



Energy Efficient Transportation Plan for Oberlin and Northern Ohio

Center for Neighborhood Technology

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Acknowledgements

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About the Center for Neighborhood Technology

The Center for Neighborhood Technology (CNT) is an award-winning innovations laboratory for urban sustainability. Since 1978, CNT has been working to show urban communities in Chicago and across the country how to develop more sustainably. CNT promotes the better and more efficient use of the undervalued resources and inherent advantages of the built and natural systems that comprise the urban environment.

As a creative think-and-do tank, we research, promote, and implement innovative solutions to improve the economy and the environment; make good use of existing resources and community assets; restore the health of natural systems and increase the wealth and well-being of people—now and in the future. CNT’s unique approach combines cutting edge research and analysis, public policy advocacy, the creation of web-based information tools for transparency and accountability, and the advancement of economic development social ventures to address those problems in innovative ways.

CNT works in four areas: transportation and community development, natural resources, energy and climate. CNT has two affiliates, I-GO™ Car Sharing and CNT Energy.

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Executive Summary

This *Energy Efficient Transportation Plan for Oberlin and Northern Ohio* assesses Oberlin’s existing transportation assets and challenges and lays out a path that will lead to a sustainable transportation system. This plan presents a bold future—one where no fossil fuel is used on Oberlin’s roads and no greenhouse gases (GHGs) are emitted as residents, students, workers, and visitors travel around Oberlin. Such a drastic change from today’s transportation system will not be easy to achieve, but Oberlin is a community with a long history of social action and innovation, and if it can apply its unique capacity to solving its transportation challenges the impacts will go far beyond the town’s borders as the world takes notice.

Figure 1. Travel in Oberlin 2007 to 2050

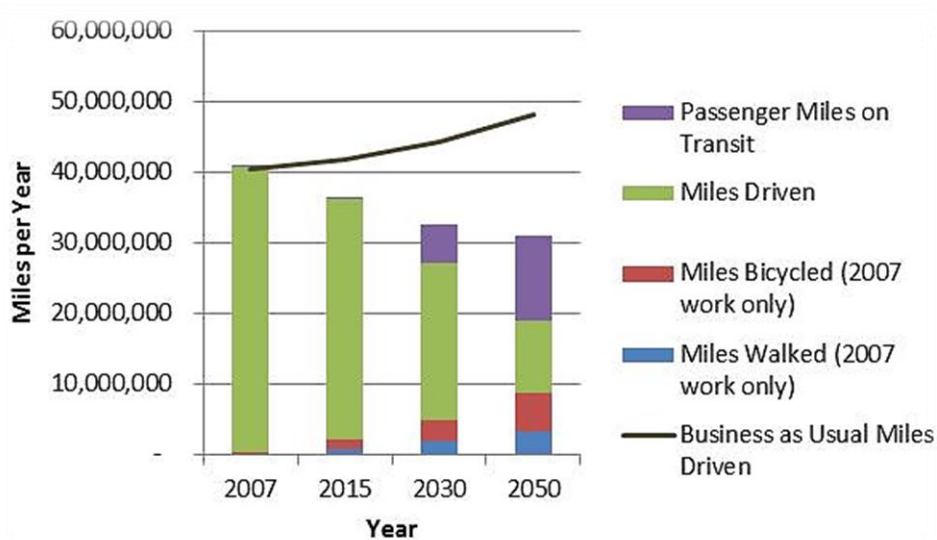


Figure 1 shows how travel in Oberlin will change under this sustainable transportation plan. This plan is designed as a portfolio of ten strategies. Each was chosen for its high potential GHG savings, its relative cost effectiveness, and feasibility. Additionally, the portfolio addresses all major transportation types in Oberlin. The ten strategies analyzed here are as follows:

