# Needs Assessment

This chapter of the PTPP presents the results of an assessment of public transit needs throughout the state. This information provided the foundation not only for the development of service improvement strategies and associated policies that are discussed in the Recommendations chapter of the PTPP, but also for the identification of strategies and solutions that can address the needs of older adults and people with disabilities, which is a key component of the Human Service Transportation Coordination Plan, integrated in this document.

The needs assessment methodology is described below, followed by a summary of the key findings from each component of the methodology. The section following that identifies common themes emerging from the analysis.

## Methodology

The needs assessment methodology consisted of four primary steps:

* Identify service gaps and unmet needs by region
* Estimate transit market segments by age, disability, income, and likely auto access in each region and statewide
* Estimate number of trips necessary to address identified needs, and required resources
* Estimate impacts of possible scenarios that may occur during the planning horizon of the PTPP

Each step is explained briefly below.

### Service Gaps and Needs

The project team assembled information from a variety of sources to identify service gaps and challenges faced by residents of eleven regions across the state. The regions used for the needs assessment aligned with the state’s eleven regional planning commissions (RPCs) and included:

* Northeast Kingdom—Caledonia, Orleans, and Essex counties
* Lamoille County
* Central Vermont—Washington County
* Upper Valley—Orange and northern Windsor counties
* Southern Windsor County
* Windham County
* Bennington County
* Rutland County
* Addison County
* Chittenden County
* Northwest Vermont—Franklin and Grand Isle counties

Data from the U.S. Census and other sources were used to generate maps for each region that illustrated the location of current transit services; key destinations, including employers of various sizes; populations in general and target transit markets such as older adults, people with disabilities, and individuals with lower incomes; and commuting patterns. An initial list of service gaps and needs was generated from comparison of transit service areas to the locations of populations likely to use transit service and key destinations, and analysis of the days and times during which transit services are available.

This information was presented at a series of eleven regional forums conducted across the state, at which members of the public and stakeholders offered comments on existing transit services, service gaps and needs, and preferred potential solutions.

Beyond the regional forums, the project team also attended nine meetings of the regional E&D committees, in which transit providers and their human service agency partners, along with RPC staff, oversee Vermont’s transportation program for Elders and People with Disabilities (E&D). Members of these committees offered comments and suggestions regarding service gaps for those two target populations and ways to address them.

An online survey on a platform called MetroQuest was conducted in two rounds. The first round, which was available from September through December 2018 and generated 1,200 responses, collected information about current use of and attitudes about transit service as well as service gaps and needs. The second round, which was conducted from July to September 2019 and generated 2,063 responses, focused on potential solutions to gaps and needs.

Finally, the project team conducted interviews with nine individual stakeholders who shared their thoughts about transit service gaps and needs, and potential service and policy solutions, for their constituent groups: transit providers, Medicaid recipients, older adults, individuals with disabilities, veterans, and others.

### Transit Market Segments

The second step in the needs assessment methodology was to estimate the number of individuals in each region in each the following sub-markets for public transit services, to facilitate estimates of the number of transit trips needed statewide to meet identified needs:

* Youth under age 18
* Young adults 18-24 years, (employed or in school)
* Adults 25-64 years, above the poverty line
* Adults 25-64 years, below the poverty line
* People with disabilities (of all ages)
* Younger seniors, age 65-79
* Older seniors, 80 years and older

People with disabilities were subtracted from the other categories to avoid double counting. Automobile availability was treated as a secondary characteristic, related to the age and income of each particular group. Groups likely to have relatively lower access to a private vehicle included youth, young adults (often by choice), adults with lower incomes, people with disabilities, and older seniors.

Appendices A through K provide a detailed analysis, region by region of the specific service gaps and needs identified using input from all of the sources mentioned above and the estimated size of transit market segments.

