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The Bureau of Business and Economic Research has been providing information about Montana's state and local economies for more than 70 years. Housed on the Missoula campus of the University of Montana, the bureau is the research and public service branch of the College of Business. On an ongoing basis the bureau analyzes local, state and national economies; provides annual income, employment and population forecasts; conducts extensive research on forest products, manufacturing, health care and Montana KIDS COUNT; designs and conducts comprehensive survey research at its on-site call center; presents annual economic outlook seminars in cities throughout Montana; and publishes the award-winning Montana Business Quarterly.

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A toy house sitting on a stack of money. (Shutterstock)

INSIDE COVER
The Fort Peck Dam spillway on the Missouri River in northeast Montana. (AP Photo, Matt Brown)

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MESSAGE FROM THE PRESIDENT OF THE UNIVERSITY OF MONTANA

I'm proud that the Bureau of Business and Economic Research, a research and public service branch of the University of Montana, has been providing information about Montana's state and local economies for more than 70 years. We all have a stake in Montana's economic future – business leaders, land managers, legislators and parents – and BBER is committed to providing predictions that allow us to make smart decisions that will fuel future economic growth.

This publication underscores the important relationship between institutions of higher education and the economic health of a region. The University of Montana actively partners with individuals and groups across Montana to build capacity and fuel economic growth for our great state. We do this in multiple ways: by working with businesses to understand their needs and to ensure that our students are well prepared to be productive members of Montana's labor force upon graduation; by conducting cutting-edge, impactful research; and by serving as a catalyst for innovation and problem-solving around some of our communities' most challenging issues, such as housing affordability.

On a personal note, as I think about my wife's family who homesteaded here five generations ago and my three children whose Montana roots grow deeper every day, I can't help but to think about what it means to be a Montanan who faces the economic challenges our communities face. This is why I and the BBER team take seriously our roles in helping to build a healthy economy for our Montana.

As we move into the future, we will continue to look to BBER to help us make wise, strategic decisions.

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MONTANA'S ECONOMY AT A GLANCE

Western Economic Growth Leads the State

BY PAUL E. POLZIN

Montana has slightly more than 1 million residents and a reputation for open spaces and vast panoramas. Yet most Montanans live in cities and towns. These communities are varied and are located from the prairies in the East to the narrow mountain valleys in the western part of the state. Each has its own character and unique economy. In this article, we take a closer look at the largest communities in Montana and summarize their economies and recent economic trends.

The diversity of Montana's urban areas is illustrated in the population data presented in Table 1. The largest community is Yellowstone County with a population of almost 159,000. The smallest is Silver Bow County with roughly 35,000 residents. Missoula is in second place with 117,000 persons, but Gallatin County's rapid growth and population of 108,000 is giving Missoula a run for its money. But Missoula's position as second is solidified when the 35,000 people in the bedroom communities in Ravalli County are included. Four of the six major communities now have populations exceeding 100,000.

Per capita income is total personal income divided by population. Per capita income is a measure of economic well-being because it is related to the resources available to the typical resident to purchase goods and services. It does not measure the size or growth of a local economy. Per capita personal income for Montana urban communities is presented in Table 2. It takes only a quick glance at these figures to note the remarkable stability of per capita income across the state's major urban areas. All of the cities are above the statewide average and within 15 percent of each other. The highest income was about $52,000 per person in Gallatin County

Light traffic flows through downtown Bozeman, Montana. (Shutterstock)

and the lowest was $42,000 in Ravalli County, which is also the least urban.

The regional pattern of growth has shifted toward the western portion of the state. High agricultural prices and the shale oil boom in the Bakken led to rapid growth in income and employment in agricultural and resource-rich counties in eastern Montana. This ended with the drop in oil prices in 2014, and the cattle and wheat price declines slightly later. Although the oil bust was not as severe as first feared, it is now the urban and western counties that lead in terms of real wage growth and employment.

Cascade County (Great Falls)

Stability accompanied by slow growth has been a distinguishing feature of the Great Falls area economy for more than a decade. Malmstrom Air Force Base dominates the local economic base and its function and staffing as a ballistic missile base has remained unchanged for at least 20 years. From 2010 to 2015, there was impressive growth in manufacturing led by expansions at companies such as Loenbro and ADF International. Great Falls continues as a trade and health care center for north-central Montana, but stability in the hinterlands has led to constrained growth for those firms serving the rural areas.

GALLATIN COUNTY CONTINUES TO BE THE GROWTH LEADER STATEWIDE BY A LARGE MARGIN.

Flathead County (Kalispell-Whitefish)

Strong growth in the Kalispell area has been propelled by significant increases in health care, nonresident travel, retail trade and service industries. Record visitation to Glacier National Park has fueled the travel industry, and Flathead County now is home to retail and service providers serving regional customers. Construction activity has rebounded strongly, and the real estate and rental industries have benefited from the strengthening in the second home and recreational housing markets. The Flathead's wood products industry has not been hit as hard as elsewhere in the state.

Table 1. Population of Montana's urban areas. Source: U.S. Census Bureau.

Area	Population
Great Falls area	81,654
Kalispell, Whitefish, Bigfork	100,000
Bozeman, Big Sky	107,810
Helena area	67,773
Missoula area	117,441
Hamilton area	43,463
Butte area	34,602
Billings area	158,980

Table 2. Per capita personal income for Montana's urban areas. Source: U.S. Bureau of Economic Analysis.

Area	Income	Percent of Montana
Great Falls area	$46,000	101.4
Kalispell, Whitefish, Bigfork	$45,800	100.9
Bozeman, Big Sky	$51,800	114.1
Helena area	$47,300	104.2
Missoula area	$46,800	103.1
Hamilton area	$42,100	92.8
Butte area	$47,900	105.5
Billings area	$50,000	110.2

Gallatin County (Bozeman-Big Sky)

Gallatin County continues to be the growth leader statewide by a large margin. The torrid nonfarm earnings growth of more than 8 percent per year posted a few years ago has now decelerated to slightly more than 4 percent per year. Other Montana communities are struggling to exceed 2 percent. The causes of growth are not hard to find. Bozeman is home to Montana State University, which has seen increasing enrollment and expanded research. There is the exciting high-tech industry concentrated in manufacturing and professional services. Bozeman also is growing as a health care center. Additionally, nonresident travel, mostly in Big Sky and West Yellowstone, is seeing more visitors throughout the year. With all these growth factors, construction is booming. Congestion and affordability have emerged as pressing issues in Gallatin County, but many other parts of the state would wish to have these problems.