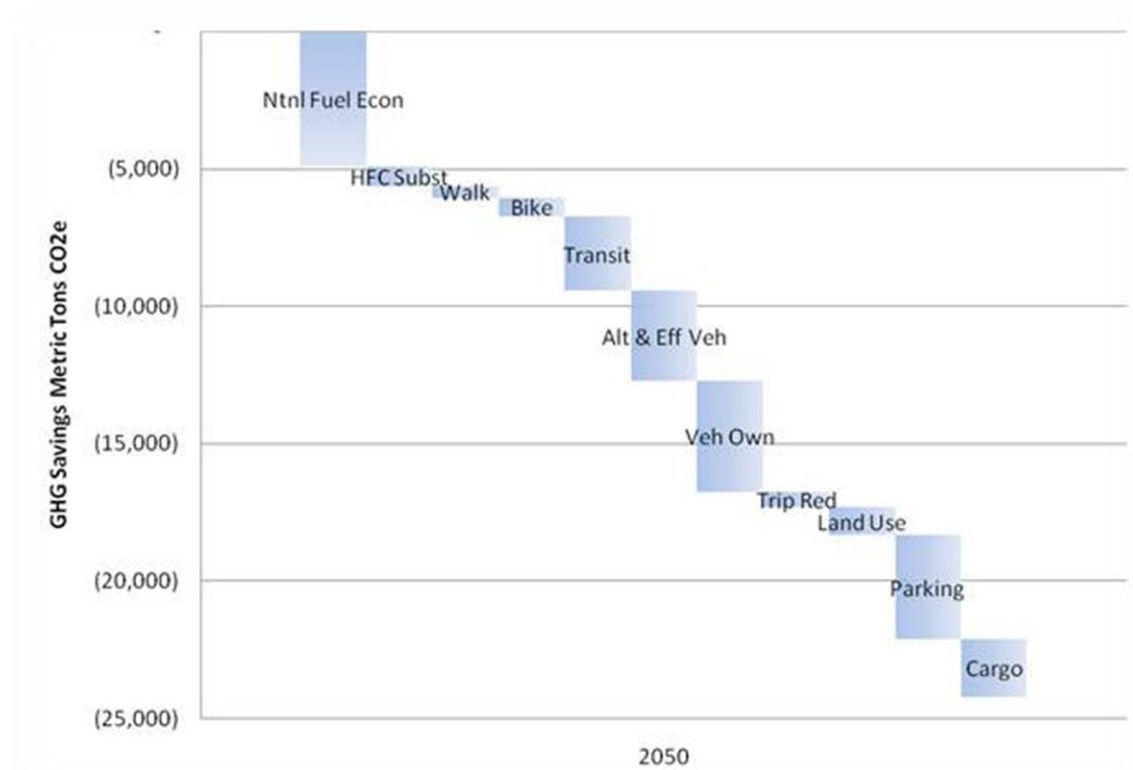
1. **Walking**—Promote walking as major mode of transportation in Oberlin.
2. **Bicycling**—Increase bicycling's share of trips in Oberlin.
3. **Transit**—Create shared passenger transportation for Oberlin.
4. **Alternative, Efficient Fuels and Vehicles**—Fuels and vehicles that can make motorized transport zero- or low-carbon.

5. **Reduced Vehicle Ownership**—Promote alternate modes of transportation, fewer trips, and shorter trips through reduced vehicle ownership.
6. **Trip Reduction**—Reduce the number of trips Oberlin workers and residents need to take.
7. **Land Use**—Land use and urban form that supports lower car ownership, fewer and shorter trips, and alternative transportation modes.
8. **Parking**—Change parking infrastructure and policies to incentivize low-carbon transportation.
9. **Cargo**—Low-carbon solutions for cargo transport to and from Oberlin.
10. **Long Distance Travel**—Create options for low-carbon long distance travel to and from Oberlin.

This sustainable transportation plan looks at these strategies quantitatively and qualitatively. Three scenarios of emissions reductions are considered: a 25% reduction below 2007 levels by 2015, 75% reduction by 2030, and 100% reduction by 2050.

