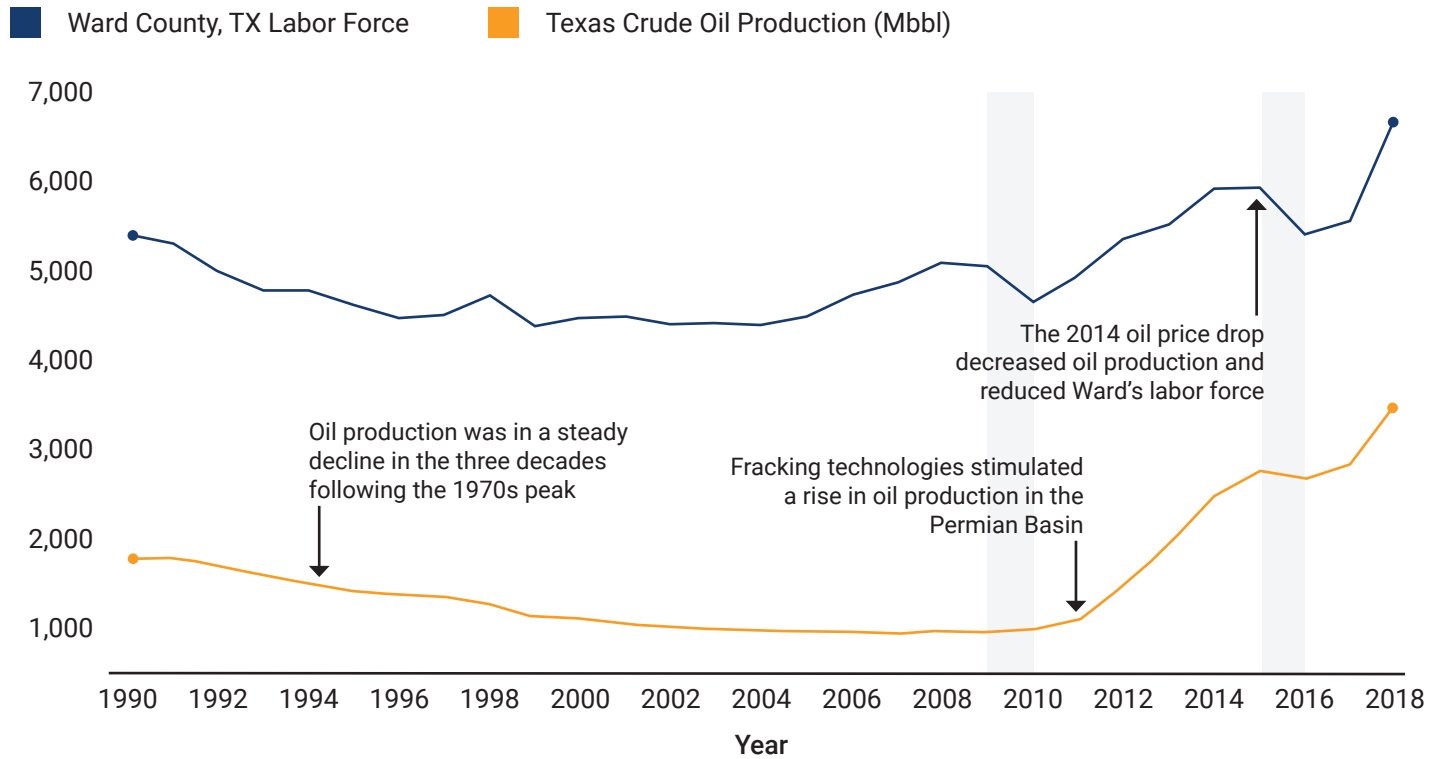
The oil and gas industry is the largest employer in Ward County, creating around 26% of all jobs in the county.¹¹



Ward's economy is heavily dependent on oil and gas, with employment and wages closely tracking oil prices. Mayor Adam Steen of Monahans City explained that Ward has an institutional memory of the bad times. In the 1980s, a surplus of crude oil led to declining oil prices in 1986. As a result, Ward's population declined steadily—from a peak of 16,200 in 1982 to a low of 10,100 in 2007—over time with decreasing oil production. From 2008 onward, the development of hydraulic fracturing and horizontal drilling techniques, coupled with a high demand for oil, brought the Permian Basin back to business, inducing a spike in oil production. Ward's population began to climb in kind and has since reached its current total of 11,700.