### Trips Necessary to Meet Needs and Required Resources

The third step in the needs assessment involved estimating the number of transit trips needed statewide to address identified service gaps and needs. Estimates were developed by assuming 1) an annual number of transit trips per member of each market segment to fully meet transportation needs and 2) a reduced number of transit trips per market segment member to meet only basic, lifeline needs. The purpose of this analysis is to create order-of-magnitude estimates of the number of transit trips that would need to be operated, and the cost of operating those trips if Vermont adopted policies to address all of the potential needs of these populations, or all of the basic, lifeline needs.

### Impacts of Possible Scenarios

The final step in the needs assessment methodology was to consider several possible scenarios that could occur during the 5-10 year planning horizon covered by the PTPP, and the impacts that they might have on transit ridership. This is a separate analysis from the consideration of needs and is more relevant to people who might choose to use transit service instead of driving.

Scenarios included:

* A doubling of fuel prices leading to higher transportation costs, and higher demand for transportation services as drivers seek a more affordable alternative
* Continued relatively low fuel prices, which would create a challenging environment for transit, since choice riders would have little incentive to choose transit over driving
* A changed transportation landscape due to advancing technology, primarily driverless cars and transit vehicles, plus greater availability of ridesharing (services such as Uber and Lyft) and technologies to allow for more efficient grouping of trips

The impacts of each scenario on transit ridership and the net cost per trip were estimated to give policy makers some indication how each scenario may affect public transit subsidies over the next decade.

## Data Gathering and Outreach

Key points that emerged from each stage of the data gathering process are summarized below.

### Data Analysis

The data analysis conducted by the project team resulted in a number of conclusions about existing fixed route and demand response services and service gaps or needs that are not completely addressed.

#### Fixed Route Service Overview

* In each region, fixed route services cover appropriate areas given the following factors:
	+ Density of populations and jobs, a key indicator of the effectiveness of fixed route services
	+ Concentrations of target groups: older adults, people with disabilities, individuals with lower incomes
	+ Key medical, shopping, employment, educational destinations
* Deviations, or requests from riders for pickups or drop-offs within ¼ to ¾ of a mile from routes expand the reach of fixed route services.
* The span of fixed route service is generally business hours or up to 12 hours of service per weekday. Exceptions are:
	+ Saturday service is available on some routes in some regions
	+ Service in Chittenden County is generally available 12-17 hours per day Monday through Saturday, with a somewhat lower level of service on Sunday
	+ Commuter routes, which operate several trips in morning and afternoon peak hours
* Frequency varies from several trips/day to every 30 minutes
	+ Chittenden County service operates up to every 20 minutes
	+ Several providers offer service on designated days in smaller towns
* Providers located near ski areas or colleges offer seasonal services

#### Fixed Route Gaps and Challenges

Common gaps in the fixed route systems that were identified across regions include:

* Lack of first/last-mile options that limit the use of fixed routes
* Schedules for local and commuter routes generally do not accommodate trips to jobs with non-traditional hours
* Rural communities and some larger employers are not served by existing routes

Based on mapping and data analysis, and confirmed by regional forum comments and MetroQuest responses, potential fixed route changes, where supported by the required levels of density, would be additional service during early morning and evening hours, service to provide work trips to 2nd and 3rd shift jobs, and increased weekend service.

#### Demand Response Service Overview

In all regions, transit providers and E&D partners deliver the majority of available demand response services. Services are provided primarily to clients of partner human service agencies and are delivered through a combination of provider-owned vehicles driven by staff and rides provided by volunteer drivers.

In some areas, Ticket to Ride is also available. This program is essentially a flexible spending account for E&D eligible individuals that allows people to make trips for purposes beyond medical trips, adult day, and shopping.

ADA paratransit service, for individuals who are unable to use fixed route services because of a disability, is also available in several areas, including most of the GMT-Urban service area, Morrisville, Rutland, Brattleboro, and White River Junction/Norwich. ADA paratransit matches fixed route service in terms of service area, days/hours of service, and other service characteristics. In smaller communities, deviated fixed route services that allow for pickups or drop-offs within ¼ to ¾ of a mile from the route take the place of separate ADA paratransit service. Deviated services are typically open to people with disabilities and others.