Lewis and Clark County (Helena)

Being a government town has both plusses and minuses. On the plus side, stable state and federal government jobs helped Helena avoid the worst of the Great Recession. In the current political climate, government has not exactly been a booming industry, and the Lewis and Clark County economy has lagged behind most other urban areas in terms of recent growth. There have been positive developments in the private sector, though. The Boeing manufacturing plant is adding workers, and Helena continues to grow as a regional trade and service center. The county's health care industry also is expanding.

Missoula County (Missoula)

Missoula County has finally emerged from a slow-growth slump following the Great Recession and the closing of the largest manufacturing facility in the state. It is now in the middle of the pack among Montana cities in terms of growth. The renewed growth was led by a strong construction boom beginning in 2015, particularly commercial and multifamily residential structures, followed by the addition of new professional business services and the revival of a major industrial site in Bonner. On the minus side, the enrollment declines and layoffs at the University of Montana will have a dampening effect on the economy, but the exact impacts are not yet seen in the data. A rebound is also under way in Ravalli County, where much of the economy depends on commuters from Missoula and closely follows the economic trends of its neighbor to the north.

Yellowstone County (Billings)

Billings continues as the largest trade and service center in the Upper Plains. It comes as no surprise that the export components of retail trade, wholesale trade and professional services were the greatest contributors to economic growth

since the Great Recession. Manufacturing (primarily the oil refineries) has also been growing. In the past few years, increases in the health care industry have been significant. Since 2014, the Billings-area economy has faced the added challenge of the slump in the Bakken due to low oil prices. Overall, the Billings area economy has performed at about the statewide average during the past five years and roughly in the middle of the pack among Montana cities.

Silver Bow County (Butte)

The Butte area economy has quietly diversified away from mining. State government, including Montana Tech, utility headquarters (Northwestern Energy) and trade center retail trade also have become important contributors to economic growth. In the most recent data, retail trade has posted the largest increases. This may be due to the fact that Butte hosts the headquarters of a large and growing chain of gas stations and convenience stores. Continuing its mining heritage, Butte is home to the Montana Resources copper mine. The miners' wages are tied to company profitability, which in turn depends on copper prices. This can lead to wide year-to-year swings in reported earnings for the copper mining industry.

Richland County (Sidney)

The worst seems to be over for the Richland County economy. The last full year of data show only a modest decline in the overall economy after several years of double-digit decreases. All but one of the nonfarm basic industries (oil field trucking being the exception) were stable or posted increases in 2017 – even the oil and gas industry was stable. The farm and ranch sector continued to be weak. The strongest growth in non-energy sectors were in manufacturing and wholesale trade (farm implements). Looking back, the non-energy sectors of the Sidney-area economy were remarkably unaffected by the oil boom.

Custer County (Miles City)

The past three full years of data show modest declines in the Custer County economy. Mining services was the only industry to post major decreases – these include companies serving the Bakken oil fields on the Montana-North Dakota border. Miles City continues as a regional trade and government center. State and federal employees provide a stable counterweight to the volatility of the energy sector. These government facilities include the Pine Hills Correctional Facility and the regional field office for the Bureau of Land Management.

Big Sky Area

There is little data for the Big Sky economy because it is a census-designated place rather than a county or a city. The available data suggest there are about 2,300 jobs in Big Sky on an annual average basis. Big Sky accounts for about 4 to 5 percent of total employment in Gallatin County. Annual growth rates for Big Sky are volatile, perhaps influenced by the success of specific ski seasons. Big Sky does not have a diversified economy and employment is concentrated in recreation and accommodations, construction and real estate. This pattern of employment is also seen in other ski communities, such as Telluride and Keystone, Colorado.

Paul E. Polzin is director emeritus at the Bureau of Business and Economic Research at the University of Montana.

HOMEBUILDING IN MONTANA'S HOT MARKETS

Assessing the Response of Builders to Higher Prices

BY BRANDON BRIDGE AND PATRICK M. BARKEY

The housing price growth that has pushed the issue of housing affordability to center stage began in earnest around the year 2000. Growth in prices accelerated to average 7.4 percent per year between 2000 and the peak of 2009, more than twice as fast as the 3.5 percent gains per year in median household income over the same period. With strong price growth resuming after the recession, the result is that housing prices have more than doubled since 2000 in five Montana counties, with 18 out of the 26 counties with available data reporting price gains of at least 70 percent through 2017.

Those price gains have caused hardship for buyers and a windfall to sellers, of course. But they have also sent a market signal to builders and developers. Have builders and developers responded to higher prices by expanding the supply of housing through new construction? Or have constraints on the marketplace – imposed, say, through local building regulations or by shortages in the construction workforce – held rates of housing construction in check?

A state-level analysis conducted by EcoNorthwest, a Portland-based consulting firm, recently investigated that question. By comparing the response of builders to fluctuations in prices before the year 2000, the firm estimated how much housing would have been built had the historical, pre-2000 relationship between new building rates and prices continued unchanged.

Their conclusion was that 23 states showed an under-production of housing in the years since 2000, amounting to a total of 7.3 million housing units. That is to say, had builders in those states responded to prices after 2000 the same way they did prior to that year, 7.3 million more housing units would have been built than actually were. The shortfall was dominated by California, which accounted for almost half the total. Montana was not included in the group of under-building states in the EcoNorthwest analysis.

Construction workers Wade Schmaing, left, and Tye Brnall work on windows in Big Sky, Montana. (AP Photo, Anne Sherwood)

Housing Under-Production in Montana Markets

Housing markets are fundamentally local, and the finding that in Montana as a whole builders have responded to higher prices since 2000 in essentially the same fashion as they did prior to that year may not hold true for markets within the state. Using the same methods as the EcoNorthwest study, we examined the pre- and post-2000 relationship between rates of homebuilding and housing prices by:

- fitting a statistical model between total residential building permits, on the one hand, and housing prices and other control variables, using available pre-2000 data;
- using that model to make a prediction of new construction each year after 2000 based on the behavior of prices for the 2000-17 period; and
- comparing the predicted level of building with what actually occurred.