Attaining zero carbon emissions for transportation in Oberlin in 2050 will require every household, business, and institution in Oberlin to operate differently than they do today. An Oberlin of 2050 with no transportation GHG emissions will have fewer cars on the road. The cars and trucks that do drive will run on clean fuels including renewable electricity and sustainably generated biodiesel. Visitors to Oberlin will come by transit and bicycle. Those visitors who arrive in fossil fuel cars will be given incentives to park them and use alternate modes of travel. Transportation options will be more robust than today with a fixed guideway transit system, community-wide car sharing for residents and businesses, and infrastructure for bicycling and walking. Figure 2 shows how the strategies described in this report will get Oberlin from its current annual emissions of over 24,000 metric tons of carbon dioxide equivalent (mtCO₂e) to zero in 2050.

Figure 2. GHG Savings from Transportation Strategies in 2050



Transforming Oberlin into a zero carbon transportation community will not happen overnight. It will require thousands of individual decisions by individual actors—decisions to walk to the store instead of driving, to buy an electric car to replace an old gasoline model, to share rides or cars with neighbors, to combine trips to the store and travel less. It will also require significant community leadership to develop the infrastructure and policies necessary to enable households and business to build Oberlin’s economy without fossil fuels.

The results of such action will be manifold. Beyond the energy security and GHG impacts, zero carbon transportation in Oberlin will bring cleaner air, healthier and more active households, and contribute to the economic development of the community. Providing alternatives to private vehicles for travel will improve accessibility for those who cannot drive, and a focus on affordable alternatives will ensure mobility for households of all incomes. As a community that meets travel needs through shared transport and physical activity, Oberlin will build on its history of civic engagement and set a new standard for communities around the world. This plan intends to provide a starting point for Oberlin’s sustainable transportation future—one that can be replicated in other communities in Northern Ohio and beyond.

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1 Introduction

As an international leader in sustainability, Oberlin has served as a center for advancing the practice of creating green communities. Oberlin College's commitment to the goal of climate neutrality provides a framework for implementing the next generation of sustainable, energy efficient policies and projects that can be a model for communities around the world.

Transportation is not the largest source of energy use and emissions in Oberlin College or the City of Oberlin, but energy efficient, low-emissions transportation solutions are essential to creating an integrated sustainable economy for Oberlin's future. Transportation is the second largest expense for most households in the U.S. after housing, and communities that allow residents and businesses to reduce transportation costs while cutting energy use and emissions can increase competitiveness.

This *Energy Efficient Transportation Plan for Oberlin and Northern Ohio* assesses Oberlin's existing assets and challenges and lays out a path that will lead to a sustainable transportation system. This plan presents a bold future—one where no fossil fuel is used on Oberlin's roads and no greenhouse gases (GHGs) are emitted as residents, students, workers, and visitors travel around Oberlin. Such a drastic change from today's transportation system will not be easy to achieve, but if Oberlin can demonstrate a successful alternative transportation system the impacts will go far beyond the town's borders as the world takes notice.



1868 View of the Town of Oberlin, Ohio. Photo Courtesy of Oberlin College Archives.

1.1 Context

In the time since Oberlin's founding in 1833, it has changed from a rural college town in Ohio's forests to part of a major metropolitan region and a place world-renown for its sustainability ideas and actions.¹ The transportation needs of Oberlin's residents, workers, students, and visitors have changed as well. Like the rest of the country, fossil fuel-powered vehicles have shaped Oberlin's transportation system for the past century. However, Oberlin has made a commitment sustainability, which should include addressing its contribution to global climate change by seeking to achieve net neutral emissions of GHGs. Fulfilling this commitment requires assessing all aspects of Oberlin's economy and infrastructure to find low-carbon solutions. To be sustainable, these solutions should make the best use of Oberlin's existing assets, seek to curb costs for residents and businesses, and lay the framework for the next century of a thriving community. Transportation is a significant source of Oberlin's global warming impact and will therefore be an important part of the solution to reducing emissions in Oberlin.