#### Demand Response Gaps and Challenges

Eligible riders for demand response service generally include older adults, people with disabilities, and human service agency clients. This means that members of the general public in areas without fixed route service who do not qualify for E&D transportation have no transit options available to them.

Even for those eligible for E&D service, funding constraints have led to prioritized trip types. Critical care medical trips—for dialysis, cancer treatment, and sometimes cardiac care and adult day health—are given the highest priority in all regions. Lower priority trips, particularly wellness trips to exercise programs or social activities, which have been shown to contribute to positive health outcomes and reduced health care costs, are not regularly provided in some areas. Providers and partners in some regions use trip or funding limits per person as a way to manage constrained budgets.

Volunteer drivers are an essential element of service delivery for E&D trips, but for most transit providers, there is an inadequate supply of volunteers, and recruitment and retention are challenging.

### Regional Forums and E&D Committee Meetings

Service gaps and challenges reported in regional forums and E&D committee meetings are listed below.

While many regions are faced with specific challenges due to their locations or the size and/or characteristics of their populations, there were common themes that emerged across regions.

Comments that were raised in multiple regional forums include the following:

* Workforce development/access to jobs are transportation priorities in at least eight of eleven regions
	+ Suggested solutions include availability of transit service during non-traditional hours, longer span of fixed route service, and more frequent trips to urbanized areas
* Rural areas need options
	+ Fixed routes and schedules, if any, are limited
	+ First/last-mile options needed to enable potential transit users to get to and from stops
	+ Demand response services in rural communities, which may be the only available transit services, are constrained due funding limitations
* Existing services and resources may not be well known, despite marketing of the information resources offered by Go! Vermont and transit providers’ websites and online trip planners
* More integrated walk/bike/transit/driving networks would encourage transit use

Common themes also emerged from meetings with E&D committees, mostly centered around the effects of funding limitations:

* Funding constraints have led to prioritized trip types, and trip limits are in place in some regions; only two regions provide E&D services without limits.
	+ Even high priority critical medical care and adult day health trips are limited in some regions
	+ Shopping and congregate meals are sometimes limited
	+ Wellness trips often fall to the bottom of the priority list and cannot be provided within available funding limits
* Financial resources to bring other human service partners into the program are not available
* Volunteer drivers are an essential element of service delivery, but recruitment and retention are challenging

High priority E&D trips include critical care/adult day health, non-Medicaid medical, meals, shopping, vocational, and social/personal/wellness trips, with the order varying by region. E&D committees noted the following trends in the highest priority trips:

* Demand for critical care trips is increasing in the Central Vermont region (Washington County), Rutland County, and Lamoille County/Northeast Kingdom (which share an E&D committee)
* Demand for critical care trips or adult day health trips is decreasing in the Northwest Region (Franklin/Grand Isle Counties) and the Upper Valley Region (Orange and northern Windsor counties).

As mentioned above, some E&D transit providers and their partners limit trips in order to manage tight budgets. In the Lamoille County/Northeast Kingdom E&D region and the Bennington County region, no trip limits are in place. Limits placed on individual riders in other regions include the following:

* Southeast Region (Windham and southern Windsor counties):
	+ Two dialysis, three cancer treatment trips/week
	+ Three out of town medical (25 miles)/month
	+ Recent cuts to critical care, shopping trip limits
* Addison County
	+ Six one-way trips/month, including four out of county
	+ 100% cancer, dialysis, cardiac rehab trips are provided
* Rutland County
	+ Some partner organizations limit number of trips
* Upper Valley (Orange and northern Windsor counties)
	+ 10 round trips dialysis, 13 round trips cancer/month
	+ Ticket to Ride limited by monthly dollar amounts
	+ Ticket to Ride waiting list
* Northwest Region (Franklin and Grand Isle counties)
	+ Six one-way trips/month in Franklin County
	+ No limits in Grand Isle County
* Chittenden County
	+ Limits vary by partner organization; most limit the number of trips per week or month
* Central Vermont Region (Washington County)
	+ Ticket to Ride is limited by monthly dollar amount; waivers for additional trips