FIGURE 1

Oil Production Dictates Labor Force Growth in Ward County



Source: U.S. Bureau of Labor Statistics and the Railroad Commission of Texas.

A boomtown's most telling metric of economic performance is its population count. As seen in Figure 1, Ward's labor force population paralleled the crude oil production in Texas. After the peak of oil production in the United States in the 1970s, the demand response to supply shocks started to push oil prices down, sparking a continual fall in supply throughout the ensuing three decades. Ward's labor force stayed stagnant during the same period. After a short decline in workers due to the Great Recession's aftermath around 2010, Ward's labor force began to increase sharply following the oil boom cycle induced by innovations within the oil industry. In late 2014, oil prices dropped due to a significant surplus of crude oil, and Ward's industries shed labor during the oil glut until 2016. The county's labor force started to pick up again as prices recovered. For a boomtown like Ward, strategies to deal with bust cycles when oil prices drop, workers leave, and the economy dials down are critical to sustaining its economy through the hard times.


The economy of the city almost solely relies on the oil industry and what it brings out here as far as workers and all the businesses thriving off of it. We can all feel when the oil price dips down, and we can all feel when it goes up. And there's good and bad with both.



Small-holding ranchers like Generation Cattle Ranch face considerable obstacles when integrating connected technologies into their operations. Reliable broadband connectivity would enhance the Hunts' access to real-time market prices, online auctions, and precision livestock management software.

IMPLEMENTING TECHNOLOGY IN THE ENERGY VALUE CHAIN

To match the rest of the Permian Basin's production speed during boom cycles and to keep the industry afloat during bust cycles, Ward has implemented innovative technologies on the ground.



New companies like Atlas Sand, a frac sand reserve holding company, moved to Ward County in recent years, drawn by the county's natural endowment: an abundance of sand with high silica content. Atlas Sand imported new technologies into Ward to exploit the county's sand fracking potential. New company inflows translate to new jobs for local residents and offer the county an opportunity to attract new populations.

The oil and gas industry produces so much more than people realize. Our medical supplies, appliances, refrigerators, batteries, and tires for our vehicles—all of these products depend on the oil and gas industry. Even though we're looking to diversify and switch to electric cars, we still have to have the oil and gas industry because electric cars still need batteries and tires. So we still have to produce in this industry so that people can continue to live and grow through this industry.

Teresa Burnett
Executive Director
Monahans Chamber of Commerce

Atlas Sand has promoted technological innovations in the field, pushing systems toward centralized controls and automation. Firms like these have created thousands of jobs in Monahans, including for truck drivers, last-mile division teams, mechanics, electricians, systems and network engineers, and cybersecurity specialists. The new firms focus on hiring workers from the community and providing on-the-job training. The new middle-skill jobs create quality wages and more energy-proof skills that workers can transfer to other companies located throughout the Permian Basin with similar emergent workforce needs to support energy-diversified jobs like clean tech, solar, and other green economy jobs. In addition, there is untapped potential in utilizing Ward's silica sand that can be used for chips in computers and phones.