All day every day, goods and people are moving into, out of, and around Oberlin. Students and professors are going to classes. Business owners are arriving at shops, receiving goods, and selling them to neighbors and visitors. Residents are going to work in communities throughout the region. Trips to Cleveland are being made for concerts, doctor appointments, and departures to places all over the world from Cleveland's airport. Creating a sustainable transportation plan for Oberlin requires asking: What will these trips look like in the future? How will low-carbon transportation options enable mobility in the region? Are there ways to make trips shorter and faster or even unnecessary?

1.1.1 The Case against Business as Usual

The scientific evidence that global warming is happening and that it is caused by humans is overwhelming. The devastating consequences that a warmer earth will bring to people around the planet is reason enough for Oberlin to take action to reduce GHGs. But even if that were not the case, developing a sustainable transportation strategy makes sense for many other reasons as well. A car-centric transportation system is not an equitable system. Children, seniors, low income residents and workers, and persons with disabilities all need safe, affordable, accessible transportation options, and a community that focuses its transportation infrastructure solely on cars will neglect these most vulnerable travelers.

Conventional automobile traffic and its air pollution emissions also pose health threats to these populations and the community as a whole. Over-investment in roads and highways enables sprawling development that damages biological habitats and endangers local agriculture.

¹ Oberlin College, "About Oberlin," accessed May 2011, <http://new.oberlin.edu/about/index.dot>

Building a transportation system that is no longer dependent on foreign oil imports will give Oberlin energy independence and could provide a buffer in times of global insecurity. Oberlin has the choice to do something different with its transportation system than what has been business as usual in the U.S. for the past decades. An energy efficient transportation system is in keeping with Oberlin's stated sustainability goals and will provide it with a solid foundation for success in coming decades.

Oberlin is making great strides in improving the sustainability of its buildings and electricity system, but a green building is not really sustainable if it is primarily accessed by petroleum powered vehicles. Transportation caused just 15% of the GHG emissions emitted in Oberlin in 2007—electricity and natural gas were the largest sources—but that is because Oberlin's coal-based electricity has overshadowed its GHG inventory in past years.² As the city works to build a cleaner power supply, transportation's share of emissions in the community will grow if action is not taken. Oberlin will not be able to meet its sustainability goals without addressing the energy efficiency of its transportation.

1.1.2 Transportation and Economic Development

Creating a great place where people want to live and work can help attract business investment. A place where there are many transportation options and one does not need to use a car to get around provides a quality of life benefit that can help businesses retain employees. The lower cost of living that can be attained when households do not need to own cars to meet their travel needs can improve Oberlin's affordability and enable households to spend money at local businesses rather than on imported oil. Further, becoming known as a laboratory for cutting-edge transportation alternatives will reinforce Oberlin's reputation as a world leader in advancing the practice of sustainability. All of this can be leveraged to maintain a robust economy in Oberlin. Many of the innovations that will be required to meet a zero carbon transportation goal could generate business opportunities through products and services that can be used in Oberlin and brought to customers seeking green transportation solutions around the world.

1.1.3 Creating a Culture of Alternative Transportation

For Oberlin to succeed in creating a sustainable transportation system it will need to change not just its transportation system but its culture. The good news is that Oberlin is starting from a point of advantage with its strong walking, bicycling, and environmentally conscious populace. Oberlin as a community, including its institutions and employers, can provide a set of incentives to make further change possible. Transportation policies that prioritize low-carbon

² Nathaniel Flaschner Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality," May 2009.

modes over other forms, contests that challenge participants to switch their travel habits and reward them for succeeding, and low-carbon transportation civic events—like car-free days—can all help build an alternative transportation culture. Once seeds are planted, some of the changes will grow on their own—with more bicyclists, businesses to support bicyclists will arise, and more people will start bicycling as a result—but ongoing investment and policy changes will be required as well. This investment will pay returns as a community of active individuals engaged in the sustainability of their daily travel bring many other civic benefits to Oberlin.