### Survey Results

The MetroQuest survey covered many topic areas, including broad policy options, current modes of travel, current travel purposes and desired trips. The section most relevant to the needs analysis concerned the various possible improvements to transit service that would encourage people to make greater use of the transit system. Nine possible improvements were listed, with an “Other” category available for respondents to specify another type of improvement that was not listed, and a “none of the above” option available for people who prefer driving and would not use public transit under any circumstances. The nine types of improvements were the following:

* More frequent service
* More service near my home
* Service to my desired destinations
* Evening and/or weekend service
* More reliable service
* Faster service
* Cheaper service
* Safer service
* Better information about the service

The responses to this question indicate the most salient ways for the transit system to become more attractive to Vermonters and thus meet their travel needs. The results were considered for the state as a whole, and then broken down by people who currently use transit vs. those who do not, and then by those living in urban areas vs. those in rural areas.

#### Statewide Results

The most popular desired improvements to transit included more frequent service (50% of respondents), service closer to homes (49%) and desired destinations (46%), and evening and weekend service (41%). These four responses were significantly more popular than any of the other choices, as shown in Figure 1 below. Thus the overall quantity of service, rather than specific aspects of the quality of service, seem to be the overriding concern, at least on a statewide basis.

Only 6% of survey respondents responded that none of the improvements would encourage them to drive less, suggesting that providing more and higher quality transit service would draw additional users. The most common “other” responses included early morning service, more and bigger park and rides, and an app to provide real-time bus arrival information.

Figure | Desired Improvements to Transit



#### Breakdown by Transit Use

Respondents who never use public transit services were most likely to express a desire for more service near their homes (59% of respondents) and service to their desired destinations (49%) as shown in Figure 2. This suggests that a key barrier for many respondents who only drive is a lack of service where they need it.

Respondents who used some type of transit at least once in the last month were most likely to express a desire for more frequent service and more evening and/or weekend service, suggesting that many existing transit users would use transit more often if it had greater frequency or a longer span of service. Thus, the level of service is more critical than service coverage for transit users.

Travel time and reliability are important factors when people choose their travel modes, but they rank well below service supply measures in this context. This suggests that the existing transit services used by the respondents are already satisfactory in terms of travel time and reliability, and so improvements in those factors would not alter their travel choices. Rather, people are looking for more service when and where it is not already offered as the most significant inducement to use transit more often.

Figure | Desired Improvements to Transit Breakdown by Mode Choice



#### Urban-Rural Breakdown

There are some notable differences between the desired transit improvements preferred by urban and rural Vermonters. For this purpose, “urban” was defined as someone living the core communities of Chittenden County or one of the other urban clusters in the state, such as Rutland, Barre-Montpelier, White River Junction, Brattleboro, Bennington, etc.

As shown in Figure 3, rural Vermonters were far more likely than urban residents to want more service near their home (66% of rural residents, as opposed to 35% of urban residents) and somewhat more likely to want more service to their desired destinations (49% of rural residents versus 44% of urban residents). This suggests that rural residents see a need for greater transit coverage in their community, while urban residents recognize that they already have some service coverage.

In contrast, urban Vermonters were more likely to want more frequent service (57% of urban Vermonters versus 51% of rural Vermonters), and significantly more likely to want more evening and/or weekend service (50% of urban residents, as opposed to 36% of rural residents) and more reliable service (16% of urban residents versus 6% of rural residents).

Thus, rural residents are most concerned with having any service at all, while urban residents are more concerned with upgrading the service they already have.

Figure | Desired Transit Improvements Urban-Rural Breakdown



### Stakeholder Interviews

During the course of the Needs Assessment, nine individuals were identified as candidates for individual stakeholder interviews. These interviews were seen as complementing the information received from participants in the 11 regional forums that took place in October-December 2018 by either filling subject gaps or diving deeper on recurring themes. The interviews were conducted either in person or on the phone, with most taking place in February and March 2019.