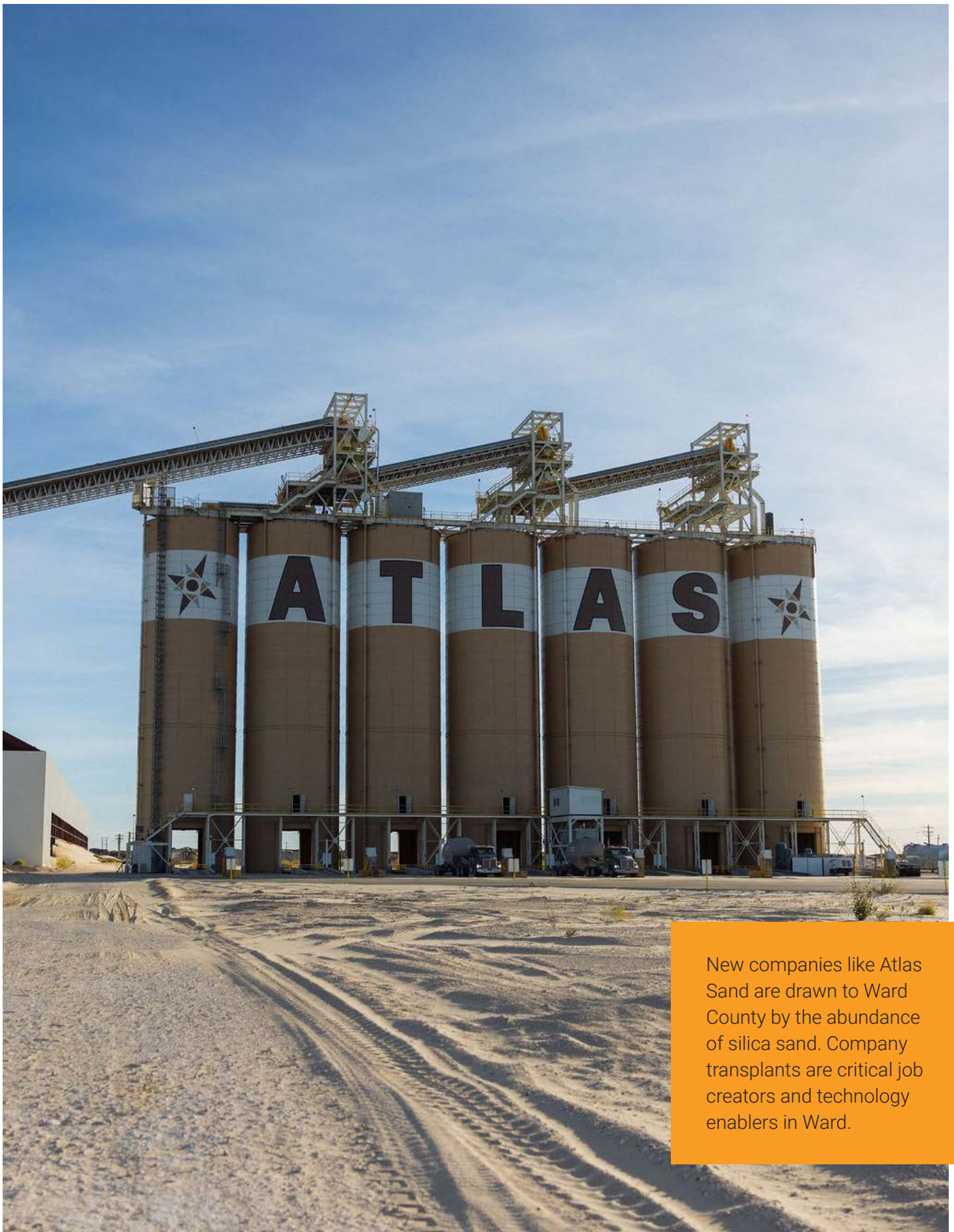
Other than firms directly supporting the oil and gas industry, a newer industry in Bitcoin mining that benefits from abundant power sources has emerged in Texas, including at Ward County. While Bitcoin mining is extremely energy-intensive, it takes advantage of untapped energy, such as natural gas, that would otherwise be unused due to limited transportation methods.¹² In addition to providing natural gas, Texas provides institutional support for the Bitcoin industry with the backing of local leaders. Ward County has seen an increase of solar farms to source power to the Bitcoin industry. While the Bitcoin industry has potential for growth in a county like Ward, extra precautions must be taken so that the supporting infrastructure are in place to accommodate an intensive energy-consuming industry that will bring about a high population influx in addition to the workers migrating for the existing oil and gas industry.¹³

One major infrastructure needed to support the growing energy-adjacent industries in Ward County is broadband. Atlas Sand has experienced firsthand the limitations that a poor broadband infrastructure can bring to a growing industry. Cody Fuentes, an engineer at Atlas Sand, recalled the digital divide and lack of connectivity in rural areas as two of the greatest

Tech and specialized skills are becoming more and more important. It's core. It's a big transition we made over the last two years, and we've seen what technology can do for us and how we can adapt it into our environment. And we've seen a lot of positive influences, especially going through COVID-19. Recently, being able to implement a lot of technology in the field has really helped us thrive.