Oberlin Ohio Sign, 1960's. Photo Courtesy of Oberlin College Archives.

1.1.4 Improving the Energy Efficiency of Transportation in Northern Ohio

Oberlin will not be changing its transportation system in a vacuum. The transportation strategies outlined in this plan will create benefits for surrounding communities as Oberlin residents drive cleaner cars in other towns and use bicycles for regional travel. A vibrant downtown Oberlin accessible by transit and regional bike paths will change the travel patterns of people throughout the region as it draws shoppers and visitors.

Some of the strategies presented here will need regional cooperation to fully succeed—a sustainable transport system in Oberlin that aims to reduce driving needs to include public transit options that connect it to the larger region. Given Oberlin’s small population, regional coordination is likely the best way to gain the economy of scale needed to make frequent, reliable, and well-connected transit a reality. In the end, Oberlin’s leadership and action on energy efficient transportation will help it serve as an innovation incubator for low-carbon transportation solutions in small communities that can then be replicated throughout Northern Ohio and beyond.

1.2 Creating a Sustainable Transportation Plan for Oberlin

This transportation plan has been developed in several stages. The first step involved understanding the current transportation system in Oberlin by creating a transportation profile for Oberlin today, which is summarized in this plan. Interviews, focus groups, and a literature review were used to inventory current transportation assets, trends, opportunities, and challenges.

The next step was to identify and analyze a portfolio of potential energy efficient, low-carbon transportation solutions for the area. Strategies were gathered from the literature, interviews, focus groups, and the Center for Neighborhood Technology’s (CNT’s) extensive work in the area of sustainable communities. Strategies were ranked according to a series of criteria including GHG reduction potential, cost, implementation time, and feasibility.

A resulting portfolio of 10 high-priority strategies that address all aspects of travel in Oberlin is presented in this plan along with quantitative and qualitative analysis of each. Taken together, and implemented at scale, these strategies could create a climate neutral transportation system in Oberlin by 2050. They also have the potential to improve the energy efficiency, energy security, and sustainability of Oberlin and the surrounding area. The ten strategies analyzed here are as follows:

1. **Walking**—Promote walking as major mode of transportation in Oberlin.
2. **Bicycling**—Increase bicycling's share of trips in Oberlin.
3. **Transit**—Create shared passenger transportation for Oberlin.

4. **Alternative, Efficient Fuels and Vehicles**—Fuels and vehicles that can make motorized transport zero- or low-carbon.
5. **Reduced Vehicle Ownership**—Promote alternate modes of transportation, fewer trips, and shorter trips through reduced vehicle ownership.
6. **Trip Reduction**—Reduce the number of trips Oberlin workers and residents need to take.
7. **Land Use**—Land use and urban form that supports lower car ownership, fewer and shorter trips, and alternative transportation modes.
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10. **Long Distance Travel**—Create options for low-carbon long distance travel to and from Oberlin.

This plan is intended to provide an overview of Oberlin’s existing transportation system and give an understanding of the scale, scope, and nature of actions that will be required to transform Oberlin’s transportation system into an energy efficient low-carbon system by 2050. This report is organized into five sections and two appendices as described below:

1. **Introduction**—Lays out the context and describes the structure of the report.
2. **Transportation in Oberlin: Past, Present, and Future**—Provides an overview of Oberlin’s potential energy and GHG emissions future through 2050 with and without a sustainable transportation plan.
3. **Assets and Challenges to Sustainable Transportation**—Describes Oberlin’s current transportation demographics, infrastructure, and the assets this plan builds on as well as the challenges it seeks to overcome.
4. **Sustainable Transportation Strategies**—Provides quantitative and qualitative analysis of a portfolio of ten strategies that make up this sustainable transportation plan.
5. **Conclusion and Supportive Actions**—Provides final thoughts, including discussion of non-quantifiable actions that Oberlin can take to improve the success of this plan.
6. **Appendix A: Modeling Methods**—Gives technical information on the quantitative analysis used in this report.