#### Methodology

Interviewees consisted of leaders of non-profit human service organizations, State agencies, and others. The list was not meant to be comprehensive in and of itself, but rather to give the consultant team additional insights from a variety of perspectives. The organizations included the following:

* Vermont Public Transportation Association
* Agency of Human Services – Department of Vermont Health Access (DVHA)
* Agency of Human Services – Department of Disability, Aging and Independent Living (DAIL)
* Vermont Center for Independent Living
* Office of Veterans Affairs
* AARP Vermont
* Capstone Community Action
* United Way of Northwest Vermont
* Vermont House of Representatives

The individuals to be interviewed were selected jointly by the consultant team and the VTrans project managers. The goal was to obtain a broad range of input not only on issues of the need for public transit and human service transportation, but also on the effectiveness of VTrans to develop and sustain partnerships with other agencies to promote service quality and awareness. Questions were developed to stimulate discussion of various areas of need (as was true in the regional forums) and to probe about any specific insights relating to the constituencies their agency/organization serves. Participants were informed their responses would be reported in aggregate with no comments attributed to any one participant. This approach was designed to encourage candid responses.

#### Key Findings

A number of themes emerged from the interviews, and there was a significant amount of overlap to the themes that were most common in the regional forums. The most salient points are summarized below.

* Demand response service
	+ Opioid treatment trips causing a significant strain on the Medicaid transportation budget because it is raising the per member per month rate, due to the need to ride every day of the week for treatments. It is also a challenge because a portion of the volunteer driver pool is uncomfortable transporting opioid addicts. Recovered addicts may be a source of drivers.
	+ In general, both DVHA and VTrans are working to make sure needs of low-income Vermonters are met; will approve all medical trips allowable consistent with federal rules.
	+ There was a strong consensus to expand volunteer driver programs through marketing/awareness and streamlining of the background check process.
	+ Greater coordination between providers (trips crossing regional boundaries) is a continuing goal; has been a hope associated with Routematch—a dashboard where connections could be made and so that providers could see each other’s trips. This goal is not yet realized due to technical and staff capacity limitations. Also, more progress on E&D and Medicaid coordination is desired.
* Elders and Persons with Disabilities Program
	+ Create individual flexible E&D budgets – similar to Ticket To Ride program. Tailor allocation amounts based on need and location, so that wheelchair users have a sufficient allocation due to the added expense of each trip, and reflecting that people who live in town centers have access to bus services and so additional funds should be available to rural participants who have no other options. These individual budgets should be conjoined to trip accounts so that private funds can be added (and serve as match).
	+ Improve functionality of E&D committees
		- Define roles and responsibilities
		- Better communication to Town officials
		- More data and clearer standards; use evaluation tools like rider surveys
		- Ride guide to disseminate information more easily
	+ Number one unmet need is social trips; personal business trips other than grocery shopping are also difficult to accomplish
* Housing
	+ Changes to Act 250 needed to facilitate housing construction for older adults in village centers; could include transfer of development rights
	+ There are limitations on development because of lack of water and sewer infrastructure
	+ Older housing stock is not accessible to people with disabilities
	+ AARP is working with the State to change housing bylaws at the local level
	+ Inadequate affordable housing available
* Urban/Rural differences
	+ Different policy priorities regarding coverage vs. quality of service; in the urban area, coverage is reasonably thorough but there are frequent requests for a higher level of service, while in rural areas, there are often large gaps in coverage
	+ Housing construction and availability vs. affordability; in urban areas, affordability is the primary issue while in many rural areas and town and village centers, there is simply not enough housing available
	+ Legislative action tied to the power of the Chittenden County delegation; implies that statutory changes must benefit both the urban and rural areas
* Aging
	+ Vermont needs forward-looking planning for younger seniors to avoid crisis later on
	+ Needs of veterans increasing; access to VA hospitals is currently provided in cooperation with transit providers. (VA has 11 drivers and provides over 13K trips per year)
	+ Adult Day programs likely to increase significantly; unclear if state is prepared for this
	+ Partners for VTrans in addressing the issue of aging in Vermont
		- DAIL
		- AARP
		- COVE (Community of Vermont Elders)
		- AAA (Area Agencies on Aging)
		- T4VT (Transportation for Vermonters)
* Access to Healthcare
	+ Engage hospital networks to help fund transportation (related to Accountable Care Organization model) so as to minimize the total cost of care and improve health outcomes
	+ Better communication and relationships between hospitals and transit providers (including such programs as Rides to Wellness)
* Information/awareness
	+ Travel training and bus buddy programs can have significant benefits for all segments of the population.
	+ Simple items like refrigerator magnets with key information can improve awareness
* Technology
	+ Real-time information about transit vehicle location can have a large impact on ridership
	+ Real-time ride scheduling can make demand response service much more attractive
* Commuters and other riders
	+ Amenities at bus stops make the system more attractive
	+ First mile/last mile connections are vital in less dense areas
	+ Access to jobs for rural residents without a reliable car are essential, also allowing parents to get kids to daycare