Cody Fuentes
IT junior systems engineer
Atlas Sand

challenges when implementing new technology. Having a single internet service provider was especially problematic when dealing with outages. Mr. Fuentes expressed feeling “crippled in our communication and ability to work when the internet goes down due to wind or rain. Having reliable [broadband] sources is going to change the game for us.” Keith Balderaz, Permian Basin business development manager of Maverick International, also shared that “we are one of the busiest areas in the country and a top-producing basin. Lack of communication [due to lack of broadband] should not be an issue here.”



New companies like Atlas Sand are drawn to Ward County by the abundance of silica sand. Company transplants are critical job creators and technology enablers in Ward.

The green energy sector is growing in our area—we have solar farms going up to help provide energy to our refineries. The fastest growing industry here is the Bitcoin industry, which uses vast amounts of power. Ward County is always looking to diversify, but diversification costs a lot.

Teresa Burnett
Executive Director
Monahans Chamber of Commerce



Teresa Burnett, Executive Director of the Monahans Chamber of Commerce, is a leading force in Ward County's efforts to close its digital divide. Burnett has been instrumental in marshaling resources to support the development of an ambitious ethernet ring project that will strengthen the county's broadband infrastructure.



BROADBAND FACILITATES INDUSTRY DIVERSIFICATION AND ATTRACTS BUSINESSES

It's not only the energy-adjacent sectors that Ward County is seeking to grow.



Agriculture is a relatively untapped industry in Ward with potential for growth and diversification. Village Farms is an international produce supplier to grocery stores and retailers in North America. They opened a greenhouse in Monahans in 2012, the fifth greenhouse built by the company in Texas, which produces tomatoes, bell peppers, and cucumbers. The decision to locate in Monahans came from labor availability, low input and energy costs, and high economies of scale. However, lack of internet connectivity prolonged the construction of the greenhouse, which took two years to build. In addition to the crops that Village Farms produces, Director Burnett observes growth potential in Ward for sunflowers and pomegranates, both of which take well to dry heat.

Monahans and this entire region are dying for growth outside of the oil industry. I hope that broadband will open up a lot of opportunities for local leaders to be able to even consider talking to people to try to bring business here.