7. **Appendix B: Expanded Oberlin Present-Day Transportation Profile**—Provides additional detailed information on Oberlin’s transportation system today as background.

2 Transportation in Oberlin: Past, Present, and Future



Greyhound Bus, Oberlin, Ohio 1945. Photo Courtesy of Oberlin College Archives.

2.1 History

Historically, Oberlin was served by several different forms of intercity transportation, including a commuter rail, streetcars, and greyhound buses. As the Oberlin Heritage Center describes in its *Biking Tour of Historic Oberlin* pamphlet,

“[T]he Oberlin Depot...was once Oberlin’s train station. Trains stopped in Oberlin from 1866 to 1949. The train service gradually decreased over the years, and by the 1930s, there was only one train a day—a commuter train on its way from Toledo to Cleveland stopped in Oberlin around 7:00 each morning and returned around 6:00 each evening. It was known as “the Plug” and served as an alarm clock for many people in town. There was also a trolley line that operated in

Oberlin from 1897 to 1931. Known as the Interurban, the trolley took people to Elyria, Cleveland, and other nearby destinations.”³



Oberlin, Ohio Train Station 1940's. Photo Courtesy of Oberlin College Archives.

The College was a noted user of the rail service; *Pictorial Memories of Oberlin* notes that College travel for events, such as sports and music, at times had dedicated trains and rail cars. In addition, rail carried freight and fresh milk from the surrounding areas. Students and residents could ride to the train stations in the area by hiring horse-drawn carriages.⁴

2.2 Today

As transportation in and around Oberlin has evolved over the years, some things have remained constant. Oberlin's small size and the closeness of the College to downtown means that Oberlin the central part of town remains a very walkable place. A recent

³ Oberlin Heritage Center, *Biking Tour of Historic Oberlin*, 2008, <http://www.oberlinheritage.org/cms/files/File/webtour%205-2008b.pdf>.

⁴ Rotary Club of Oberlin, *Pictorial Memories of Oberlin*, 2nd ed., Oberlin, 1989.

essay by new urbanist Hazel Borys provides a modern picture of the day-to-day transportation use of an Oberlin resident,

“When I lived in Oberlin, I rarely drove, except for once-a-week sort of requirements. Walking and bikes were the primary modes of transportation for daily needs, and the gathering places were plentiful and engaging. It was a 5-minute walk from most residences to either civic amenities or the retail of Main and College Streets. The variety of housing types was wide enough to allow a bevy of college students to assist with our childcare from a close proximity. On the commercial corridors, vertical mixed use allows for an integration of services, and recent new developments encourage aging in place and some town-gown reconnection.”⁵