#### Conclusion

Many of the themes mentioned by stakeholders echoed those heard in the regional forums and the MetroQuest input. The stakeholders were able to provide additional detail beyond what was heard in the other outreach channels. Some of the discussions included potential solutions, which have been incorporated into the draft recommendations.

## Common Themes from Regional Analysis

Among the many forms of analysis, outreach and data collection, several prominent themes emerge. Without losing the detail provided above and in the appendices, the most important public transit needs facing Vermont are the following:

* **Lack of transit access in rural areas**
	+ While it is the case that traditional bus services cannot operate efficiently in areas without a significant amount of population density, the need for public transit access outside of urban areas and small towns exists and is likely to grow as the population ages. The challenge is both one of service supply—having sufficient resources available to operate appropriate service in rural areas—and one of information and awareness in that people may not know that resources exist nor how to gain access to them.
* **Lack of resources to meet the needs of vulnerable populations both today and in the future**
	+ Compared to most rural states, Vermont is very generous in the expenditure of state and federal funds to assist older adults and people with disabilities, as well as low-income individuals. In spite of that, there are significant unmet needs, especially with regard to trips for wellness and social activities. The expected large increase in Vermonters over the age of 80 in the coming decade will increase the gap in resources.
* **In areas that have bus routes, improved service levels and connections are needed**
	+ Various outreach channels indicate that there are many Vermonters, especially young ones, who would like to use public transit but do not because the schedules do not work for them, or because there are missing links in the system. Increased evening and weekend service would be attractive to many, and improved first mile/last mile connections via a variety of modes would make the core bus routes accessible to a wider area.
* Transportation for access to jobs
	+ The need for better options for work trips, supported by analysis of the availability of existing transportation services, was raised in all eleven Regional Forums and emerged as a major theme in eight of those. This need is a component of each of the needs described above. Potential solutions may include first mile/last mile connections, longer fixed route service hours or more useful schedules, subscription demand response service for work trips, increased use of carpooling and vanpooling, and new types of services such as microtransit (technology-enabled, near real-time demand response service such as that provided by Uber and Lyft but operated by public transit providers).

## Resources to Meet Needs

Earlier sections of this chapter identified a range of needs that are not adequately met by existing public transit service in Vermont. The next logical step is to estimate how much it would cost to address all of those needs so that policy-makers and decision-makers can make informed choices about future investments in service, technology, vehicles, facilities and other infrastructure.

By its very nature, such an estimate would be a very rough approximation since it is impossible to quantify precisely all of the travel demand of Vermont residents—not to mention the added demand of visitors to the state—and determine how much of it would be served by transit routes and demand response vehicles. To produce a reasonable, if very rough, estimate, available data was compiled and processed with a series of assumptions described in Appendix L, to yield estimates of the number of annual transit trips to meet the “basic” needs of Vermonter and the number to provide a “full” level of mobility to Vermonters. In both cases, it is assumed that automobile ownership would remain at its current level and that people who drive themselves or family members to accomplish their daily needs would continue to do so. The potential for public transit to carry more people who currently drive is considered in the section on scenarios below.

