

**T**he following chapters are the synthesis of public forum notes and interviews, statistical polling, written comments, trend line research, and the many other contributions from Vermonters described in the Introduction in Part One of *Imagining Vermont*. They reflect, to the best of the Council's ability, the essence of what Vermonters shared. The Council's purpose in these chapters is to reflect what we have gathered about important subjects, whether they are emotional, divisive or matter-of-fact. All of the information was organized into ten key issues areas: *Vermont Culture; Population; Natural Environment; Working Landscape: Agriculture and Forestry; Built Environment: Development and Land Use; Economy; Education; Human Services, Health, and Safety; Infrastructure; and Energy*.

While each chapter encompasses a wide range of research and discussion, a common framework is used. Quotes from Vermonters illustrate specific points or show a range of opinions, and research and polling provide balance to the individual voices, lending authority or illuminating contradictions in the ideas expressed. All references, unless otherwise noted, are from the St. Michael's report *Vermont in Transition: A Summary of Social, Economic and Environmental Trends*, the companion volume to this report. When UVM's Center for Rural Studies web and telephone surveys are referenced, these percentages and data are found in the *Looking Ahead: Vermonters' Values and Concerns* reports.

The Council invites every reader to think about conclusions from the data and what directions it might suggest for Vermont. These chapters summarize what the Council heard; the Council's own conclusions can be found in Part Two of *Imagining Vermont*.





## Infrastructure



**V**ermont's society and economy rely on a complex web of infrastructure systems: transportation, water, sewer, power, and communications. Often these systems are invisible to the people who rely on them; it is interesting to note that in conversations throughout the state, infrastructure most often came up as a topic in forums when it did not meet the needs and demands of Vermonters. Even though it is often taken for granted, Vermonters recognize that the physical and electronic infrastructure provides the necessary foundation for successful community and economic development. They want to see long-term and wise investment in infrastructure that offers greater efficiencies to Vermont's businesses, improves the quality of life, and brings existing systems up to standards. But their opinions on how best to invest vary widely.

Vermonters today are concerned about the older infrastructure of roads, bridges, and water and sewer systems. They see systems degraded by age, where decay could severely disrupt commerce and community life. They look to the future of their communities and the development of commerce, education, and culture and believe that universal access to affordable broadband Internet and wireless communications networks is essential. Citizens also identify cultural or community infrastructure such as training programs, small business incubators, town websites, community communications networks, and other online community services as essential for them to meet the future with confidence.

## Communications

Among Vermonters' top infrastructure concerns is communications, especially cellular telephone coverage and high-speed internet access. The Council on the Future of Vermont heard citizens of all ages and occupations – from high school students to business leaders and farmers – complain about serious gaps in what is now an essential foundation for business development, community connection, and – for young people especially – social networking. One participant in Poultney laughed as he declared, “I only get cell phone reception in the outhouse – facing east.” Many others told us that they cannot get cell phone reception in the hills and valleys that surround their homes or places of business. In his 2007 inaugural speech, Governor James Douglas acknowledged the lack of mobile telecommunications infrastructure and the need for it when he emphasized his plan to make Vermont an ‘E-State’ with universal access to cellular and broadband connections by 2010. In the economic climate of the nation in early 2009 and in the federal stimulus package passed by Congress at the time of this writing, high-speed Internet access is targeted as a priority for the nation and all its citizens.

### *Community and Business Needs*

Telecommunications infrastructure is critically important for economic development and job creation. For businesses to remain competitive, affordable access to digital information and commerce is essential. High-speed networks allow start-ups, telecommuters, and small businesses to connect to far-away clients, customers, and business partners from their Vermont headquarters, be it an office building or a kitchen table. One participant in Glover told the Council, “Because of telecommuting some people can work from anywhere, but they need the infrastructure to support it.”

