

Moving Forward at the Speed of Light: Fiber Infrastructure for the 21st Century

Existing Conditions and
Needs Assessment



Prepared for the Rexburg Region

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Overview

Introduction

Over the next thirty years, the businesses, residents, and institutions of the Rexburg region will spend about \$2.3 billion for telecommunications services--in today's dollars, unadjusted for inflation and unadjusted for price increases. Some analysts believe that the average household bill for services delivered via broadband may double in the next ten years, which would make the thirty year projection easily reach twelve billion. Currently, there exists a substantial opportunity to capture more of these funds and direct them towards greater job creation and business opportunities for the region.

In a discussion at a broadband conference in April (2008), FCC Commissioner Deborah Tate indicated that demand for bandwidth is doubling every two years, and that the FCC expects that the typical bandwidth needed by businesses and residents in 2015 (just two years) will exceed 50 megabits.

Community livelihood and the economic future in Rexburg and the surrounding counties is dependent upon the availability of affordable high speed broadband services--at the bandwidths that will be needed to conduct business in the future ("big" broadband), not at today's "little" broadband speeds. Businesses large and small are already heavy users of the Internet, and their bandwidth needs will increase dramatically as two business trends accelerate:

- Business travel costs are increasing rapidly as the cost of fossil fuel increases. Both the cost of ordinary commuting to the workplace is increasing as well as the cost of out of town business travel by air. Businesses are already investing heavily in HD quality business videoconferencing systems, and will make more use of them to reduce travel costs. These HD quality business videoconferencing systems require dramatic increases in bandwidth that are not affordable or in most cases even available in areas of the Rexburg region today.
- More and more workers and business people are working from home, either on a part time or a full time basis. New work from home job opportunities are growing rapidly, but most of those jobs require a wired Internet and a wired phone connection to qualify. Many corporate and business employees will be seeking permission to work more from home (e.g. one or two days per week) to reduce travel costs. Some major businesses in other parts of the U.S. are already actively planning to have 20% of their workforce work full time from home to reduce employee travel costs and office energy costs. Corporate employees working from home require high bandwidth services to be connected to the office network and to use corporate videoconferencing systems. These corporate network services will require 35-50 megabit connections within five years.

The five localities in the Rexburg region covered in this report can take advantage of the emerging business and residential growth in the counties, while also taking steps to improve the competitive advantages of the cities. This can only be accomplished if the region has the right telecommunications infrastructure that will support the needs of existing businesses and also attract new businesses.

The current broadband business model is broken

The current business model for selling broadband is an anachronism that evolved in the early nineties with the introduction of dial up Internet access. At that time, there was little more than email and a few text-based Web pages available on the Internet, and selling bandwidth “by the bucket” worked fine. For something like \$20/month, subscribers got a “bucket of bandwidth” that was defined by some upper limit on that bandwidth, like 14,400 bits/second or 56,000 bits/second.

As the Web evolved to include video and audio, and as new services like telephone over the Internet (Voice over IP, or VoIP) became available, more bandwidth was needed to support these uses. Broadband was and still is sold by the “bucket,” but the bucket is now larger, with the DSL bucket typically advertised as something like 1/2 megabit/second, and cable modem service typically promoted as 1-3 megabits/second. We are still buying bandwidth by the bucket.

This business model is fundamentally broken. There is no way to fix it. The broadband business model of selling bandwidth by the bucket means ***providers make the most money if their customers do not use the service at all.*** They make the least amount of money if customers like the service and use a lot of it. This approach is upside down from most other businesses. It leads to odd behavior by the service providers that causes them to punish or even disconnect customers that use too much of the service.

From an economic development perspective, this is disastrous. Local businesses should not be punished for using too much of an essential business service. An apt analogy would be if the Department of Transportation told a businesses that the tractor trailers they were using were “too big” and henceforth all deliveries had to be made by pick up truck. We know intuitively that this would make the business uncompetitive with businesses in other regions that had roads that supported tractor trailers.

Recent analysis indicates that rural areas are five times more likely to have slower connection speeds compared to urban areas, three times more likely compared to small cities, and twice as likely when compared to towns. Usage figures show that the top 1 percent of broadband connections are responsible for 20 percent of the Internet traffic and the top 10 percent consume 60 percent of the bandwidth. This disparity in usage is indicative of an infrastructure model that has failed to create a fair playing field.

Economic Impact Analysis

Broadband is not a silver bullet for communities. Broadband investments need to be tied to a wider set of community and economic development strategies that help make communities en-

gaging and interesting places to locate and run businesses, and to make communities a vibrant and safe place to live. Communities that have made broadband investments without taking the time to identify a broader set of goals and expected outcomes have usually been disappointed when broadband investments have not had much of an impact. However, it is clear that broadband investments are critical for economic viability.

- In 2008, U.S. industries invested over \$455 billion dollars in ICT investment, including over \$60 billion in broadband.
- A 2011 report from the McKinsey Global Institute studied the Internet’s growing impact on the economy. The report found that the Internet accounted for 21% of GDP growth in the last five years for mature countries, and this number is only expected to climb higher.
- \$8 trillion dollars is exchanged through *e-commerce* annually.

The financial analysis below demonstrates 30 year expenditures for routine and normal telecom services for businesses, residents, schools, and institutions for the Rexburg region. These numbers are based on the combined data for the City of Rexburg, Fremont County, Madison County, Teton County, Idaho, and Teton County, Wyoming. Over the next three decades, about \$2.1 billion dollars will be spent on telecom services. This is a very conservative estimate that does not take into account the ever expanding demand for new kinds of services. The model looks only at current demand. A community investment in a community-owned and managed digital road system, where all services are provided by the private sector, would have substantial benefits.

Rexburg Region 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with “little” broadband cable modem/DSL/wireless	Households with no Internet
Total households	28,072		
Total businesses	5,029		
Percentage of households	4%	83%	13%
Number of households	1,260	23,159	3,652
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$61,257,034	\$1,417,355,280	\$151,199,722
Total residential expenditures	\$1,629,812,036		
Total telecom expenditures ¹	\$1,874,283,842		

City of Rexburg 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with "little" broadband cable modem/DSL/wireless	Households with no Internet
Total households	7,491		
Total businesses	750		
Percentage of households	3%	81%	16%
Number of households	226	6,102	1,163
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$10,994,691	\$373,452,718	\$48,131,772
Total residential expenditures	\$432,579,181		
Total telecom expenditures ¹	\$497,466,059		

Fremont County 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with "little" broadband cable modem/DSL/wireless	Households with no Internet
Total households	4,377		
Total businesses	619		
Percentage of households	8%	66%	26%
Number of households	335	2,899	1,138
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$16,294,521	\$177,411,891	\$47,114,028
Total residential expenditures	\$240,820,439		
Total telecom expenditures ¹	\$276,943,505		

Madison County 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with "little" broadband cable modem/DSL/wireless	Households with no Internet
Total households	3,358		
Total businesses	602		
Percentage of households	4%	80%	16%
Number of households	130	2,686	542
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$6,315,794	\$164,387,129	\$22,438,022
Total residential expenditures	\$193,140,944		
Total telecom expenditures ¹	\$222,112,086		

Teton County, ID 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with "little" broadband cable modem/DSL/wireless	Households with no Internet
Total households	3,647		
Total businesses	807		
Percentage of households	4%	85%	11%
Number of households	136	3,100	412
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$6,593,484	\$189,694,620	\$17,046,297
Total residential expenditures	\$213,334,401		
Total telecom expenditures ¹	\$245,334,562		

Teton County, WY 30 Year Telecom Expenditure Analysis			
	Households still on dial-up	Households with "little" broadband cable modem/DSL/wireless	Households with no Internet
Total households	9,199		
Total businesses	2,251		
Percentage of households	3%	92%	5%
Number of households	235	8,495	469
Average monthly telecom expenditures	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65 Dial up Internet: \$20	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$75 Broadband Internet: \$45	Local phone: \$25 Long distance: \$25 Cable/satellite TV: \$65
Annual cost/household	\$1,620	\$2,040	\$1,380
30 year telecom expenditure	\$11,400,321	\$519,910,922	\$19,422,769
Total residential expenditures	\$550,734,011		
Total telecom expenditures ¹	\$633,344,113		

¹ Business, schools, institutions, and government costs estimated conservatively at 15% of residential expenditures.
Source: Mediamark Research, Inc.

Community investments in infrastructure will accelerate the availability of broadband options within the community, especially in the business and retail sector. It is important to note that the government entities would not sell services to the public and would not compete with private sector firms. Instead, private sector firms, including existing telecom providers, would use the new infrastructure to compete with each other. Service providers using the network would pay a small portion of revenue to the network for the use of the infrastructure.

Who Needs A Gig?

There is much confusion about the “true” definition of broadband. From the perspective of economic development, there can be no upper limit on the definition of broadband. Saying that broadband (as an example) is 5 megabits/second of bandwidth or 10 megabits/second is to immediately tell businesses in the region that there will be structural limits on their ability to do business in the future—it is dictating the size of truck that can be used to deliver goods and services. Here is the only appropriate definition of broadband:

Broadband is whatever amount of bandwidth is needed to support a business’ ability to compete in the global economy.

Broadband is a community and economic development issue, not a technology issue. The essential question is not, “What system should we buy?” or “Is wireless better or cheaper than fiber?” Instead, the question is:

“What do our businesses and residents need to be able to compete globally over the next thirty years?”

If the Rexburg region is to make investments in broadband and telecommunications infrastructure, it is absolutely critical that those investments are able to scale gracefully to meet business and economic development needs for decades. This drives the solution towards an integrated fiber and wireless system, rather than a wireless only service orientation. Wireless is able to provide basic Internet access needs, but is not able to support advanced video and multimedia services. Some off the shelf business videoconferencing systems in use today require a minimum of 50 megabits of bandwidth--far beyond the capabilities of any wireless system. Two key concepts that should drive community investments in telecom are:

***“Broadband” is not the Internet
Bandwidth is not a fixed number***

Broadband and “the Internet” are often used interchangeably, but this has led to much confusion. Broadband refers to a delivery system, while “the Internet” is just one of many services that can be carried on a broadband network. The challenge for communities is to ensure that businesses and homes have a broadband network with sufficient bandwidth to deliver all the services that will be needed and expected within the next three to four years, including but not limited to “the Internet.”

Bandwidth needs for the past decade have been growing by 25% to 50% per year, and show no sign of slowing. As computers and associated hardware (e.g. video cameras, audio equipment, VoIP phones) become more powerful and less expensive, new applications and services are continually emerging that drive demand for more bandwidth. The table below indicates the likely growth in bandwidth, based on current uses, emerging high end equipment, and research lab/university/government networks already deployed and in use. Lightpaths refer to placing multiple wavelengths (paths) of light on a single fiber. High end commercial equipment already in production is routinely placing 20+ lightpaths on a single fiber, with each light path capable of carrying data at gigabit speeds. This technology will move down to ordinary business and residential network equipment over the next ten to fifteen years. Current fiber being installed will

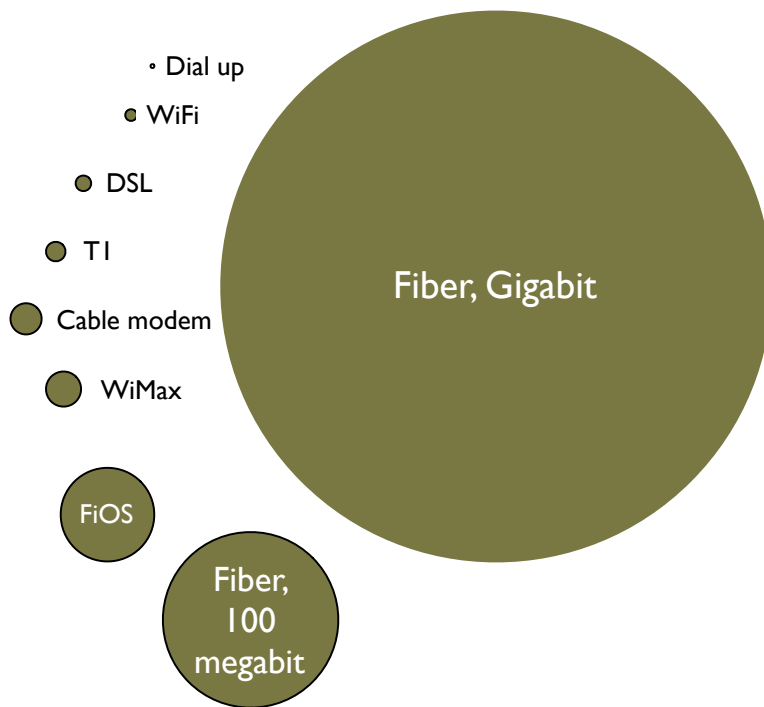
require only a relatively inexpensive equipment upgrade to increase carrying capacity over the same fibers.

From a report by the Information Technology and Innovation Foundation (March, 2009), listed below are the bandwidth requirements for services already commonly in use and for emerging services like telepresence business videoconferencing.

Application/Service	Upstream Bandwidth Requirement	Downstream Bandwidth Requirement
Medium resolution videoconferencing	1.2 megabits	1.2 megabits
Streaming video (720p)		1.2 megabits
Standard definition TV		4 megabits
Basic HD videoconferencing (720p)	1.2 to 4 megabits	1.2 to 4 megabits
Telepresence high resolution HD videoconferencing	5 megabits	5 megabits
Video home security service	10 megabits	
HD digital television (1080p)		15 megabits
Telepresence high resolution HD videoconferencing (1080p)	15 megabits	15 megabits

Note that the business videoconferencing services all require symmetric bandwidth. This is a critically important issue, as current incumbent “little broadband” services like DSL and cable modem systems do not offer symmetric bandwidth (where the upstream and downstream bandwidth is equal). Using this information, we can project what the Rexburg region’s homes and businesses will need in the coming years.