The “full” level of mobility was based on daily trip rates derived from the 2017 National Household Travel Survey, thereby assuming that the portion of the population that was assumed to need transit service (i.e. not be able to drive themselves) would be taking all of their trips via public transit.

The “basic” level of mobility was assumed to consist of 12 round-trips per month (24 one-way trips), or about 3 round-trips per week. This figure seems to be a reasonable estimate of the minimum number of trips needed for basic subsistence and is consistent with a similar analysis done as part of the 2012 PTPP.

Considering all of the trips taken by Vermonters who do not have easy access to an automobile and subtracting out those trips likely to be made by walking or bicycle gives us a total of 22 million trips that could be served by public transit. In FY2018, about 4.3 million transit trips were provided (excluding tourism services) meaning that 17.7 million additional transit trips would be carried to meet the “full” needs of Vermonters who don’t have easy access to automobiles. This figure can be considered the upper bound of “needs” for the near term. It does not include riders who might be drawn to public transit for convenience, environmental concerns or cost savings and thus give up driving for some of their travel.

Looking only at the basic level of mobility, a total of 6.5 million additional transit trips would be carried to meet the essential needs of Vermonters who don’t have easy access to automobiles.

In order to calculate the costs of carrying all of those additional transit trips, it is necessary to split the totals into urban and rural figures, because the operating subsidy per trip is very different for the two environments. It is assumed that the FY2018 net cost per trip (gross operating cost less fare revenue) for urban and rural trips remains the same for the millions of additional trips that would be added to the system. The FY2018 net costs (operating subsidies) are as follows:

* Urban operating subsidy: $4.64 per trip
* Rural operating subsidy: $10.11 per trip

Among the 17.7 million additional trips estimated for the “full” level of mobility, 4.2 million apply to the Urban area and 13.5 million apply to the Rural area. Multiplying those figures by the respective operating subsidies per trip produces a cost estimate to serve those new trips of $19.6 million for the Urban area and $136.2 million for the Rural area, resulting in a statewide total of $156 million. Urban spending would nearly triple from its currently level of $10.5 million, but Rural spending would increase by a factor of 10.

For the “basic” level, among the 6.5 million new trips, 730,000 would occur in the Urban area and 5.7 million in the Rural area. Multiplying those figures by the respective operating subsidies per trip produces a cost estimate to serve those new trips of $3.4 million for the Urban area and $60 million for the Rural area, resulting in a statewide total of $63.4 million. These figures are summarized in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Statistics Excluding Intercity, Tourism and Volunteer Driver Trips** | **Urban** | **Rural** | **Statewide** |
| FY2018 Riders | 2.3 million | 1.5 million | 3.8 million |
| FY2018 Net cost per rider | $4.64 | $10.11 |  |
| FY2018 Total subsidy | $10.5 million | $15.5 million | $26 million |
| “Full” additional riders | 4.2 million | 13.5 million | 17.7 million |
| “Full” additional net cost | $19.6 million | $136.2 million | $156 million |
| “Basic” additional riders | 0.7 million | 5.7 million | 6.5 million |
| “Basic additional net cost | $3.4 million | $60.0 million | $63.4 million |

## Future Scenarios and Ridership

It is unlikely that conditions will remain the same as they are today for the next ten years. The environment in which public transit operates and the costs it faces are very likely to change. This section examines three possible scenarios that would affect ridership and costs in various ways, thus having a significant impact on the cost efficiency of the transit system and the resources necessary to operate it.

It is important to note that none of the scenarios envisage significant changes in housing or in other land use/development patterns. Even if there were a consensus now that development patterns need to change and a strong impetus to invest, the results of this change would only begin to take effect toward the end of the ten-year timeframe of the PTPP. A more appropriate timeframe for land use changes is 20 or even 30 years.