Without a large local consumer base or the transportation infrastructure to convey goods, some of the more rural parts of the state, such as the Northeast Kingdom, have missed out on economic opportunities available in the state’s population centers and thus have been passed over by economic prosperity. Rural places need access to larger markets via the Internet even more than their more populated neighbors. With access to affordable high speed connections, rural businesses can use digital information and technology systems to compete with service-based businesses from all over the world. The ability to be connected, rather than historically isolated, presents many benefits to rural communities. A Newport resident claimed, “We

have an opportunity to really do something about the broadband and cell service. Communications infrastructure supports jobs and visitors.”

Attendees at public forums cited not only business opportunities available with information and communication systems, but also cost-saving ideas and efficiencies in the delivery of a variety of services from telemedicine to distance learning and emergency services. Broadband telecommunications services are important to schools, families, hospitals, libraries, government, and emergency services. Reducing the costs of medical visits through telemedicine, enabling students to take online classes from home, staying connected with distant loved ones – these and other benefits come with investment in a comprehensive and reliable cellular and broadband infrastructure. Residents of the Unified Towns and Gores of Essex County told the Council that emergency services are unable to respond to extreme accidents in rural wilderness areas because of the lack of communications infrastructure; with cellular service in these areas, they could respond quickly and efficiently, potentially saving lives.

### *Challenge and Demand*

One of the biggest challenges in creating an ‘e-state’ in rural Vermont is ensuring that access is available in all hills and hollows – even where demand is low and services have low or non-existent return on investment in the short term. Although almost 90 percent of Vermonters have access to at least one mass-market broadband service, the remote and rural areas of the state are most difficult to serve. Rural counties like Essex have the lowest rates of access, while Chittenden and Grand Isle counties have the highest rates. Even in places that have some access to high-speed internet services, providers charge different connection fees and speeds of connectivity vary considerably, in part because digital technologies are still changing rapidly and business investments are more challenging for high speed infrastructure where there are fewer customers.

Vermonters have been quick to make the leap to these systems when available. In 2001, Vermont had 16,000 high-speed connections and just six years later, it had 193,151. According to the Vermont Department of Public Service, “growth in high speed computer access has kept pace with national trends and does not appear likely to slow.” National data show dramatic increases in internet usage and in computers with broadband access – from 5 percent of adults using the Internet in 1995, to 70 percent using it in 2006. Nearly 57 percent

of Vermont's population uses mobile telephones – a number that, given national trends, can only be expected to increase.

With all of the attention and focus on telecommunications as the wave of the future, Vermonters throughout the state cautioned the Council that the expansion of internet-based culture and social networking can bring unintended results. Vermonters do not want to see internet culture undermine or weaken the face-to-face interactions that characterize Vermont. Many felt that while it is advantageous to give people the opportunity to work anywhere by telecommuting, a distinct disadvantage is that their work keeps them isolated at home instead of interacting within a larger environment. There is a danger, in some people's minds, of "a breakdown of community and social capital. There is a shift away from community gatherings toward media and virtual life." A young woman at a public meeting in Burlington was especially concerned about the implications of technology use by younger Vermonters. She said that she sees people interact with screens, games, cell phones, and other technology rather than with each other. As she put it, "the pendulum needs to swing back the other way. We need to use technology as a means and not an end." In a state where the sense of community is of high value to citizens, Vermonters embrace the tools of technology and communication, but not at the expense of civic life and face-to-face community.

## Transportation

Transportation, or the movement of goods, services, and people around Vermont, is a significant topic for Vermonters. Citizens in CFV forums most often spoke of four transportation-related concerns: the cost of fuel; the externalities of fossil-fuel-based transportation; access to public transportation; and the condition of the state's physical transportation infrastructure.

Many Vermonters, like this forum participant in Bristol, expect rapid change in the way we use and think about transportation in the future. "With the price of fuel rising, we may need to look inward more to sustain ourselves – living closer to where we work, and developing a true transportation infrastructure that gives priority to public transportation/ride sharing. We will need to buy more things locally – which will help keep our dollars circulating within our communities."

## *Transportation Costs*

Personal automotive transportation has become indispensable to sustaining rural life in Vermont. Vermonters depend on roads and bridges to move people and goods around the state. And because people primarily use personal automobiles running on fossil fuels, citizens here are sharply affected by changes in global supply and cost of oil worldwide. The cost challenge is both private and public.