We conducted this preliminary analysis for four counties in the state: Gallatin, Lewis and Clark, Missoula and Yellowstone.

The graphical display of our findings in the four figures is illuminating. In each figure we consider the relationship between price growth and home building for three separate periods: the years before 2000 (back to 1980, depending on available data), the prerecession housing boom period 2000-07, and the post-recession period 2013-17. We present price growth, as measured by the Federal Home Finance Agency's Housing Price Index, construction growth, as measured by census building permits, and predicted construction growth. The latter is based upon a statistical model fitted to the pre-2000 data. Averaging growth over a number of years smooths out some of the volatility in the data and allows simpler comparisons to be made.

Let us first examine the Gallatin County results shown in Figure 1. There was robust price growth and construction growth that preceded the year 2000, exceeding 5 percent and 20 percent per year, respectively. Price growth accelerated to almost 8 percent per year during the pre-recession boom, but construction growth – while still strong – actually decelerated slightly to just over 15 percent per year, which was exactly the price response we predicted. Price growth has also been strong since 2013, with a construction response even stronger than predicted.

Lewis and Clark County construction rates (Figure 2) were higher during the pre-recession boom than during the years before 2000, despite the fact that price growth during the boom was more restrained. Home building in the Helena area was stronger than predicted in 2000-07, but less than predicted in more recent years, despite an acceleration in home prices during 2013-17.

There is no evidence of underbuilding in the Missoula market during the pre-recession period 2000-07, as shown in Figure 3. Construction has actually been stronger in recent years, averaging 25 percent per year growth in permits, even

Figure 1. A comparison of growth in housing prices and residential building permits, Gallatin County, average annual percent growth. Source: BBER analysis.

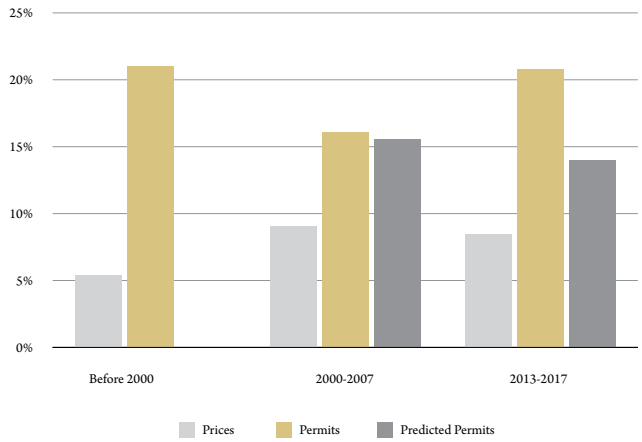


Figure 2. A comparison of growth in housing prices and residential building permits, Lewis and Clark County, average annual percent growth. Source: BBER analysis.

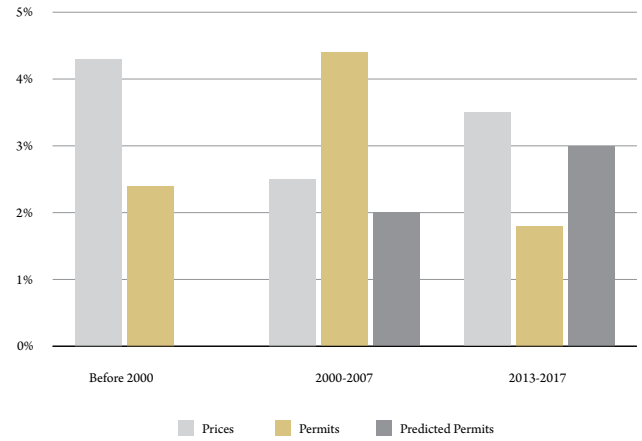


Figure 3. A comparison of growth in housing prices and residential building permits, Missoula County, average annual percent growth. Source: BBER analysis.

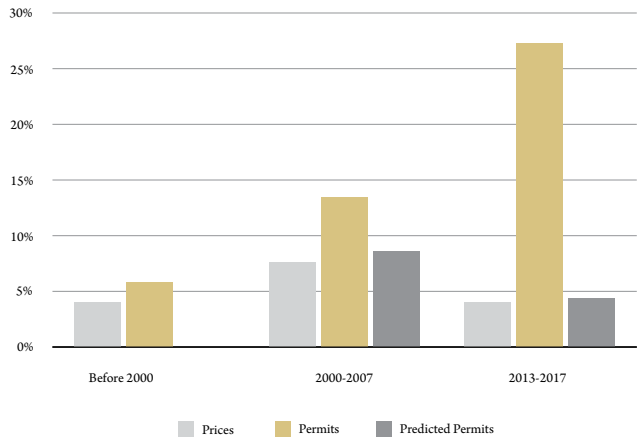
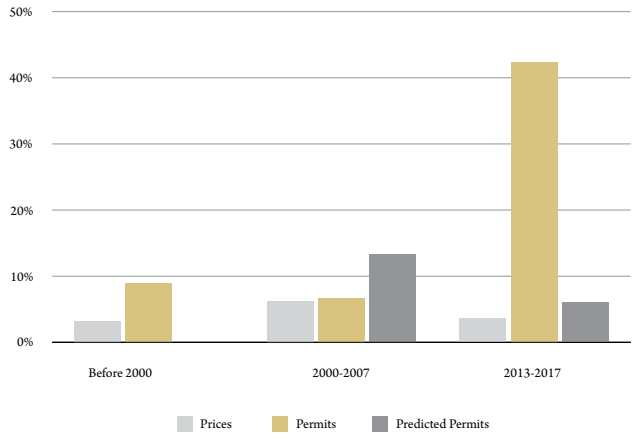


Figure 4. A comparison of growth in housing prices and residential building permits, Yellowstone County, average annual percent growth. Source: BBER analysis.



though average housing prices have grown more slowly since 2013 than they did in the housing boom of past decade.

Yellowstone County's pattern is similar to Missoula's – higher rates of building than would be predicted based on price growth during the 2000-07 years, with a construction surge taking place in more recent years when price growth was slower than the boom.

Summary

The analysis described here was motivated by a simple idea – that higher housing prices should spur more housing construction. This is the old notion of the supply curve from your introductory economics textbook – and that increases in supply should, all other things being equal, help to restrain price growth. If that supply response is muted, it helps prices grow faster.