	Next 2-4 years	Next decade	Twenty years
Small business needs (1-9 employees)	10-25 megabits of symmetric bandwidth and 5-10 megabits of Internet access	100 megabits of symmetric bandwidth and 20-40 megabits of Internet access	Gigabit+ symmetric bandwidth and 50 to 100 megabits of Internet access
Medium-sized business needs (10-100 employees)	50-100 megabits of symmetric bandwidth and 10-20 megabits of Internet access	Gigabit symmetric bandwidth and 50 to 100 megabits of Internet access	Multiple gigabit symmetric circuits and lightpaths and 100+ megabits of Internet access
Large business needs (100-1000+ employees)	Gigabit+ symmetric bandwidth and 100+ megabits of Internet access	Multiple gigabit symmetric connections and 250 to 500 megabits of Internet access	Multiple gigabit symmetric circuits and lightpaths and 1 Gigabit+ of Internet access
Residential needs	25-50 megabits of symmetric bandwidth and 4-8 megabits of Internet access	100 megabits of symmetric bandwidth and 20-30 megabits of Internet access	A Gigabit symmetric circuit and/or lightpaths, with 50 to 100 megabits of Internet access



Use Trends and Service Needs Analysis

Mark Peterson, a Professor of Community and Economic Development at the University of Arkansas who studies the impact of broadband access and affordability on rural communities, wrote recently, “Broadband connectivity is not the infrastructure of the future, it is the infrastructure of the present.” The Rexburg region faces a challenge in economic development infrastructure with primarily “little broadband” (i.e. DSL, wireless, and cable services) when many communities, regions, and countries have already made the decision to focus resources on the development of “big broadband,” which is typically fiber with a minimum capacity of 100 megabits or gigabit to the premises.

- A third of IBM employees work from home at least part time, and the company has reported annual savings of \$110 million.
- Australia’s government is converting the entire telecommunications infrastructure for the country to an open access system by buying a major portion of Telstra assets. Telstra, which is currently the country’s primary incumbent telecom provider, will become a service provider on the new open network.
- South Korea will provide almost universal coverage through a network offering speeds of 1 gigabit/second
- As of 2010, there were 57 municipal-owned networks that served 3.4 percent of fiber to the home subscribers in the U.S.
- Broadband networks also allow for smart metering and efficient utility provisioning. A community in Appalachia saved \$2 million in reduced water and sewer overflow fines by using their broadband network to make use of real-time sensors and asset monitors.
- Fiber to the premise attracts home buyers, who are willing to pay \$2000 to \$4600 more for a house with fiber service.

- Homes connected to broadband fiber have an 8.6 percent higher asking price and a 4.5 percent higher appraisal value than comparable homes without a fiber connection.
- More than 13% of homes in the U.S. had been passed by fiber by mid 2009.
- Nationally, less than 10% of homes have no access to any kind of broadband service, but in the region, more than 16% of homes still have no broadband access, or 50% higher than the national average.
- Fiber to the home users say they are able to work from home more often, averaging 7.3 workdays per month, reducing their carbon footprint and decreasing wear and tear (and maintenance) on roads.
- Converting 14% of regular jobs into telecommuting jobs would eliminate an estimated 136 billion vehicle travel miles and reduce CO₂ emissions by 55 million tons.
- Global IP traffic has increased eightfold over the past 5 years, and will increase four fold over the next 5 years.
- In 2015, there will be 6 million Internet households worldwide generating over a terabyte per month in Internet traffic.
- Traffic from wireless devices will exceed traffic from wired devices by 2015.
- From a study of 13 countries, the Internet has contributed on average 3.4 percent to GDP. Additionally, the Internet contributes to more GDP than agriculture, energy, and other better-established industries from the 13 countries studied.

In its March, 2009 report, the ITIF (Information Technology & Innovation Foundation) listed some of the next generation services and applications enabled by high performance, affordable broadband. The table below lists these and other services that all represent broadband-enabled applications and services that must be available in the Rexburg region if the region is to remain economically viable.

Residential and Business	Videoconferencing
	IP TV (Internet Protocol TV)
	HD streaming video
	Ultra hi-def (BluRay) video streaming
	Video on demand (e.g. Netflix)
	Place-shifted video
	Cloud computing services
	Online and cloud-based gaming
	Smart homes, buildings, and appliances, including smart electric meters, AMR
	Remote computer aided design (CAD)
	Work from home jobs
	Business from home
	3D graphic rendering and CGI server farms
	Remote network management and managed services
	Virtual collaboration spaces (e.g. enhanced GoToMeeting, Webex style services)

Public Safety	Intelligent transportation applications (smart road systems)
	Public safety and first responder networks
	Emergency dispatch and coordination
	Webcast agency meetings (e.g. virtual meetings)
	Online training for first responders, fire, and rescue
Society	Broadcast of local sports events
	Videoconferencing of community and town hall meetings for wider participation
	Wider availability of nonprofit and community organization services
Health Care	Teleconsultations
	Telepathology
	Telesurgery
	Remote patient monitoring
	Remote diagnosis
	Remote medical imaging
	Grid computing for medical research
Education and Research	Distance education
	Virtual classrooms
	Remote instrumentation
	Multi-campus collaboration
	Digital content repositories and distribution (digital libraries)
	Data visualization
	Virtual laboratories
	Grid computing for academic research

When analyzing future service needs, it is important to take into account ALL services that may be delivered over a broadband connection. As we noted in the previous section, “broadband” is not a service--it is a delivery medium. If we think about broadband using a roads analogy, broadband is the road, not the trucks that use the road. Internet access is a service delivered by a broadband road system, and that Internet service is just one of many services that are in demand. Today, congestion on broadband networks is not due just to increased use of email and Web surfing, but many other services.

FCC Commissioner Deborah Tate spoke in April, 2008 at the Broadband Properties conference in Dallas, Texas. Commissioner Tate noted that:

- Demand for bandwidth has been doubling every two years for the last ten years.

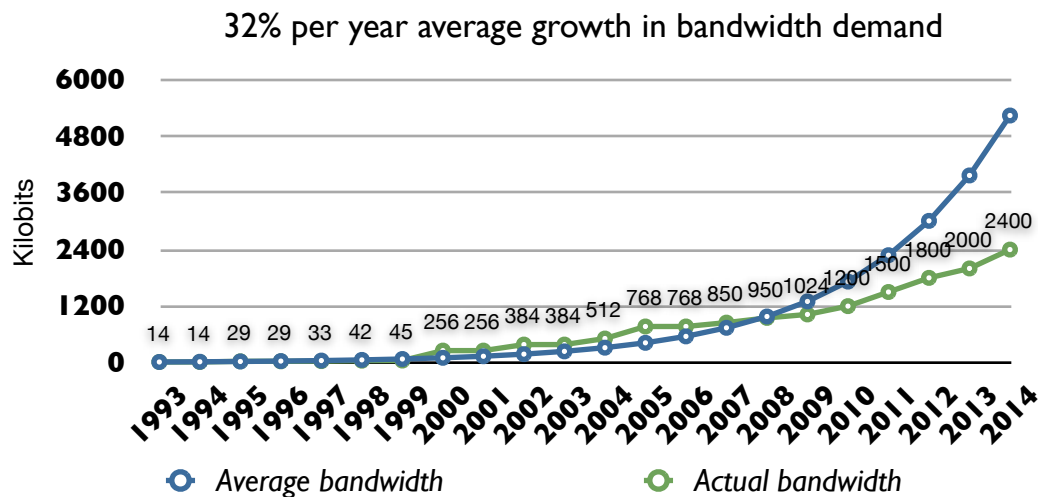
- By 2015 (just three years from now), the FCC thinks bandwidth requirements will be fifty times (50x) what they are today (current average bandwidth to homes and businesses is 1-2 megabits). In Japan, where they have had 100 megabit connections to homes and businesses available for several years, they are already observing congestion--meaning 100 megabit pipes are already filling up.
- Americans are watching more than 10 billion videos per month over the Internet. This has been a huge driver of bandwidth demand
- The size and resolution of digital device screens is another reason for bandwidth demand increases. The surface area of all digital screens increased 43 percent from 2000 to 2008 and will increase 64 percent more by 2013.
- The FCC's prediction of a 50x increase in bandwidth needs in just five years indicates that DSL and cable modem services will be inadequate, especially for businesses, but also for home uses of telecom services.
- This means that current DSL, wireless, and cable modem services are completely inadequate for future needs. Current DSL offerings are in the range of 384 kilobits to 768 kilobits for most residential users, 768 kilobits to 1.5 megabits for business DSL users, and there are severe distance limitations on DSL. Higher bandwidth (2-5 megabits) is possible, but as the DSL bandwidth goes up, the distance it can be delivered goes down.
- Current wireless offerings are in the range of 1/2 megabit to 1 megabit, and future WiMax services will only be able to deliver 2-4 megabits. Some wireless providers are rolling out 10-15 megabit services, but wireless does not scale up well with respect to cost. As bandwidth increases, the cost of the equipment also increases, and even a 15 megabit service is well short of the FCC projections of the need for 50 megabits of bandwidth in the near term. Wireless performance and capacity is heavily dependent upon backhaul (the local connection to the provider's core network); if this connection is also wireless, the bandwidth available at the access point is shared among all users, even if the rated capacity of an individual connection is 15 megabits. In other words, if the backhaul capacity is 100 megabits, and twenty local users are sharing that capacity, actual bandwidth available to any single user may be much lower than 15 megabits. If all the users are trying to watch video at the same time (not uncommon in early evening), performance can suffer drastically.
- A smartphone demands as much bandwidth as 30 regular cell phones, and one laptop or tablet device can use as much bandwidth as 450 regular cell phones.
- Current average bandwidth for cable modem services is typically 1 to 2 megabits. It is important to note that cable providers make heavy use of the phrase "up to" in their advertising, and it is not unusual to see ads promoting cable modem speeds of "up to 6 megabits." However, that amount of bandwidth is shared among many users (often 200 or more) in a neighborhood, which results in much lower average speeds, and during peak use times in residential areas,

the actual bandwidth available to a single household may be less than one megabit.

The challenge for leaders in the Rexburg region is to ensure that the region has a telecommunications infrastructure in place that will be able to handle the 50x bandwidth increase projected by the FCC (which is based on many years of real world data).

At the same conference, a talk by a DirecTV official provided additional insight into residential bandwidth needs. The DirecTV speaker noted that one of their biggest complaints is that the company does not have enough HD format programming. He went on to note that a single channel of “standard” HD content uses 10 megabits of bandwidth when delivered via IP-TV, and a live event like a race or sporting event (e.g. football) requires 15 megabits of bandwidth. The firm is already delivering video programming to end users using Internet-based IP-TV formats, and noted that many buildings and homes do not have the internal cabling to support the IP-TV bandwidth needs. He also indicated that their early IP-TV users cannot tell the difference between IP-TV delivery of video and traditional cable/satellite delivery.

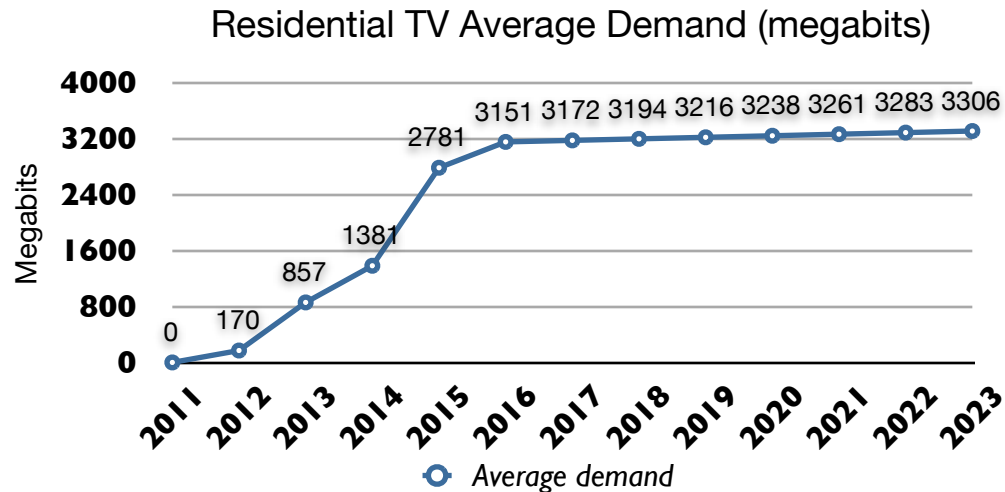
In 1993, the year that the Blacksburg Electronic Village began offering the first residential Internet access in the world, the average connection speed was 14,400 bits per second. At the end of 2007, the average bandwidth to the home is fifty times that for DSL service (768,000 bits per second), and over 70 times that for the typical cable modem connection (about 1,000,000 bits per second). DSL speeds have flattened out (the green line on the chart) because DSL capacity has flattened out, not because demand has diminished. The blue line (average bandwidth) has been increasing steadily year by year.



The table below presents the estimated connection type for residents in the Rexburg region.