The Council's research showed that more than 98 percent of Vermonters ride in personal vehicles on any given day, more than three-quarters of which are single-occupancy vehicles. In 2001, Vermonters averaged a travel distance of thirty-six miles per day. The University of Vermont's Transportation Research Center estimates that the average annual highway vehicle miles traveled per person is around 12,400 miles, significantly higher than the national average of 10,100 miles. (See the Vermont Transportation Energy Report, August 2008). This is the equivalent of traveling the length of the state nearly seventy-seven times. Vermonter's personal transportation accounts for approximately 33 percent of the state's total energy usage, more than the national average of 28 percent.

Moreover, Vehicle Miles Traveled (VMT) by Vermonters increased from 1986 to 2006 at a rate of 1.4 percent annually. The number of registered vehicles in Vermont increased by 2 percent a year in the same time period. Fuel economy standards in vehicles increased only slightly during this period (by 0.4 percent). This means that Vermonters are driving more miles and adding vehicles to the roads while the number of miles they get per gallon has not increased significantly.

Many Vermonters warned the CFV that Vermont and the nation "dodged the bullet" after the energy crisis in the 1970s and that neither lifestyles nor dependence on foreign oil changed significantly. Today's volatile gas prices have prompted many to say that this is Vermont's second chance to change the way they consume energy for transportation. Citizens call for dramatic improvements in efficiency, but even more for the expansion of public transportation systems to meet the diverse and challenging needs of a rural population.

Transportation costs are a major issue for businesses, grocery stores, schools, cities, and towns, as well as for individuals. At the time of the CFV public forums, pump prices for gasoline had risen to over \$4 per gallon in Vermont. These day-to-day costs are a challenge for state government and public services as well. The Council learned that the Vermont State Police, among others, were faced with decisions around



decreased services because of increased gas prices.

In addition to the costs of fossil fuel based transport, Vermonters hold a range of opinions on the certainty and magnitude of a future crisis in the supply of fossil fuels, especially oil. Some believe that the state is at a crisis point, and will see a tremendous shift in the next fifty years in the availability of fuels. This crisis will lead to revolutionary change in transportation systems and land use patterns. Many others told the Council that the state should advance its energy independence and move away from relying on oil that comes from other countries, especially in the Middle East. Others believe that the world is at or near “peak oil,” at which point the amount of petroleum-based fuel produced annually will begin to decline (U.S. oil production peaked in the 1970s). Many are concerned with carbon impacts and global climate change and believe that the state and its citizens have a moral responsibility to limit their emissions of carbon dioxide.

While some contend that Vermont’s small scale means that it has little ability to affect global issues like climate change, many urge Vermonters to do their part and even take leadership to lower vehicular miles traveled or advance new technologies or public transportation solutions. A forum participant in Hinesburg spoke for many arguing that, “There will be a dramatic transportation change. The car culture will end. We will struggle because we aren’t putting in the infrastructure to respond to the end of personal transportation.”

For the individual, the costs of owning and operating a car can be steep. The Council heard from residents on fixed incomes, including many seniors who could no longer drive into town on a regular basis. Young people testified that personal vehicles are more necessary to them growing up in rural areas than if they lived within easy access of subways, buses, and other forms of public transit. But these costs are prohibitive and limit the opportunities young people have to visit, study, work, or recreate beyond their own town.

### ***Public Transportation***

The issue of public transportation came up in many different focus groups, for a variety of reasons. Elders at a senior center in St. Albans told the Council that a single bus service would relieve the need for coordination and ride sharing that now occurs for grocery shopping. High School students in Poultney cited the efficient and well-run train systems in other countries as a priority for Vermont infrastructure. An advocate for gay, lesbian, and bi-sexual Vermont teens said that transportation to safe spaces is critically important for young people, especially when they feel isolated in rural areas. In general, Vermont voices were raised in support of a way to finance a dramatic expansion of public transportation in the state – especially routes and systems that served the specific needs of rural communities. A participant from Glover told the Council, “If it is expensive to travel or the cost of individual transportation increases, this can create incentives to find alternatives – car pooling, buses, trains, et cetera.”