Many things have changed in housing markets in Montana since the year 2000. Price growth has been faster, even accounting for the price bust of the Great Recession. Swings in building activity have been more volatile. And the relationship between housing prices and housing construction has become weaker as well, at least in the four counties analyzed here.

Montana was already considered to be a "no under-production" state by EcoNorthwest – a state where there was no evidence that the supply response to increased housing prices was inhibited by regulatory policy or anything else. Thus, the mixed conclusions on this question for the four individual counties we examined here are not completely surprising.

An examination of individual years does show some years with shortfalls in actual construction, compared to what one might expect based on prices. But these are more than offset by years when the opposite is true. Based on the evidence presented here, we have little support for the hypothesis that the regulatory or other constraints on development have had meaningful impacts on housing supply in the four Montana housing markets analyzed here.

Reference

Buchman, Marley and Michael Wilkerson, "Housing Underproduction in the U.S.," EcoNorthwest, Portland, OR, January 2018.

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FACING THE CHALLENGE OF AFFORDABLE HOUSING

Working Toward Solutions in Montana

BY PATRICK M. BARKEY

Housing in general, and home ownership in particular, have always been visible, tangible evidence of economic success. Simply put, economic systems and economic leadership that cannot adequately house their populations are judged as failures.

Perhaps that is why the escalating cost of housing in recent years, both in absolute terms and relative to income, has inspired calls to action at the local, state and national level. Witness the efforts to reform Seattle's homeowner dominated neighborhood councils, the recently failed measure in California to override local building restrictions along transit corridors and the bill sponsored by Sen. Elizabeth Warren to spend $50 billion annually to build affordable multifamily housing in urban areas.

There are plenty of policies in support of housing and home ownership in place already, and evidence of their effectiveness is unconvincing. Despite spending $120 billion per year on tax subsidies to subsidize home ownership through the mortgage-interest deduction and enormous interventions in mortgage markets, with government-supported enterprises like Fannie Mae and Freddie Mac, ownership rates in the United States are lower than many countries that do none of these things. When it comes to affordability, those policies arguably make the situation worse by super-fueling demand for larger and more expensive homes.

But those policies have been in place in one form or another since the 1930s. The acceleration in home prices that has led to housing cost issues today began in the 1990s and really kicked into gear during the first seven years of the previous decade, when home prices in Montana increased by 7.4 percent per year for eight consecutive years, mirroring the national trend (Figure 1). While often dismissed as a bubble – or an unsustainably high price driven by speculation and

Lena Faulconbridge stands outside her home in Missoula, Montana in 2018. She faced eviction from her trailer court because it was being developed into apartments. (AP Photo/Missoulian, Kurt Wilson)

not the more fundamental forces of supply and demand – the sustained price growth that has resumed after the bust suggests otherwise.

The focus of research on housing price growth has been on policies at the local level. Housing regulations are easy to talk about, but harder to measure. The variants are endless, but commonly include (Gyourko and Malloy, 2014):

- Infrastructure requirements
- Height restrictions
- Caps on numbers of units
- Population growth limits
- Urban boundaries or green zones
- Restrictions on rezoning
- Super majority, voter or multiple jurisdictional approvals
- Minimum lot size requirements
- Delays in local government decision-making

To measure the extent of regulation in any local market, much less assessing whether or not regulation is becoming more or less prevalent, is a daunting task. Yet there exists ample evidence that local regulation has a significant impact on housing costs. This is clear from a comparison of housing prices (as shown in Figure 1) to published measures of construction costs by Glaeser and Gyourko (2002) and others. The fact that since the mid-1980s prices and costs have widely diverged, with prices rising to nearly double the costs supports the argument that regulatory restrictions have had important price impacts.

MEDIAN HOME SALE PRICES IN RAVALLI AND LAKE COUNTIES, THE LEAST AFFORDABLE IN THE STATE, WERE SIX TIMES AS HIGH AS MEDIAN HOUSEHOLD INCOMES THERE.

Why High Housing Prices Matter

Of course, even if housing markets were efficient and prices reflected costs, those prices might be more than some households can pay. This is particularly true in areas with high in-migration and high demand and in places with geographic obstacles like water or mountains – land prices would be reflected in housing costs. In such situations, one might expect that a more intense use of land through higher density development would mitigate such outcomes, but few Montana communities have embraced this approach.

Housing is an asset, and any force that pushes asset prices up or down necessarily has equal and offsetting impacts on buyers and sellers. But from a societal point of view, there are at least three different ways in which artificially high housing prices bring about outcomes that shrink the overall economic pie. At the local level, high housing costs affect labor supply to area employers, affecting the costs or even the viability of services – even schools – that form the fabric of urban life. High housing costs push lower-income families out to the fringe or even outside urban areas altogether, increasing commutes, transportation costs and environmental impacts.

High housing costs can also have consequences for overall economic growth. This is because areas of the country that have the fastest growth tend to have the lowest rates of new home construction and thus the fastest increases in housing costs. High housing costs effectively inhibit workforce mobility, which has played an important role historically in helping households cope with economic change. Lower mobility threatens to increase income inequality and lower overall wealth.

Housing Affordability in Montana

Is there a housing affordability crisis in Montana? Certainly there are parts of the state where prices have increased rapidly. Gallatin County has seen housing prices – as measured by the Federal Housing Finance Agency's Housing Price Index –