Adam Steen
Mayor
Monahans City

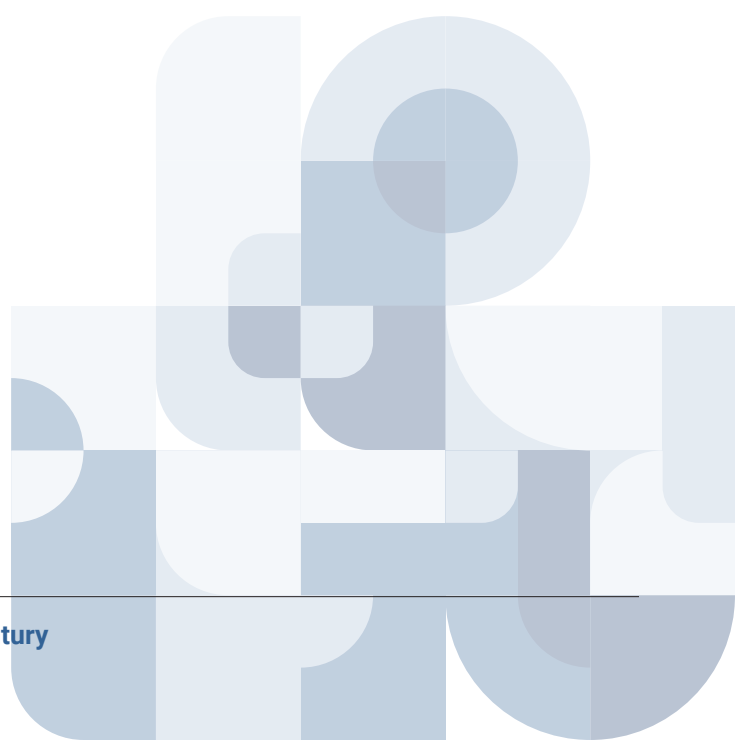
Cattle ranching is another area of growth in Ward County. Small businesses such as Generation Cattle Ranch, run by third-generation ranchers, are striving to find a niche market in a meat industry dominated by big meat processing corporations. Small firms endeavor to set themselves apart from big corporations by communicating directly with consumers—to show how the ranchers manage their cattle in a healthy and environmentally friendly manner. Broadband plays a role in every part of this process. All cattle are given electronic ID tags that provide real-time data crucial for price-setting. The internet allows ranchers to manage cattle health via GPS tracking tags. Companies leverage social media to advertise how the ranch grows grass to capture the carbon emitted by their cattle. Todd Hunt, a third-generation rancher at Generation Cattle Ranch, pointed out that the stereotype of an uneducated farmer is outdated and that workers in agriculture yearn for more education and greater access to technology to innovate and improve their field.

When oil prices dip, Ward residents need to rely on their small businesses and go into “survival mode,” trying to shop local to help each other out. Mayor Steen described a catch-22 effect for small businesses having a hard time employing workers when they most need them during boom cycles as individuals seek out higher paychecks in the oil industry. Population churn and a mobile population driven by wages makes it hard for Ward to grow alternative industries without certainty of the market, consumers, and workers. High-speed internet remains a critical infrastructure for business owners like Marielena Saenz and Ever Saenz, who own a franchise coffeeshop, RV park, and a laundromat. Business owners need reliable internet to be able to process payments and to attract customers looking to get work done.

I really think if we as an American people can get past the point of categorizing [those working] in agriculture as one of the big bad guys and the culture of environmentalists being against us, there's a place where we can make progress. Hopefully, with better [internet] access, we can do that.

Todd Hunt
Third-generation cattle rancher

Even though small businesses make up more than 90% of businesses in rural areas, only 10% of funding from the Small Business Administration's (SBA) 7(a) loan program was awarded to businesses in nonmetropolitan areas for the fiscal years 2010 and 2021.¹⁴ Rather than assigning all rural funding to the USDA, federal programs such as the SBA lending program need to explicitly account for rural small business heterogeneity to fund small businesses in rural communities, including those in agriculture, which contribute to the local economy as well as the environment.





The growth of small and micro-business is crucial to the revitalization of rural communities. Policymakers must align capital strategies and investments in broadband to ensure the adaptability and sustainability of these Main Street job creators.

Internet to the business is crucial here. When our internet goes down our business suffers greatly because it takes forever to run a credit card. We do have offline mode, but it still takes like about 60 seconds... time is money here because people will drive off if we take too long so speed is as efficient as essential. And our customers come in and do their work because there's nowhere else in town that offers free internet.





Ward County's Ethernet ring will support the county's global vision for economic diversification by providing reliable internet connectivity for local businesses, hospitals, and neighborhoods.



BROADBAND AND THE ROLE OF ANCHOR INSTITUTIONS

Anchor institutions play a crucial role in investing resources to address structural gaps in rural communities, including the broadband infrastructure and the local workforce.



Ward County's anchor institutions like the Ward Memorial Hospital and Odessa College have regional spillover benefits by serving nearby populations and bringing needed infrastructure to the regions. Ward Memorial Hospital is a county-owned hospital in Monahans, a Level IV Trauma Center, servicing 14 surrounding counties. Reliable access to broadband is critical for continuous patient care, especially for a hospital like Ward Memorial that uses teleradiology in place of in-house radiologists. Infrastructure investment in health and housing, including telehealth, help to stabilize the churning populations by making the county an attractive place to settle down in with affordable and accessible healthcare.