Internet Connection Type	Total	Percentage	Index
Any Broadband or High speed Connection	12,859	75.66%	108.2
Cable Modem	6,031.2	34.3%	109.6
DSL Connection	3,792	23.59%	103.8
Dial-up modem	637	4.16%	110.8
Not sure/Don't know	333.6	2.09%	79.8
Wireless Connection from a computer or laptop (e.g. Wi-Fi, wireless router, etc.)	3,940.4	23.12%	114.4

As has been mentioned earlier, the increase in TV and Video usage is one of the largest drivers of bandwidth usage. The demand for video will continue to increase, and in 2013, it is expected to account for over 60% of all Internet traffic. This increase in bandwidth is reflected in the graph below, which estimates the growth in average residential demand in the Rexburg region for the next 20 years



Distance learning, entertainment, and video conferencing are three major applications of Internet video. Distance learning from home with live video feeds will require high performance 2+ megabit connections in the near term (next 2-4 years), and over the next 4 to 7 years, there will be many distance learning courses that will incorporate live HD two-way video feeds, enabling students to participate in classroom discussions at a much higher quality level. Distance learning could be an important home-based application for workforce training and retraining. Some Idaho community colleges offer “hybrid courses” where a student attends several class sessions at the college and the remaining sessions online from their home, the library, or another location.

Entertainment will also drive bandwidth demand from the home, and the popularity of video sites like YouTube and Netflix provide a good indication of the long term demand for video in many forms, including:

- Live feeds (e.g. live TV shows, sports coverage, and live news reports).
- Video on demand (TV shows available for viewing at any time, rather than at scheduled times).
- Movies on demand (instead of going to the video store).
- Two way video conversations (family, friends).
- Video stored on home computers and distributed across the Internet (e.g. videos of grandchildren, family activities).
- Local video content streamed live or from a server (e.g. high school football games, other sporting events, council meetings, other civic activities).

Most homes in the Rexburg region have multiple channels, meaning that a minimum of 25 megabits of bandwidth is required just to have both televisions on and tuned to two different

channels. If a third person in the home is attending an evening distance learning course that uses HD video, the total bandwidth need would be more than 40 megabits.

Another source of increased demand, alluded to above, is multi-tasking. Surfing the Web while watching TV is becoming commonplace. With the proliferation of smart-phones, tablets, and laptop computers, the amount of potential users is also increasing. The chart below presents the Internet use frequency for residents in the Rexburg region. On an average day, more than a quarter of residents within the Rexburg region spend between 2 to 5 hours on the Internet.

Internet Use Frequency (total time spent on a Saturday)	Total	Percentage
Internet - Times looked at/used: 1 hr. - less than 2 hours	12,036	33.88%
Internet - Times looked at/used: 10 or more hours	1,319	3.71%
Internet - Times looked at/used: 2 hrs. - less than 5 hours	9,984	28.11%
Internet - Times looked at/used: 5 hrs. - less than 10 hours	4,180	11.77%
Internet - Times looked at/used: less than 1/2 hour	8,004	22.53%

Additionally, while it is safe to assume that consumers of the Internet typically use the computer as the main form to log on into the Internet, the below table suggests that there is a growing trend in using a cellphone or smartphone for the Internet.

Devices used to look at or use on the Internet	Total	Percentage
Any Computer	63,310	74.55%
Cellphone or Smartphone	21,611	25.45%

While bandwidth demands have steadily increased, the supply of adequate bandwidth has struggled to keep up. The result of this has been a mixed record of service and performance. The copper cable and wireless technologies are having a difficult time meeting current demand, and it will likely be technically impossible for them to meet future demand in the not-so-distant future. As a result:

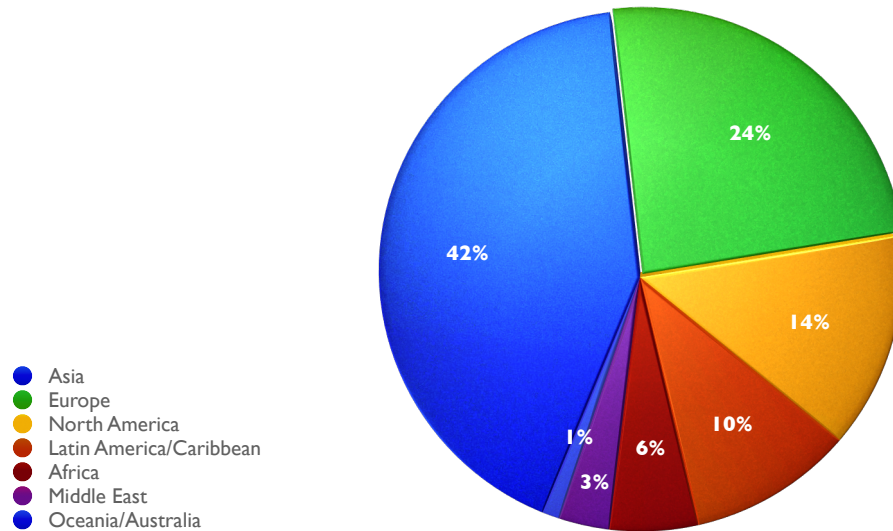
- Most consumers receive well below the advertised speeds they are purchasing. Providers are forced to limit speeds or compress data during periods of high demand.
- Bandwidth during the evening may only be 30 percent of advertised peak speeds.
- Content providers have resorted to compressing the signal as a way to reduce data size. This results in a lower quality video signal that may appear distorted or blurry, if it comes through at all.

Who isn't online?

The Internet has become increasingly widespread in our society and for good reason. In order to support a high demand for Internet, the infrastructure must be in place. High capacity networks are seen as strategic infrastructure that serves as the catalyst for sustainable economic growth. According to Pingdom, an Internet monitoring service, there were over 1.97 billion Internet users worldwide. Of the 1.97 billion Internet users, 825.1 million of them come from Asia, 475.1

million come from Europe and 266.2 million come from North America. 2010 experienced a 14% increase in Internet users since the previous year. In addition, there were 107 trillion emails sent, a 39.1% increase in Apache websites, 88.8 million .COM domain names existing, 25 billion tweets sent, and 2 billion videos watched on youtube per day in 2010.

Internet Users Divided by Region, June 2010



What happens in just one day on the Internet?

- Enough information is consumed to fill 168 million DVDs.
- 294 billion emails are sent.
- 2 million blog posts are written.
- 172 million people visit Facebook.
- 40 million people visit Twitter.
- 22 million visit LinkedIn.
- 250 million photos are uploaded.
- 22 million hours of TV and movies are watched on Netflix.

Service Bandwidth Needs for the Next Five Years

Using the same growth rate that has been documented for the past fourteen years, it is easy to see that DSL does not have the capacity to meet anticipated needs. In fact, in the next five years, bandwidth demand will triple if historical growth rates are maintained--and the average annual growth has been 32% per year since 1993. There is no reason to believe that this will change in the short term. The growth of video-oriented content like YouTube and many other video content services, including emerging movies on demand, will likely push bandwidth demands even higher than the historical growth rate.

As noted above, over the past fourteen years, average yearly growth has been 32%. The future projections for service needs are designed on an average annual growth of just 5%. **The lower**

rate used for projections in this report provides a very conservative estimate of future need.

The lower rate is also used because eventually, bandwidth needs to businesses and homes will flatten out as service demands mature and the infrastructure catches up. Skeptics who may suggest that no more bandwidth is needed than what is currently available may wish to study these charts carefully.

Broadband at Home Penetration Rate

The table below illustrates the rapid pace of adoption of the Internet and the demand for broadband. While it took eighteen years to reach the point where half of American households had technology like a color TV or a personal computer, the time required to reach that point for broadband access to the Internet was almost half that, or about 80% less time.

Another way to think about broadband is that it has been more popular than color television.

Adoption Time	Years to reach 50% use
Broadband at home	10
CD player	10.5
VCR	14
Cell phone	15
Color Television	18
Personal computer	18

Source: Pew/Internet Measuring Broadband Report, 2007

Service and Gap Analysis

Business Bandwidth Needs

The next table shows bandwidth consumption for several types of businesses and a projection of the bandwidth needed 5 and 10 years out. The cost of fuel is already affecting business travel decisions, and more and more businesses will invest in HD quality business videoconference systems to reduce the need for travel. These HD systems require substantial bandwidth; a two way HD video conference requires 20-25 megabits during the conference, and a three way conference requires 30-35 megabits during the conference. As more workers try to reduce the cost of driving to and from work by working part or full time from home, the business location must provide network access (Virtual Private Network, or VPN) to the employees working from home. These home-based workers will make extensive use of videoconferencing to attend routine office meetings remotely and to enhance communications with co-workers, including videoconferences with other home-based workers in the company. A VPN network providing remote access to just two or three home-based employees could require 50 megabits of bandwidth during normal work hours.

	Large Business		Small Business		Home Based Worker		Business From Home	
Description	A larger business with about 50 workstations.		A small business with 10 to 15 employees, and 7-10 workstations.		A single employee working at home for his/her company.		A home business with one or two employees working at home.	
	Concurrent Use	Mbps	Concurrent Use	Mbps	Concurrent Use	Mbps	Concurrent Use	Mbps
Telephone	20	1.28	5	0.32	1	0.064	1	0.064
TV		0		0		0		0
HDTV		0		0		0		0
Credit Card Validation	4	4	1	1		0		0
Security System	1	0.25	1	0.25	1	0.25	1	0.25
Internet	20	30	7	10.5	1	1.5	1	1.5
VPN Connection	5	25		0	1	5		0
Data Backup	5	7.5	1	1.5	1	1.5	1	1.5
Web Hosting	1	2		0		0		0
Telehealth (provider)		0		0		0		0
Workforce Training (online classes)	2	20	1	10		0	1	10
HD Videoconferencing	10	100	2	20	1	10	1	10
Totals		190.0		43.6		18.3		23.3
5 years from now (megabits)	570		131		55		70	
10 years from now (megabits)	1710		392		165		210	

Residential Bandwidth Needs

The table below depicts the bandwidth needed for typical residential services which are available now or will be available in near future. In a next generation network all services will be delivered over a single network infrastructure which will require an access network that can support providing most services to most consumers simultaneously. Today's shared networks (cable and wireless in particular) rely on the "bursty" nature of traffic to provide services to end users. If all end users were consuming their "advertised" bandwidth today's cable and DSL networks would grind to a halt.

In fact, they already are; some cable providers have begun to receive heavy criticism for undocumented manipulation of data traffic. Existing cable modem network users are overwhelming the digital cable networks that were upgraded as little as three or four years ago, and the firms have had to artificially reduce the bandwidth available for certain kinds of high bandwidth services (e.g. peer to peer file sharing). Some cable providers have even run into capacity issues with the TV portion of their networks, and some consumers have observed that some HD TV channels have been so highly compressed that picture quality has been noticeably degraded when compared to the same channel delivered by satellite.

The table below is designed to show bandwidth consumption in several scenarios. Network design requires a system than can meet peak demand across the entire network, meaning the network must be able to deliver peak bandwidth demand to a majority of households at the same time. Super Bowl Sunday is a typical example of a day when a majority of households may be watching a video at the same time. Political debates, season finales of popular shows, and even a typical Saturday afternoon during football season may see many households trying to access

multiple channels of video simultaneously. This table shows the severe gap between current DSL, wireless, and cable modem options in the Rexburg region and projected future demand.

Description	Residential Day-time		Early Evening		Evening and Late Night		Snow Day	
	Concurrent Use	Mbps	Concurrent Use	Mbps	Concurrent Use	Mbps	Concurrent Use	Mbps
	Intermittent Television and Internet use across a small percentage of households.		Increased television, telephone, and Internet use as children arrive home from school and employees from work. Use of other services increases.		Peak television and Internet use. Multiple TV's are on, phone and computer being used.		On top of typical daytime traffic children are home from school, and many employees are home working.	
Telephone	1	0.064	1	0.064	1	0.064	1	0.064
TV	1	2.5	1	2.5	1	2.5	1	2.5
HDTV		0		0	1	8	1	8
Security System	1	0.25	1	0.25	1	0.25	1	0.25
Internet	1	1.5	1	1.5	2	3	3	4.5
Online Gaming		0		0		0		0
VPN Connection		0		0		0	1	5
Data Backup		0	1	1.5		0	1	1.5
Telehealth (subscriber)		0		0		0	1	5
Distance Learning / Workforce Training		0	1	10	1	10	2	20
HD Videoconferencing		0		0		0	1	10
Totals		4.3		15.8		23.8		56.8
5 years from now (megabits)	13		47		71		170	
10 years from now (megabits)	39		142		214		511	

Economic Impact Potential

According to the 2009 report from the World Bank on information and communications technologies, for every ten additional broadband subscribers out of 100 inhabitants are correlated in high income countries with GDP growth increases of 1.21%.

Prosperity

As suggested from the statistic above, the Internet generates growth. In more than a handful of countries, GDP growth doubled to over 21% due to the Internet. Although some jobs have been eliminated due to the emergence of the Internet, nearly 1.2 million jobs have been created over the past 15 years from the Internet. The McKinsey's global SME survey suggests that 2.6 jobs were created for every one destroyed.

Health Care Delivery

According to "The 2008 State New Economy Index" healthcare can be significantly improved in the future through greater use of information technology and connectivity to the web. Healthcare costs can potentially be cut by \$80 billion annually. The cost of health care continues to rise annually. For instance, health care as a share of U.S. GDP has almost doubled from 8.8 percent to 15.3 percent in 2005. One aspect of health care that is gaining steam is electronic prescribing. Electronic prescribing cuts medical transaction costs by eliminating the need for confirmation phone calls and faxes and reduces the chance of health risks due to prescription delays. This is a particularly useful asset for communities in rural areas who do not have convenient access to medical assistance.