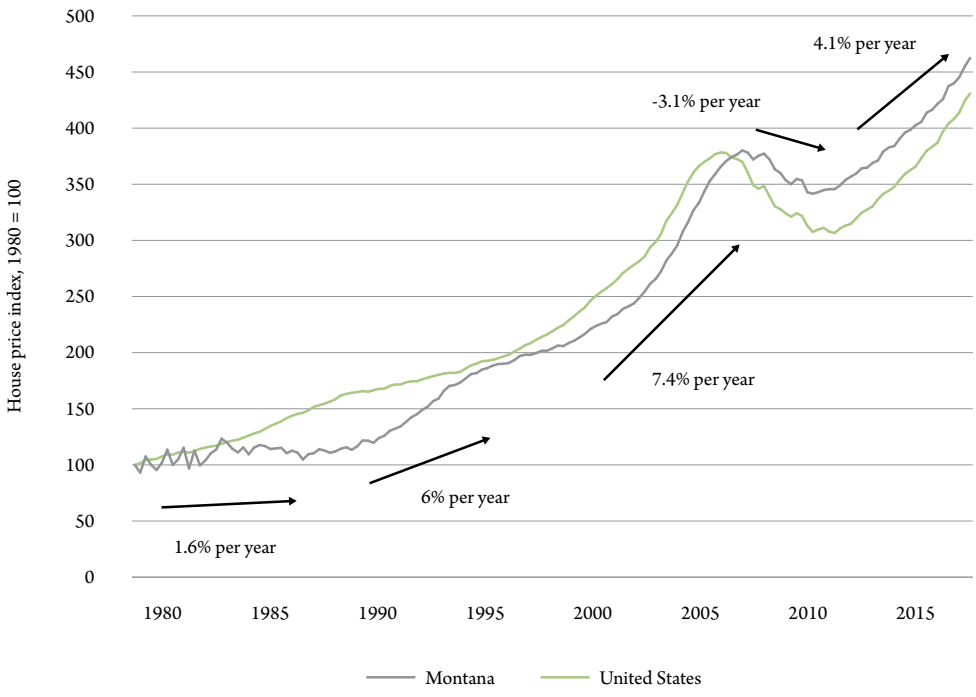


Figure 1. Housing price index, all transactions, Montana and U.S., 1980-2018, Index 1980=100. Source: U.S. Federal Home Finance Agency.

increase by 50 percent since 2012 (Figure 2). Yet the question of affordability needs to consider those prices in relation to incomes. Median household income in Gallatin County in 2016 was $60,439, the third highest in the state. The ratio of home prices to income, a simple measure of affordability, shows Gallatin County to be more affordable than most counties in northwest Montana, including Missoula.

The price-to-income ratios for the 38 Montana counties for which adequate housing price data were available reveals that affordability generally worsens as one travels west (Figure 3). Median home sale prices in Ravalli and Lake counties, the least affordable in the state, were six times as high as median household incomes there. Higher incomes and more moderate prices produced lower ratios in counties like Yellowstone and the oil-producing counties of Richland and Fallon in the east.

Affordability has always been worse in the West – at least going back to the beginning of the past decade. But in the run up of prices before the Great Recession, affordability was significantly eroded. The resumption of stronger price growth since 2012 has again outpaced income growth, with affordability lower in most parts of the state today than five years ago. Despite this deterioration, prices relative to income are lower today than they were just before the housing bust 11 years ago.

The situation is a bit more restrained in rental markets. While rents have increased markedly since 2012, in 2017 the median renter household paid about 32 percent of their pretax income for gross rent in Missoula and about 31 percent in Gallatin counties. Both figures are reasonably close to the 30 percent threshold often used to define "housing stress" in household budgets.

Working Toward Solutions

The solution to housing affordability depends on one's view of the problem.