Vermont ranks thirty-eighth among the nation’s states in the use of public transportation. The percentage of Vermonters who use public transportation is predictably low due to the state’s rural geography and consequent dependence on individual transportation. While just 0.8 percent of the population uses public transportation, compared to the national average of 4.8 percent, use is increasing in some areas. Bus and train ridership in Vermont has increased significantly in recent years. For example, the Chittenden County Transportation Authority (CCTA) saw an 18 percent rise in ridership from 2004 to 2007. The Green Mountain Transit Agency (GMTA) saw an increase of 37 percent in ridership during the same time period.

In public forums, many Vermonters wanted to see reinvestment in and attention to the state's existing railways as a vital part of public transportation infrastructure. Commuter trains were most commonly referenced, especially by attendees in more heavily populated areas of the state and in areas where trains used to run but no longer do. In 2008 two commuter rail lines served the state. Although many respondents in the CFV process would like to see trains as a part of the future of Vermont's infrastructure, most recognize that there are significant cost and maintenance challenges in bringing the current system up to standards and/or expanding it.

While questioning the 'car culture,' many participants proposed alternative transportation, energy, and infrastructure ideas for the state to ponder. Other types of infrastructure, such as bicycle lanes, multi-modal transportation networks (that emphasize bus, car, trail, walking, and other modes of transport), pedestrian streets and venues, and ride share systems were also suggested in the course of the CFV sessions. Some Vermonters advocated for a network of safe and well marketed bicycle routes throughout the state, and campaigns to promote them for use by commuters and tourists alike.

### ***Transportation Infrastructure***

Asked about the most significant challenges ahead for Vermont, one Johnson resident spoke for many by pointing to "crumbling infrastructure: roads, bridges, buildings." "Our infrastructure is old," said a respondent from Manchester.

Whether it's the dirt roads Vermonters live on, the town bridges and culverts they cross, or the water and sewer lines they have to pay for, the state's physical infrastructure undergirds Vermont culture and commerce and requires long-term planning and investment, locally, regionally and statewide. Vermonters recognize the importance of maintaining adequate infrastructure systems: they know that good roads and reliable water and sewer systems allow towns to add new residents and businesses to expand and add new jobs to the economy. They also know that maintaining and improving infrastructure is expensive; many talked about dealing with the costs in town budgets, or through municipal grants.

Vermont has more roads in need of repair than the national average. In 2006, about 25 percent of the miles of Vermont roads were in "mediocre or poor condition," down from about 35 percent in 2000, but

significantly worse than the U.S. average of 17 percent (for comparison, Georgia had 1 percent while New Jersey had 50 percent).

On the other hand, deferred or delayed bridge maintenance has left many bridges in critical and poor condition. According to the U.S. Bureau of Transportation Statistics, about 35 percent of Vermont's bridges (967 of 2,690) are either "structurally deficient" or "functionally obsolete," that is 10 percent higher than the national average. Other U.S. Department of Transportation data show that the percentage of Vermont's bridges that are in poor condition has been decreasing in past years, from 42 percent in 1995 to 35 percent in 2007. Yet the Vermont Department of Transportation states that "decades of deferred maintenance has pushed structure need above annual funding levels" and that the number of bridges judged to be in poor or critical condition by the state decreased only from 462 to 431 from 2000 to 2006.

Vermont pays for its costly and constantly used transportation systems through four primary sources of revenue: fuel taxes, motor vehicle fees, federal highway aid, and a portion of the purchase and use tax, some of which is tapped for General Fund uses. As with many revenue sources, these four have declined in recent years – due in part to the increase of cost of gas, which has reduced driving, as well as fewer vehicle purchases. According to the UVM Transportation Research Center, in 2004 the number of new vehicles purchased was 42,320; in 2007 it was down to 37,079.