Government and Civic Life

The term E-Government refers to networked information technologies online to serve constituents. The Internet cuts costs for many state governments from reducing the paper trail to expediting services through the Web like renewing drivers' licenses and paying taxes. Furthermore, E-government will become a setting for online based discussions between constituents and bureaucrats. This allows for greater transparency in hopes of garnering a better perception of how government functions. More local and state governments and the federal government are attempting to involve constituents through webinars, blogs, wikis, and videos.

Education

Students benefit greatly through the use of computers and Internet. Nearly every public school in America has access to the Internet. In 2007, there were 180,00 more instructional computers in the schools than in 2006. Students who attend schools without access to computers and the Internet may be ill prepared for the work place. The prevailing use of information technologies in not only the United States, but also globally is a clear indicator that future prosperity is in the hands of students who are able to understand and use the pertinent tools.

Job Creation

As businesses inevitably rely more on dependable access to telecommunications to sustain their trade, they are also seeking fast and affordable networks as well. In many cases, cable and DSL companies are monopolies within a community. Unsurprisingly, these companies are able to provide unreliable and slow networks, since customers have no other choice but to purchase their products. As a result, numerous communities have taken the issue into their own hands and built their own networks. Communities are able to control the capacity connections and the reliability of the services. Ultimately, affordable access to reliable Internet services is a catalyst for economic growth and job creation.

- Chanute, Kansas (Chanute Municipal Network): One of the reasons why Spirit AeroSystems chose Chanute for their new manufacturing facility is because of their leading broadband infrastructure. As a result, the plant created over 100 new jobs.
- Bristol, Virginia (Optinet): This community has a public owned network that attracted companies like CGI and Northrup Grumman. These companies not only created 700 jobs, but also paid twice the average wage in the community due to the convenience of the network.
- Springfield, Missouri (SpringNet): When a carrier failed to meet the demands of Springfield, SpringNet was created and ultimately served to provide the necessary connectivity to create over 400 jobs to the community.
- Chattanooga, Tennessee (EPB Fiber): According to an academic study, the first ten years of the EPB fiber network will produce over 3,6000 new jobs correlated with the City's high speed Internet, phone, and television services.
- Palm Coast, Florida was able to retain the city's largest employer (over 500 jobs) because the city-owned open access fiber network sharply reduced the cost of Internet access within the City.

Public Savings

When local governments build their own networks, they experience striking savings and greater reliability. How? Since the local governments own the network, they have the leverage to determine the future costs and when these price hikes would occur. Community anchor institutions like schools, libraries, and government facilities may reap in the greatest savings because they are no longer contracted to sign a lease to join a network.

- Martin County, Florida: Once the initial capital investment in the fiber asset is paid off, Martin County School District will save nearly \$340,000 per year. In other words, the school district will only pay an estimated \$6,000 per year for a gigabit connection to 26 locations.
- Bristol, Virginia: One study concluded that Bristol schools have saved \$1 million from 2003-2008 just by self-provisioning phone services. This results in nearly \$10 million in savings for the community.
- Martinsville, Virginia: Similarly to Bristol, Virginia, Martinsville saves between \$130,000 and \$150,000 annually because they do not need to lease telephone lines.
- Medina County, Ohio: When data needs were fulfilled by Time Warner Cable, Highland Public Schools spent \$100,000 per year for the company's services. However, the county saved \$82,000 in 2012 when it switched over to the Medina County municipal network since the cost was only \$18,000 per year.
- The city of Wilmington, North Carolina uses its fiber network to turn the lights off at sports parks at night. Cameras have been placed at every sports and recreation field, along with remote control light switches. A single city employee can quickly check the cameras to see if anyone is still at a field, and if not, a couple of mouse clicks turn off the lights. The city expects to save \$800,000 per year on electricity costs.

Demographic Analysis

Population of the region

In the last decade, the region experienced comparable growth compared to the state average and the national average. Considering that much of the state’s growth has taken place in the City of Rexburg and Teton County in Idaho, the growth rate for this area is an indication of regional strength.

Growth in the counties has been strong for areas like Teton County, Idaho and Madison County, while counties like Fremont and Teton County, Wyoming have experienced slower growth. Over the next several years, the region is expected to grow in all of the counties, while projected growth in Rexburg is expected to remain flat--but if the university continues to expand, the student population growth will change this. For the region as a whole to increase its attractiveness for business relocation, improved and more affordable broadband services will play a key role in supporting work-from-home jobs and new business and entrepreneurial activities.

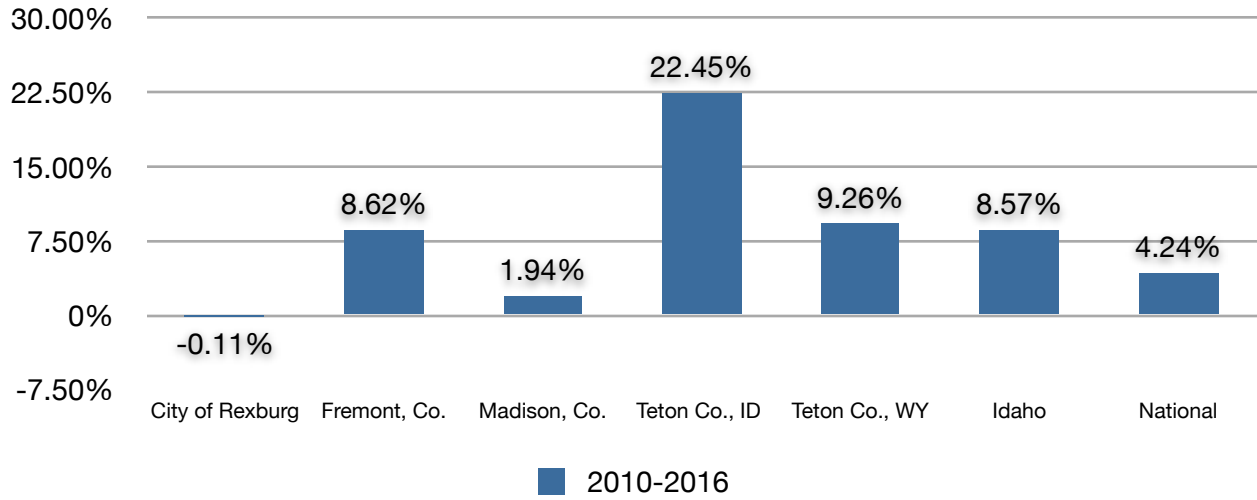
Year	City of Rexburg		Fremont County		Madison County		Teton County, Idaho		Teton County, Wyoming	
	Pop.	% Change	Pop.	% Change	Pop.	% Change	Pop.	% Change	Pop.	% Change
2016	25,765	-0.11%	14,840	8.62%	38,469	1.94%	14,139	22.45%	24,082	9.26%
2010	25,794	43.32%	13,561	12.85%	37,724	27.19%	10,965	45.29%	21,853	16.48%
2000	17,997	14.69%	11,818	7.47%	27,468	13.81%	5,999	42.67%	18,251	38.79%
1990	15,353		10,935		23,675		3,439		11,172	

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1
 * US Census Bureau Population Estimates Program
 * Weldon Cooper Center for Public Service, UVA

Year	Region		Idaho		National	
	Pop.	% Change	Pop.	% Change	Pop.	% Change
2016	91,530	8.83%	1,761,049	8.57%	325,019,261	4.24%
2010	84,103	32.37%	1,622,076	25.36%	311,792,006	10.85%
2000	63,536	22.53%	1,293,938	14.40%	281,279,915	14.40%
1990	49,221		1,006,739		248,576,851	

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1
 * US Census Bureau Population Estimates Program
 * Weldon Cooper Center for Public Service, UVA

Population Change



Household Size and Growth Trends

The number of households in the Rexburg area is expected to rise in the next five years, while the number of persons living in the average household will remain close to the same. The size of an average household and the number of households are important data indicators when predicting broadband take rates and modeling potential income. Most services are subscribed on a per household basis, rather than on a per person basis.

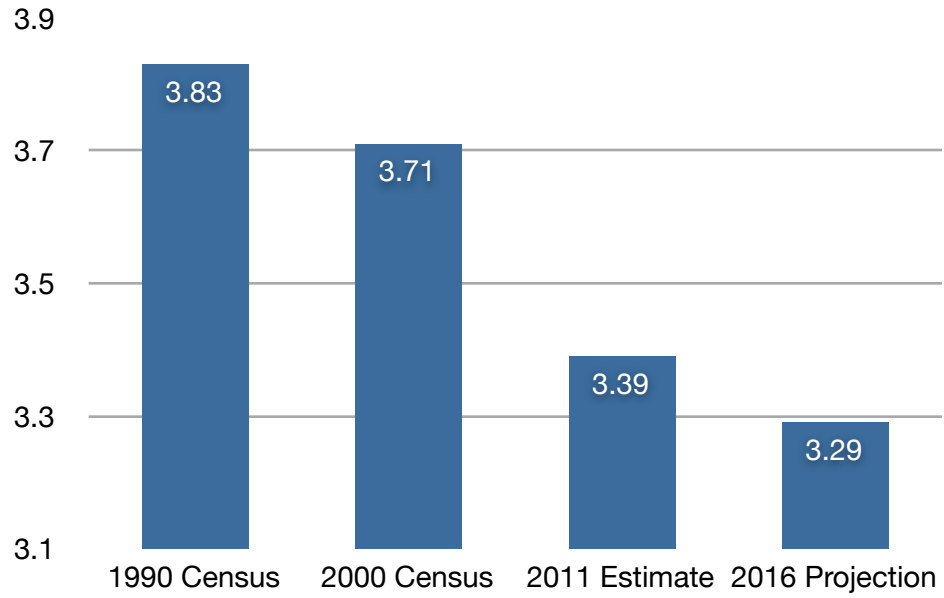
When calculating infrastructure investment costs, household statistics are also important because duct and fiber connections are made to the household (premise). Projected steady growth in households suggests that the region will see steady demand for connections (as opposed to a situation where the number of households is shrinking). The table below shows housing projections using census data.

The overall trend for the Rexburg region as depicted by the tables and graphs shown below is that the total number of households has increased and is expected to increase. Teton County, Idaho nearly doubled the total number of households in the last decade and is expected to increase by over 25%.

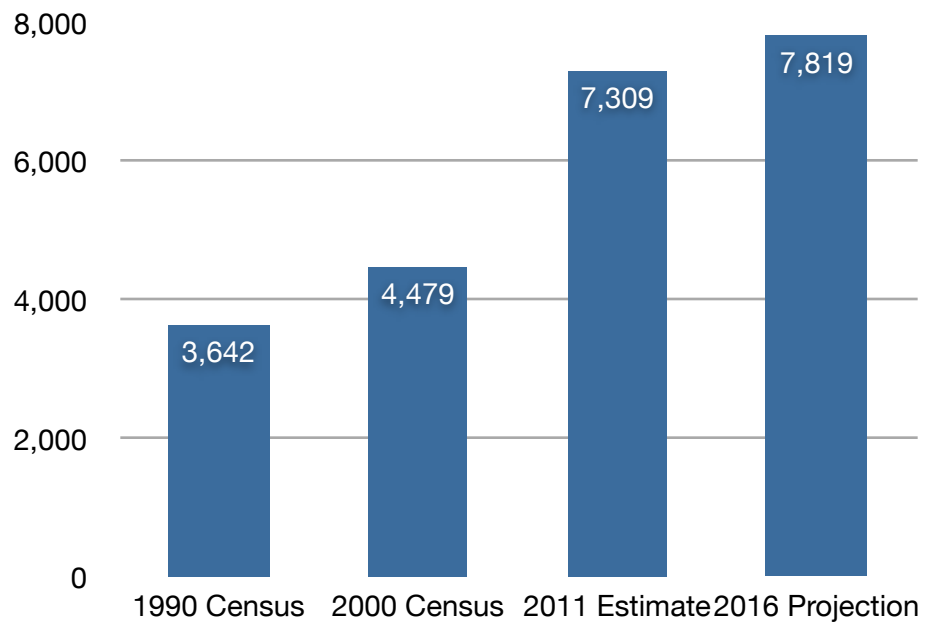
Rexburg, ID	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Total Households	3,642	4,479	7,491	7,819	40.2%	4.2%
Size of Household:						
1 Person	11.5%	12.6%	8.5%	8.0%	-48.2%	-6.3%
2 Person	24.3%	24.2%	36.9%	40.8%	34.4%	9.6%
3 Person	13.1%	12.9%	19.5%	21.7%	33.8%	10.1%
4 Person	13.1%	14.8%	11.7%	9.9%	33.8%	-18.2%
5 Person	11.7%	9.6%	7.7%	6.5%	-24.7%	-18.5%
6 Person	18.8%	21.9%	13.1%	11.0%	-67.2%	-19.1%
7+ Person	7.7%	4.0%	2.6%	2.2%	-53.8%	-18.2%
Average Household Size	3.83	3.71	3.39	3.29	-9.4%	-3.0%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1
 * US Census Bureau Population Estimates Program
 * Weldon Cooper Center for Public Service, UVA