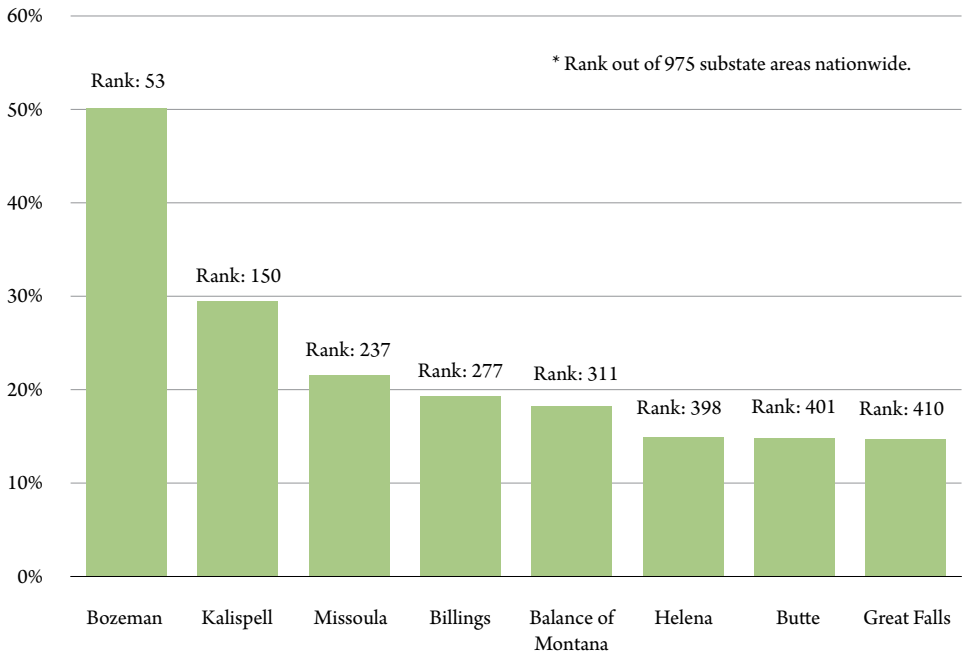


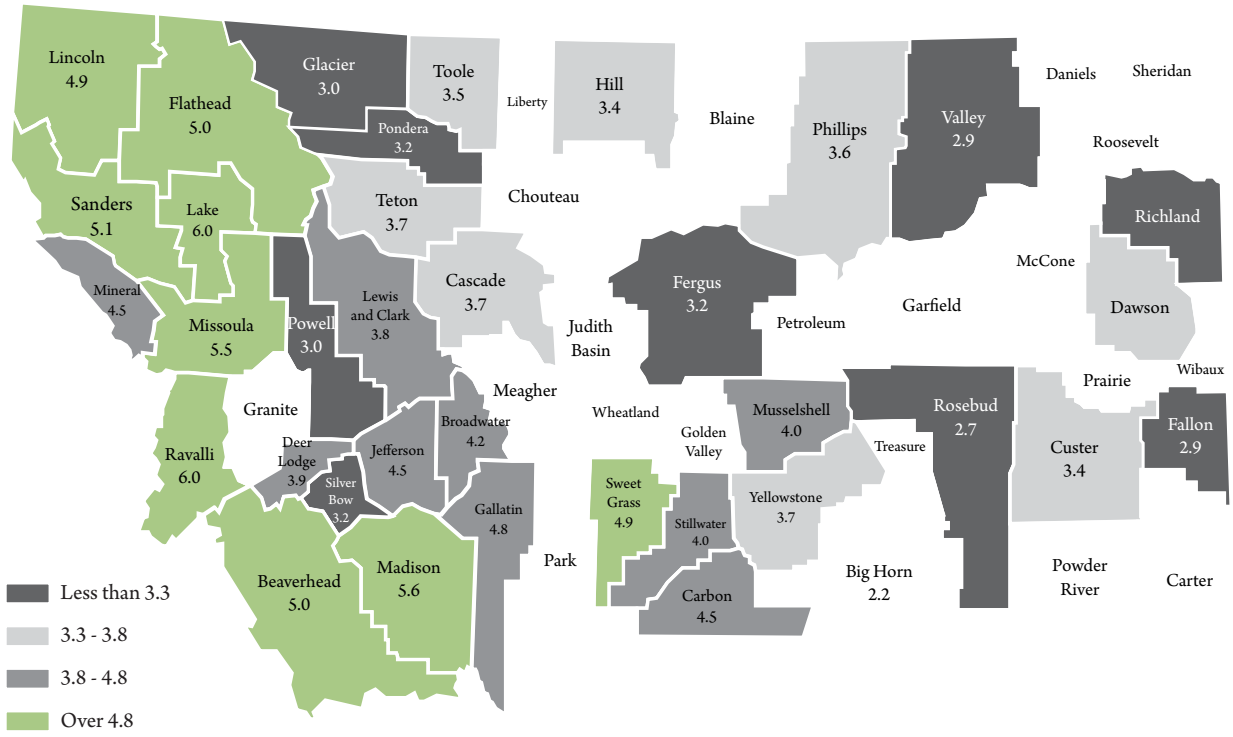
Figure 2. Housing price growth since 2012, with national rank. Source: U.S. Federal Home Finance Agency.

To some people's way of thinking, there may not be a problem with housing prices at all. Certainly in many Montana housing markets the level of prices relative to income falls short of what would be considered unaffordable. But even in the faster growing areas where prices are much higher, the regulations impacting new construction represent a sort of tax on development, which forces developers to pay the costs incurred for the congestion and inconvenience of construction and density.

The fact that tighter regulations so clearly serve the financial interests of existing homeowners by limiting the new supply that might compete with their homes in the marketplace, casts some suspicion on this argument. And it would be highly unlikely that the political process would produce just the right level of taxation of new development to produce an efficient outcome. But the thrust of this argument is that prices of housing are high because they should be high, and the solution to affordability is helping those without enough income to pay for it.

The argument that it is local housing regulation that is pushing prices up beyond costs has greater support in the data. The research we report in the accompanying article shows that a change in the housing market, occurring sometime in the late 1990s, significantly reduced the price response of housing supply, especially in western Montana. The slow supply response to historically high price growth, combined with high demand from strong economic growth, has pushed prices ever higher.

Figure 3. Ratio of home price to median household income, 2016. Source: BBER calculations from National Association of Realtors and U.S. Census Bureau.



AFFORDABILITY HAS ALWAYS BEEN WORSE IN THE WEST – AT LEAST GOING BACK TO THE BEGINNING OF THE PAST DECADE. BUT IN THE RUN UP OF PRICES BEFORE THE GREAT RECESSION, AFFORDABILITY WAS SIGNIFICANTLY ERODED.

Tackling regulation is not easy, technically or politically. Rules governing housing development are overlapping – the elimination of a single rule by one jurisdiction may have little effect. And those rules exist because those with political power put them there. Solutions could come about through interventions of state government, which could override the political wishes of local communities in governing development. That seems a long way off in Montana, but such moves have gained traction elsewhere.

There are other facets to the problem to consider. Consulting firm McKinsey & Company estimates that productivity in the construction industry has stagnated since the mid-1990s, growing by just 1 percent per year compared to the 2.7 percent per year gains in the overall economy. Part of that malaise is probably due to regulation-imposed activities that add cost with little quality benefit. But the technology of construction, in particular stick-built homes produced on-site, has not taken advantage of the kinds of process innovations that have boosted manufacturing productivity by 3.6 percent per year since 1995.

High housing costs – defined as prices and rents that are higher due to artificially restricted supply – are emerging as a significant public policy issue. While the issue is not as acute in Montana, it has worsened in recent years. Crafting solutions that flow from an understanding of how high costs have come about is critical if we are to going to make things better.

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FUELING ENERGY INDEPENDENCE

Good News and Challenges for Montana

BY BILL WHITSITT

As our nation continues to move toward energy independence, with strong energy-enabled manufacturing, lower energy intensity, progress on greenhouse gas emissions and reduced consumer costs, Montana also has good energy news – but it is tempered by a bit of reality.