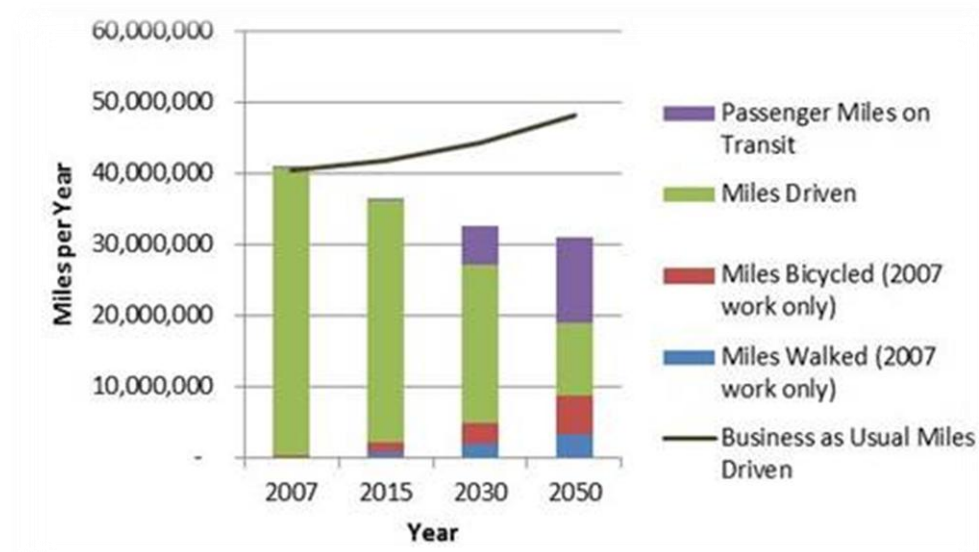
Yet, Oberlin faces some major transportation challenges. While the community supports many transportation alternatives, fossil fueled automobiles make up the majority of travel. Regional public transit has foundered. Lorain County Transit (LCT), which supplied bus service to Oberlin, cut almost all service in 2010. The Oberlin Connector bus now runs just two days a week from 9am to 3pm on a demand response basis. This limited transit access is an obstacle that Oberlin must overcome if it is to meet its sustainable transportation goals.

⁵ Hazel Borys, “Oberlin, Ohio, and the Promise of Place: A Love Letter,” PlaceShakers and NewsMakers, March 25, 2011, <http://placeshakers.wordpress.com/2011/03/25/oberlin-ohio-and-the-promise-of-place-a-love-letter>.

2.3 Looking Forward

Without taking action, it is likely that vehicle travel in Oberlin would grow slightly over time. Oberlin's GHG inventory shows 2% growth in vehicle miles traveled (VMT) from 2000 to 2007. Nationally VMT has been on the rise, and though it has shown a dip with the recent economic decline, it is expected to continue to grow. Figure 3 shows what Oberlin's VMT would be under a business as usual (BAU) scenario where no action is taken to make Oberlin's transportation more sustainable. In this case, VMT would grow from 41 million miles per year to 48 million miles per year. This 20% increase in VMT is lower than the national average, but would add additional pollutants to Oberlin's air, increase wear and tear to its roads, and could decrease the quality of life in town.

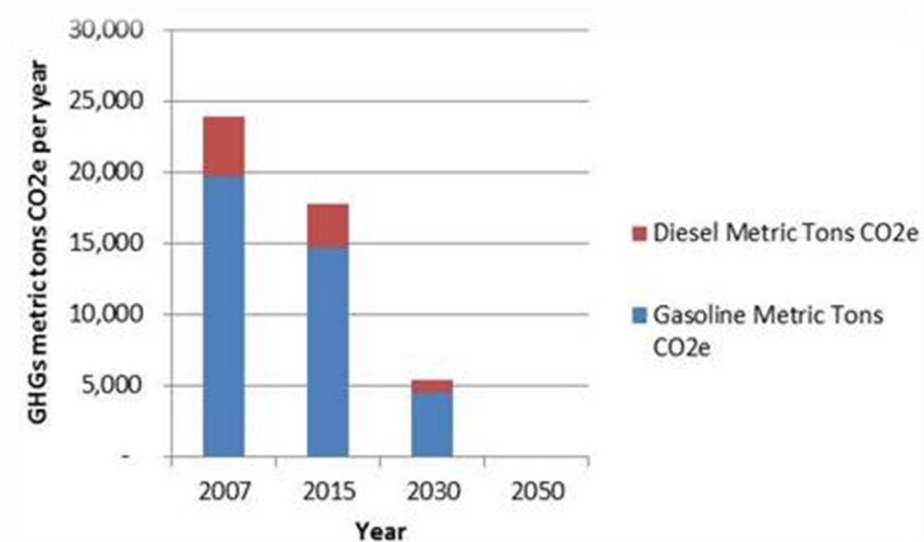
Figure 3. Travel in Oberlin 2007 to 2050