Average Household Size in Rexburg, Idaho



Growth in Households in Rexburg, Idaho



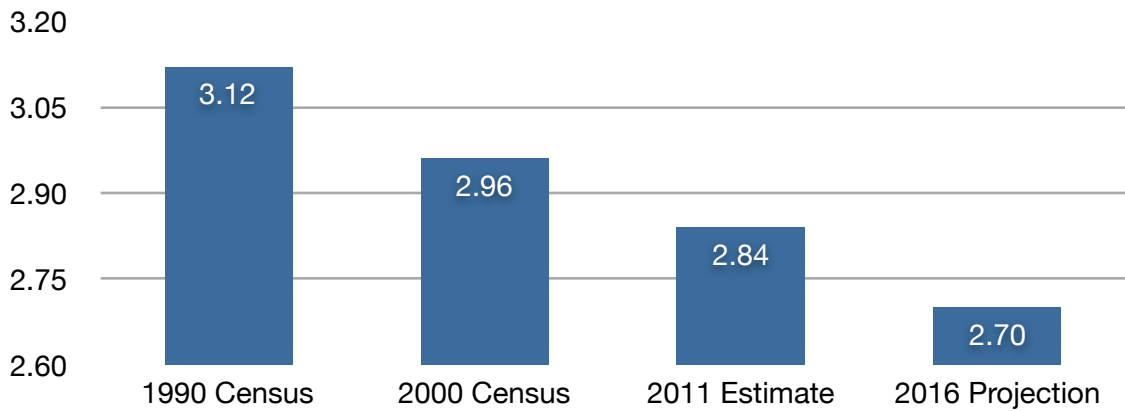
Fremont County, ID	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Total Households	3,453	3,885	4,377	5,332	11.2%	17.9%
Size of Household:						
1 Person	19.5%	19.4%	20.3%	20.4%	4.4%	0.5%
2 Person	30.7%	33.7%	35.9%	40.0%	6.1%	10.3%
3 Person	14.3%	14.6%	15.5%	17.5%	5.8%	11.4%
4 Person	13.6%	13.2%	11.7%	9.3%	-12.8%	-25.8%
5 Person	8.1%	9.4%	8.2%	6.4%	-14.6%	-28.1%
6 Person	7.0%	5.0%	4.8%	3.7%	-4.2%	-29.7%
7+ Person	6.8%	4.8%	3.6%	2.7%	-33.3%	-33.3%
Average Household Size	3.12	2.96	2.84	2.70	33.78%	-5.19%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

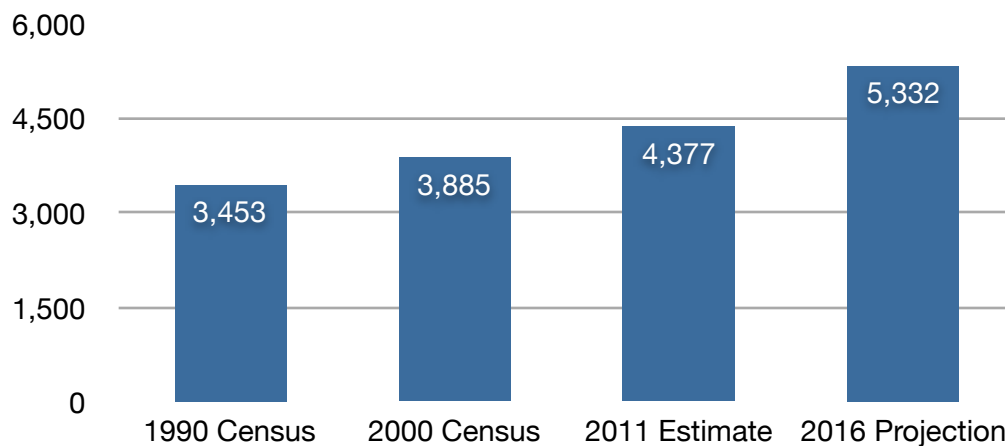
* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVA

Average Household Size in Fremont, Idaho



Growth in Households in Fremont, Idaho



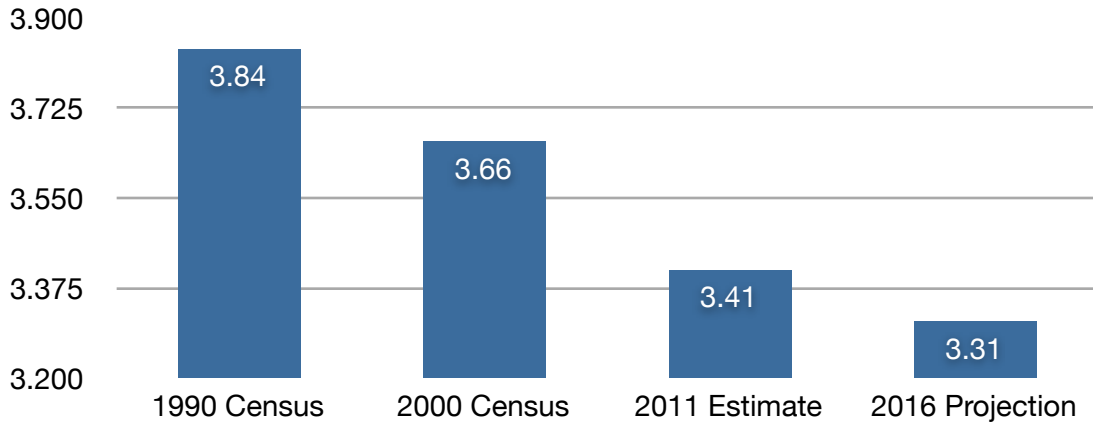
Madison County, ID	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Total Households	5,801	7,129	10,849	11,315	34.29%	4.12%
Size of Household:						
1 Person	11.5%	12.6%	9.8%	8.6%	-28.6%	-14.0%
2 Person	24.3%	25.0%	34.0%	38.1%	26.5%	10.8%
3 Person	13.5%	13.5%	18.6%	21.0%	27.4%	11.4%
4 Person	13.3%	15.4%	11.7%	10.2%	-31.6%	-14.7%
5 Person	11.6%	10.6%	8.5%	7.3%	-24.7%	-16.4%
6 Person	16.2%	16.7%	12.9%	10.9%	-29.5%	-18.3%
7+ Person	9.7%	6.2%	4.7%	4.0%	-31.9%	-17.5%
Average Household Size	3.84	3.66	3.41	3.31	-7.33%	-3.02%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

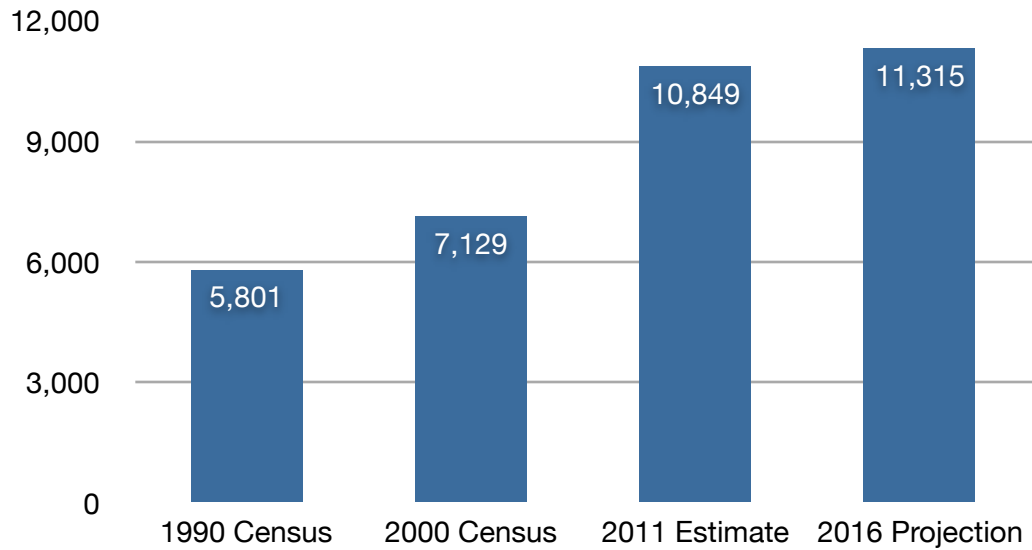
* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVA

Average Household Size in Madison County, Idaho



Growth in Households in Madison County, Idaho



Teton County, ID	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Total Households	1,123	2,078	3,647	5,386	43.0%	32.3%
Size of Household:						
1 Person	20.40%	21.20%	19.90%	19.40%	-6.5%	-2.6%
2 Person	32.10%	36.20%	37.40%	41.50%	3.2%	9.9%
3 Person	14.30%	16.20%	18.30%	20.40%	11.5%	10.3%
4 Person	13.20%	14.20%	11.50%	8.90%	-23.5%	-29.2%
5 Person	8.70%	7.80%	6.20%	4.70%	-25.8%	-31.9%
6 Person	5.70%	5.30%	3.90%	3.00%	-35.9%	-30.0%
7+ Person	5.90%	3.00%	2.80%	2.10%	-7.1%	-33.3%

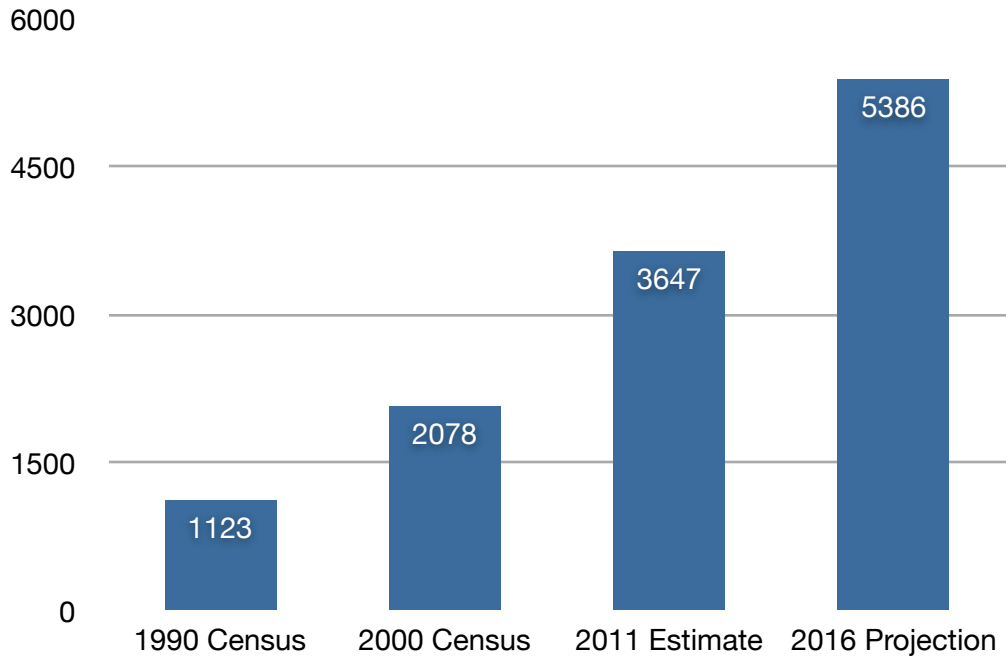
Teton County, ID	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Average Household Size	3.03	2.87	2.74	2.62	-4.7%	-4.6%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

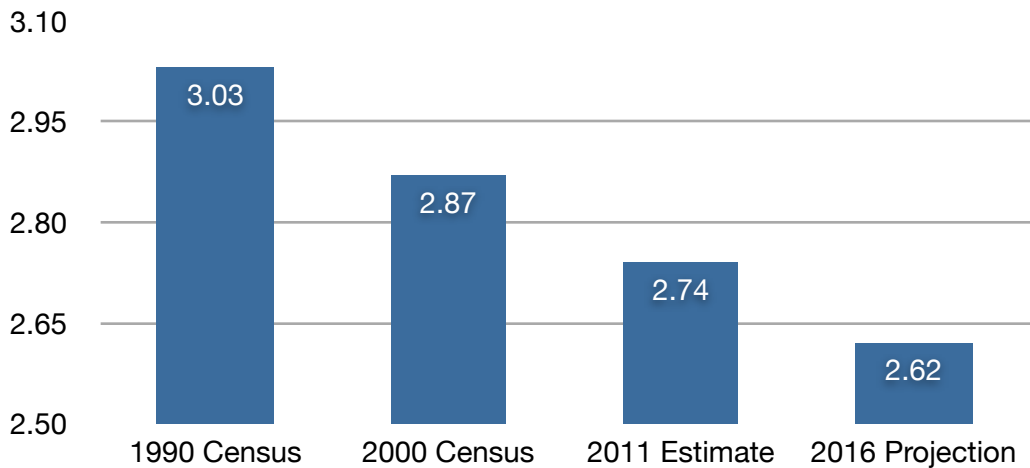
* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVa

Growth in Households in Teton County, Idaho



Average Household Size in Teton County, Idaho

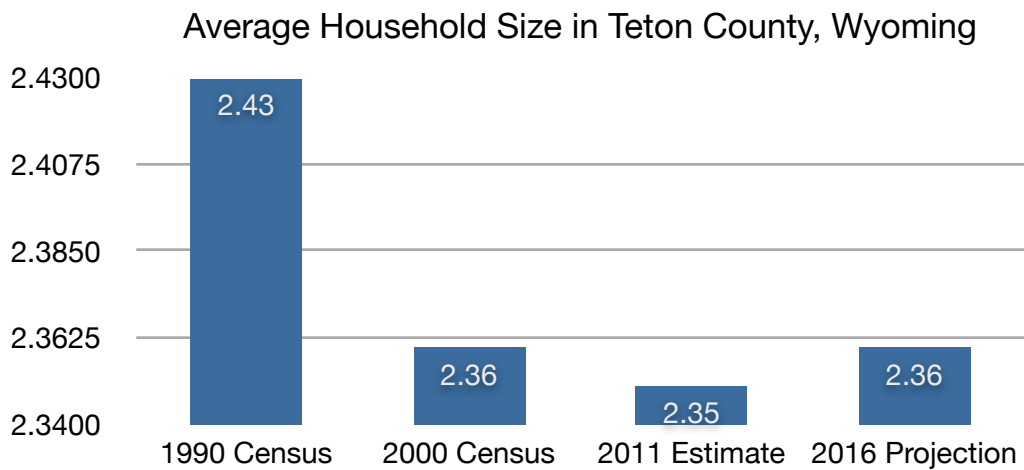


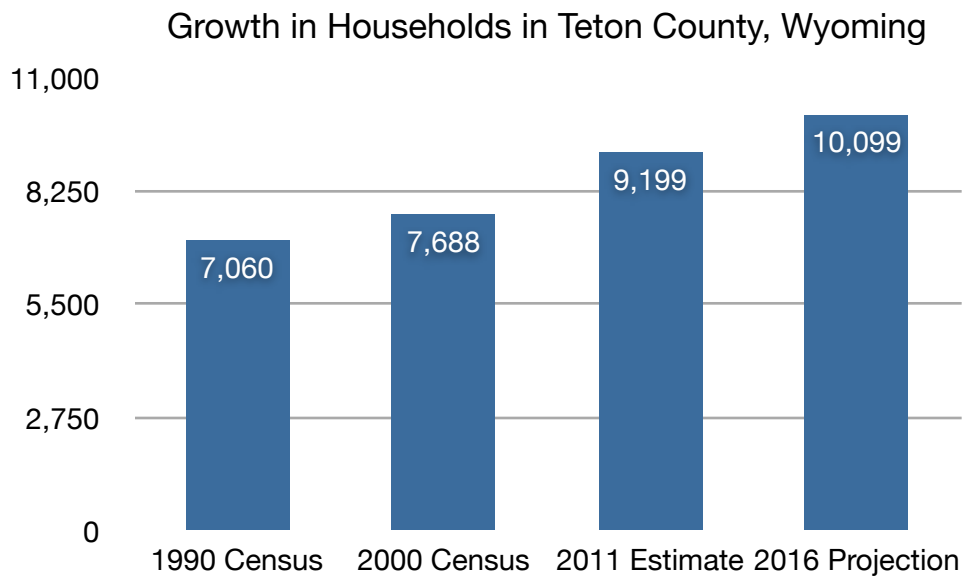
Teton County, WY	1990 Census	2000 Census	2011 Estimate	2016 Projection	2000-2010	2011-2016
Total Households	7,060	7,688	9,199	10,099	16.43%	8.91%
Size of Household:						
1 Person	26.60%	27.20%	37.20%	40.80%	26.88%	8.82%
2 Person	35.80%	38.70%	28.30%	23.90%	-36.75%	-18.41%
3 Person	16.80%	15.60%	11.20%	9.30%	-39.29%	-20.43%
4 Person	13.80%	12.20%	15.60%	17.20%	21.79%	9.30%
5 Person	4.70%	4.20%	5.00%	5.60%	16.00%	10.71%
6 Person	1.70%	1.60%	1.60%	1.80%	0.0%	11.11%
7+ Person	0.70%	0.50%	1.30%	1.40%	61.54%	7.14%
Average Household Size	2.43	2.36	2.35	2.36	-0.43%	0.42%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVa





Age Distribution

The Rexburg region has more minors than the national average but fewer minors than the state average. On average, there are more elderly people at the state and national level than in the Rexburg region. Young adults between the ages of 20 to 34 make up the largest proportion of the age demographic in the Rexburg region. The difference from the national average reflects the influence of BYU on the local population.

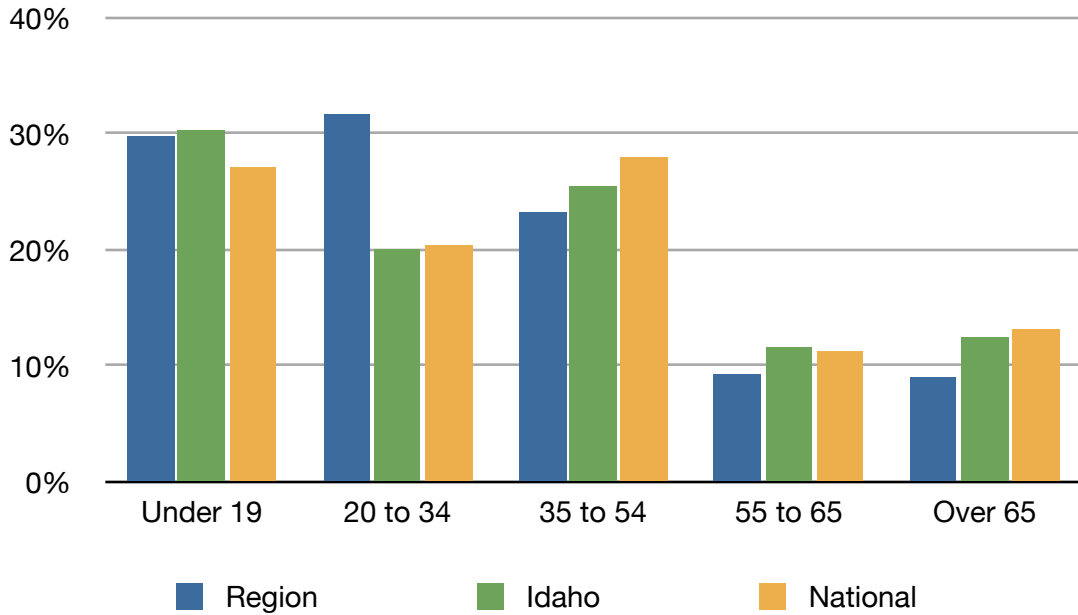
Over half the population in the City of Rexburg is comprised of young adults between the ages of 20 to 34. Different age groups use the Internet differently, and only high speed broadband can cater to the needs of each. Younger generations are often avid consumers of online video and most working-aged people will benefit greatly from a high speed connection to their home. At the same time, an ongoing awareness and education effort is often needed to help older people make good use of technology.

From experience in other areas, local real estate agents consistently report that many home buyers will NOT look at homes that do not have broadband connections, especially younger, first time home buyers. So broadband availability (or the lack of it) is changing where people choose to live.

Population	Region	Idaho	National
Under 19	29.8%	30.3%	27.1%
20 to 34	31.7%	20.1%	20.4%
35 to 54	23.3%	25.5%	28.0%
55 to 64	9.3%	11.6%	11.3%
Over 65	9.0%	12.5%	13.2%

Source US Bureau of Census 2010 Decennial Census SF3 DP-2

Age Demographics



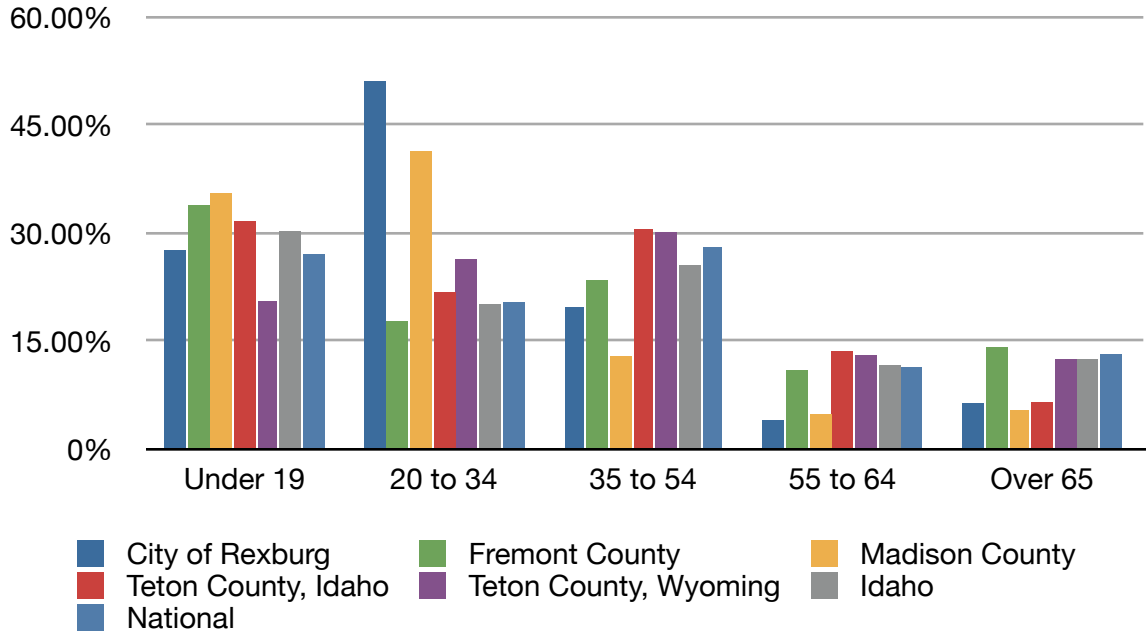
The table and chart below provide the age distribution of residents between the four localities. The proportional share of children and seniors are within the same range across the region. Madison County and the City of Rexburg have a higher share of young adults compared to the counties. As described earlier, half of the population in the City of Rexburg is comprised of young adults.

A higher share of young adults indicates a larger share of customers that will demand improved broadband services. For a number of reasons, the area is attractive to young professionals. Improving broadband connectivity and service availability represents a good opportunity to retain and attract younger residents.

Population	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming
Under 19	27.6%	33.8%	35.5%	31.6%	20.6%
20 to 34	51.1%	17.7%	41.4%	21.8%	26.3%
35 to 54	19.7%	23.5%	12.9%	30.5%	30.1%
55 to 64	4.0%	10.9%	4.9%	13.6%	13.1%
Over 65	6.3%	14.2%	5.4%	6.5%	12.5%

Source US Bureau of Census 2010 Decennial Census SF3 DP-2

Age Demographics



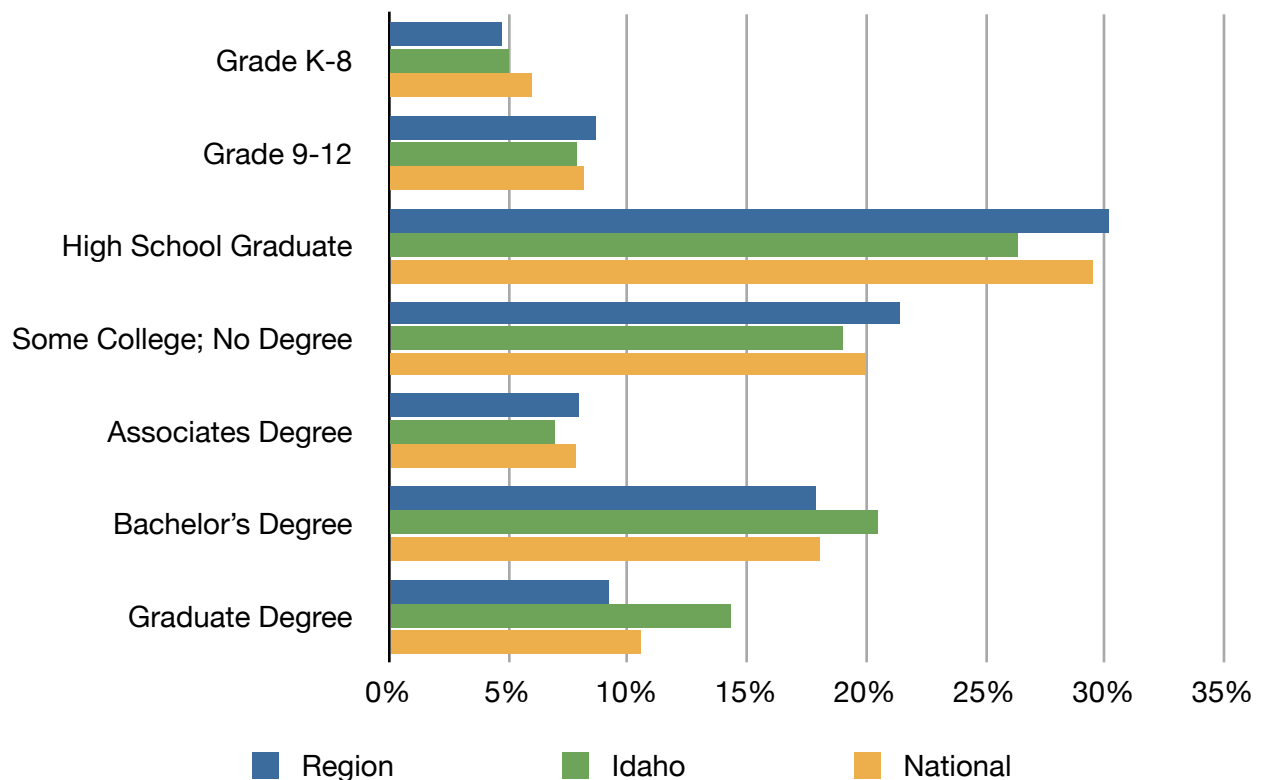
Education

In nearly every category of educational attainment after high school, the Rexburg region equals or exceeds the state averages, with the exception of advanced degrees. The Rexburg region trails behind the state and national averages in high school degree attainment. This is one area of interest that the region should be concerned in regards to retaining students. Studies have shown that people with at least a high school degree are more likely to secure careers with higher salaries. Higher salaries often translates to a more comfortable standard of living and spurs economic development when residents have disposable income.

The region has lower rates of bachelor degrees compared to the state average, but higher rates of associates degrees. Increased availability of broadband could help to further improve this over time, as increased awareness and connectivity would allow residents to complete or improve their education and skill set by attending online classes. Increased connectivity could also attract a different mix of residents (e.g., business people and entrepreneurs who can work from home).