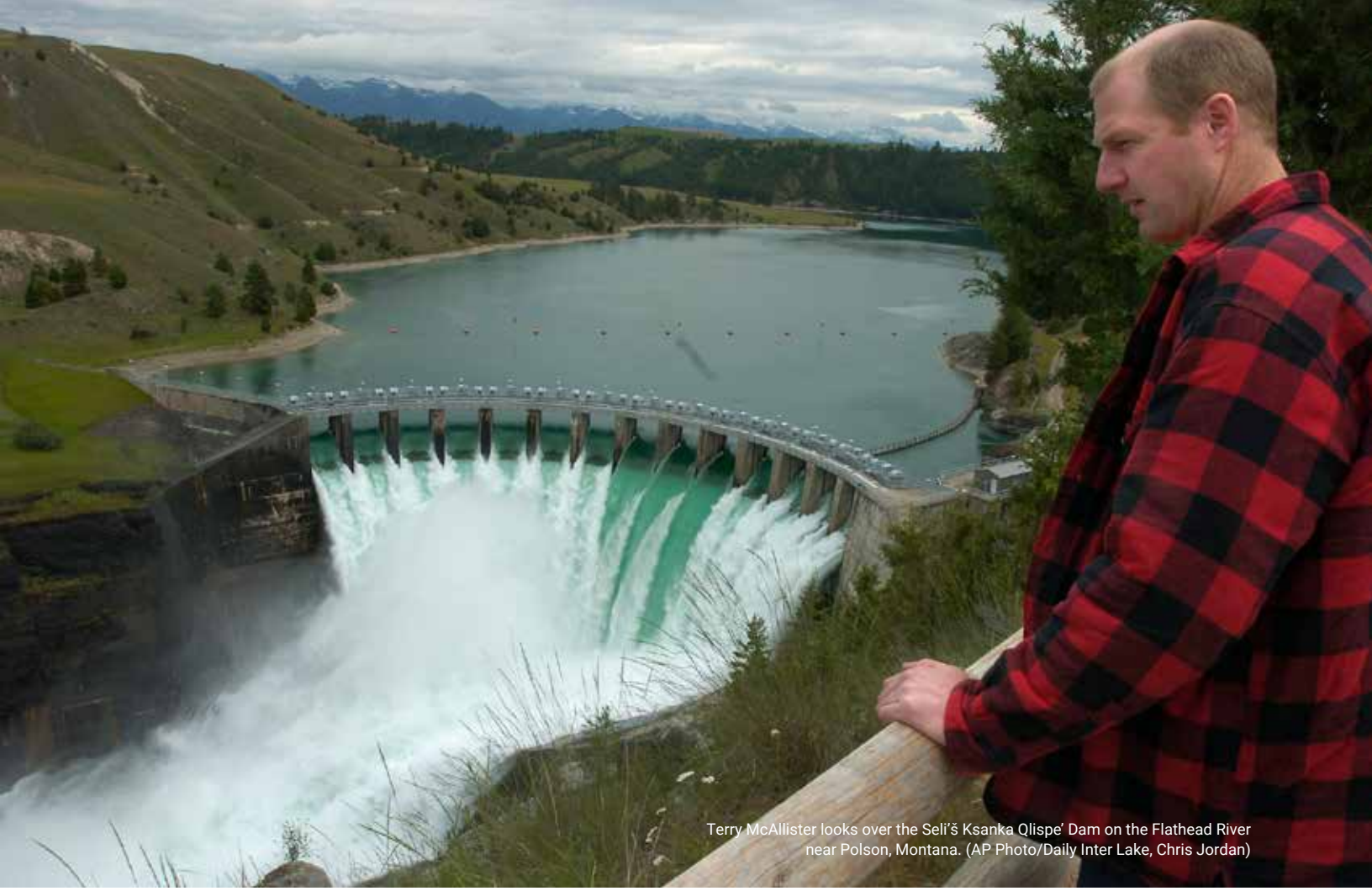
The Treasure State has oil, coal, hydro and wind resources that rank high among states. Oil and coal development and production contributed nearly $200 million to the budgets of state, county and local governments in fiscal year 2018 (Montana Department of Revenue). We have relatively low electricity prices, primarily because of our hydropower and coal-fired generation and their proximity. In fact, according to the U.S. Energy Information Administration (EIA) in August 2018, Montana's average residential electricity cost was 35th in the nation at 11.51 cents per kilowatt-hour – Hawaii ranked first at 32.40 cents/kWh and California fifth at 20.56 cents/kWh.

There has been movement toward more use of renewable sources among the state's diverse energy mix, and Montana's energy investment climate shows signs of improvement.

Montanans, however, are still among those using more energy per capita than consumers in most other states. We also spend more per person on our energy overall. In the EIA's latest full reporting year data for 2016, Montana ranked 15th in total energy consumption per capita and 14th in total energy expenditures per capita. Factors such as cold winters and long driving distances undoubtedly contribute to these trends. Other factors also provide reasons for caution when trying to gauge Montana's energy future.

Stunning technology advancements underpin a new, exciting phase of the shale energy revolution that is pushing the U.S. toward energy independence and oil and gas exports unimaginable only a few years ago.

The Bakken play in North Dakota and Montana has been part of the revolution. New exploration, development and production efficiency gains are surprising even to those accomplishing them. Increased precision in drilling and hydraulic fracturing, with use of high-tech downhole sensors, fiber optic communication, continuous remote monitoring,



Terry McAllister looks over the Seli'š Ksanka Qlispe' Dam on the Flathead River near Polson, Montana. (AP Photo/Daily Inter Lake, Chris Jordan)

and real-time process adjustments, are improving flow rates and lowering costs dramatically nationwide.

Even older oil producing areas of Montana are benefiting from technology application. Most striking for the future will be the injection of carbon dioxide into oil-bearing formations to sweep otherwise unrecoverable crude to producing wells.

A number of significant oil and gas companies in all sectors – exploration and production, gathering and pipelines, and refining – remain strong participants in Montana's energy economy. They and others see the state as one of the better places to do business.

We are seeing an uptick in oil and gas permitting by the Montana Board of Oil and Gas. Fifty-nine new-well permits were issued in roughly the first 11 months of 2018, compared with 35 for all of 2017 (Montana Board of Oil and Gas, 2018). But prices still matter. In the near term, prices may remain lower and more volatile than companies need to fund all their multimillion-dollar projects in new shale-related or enhanced oil recovery projects.

Employment patterns in oil and gas will continue to change. As we've said for several years, the old boom and bust well-driven cycles of decades past have been replaced with resource and technology plays, such as the Bakken. Today there's more stability once initial exploration and early development has occurred. The process has become one of replicating and tweaking – almost in a manufacturing sense.

New technology, data and communication-driven efficiencies in shale-related projects are potentially leading to the need for fewer, more skilled, workers than before. In places like Sidney in eastern Montana's Bakken, that also support activity in North Dakota, stability seems to be the new norm. Elementary school enrollment is steady, and housing prices have started to return toward levels seen before the big boom.

Perhaps the greatest uncertainty in Montana's energy future is in the coal industry. Coal currently fuels about half of Montana's electrical generation. But there has been a general decline in coal demand in the U.S., with plant closures tied to environmental concerns and natural gas competition.

The expected closure within the next several years of the oldest pair of units at the four-unit Colstrip Electric Generating Station, and the pending bankruptcy of Westmoreland Coal, the owner of the Rosebud Mine that supplies Colstrip, contributes to that uncertainty.