It is also important to note that this analysis mainly concerns the existing ridership base and people on the margins who may become transit riders or stop riding based on external factors. It is separate from the prior analysis looking at the needs of the whole population of Vermont.

### Scenario 1 – High Fuel Prices

In this scenario, it is assumed that gas prices double sometime within the ten-year timeframe. That would mean a retail price above $5.50 per gallon based on prevailing prices in 2019. Such an increase, especially if it happened in a short time, would cause substantial shifts in mode choice. It is assumed that drastic changes in fuel prices would affect the mode choice of people in the 18-24 and 25-64 age groups most significantly. It was reasoned that other groups have more constrained choices about transportation options (people over 80 or people with disabilities) or have a reduced amount of travel (fewer commuters) which would make fuel prices less important to them (people in the 65-79 age group).

### Scenario 2 – Low Fuel Prices

While fuel prices are relatively low now, they could go even lower. As fuel prices have dropped over the past five years, transit agencies nationally have seen their ridership decrease.[[1]](#footnote-2) As most of the research points out, fuel prices are not the only factor affecting transit ridership, but there is an undeniable correlation between the drop in fuel prices since 2014 and the decline in transit ridership. If fuel prices were to go even lower, dropping by 30% to under $2 per gallon, what would be the impact on transit? According to this analysis, the net cost per rider would increase moderately as people who have the option to drive would do so more often.

### Scenario 3 – Changed Technological Landscape

While technological advances have been affecting people’s lives and livelihoods for decades, the impacts on public transportation have accelerated quickly in the last five years. For instance, real-time passenger information systems have been around since the early 2000s, but those early systems were expensive and required significant investments to get the information on vehicle locations and arrivals into the hands of passengers. With the widespread availability of smartphones in the past few years, however, the cost to provide real-time information has dropped precipitously and transit agencies no longer need to install video screens and message boards at stops to tell passengers when the next bus will arrive.

Better information is not the only major change brought about by technology. Automakers and technology companies are working hard to implement autonomous vehicle technology, and eventually this technology will find its way into buses and other transit vehicles. In addition, companies such as Uber and Via have been working on algorithms to create shared-ride trips in real time. The old model of having to call 24 or 48 hours in advance to request a trip is giving way to the new model of using a smartphone to request a trip 15 minutes hence and then the database engine creating driver manifests in real time that maximize the efficiency of fulfulling all outstanding trip requests. The drivers receive those manifests via tablets in their vehicles, and these are updated constantly.

### Summary of Impacts

The analysis described in detail in Appendix L produced the estimated impacts shown in the table below. High fuel prices have the greatest potential impact on cost effectiveness, but technology could have a very significant impact on demand response transportation. As would be expected, high fuel prices make transit a more attractive option, helping to reduce the net cost per rider. Low fuel prices, in contrast, make transit less attractive, thereby increasing the net cost per passenger as more people choose to drive instead of riding the bus. Improved technology will reduce costs as well. The most significant change could be on the demand response side, where the net cost per rider could drop from $21 to $14 due to increased productivity.

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| **Scenario** | **Urban** | **Rural** |
| Baseline net cost per rider | $4.64 | $8.84 |
| Baseline gross operating cost | $12.8 million | $12.7 million |
| 1 – High fuel prices net cost per rider | $3.47 to $4.59 | $7.95 to $8.74 |
| 1 – High fuel prices gross operating cost | $13.8 to $15.2 m | $14 million |
| 2 – Low fuel prices net cost per rider | $4.75 | $9.02 |
| 2 – Low fuel prices gross operating cost | $12.5 million | $12.3 million |
| 3 – Technology net cost per rider | $4.10 | $8.42 |
| 3 – Technology gross operating cost | $12.2 million | $12.7 million |

1. <https://www.govtech.com/fs/transportation/2018-Was-the-Year-of-the-Car-and-Transit-Ridership-Felt-It.html> and <https://fas.org/sgp/crs/misc/R45144.pdf> [↑](#footnote-ref-2)