	Region	Idaho	National
Grade K - 8	4.1%	4.3%	6.0%
Grade 9 - 12	3.7%	7.1%	8.2%
High School Graduate	21.1%	29.5%	29.5%
Some College, No Degree	11.9%	8.7%	20.0%
Associates Degree	23.8%	17.0%	7.8%
Bachelor's Degree	10.2%	7.5%	18.0%
Graduate Degree	25.3%	25.9%	10.5%

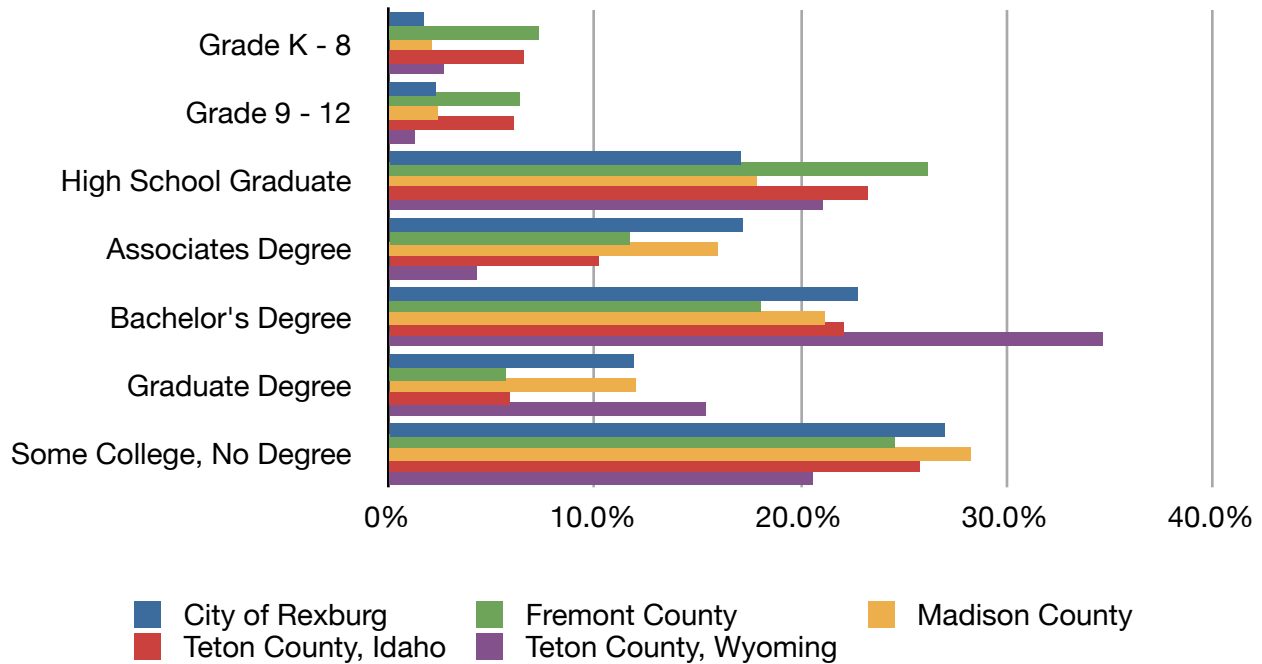
Source US Bureau of Census 2010 Decennial Census SF3 DP-2



This table and graph below provide the distribution of educational attainment for the five individual localities. It's interesting to note that each of the localities has a high share of residents with some college education but no degree. This indicates that there may be above average demand for online degree programs within the region.

	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming
Grade K - 8	1.7%	7.3%	2.1%	6.6%	2.7%
Grade 9 - 12	2.3%	6.4%	2.4%	6.1%	1.3%
High School Graduate	17.1%	26.2%	17.9%	23.3%	21.1%
Associates Degree	17.2%	11.7%	16.0%	10.2%	4.3%
Bachelor's Degree	22.8%	18.1%	21.2%	22.1%	34.7%
Graduate Degree	11.9%	5.7%	12.0%	5.9%	15.4%
Some College, No Degree	27.0%	24.6%	28.3%	25.8%	20.6%

Source US Bureau of Census 2010 Decennial Census SF3 DP-2



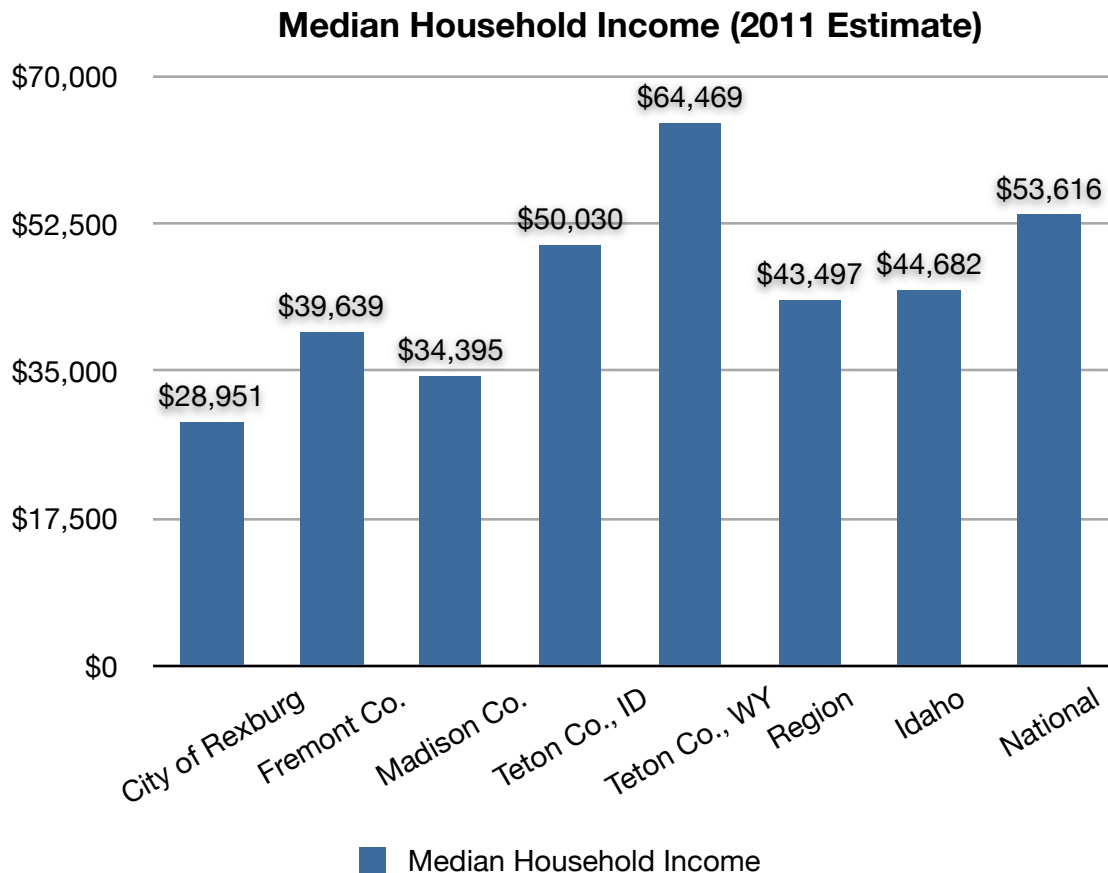
Median Household Income

The Median Household Income of the Rexburg region is lower than the national average and state average. This is a reflection of the low incomes (primarily from student households) in some areas of the City of Rexburg, and to a lesser degree, Fremont and Madison County. Both Teton County, Idaho and Teton County, Wyoming have median income levels that are above the state average. This income disparity suggests that any new broadband offerings should include affordable “entry level” Internet access offerings that will be attractive to students and families of moderate income. Regional investments in broadband infrastructure could spur increased competition and lower prices for residents and businesses, thus making access more affordable.

Improved Internet access in the region would continue to shift some employment and job opportunities towards office and professional employees. Home-based businesses and working from home jobs, either part time or full time, could contribute more to the local economy, and broadband at home is already considered a requirement among white collar professionals.

	City of Rexburg	Fremont Co.	Madison Co.	Teton Co., ID	Teton Co., WY	Region	Idaho	National
Median Household Income	\$28,951	\$39,639	\$34,395	\$50,030	\$64,469	\$43,497	\$44,682	\$53,616

Source US Bureau of Census 2010 Decennial Census SF3 DP-3

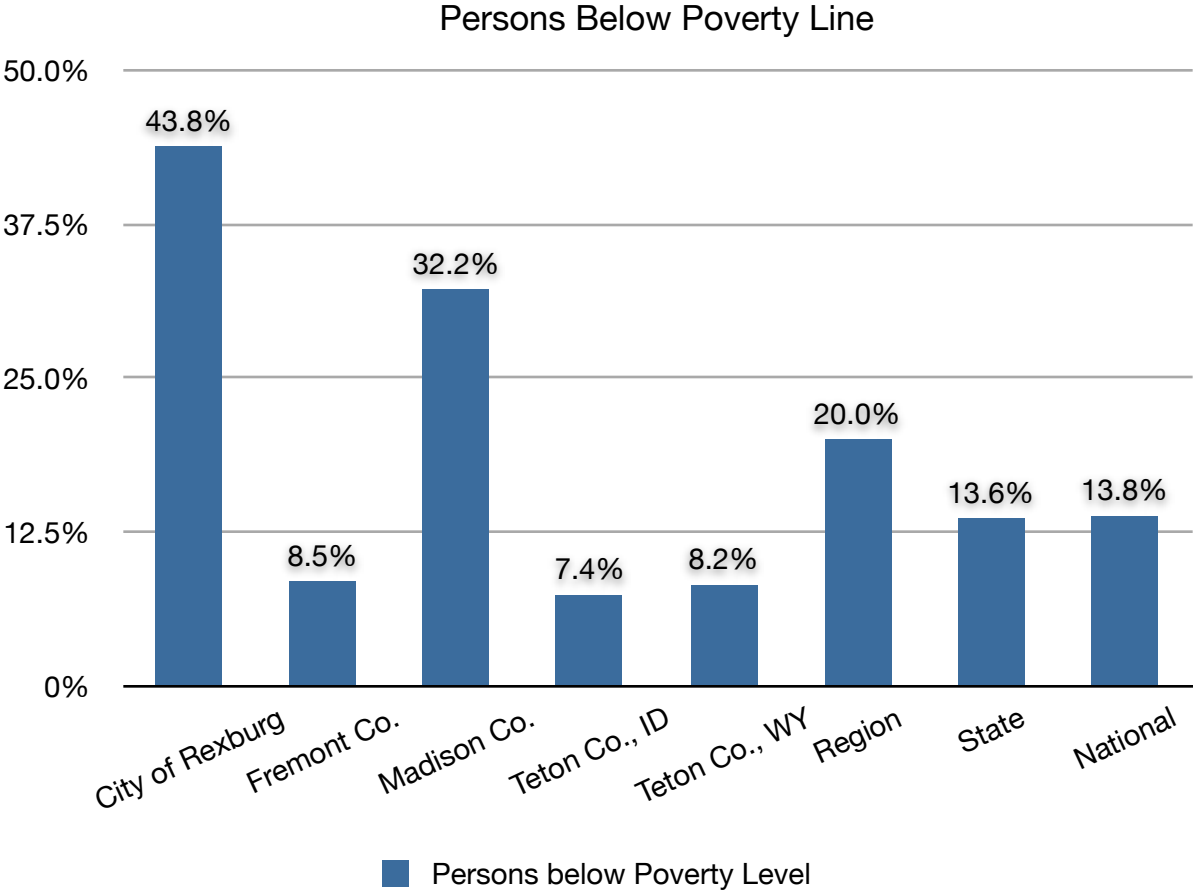


Families Below Poverty Level

The following table compares the poverty level for the five jurisdiction to the regional, state, and national averages. As a region, the area has a higher proportion of persons below the poverty level to the statewide poverty rate and the national average. When viewed individually, the poverty rates for Fremont County, Teton County, Idaho, and Teton County, Wyoming are all well below the statewide levels. In the City of Rexburg, the high number of students has a negative and somewhat misleading affect on the poverty level. More than 1/5 of the residents are living below the poverty line in the City of Rexburg. For the region as a whole, increased broadband access and affordability will be an economic advantage. Broadband access can facilitate work-from-home businesses, provide access to online degree programs, and attract more business investment and job opportunities to the area.

	City of Rexburg	Fremont Co.	Madison Co.	Teton Co, ID	Teton Co, WY	Region	Idaho	National
Persons below poverty level	43.8%	8.5%	32.2%	7.4%	8.2%	20.0%	13.6%	13.8%

Source US Bureau of Census, State and County Quickfacts
 Accessed 2011, Data from 2009



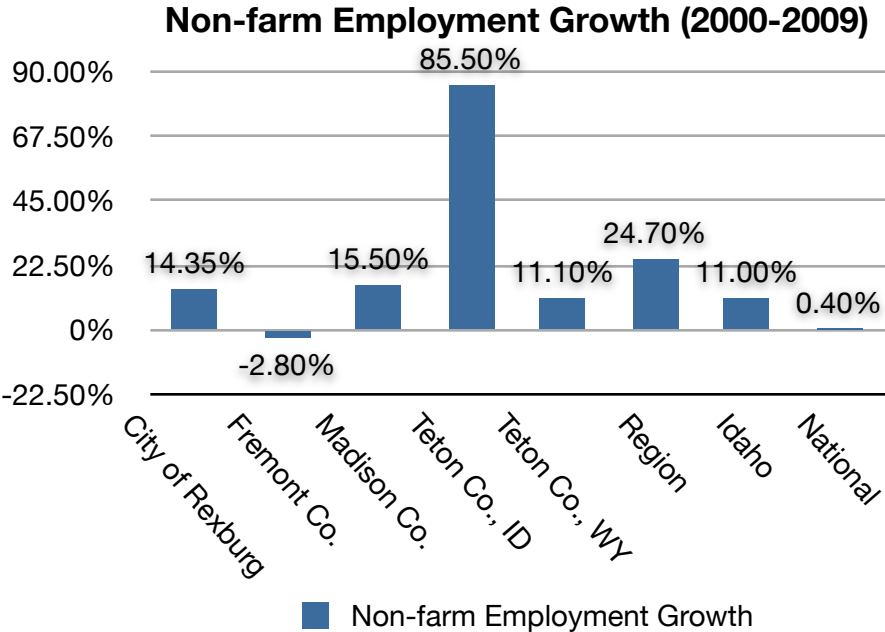
Non-farm employment growth

Fremont County is experiencing a decrease in the number of jobs, underscoring the need for corrective action through economic development focus and broadband infrastructure investments. The City of Rexburg, Madison County, Teton County, Idaho, and Teton County, Wyoming have all seen an increase in employment. This highlights the increasing demand for broadband services since more and more economic sectors depend upon a reliable network to perform their services. A joint CMU/MIT study released in 2005 showed that regions with good distribution of broadband service enjoyed more economic growth than regions without quality access to broadband services.