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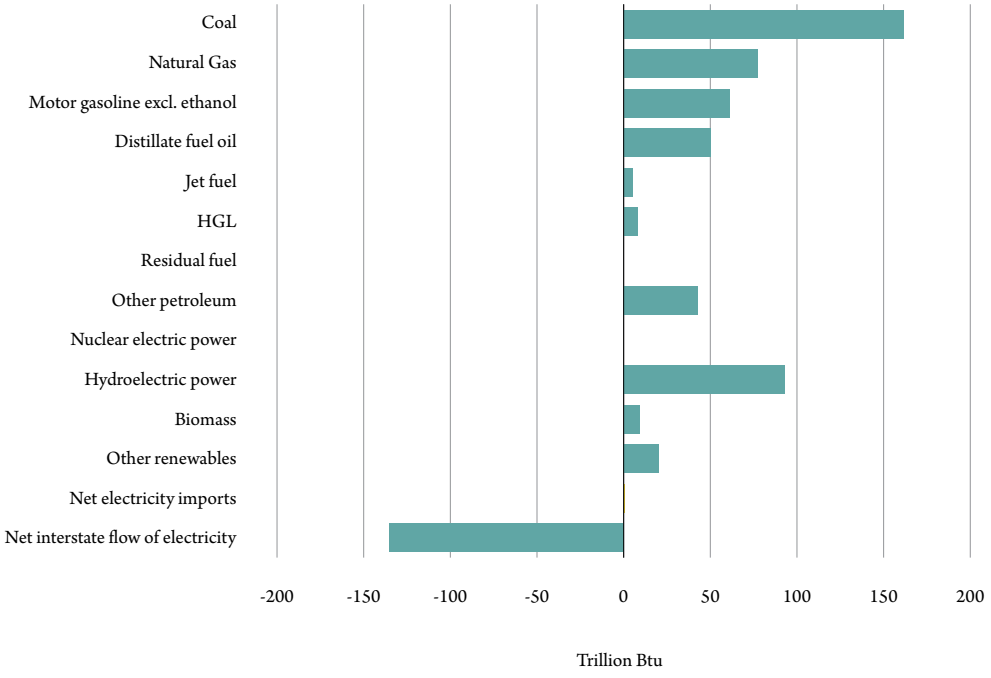
Yet, there are early indications of some changing coal dynamics. Montana coal production increased in 2018. In December, it was on pace to reach 38 million tons or 3 million tons more than in 2017. The reason could be a higher demand for coal elsewhere in the world.

The global demand for coal has been growing, with Asian nations leading the demand growth. Lacking energy diversity, coal-generating plants are still their lowest-cost option for power. Even if demand plateaus, Montana's Powder River Basin coal is best-suited for new, high-tech plants designed to run efficiently with lower CO2 emissions.

It would seem there is ample Montana mine capacity to meet an increase in export demand. Production in the state peaked at some 44.9 million tons in 2008, according to the Montana Coal Council. It could reach that level again if the demand is there. However, meeting increasing international demand for Montana's coal will depend in large measure on export terminal capacity on the West Coast.

Several ports or port expansions have been denied by states, leaving only one such project pending – the Millennium Bulk Terminal project on the Columbia River in Longview, Washington. Its proponents are continuing to battle the

Figure 1. Montana energy consumption estimates, 2016. Source: U.S. Energy Information Administration.



State of Washington for permits to modernize and expand the site of a former aluminum smelter and existing port facility. This could lead to a Supreme Court decision on the question of how far a state may go in preventing interstate – or international - commerce. Meanwhile, Montana's coal exports must be railed to British Columbia for shipment.

Finally, Montana has significant resources and future potential in renewable energy. Most significant perhaps are our hydropower resources and operations – Montana is fifth among states producing hydropower, and 23 dams provide almost 40 percent of Montana's electricity generation.

Wind energy capacity has been growing, and windmill generators are providing some 8 percent of the state's power generation. Whether that share will grow is dependent on wind power's intermittent nature and the state's electricity export transmission capacity. The state's wind power capacity factor (the percentage of total wind generation capacity that is actually available) averages 30 to 40 percent and can vary by season and even time of day.

This situation can cause significant challenges for integrating renewables into Montana's energy mix. Solutions like large-scale battery and pumped hydro storage are in the works. The state's utilities and cooperatives continue to seek improvements to systems and processes to ensure reliability of power and reasonable consumer costs. In addition, small "microgrids" and off-grid power will be part of Montana's energy future.

The bottom line for Montanans is that we are energy-blessed in many respects. But no source is perfect, and some challenges persist.

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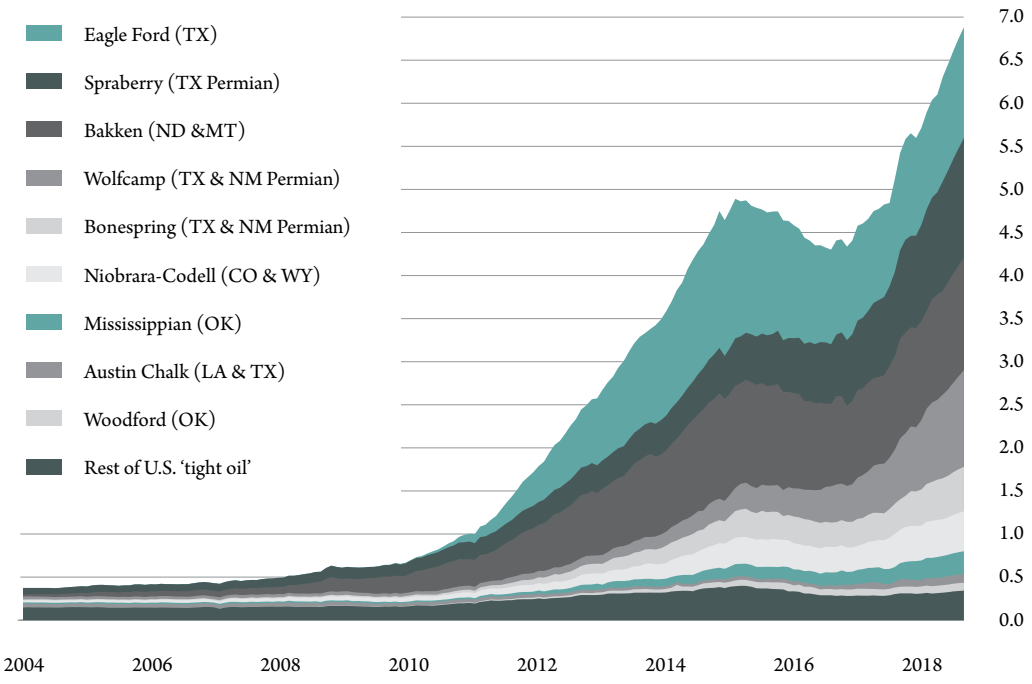

Figure 2. U.S. tight oil production, selected plays. Source: U.S. Energy Information Administration.


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