We have teleradiology, and we're reliant on high-speed internet so that they can read those CTs and MRIs. If our CT machine goes down, we have no connection in the ER, so we're very reliant on broadband access.

Leticia Rodriguez
CEO
Ward Memorial Hospital

Ward County is committed to training local talent to both reap the benefits of the oil industry's job demands and to open doors to diverse career paths. A survey on local officials in major U.S. oil- and gas-producing states highlighted workforce retention as a major source of costs.¹⁵ Sand mine companies in Ward sometimes had to recruit workers from different towns because they couldn't find workers in the region. Due to Ward's distant location, companies have a harder time attracting workers, and this shapes the company recruitment and workforce training strategies. The distant location makes it an easier business case for companies to hire locals and provide on-the-job training or invest in other workforce training pathways to skill their workers. Atlas Sand maintains internship partnerships with Odessa College, providing students with training in process and systems engineering and cybersecurity. Atlas Sand's recruiter, Kandace Bolin, additionally sits on the advisory board at Midland College to encourage students to obtain certificates and degrees in IT and mechanical and electrical engineering.

Odessa College is a public junior college at the forefront of incubating local workers by providing industry-specific training and continuing education. It was a finalist for the 2021 Aspen Prize for Community College Excellence and is recognized as a Hispanic-serving institution, with a majority of its student body being Hispanic. The college has seen its 7th year of enrollment growth, now surpassing 8,000 students and servicing 13 counties. The Monahans campus is best known for its licensed vocational nursing (LVN) programs that recruit students from throughout the Pecos, Cranes, and Odessa regions. Many students eventually settle down in Monahans and become part of the Ward community, contributing to Ward's robust population growth. The LVN program partners with Ward Memorial Hospital to provide student training. The college also provides continuing education for local residents, including commercial driver's license training and professional office skills training. Vice President Jonathan Fuentes of Odessa College explained that the college is constantly considering the local job needs and procuring the resources to train their students to meet local job demands.

The [Odessa College]
Monahans campus
is the regional hub.
We're pulling students
from all surrounding
communities, and that's
the way it has to happen
in rural communities
because they're just so
small that we have to pull
our resources together to
make it work.

Jonathan Fuentes
Vice President of Academic Partnerships
Odessa College



AL HOSPITAL

With the continual investments in Ward's broadband infrastructure, Ward Memorial Hospital can expand its critical care services to treat patients locally. The hospital continues to grow its telemedicine modalities to serve more patients at home. E-medicine treatments will reduce residents' out-of-pocket costs for transportation and medical care.



CREATING A RESILIENT RURAL FUTURE IN WARD COUNTY

Ward County is a rural majority-Hispanic community that has benefited from oil booms, working to build the future of an innovative oil sector and welcoming diverse industries.



Lashitew and Werker (2020) make a distinction between the concepts of resource abundance and dependence: While the former refers to the availability of rents that can finance human and physical capital accumulation, the latter refers to a reliance on resources that can undermine institutional quality. Investments in supporting infrastructure such as broadband, housing, hospitals, and schools can help rural communities with abundant resources to thrive and not fall into dependence. Broadband is the key economic development tool that enables counties like Ward to attract businesses, retain talent, and become a more appealing place for families to live in. Business owners, employees, local officials, and job seekers alike are eager to embrace a new digital economy in Ward.

We've completed the first stage [of the broadband project], which is an ethernet ring around our community. This prevents us from losing connectivity for hours or days, since if we lose our internet, we lose everything in our town—restaurants and hotels checking people in and out, gas stations and grocery stores that people need to purchase from. We're now starting our second phase, which is getting connectivity to residential and commercial businesses in our community. We're not sure when it will be completed, but we will keep going as long we have funding and continue to move forward on this project.

Teresa Burnett
Executive Director
Monahans Chamber of Commerce

The Monahans Chamber of Commerce, in partnership with local stakeholders and supported by national advocates such as Broadband Connect, has embarked on an ambitious ethernet ring project to respond to the gaps in the county's broadband infrastructure. Local officials have invested millions of dollars from the Biden administration's broadband subsidies into the design and build-out of the ethernet ring project. The project will improve the productivity of incumbent firms and position the county as an attractive location for other energy value chain companies.