A study by the Phoenix Center showed that broadband was also an important tool for job-seekers; those looking for jobs were more likely to find work than those on dial-up or those without any Internet access.

	City of Rexburg	Fremont Co.	Madison Co.	Teton Co., ID	Teton Co., WY	Region	Idaho	National
Non-farm employment growth	14.35%	-2.80%	15.50%	85.50%	11.10%	24.70%	11%	0.40%

Source US Bureau of Census 2000-2009 State and County Quickfacts



Business size distribution

The Rexburg region has mostly small businesses, and enjoys a business size distribution similar to state and national averages, reflecting a reasonable balance.

The trend is toward smaller businesses, and most job creation is in the category of small business (25 employees or less). Increased broadband availability and increased competition among providers could lower costs for existing businesses, making it easier for them to fund business expansion. Improved affordability and availability of broadband in the region may also help the localities attract new small businesses, especially business owners looking for good quality of life.

Number of Businesses	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming	Region	Idaho	National
1 to 9 employees	644	524	936	343	1,530	3,977	51,870	9,329,502
10 to 19	82	50	120	41	189	482	6,496	1,196,220
20 to 99	93	46	117	19	162	437	5,792	1,039,532
100+	8	7	14	2	17	48	819	195,101
Total businesses	827	627	1,187	405	1,898	4,944	64,977	11,760,355

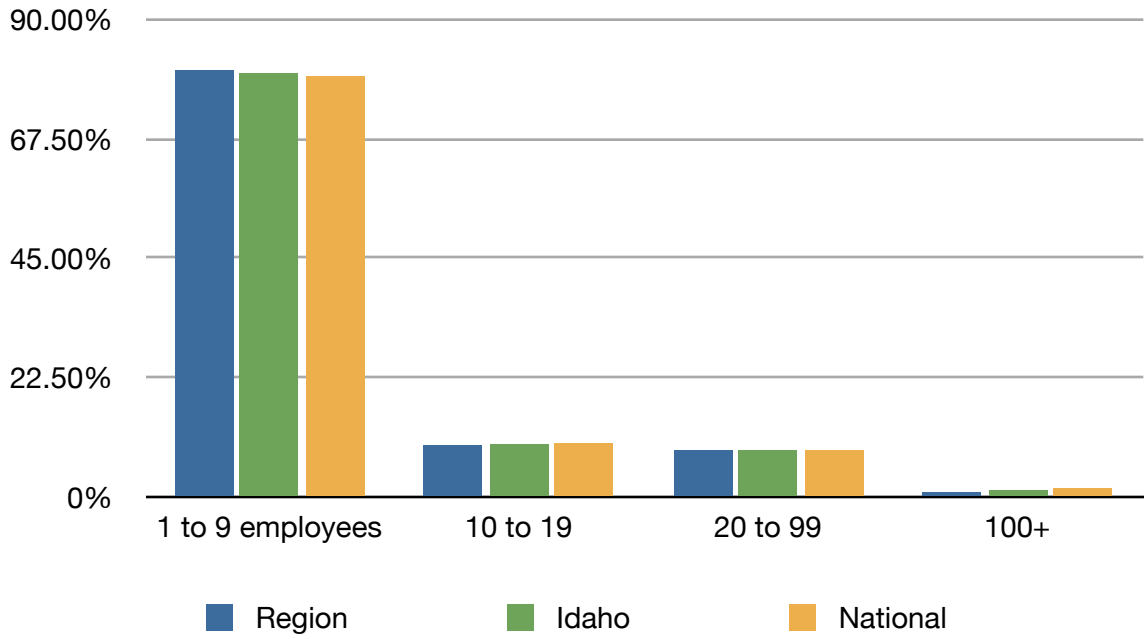
Business Size Distribution	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming	Region	Idaho	National
1 to 9 employees	77.87%	83.57%	78.85%	84.69%	80.61%	80.44%	79.83%	79.33%
10 to 19	9.92%	7.97%	10.11%	10.12%	9.96%	9.75%	10.00%	10.17%
20 to 99	11.25%	7.34%	9.86%	4.69%	8.54%	8.84%	8.91%	8.84%
100+	0.97%	1.12%	1.18%	0.49%	0.90%	0.97%	1.26%	1.66%
Total businesses	827	627	1,187	405	1,898	4,944	64,977	11,760,355

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

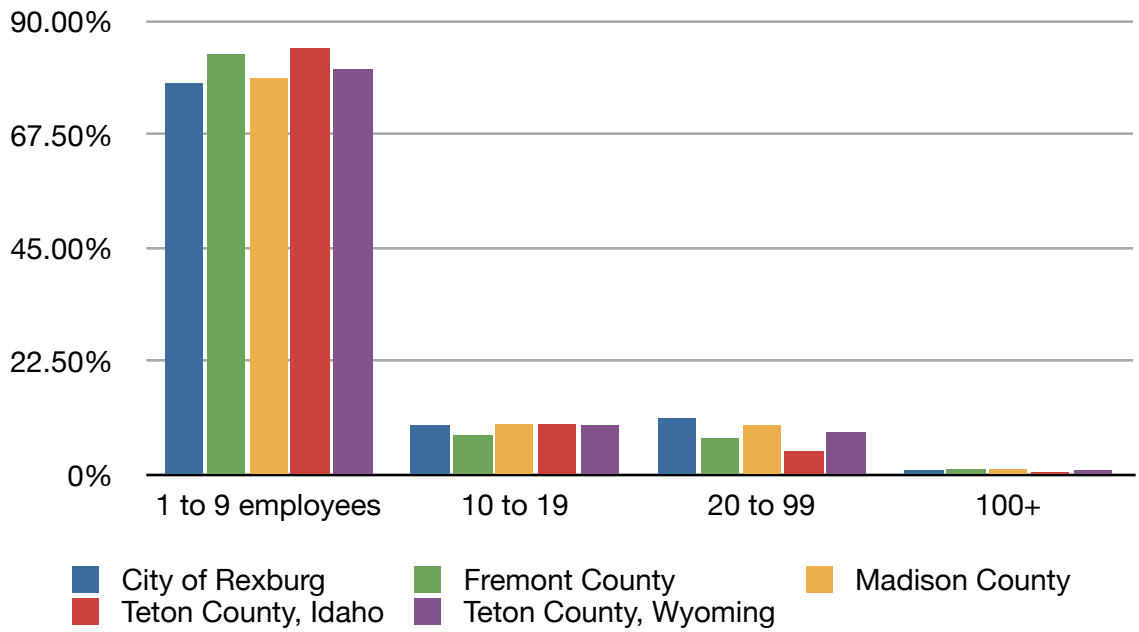
* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVa

Business Size (by % of total businesses)



Business Size (by % of total businesses)



Business and Employment Distribution

The region’s largest employer is the services sector. Services encapsulates a number of different sectors which include professional, scientific, and technical services, educational services, health care, social assistance, arts and entertainment, and accommodation of food services. Retail trade is the next largest employer.

Former lucrative trades like agriculture, forestry, fishing, construction, and manufacturing are no longer a large source of employment in the region. This is an indication that the Rexburg region is moving away from traditional forms of employment, and towards employment areas that are more technical and require broadband services to keep up with a globalized economy. Professional services are needed by Knowledge Economy businesses and entrepreneurs, and special attention should be paid to this sector to ensure that local businesses have access to the services they need to grow. Entrepreneurial businesses tend to outsource more kinds of services that small businesses did in the past. The Rexburg region, by ensuring that high quality professional services remain available (e.g. business focused accounting and bookkeeping services, business-oriented legal practices, receptionist services, copy and shipping services, temp worker services) may be able to better attract Knowledge Economy businesses.

Improvements and upgrades in the urban and town centers of the region to improve the general appearance of the area will help attract more businesses. Incentives for landlords to rehab older retail and second floor spaces can help increase the inventory of good quality professional office space. Relocation decisions are now frequently made in 90 days or less, so the region should strive to always have some good quality office space always available (with broadband cabling to the building and within the building). Class A office space is an asset that should be a priority when planning fiber or other facilities.

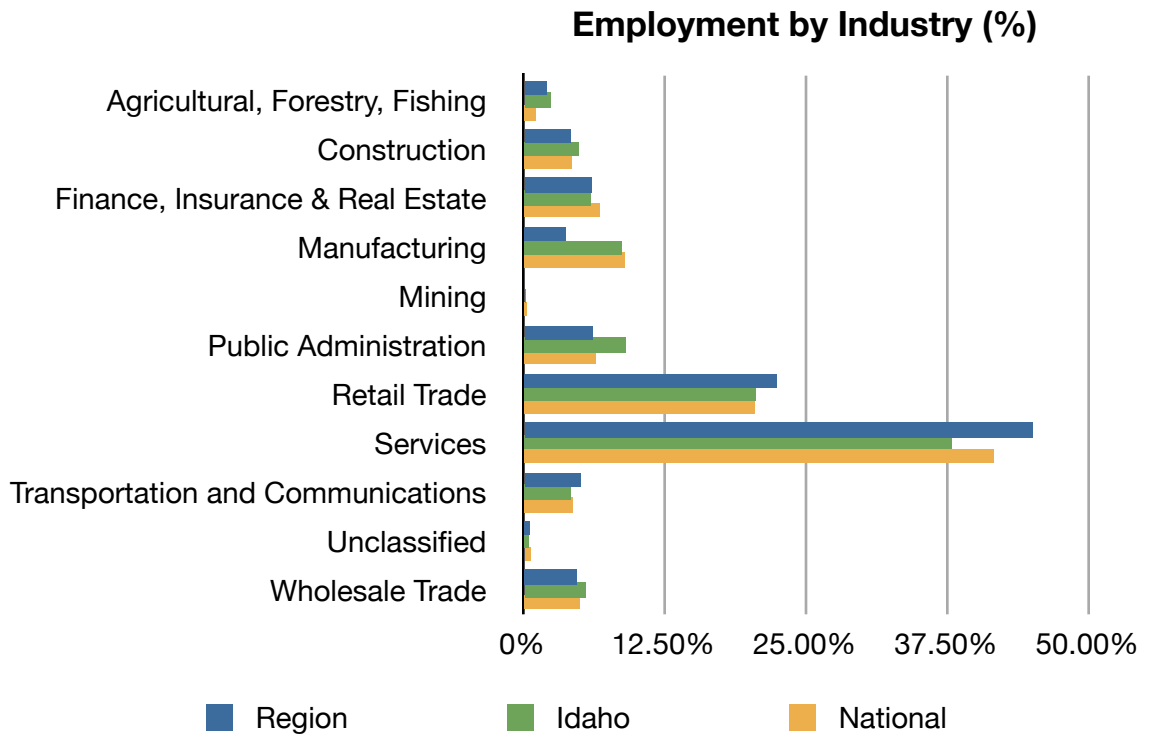
Employment by Industry	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming	Region	Idaho	National
Agricultural, Forestry, Fishing	0.9%	3.1%	2.3%	4.1%	1.90%	2.05%	2.4%	1.10%
Construction	1.1%	5.9%	3.2%	7.8%	5.70%	4.18%	4.9%	4.30%
Finance, Insurance & Real Estate	5.9%	3.0%	4.9%	6.9%	7.80%	6.02%	6.0%	6.80%
Manufacturing	4.3%	1.8%	6.3%	1.7%	2.40%	3.77%	8.7%	9.00%
Mining	0.0%	0.0%	0.0%	0.0%	0.10%	0.04%	0.2%	30.00%
Public Administration	4.8%	16.6%	3.6%	5.6%	5.80%	6.12%	9.1%	6.40%
Retail Trade	24.5%	20.5%	23.9%	21.5%	20.70%	22.41%	20.6%	20.50%
Services	46.9%	38.6%	44.9%	45.5%	46.00%	45.03%	37.9%	41.60%
Transportation and Communications	3.2%	5.0%	3.6%	1.9%	7.80%	5.05%	4.2%	4.40%

Employment by Industry	City of Rexburg	Fremont County	Madison County	Teton County, Idaho	Teton County, Wyoming	Region	Idaho	National
Unclassified	30.0%	1.3%	0.2%	30.0%	0.90%	0.59%	0.5%	60.00%
Wholesale Trade	8.2%	4.2%	7.1%	4.8%	1.00%	4.72%	5.5%	5.00%

Source US Bureau of Census 1990, 2000 and 2010 Decennial Census SFI DP-1

* US Census Bureau Population Estimates Program

* Weldon Cooper Center for Public Service, UVa



Employment by Industry (%)