The National Highway Trust Fund – the source of nearly all federal highway aid – started the decade with a surplus but is now struggling for resources as well. So, while the structures themselves are deteriorating, sometimes into complete collapse, the funds used to improve them are dwindling. This means that the challenges that face the Vermont transportation infrastructure are increasingly complex and costly. Vermonters recognize this, but still would like to find a creative solution to this major issue.

Transportation infrastructure issues are tied directly to Vermont lifestyles and to the major concerns Vermonters have about community, energy, and economy in the future. A Burlington resident claimed that, "Infrastructure is a huge issue" and called for Vermont to "focus on our existing roads and bridges, existing villages and centers, and figure out our energy future." More observations by Vermonters on the connection between energy and transportation and related issues can be found in the energy chapter.

## Other Infrastructure

In municipal settings, the CFV heard about the dwindling resources and aging systems that support Vermont's water supplies, sewage treatment, and storm-water management. During interviews with municipal leaders and organizations such as Vermont League of Cities and Towns and Vermont Downtown Program, speakers emphasized that some infrastructure issues get talked about because they are exciting – such as new railways – while others, such as sewer systems, may not be as thrilling but are just as essential to community development and business growth. One participant told CFV, “But sewage isn’t what we want to talk about.” The role of water and sewer infrastructure, and the major challenge of funding these municipal systems, was occasionally touched on in community discussions, but clearly not in a manner commensurate with their importance; consequently, coverage of these topics here is also less than the subject deserves.

In addition to comments on physical and electronic infrastructure, the Council heard from Vermonters about other infrastructures, specifically those physical buildings and organizational structures that support communities, small businesses, and regional cooperation. Many participants pointed to the infrastructure needed for innovative, local economic development, with comments such as the following:

“We don’t have the infrastructure to capture ideas and make them real. [We] need more structure for that.”

– *Brattleboro*

“The hard realities of the present must be addressed. There is a class struggle. Petroleum will become more expensive. Communities will solve these issues. Infrastructure must be developed on a community or regional basis – communities are best suited to do this.”

– *Grafton*

A Middlesex resident described the web of social, health, civic and educational infrastructure needed for economic progress, pointing to the priorities of “rebuilding social infrastructure: making local democracy more powerful, for example, town meetings; making quality health care a human right; livable wages; and viable local businesses. Also affordable public higher education and job training.”

While these comments and others like them may not relate directly to what most people think of as infrastructure, they reflect the breadth and depth of examination that participants gave the many elements they believe are essential to future job growth, quality of life, and prosperity.

As more Vermonters telecommute, some Vermonters reported, it may be especially important for village centers to be planned around transportation that allows people to interact with one another, preserving the sense of community that is so vital to residents.



### Points of Unity

Funding Vermont's infrastructure needs is a major challenge. Bridges in disrepair, inadequate telecommunications services, and rough roads affect the way Vermonters live, commute, and do business. To create a system that fulfills the current needs of Vermonters is a big task; to plan adequately for future needs, especially the transformative needs foreseen by many Vermont residents, can seem impossible.

Research shows that improvements to Vermont's transportation infrastructure are being made, that public transportation ridership is increasing, and that cellular phone service and high-speed internet access have expanded dramatically and usage has increased. These trends in the data, as well as public comments, show that Vermonters are committed to two major priorities: maintaining and improving existing infrastructure, especially those places and areas that are in poor condition, and planning for and designing future infrastructure systems that adapt to new technologies and respond to new conditions in order to keep Vermont businesses, communities, and people healthy, prosperous, and safe into the future.

Vermonters want to see infrastructure built that would improve or preserve the specialness of this place – whether it is bike lanes to keep people healthy, trains to cut carbon emissions, or high-speed internet to allow small local businesses to grow. One Northeast Kingdom participant summarized the balance of needs in a way that reflected much of what the Council heard around the state; to him Vermont must be advancing the “preservation of land and waters, and at the same time improving economic well-being of all Vermonters through energy generation, infrastructure improvement, IT [information technology] infrastructure development.” Vermonters expect infrastructure, like other development, to fit with and serve the character of the state and support its built and natural environment.