Importantly, the ethernet ring will support the county's larger vision for economic diversification, much of which depends on cutting-edge research sustained by reliable internet connectivity to experiment and scale new non-energy verticals that can take advantage of the county's resource endowments. The federal government should work with recovering boomtowns in rural America, like Ward County, to furnish the resources necessary to diversify their economies in the following ways:

1. Small business lending must explicitly account for rural small business heterogeneity.
2. Rural counties should establish a network partnership to leverage regional spillovers.
3. More infrastructure dollars are needed to support ethernet and diversification efforts.

Federal assistance must match the vision of rural America—one in which every corner of the economy, including the oil and gas industry, agriculture, hospitals, and schools, can harness broadband to innovate and provide their best services to their communities.

ENDNOTES

- 1 U.S. Census Bureau; American Community Survey 5-Year Estimates 2016-2020, Table B03002. Hispanic or Latino Origin by Race.
- 2 *Ibid.*
- 3 U.S. Census Bureau; American Community Survey 5-Year Estimates 2016-2020, Table B19013. Median Household Income in The Past 12 Months (In 2020 Inflation-Adjusted Dollars).
- 4 U.S. Census Bureau, Small Area Income and Poverty Estimates, 2020, Percent of People of All Ages in Poverty for Jasper County.
- 5 U.S. Census Bureau, Nonemployer Statistics by Legal Form of Organization and Receipts Size Class for the U.S., States, and Selected Geographies: 2019, NS1900NONEMP. Ward County.
- 6 Rowlands, DW, and Hannah Love. 2021. "Mapping Rural America's Diversity and Demographic Change." *Brookings Institution* (blog). September 28, 2021. <https://www.brookings.edu/blog/the-avenue/2021/09/28/mapping-rural-americas-diversity-and-demographic-change/>.
- 7 We define a county as majority-Hispanic if more than 30% of the population are Hispanic or Latino and less than 50% of the population are white.
- 8 Pipa, Tony, and Natalie Geismar. 2020. "Reimagining Rural Policy: Organizing Federal Assistance to Maximize Rural Prosperity." Brookings Institution.
- 9 Collins, Gabriel. 2021. "Has Unconventional Oil & Gas Development in the Texas Permian Basin Created a Subnational Resource Curse?" Working Paper. Rice University's Baker Institute for Public Policy. <https://www.bakerinstitute.org/files/17335/>.
- 10 Graves, Patrick. 2021. "Monahans Lays Groundwork for High-Speed Broadband, 5G." *FiscalNotes*, February 2021. <https://comptroller.texas.gov/economy/fiscal-notes/2021/feb/monahans.php>.
- 11 Bureau of Economic Analysis Regional Data, GDP and Personal Income by County, Total Full-Time and Part-Time Employment by Industry (CAEMP25)
- 12 Opportune LLP, et al. "Cryptocurrency In Texas: Why Bitcoin Mining Is Taking Off In The Lone Star State." JD Supra, 8 June 2022, <https://www.jdsupra.com/legalnews/cryptocurrency-in-texas-why-bitcoin-5755771/>.
- 13 Toppa, Sabrina. "Crypto Mining Strains Energy Grid and Creates Fresh Demands for Housing in Texas." *The Street Crypto: Bitcoin and Cryptocurrency News, Advice, Analysis and More*, <https://www.thestreet.com/crypto/bitcoin/crypto-mining-strains-energy-grid-and-creates-fresh-demands-for-housing-in-texas>. Accessed 28 June 2022.
- 14 Pipa, Tony, and Natalie Geismar. Modernizing Federal Investments for Rural Prosperity. Aspen Institute Community Strategies Group, 2021, p. 24.
- 15 Newell, R.G. and Raimi, D., 2018. The fiscal impacts of increased US oil and gas development on local governments. *Energy Policy*, 117, pp.14-24.

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