In contrast, Figure 3 also shows travel in Oberlin after the strategies in this sustainable transportation plan are implemented. With these actions, VMT is 79% lower in 2050 than it would be otherwise. Residents and visitors have cut out unnecessary travel and meet their travel needs with a range of options that includes bicycling, walking, and riding public transit. The reduced vehicle travel will have economic benefits and improve energy security as households no longer spend money on imported petroleum. In this scenario vehicles are powered with clean energy, including sustainably sourced biofuel and clean electricity. This report describes this alternate possible future for Oberlin and provides information to help Oberlin and Northern Ohio develop the sustainable, energy efficient transportation system of the future.

The changes analyzed in this report will result in elimination of fossil fuel use and GHG emissions in Oberlin’s transportation sector. Figure 4 shows the GHG emissions from diesel and gasoline use on Oberlin’s roads today as well as at three analysis points—a 25% reduction in 2015, 75% reduction in 2030, and 100% reduction in 2050. These analytical targets do not represent Oberlin policy, but are hypothetical targets for the purpose of this plan. These are aggressive targets, and although 2050 seems far away, meeting a zero carbon emissions goal by then will be a substantial challenge.

Figure 4. Transportation Fossil Fuel GHG Emissions in Oberlin 2007 to 2050



2.4 2015

The long term transportation scenarios analyzed here are ambitious and will take years to implement, but there is quite a bit of savings that can be realized in the shorter-term as well. A scenario of 25% GHG emissions reductions by 2015 includes increases in walking and bicycling—building on Oberlin’s existing strengths.

A 2015 scenario also begins repairing the loss of public transit that Oberlin has faced over the last several years. Increasing Oberlin Connector service to 360 days is included in this scenario. However, meeting mobility needs with a standard diesel bus is not a large GHG reduction strategy, and increasing Connector service may actually add emissions in the short term as it induces travel by providing needed mobility to households that would have no other way to get to appointments. Expanded Connector service is included here because it is an important stepping stone toward providing a broader, alternative fuel transit system. Also included is shared transportation in the form of ridesharing and car sharing, both of which can be low-capital means of providing transportation access. Overcoming policy barriers to enabling peer-to-peer car sharing would allow car sharing to expand in the community at low cost.

The 2015 scenario of 25% emissions reduction will require a broad array of adjustments: business owners will need to streamline shipping to reduce cargo traffic; fleet owners will need to upgrade vehicles with the most efficient models available; land use changes will need to be implemented to improve the location efficiency of Oberlin's existing households; Oberlin's existing alternative fuel infrastructure will need to be utilized to begin to transform the type of vehicles on Oberlin's roads. Many of these programs will start small, and will serve as testing grounds for the innovation required to meet the energy and GHG goals in 2030 and 2050. All in all, Oberlin's transportation system in 2015 will not look markedly different from today, but will be more efficient, with more low-carbon options, and will provide more access with less driving.

2.5 2030

A scenario of 75% GHG emissions reductions by 2030 was created as an interim analysis point for this plan. In this analysis, by 2030 most of the programs needed to get to zero carbon will be underway, but major infrastructure changes, such as fixed guideway transit and high speed rail will not be built out. Electricity will not yet be carbon neutral, but 85% of Oberlin's electricity will come from renewable sources, making it an attractive clean transportation fuel.

Significant changes will be required to achieve a 75% reduction in fossil fuel use and GHG emissions by 2030. Thousands of Oberlin residents and visitors will walk and bike around town every day. Regional, daily, alternative fuel transit service will be reestablished in Oberlin and have more riders than ever. Car sharing will be in widespread use with 2,500 residential and business members sharing efficient vehicles and many giving up their older, less efficient cars in the process. Land use changes will be made to help 400 existing households have easier access to destinations including work, school and shopping to reduce their overall need for travel.

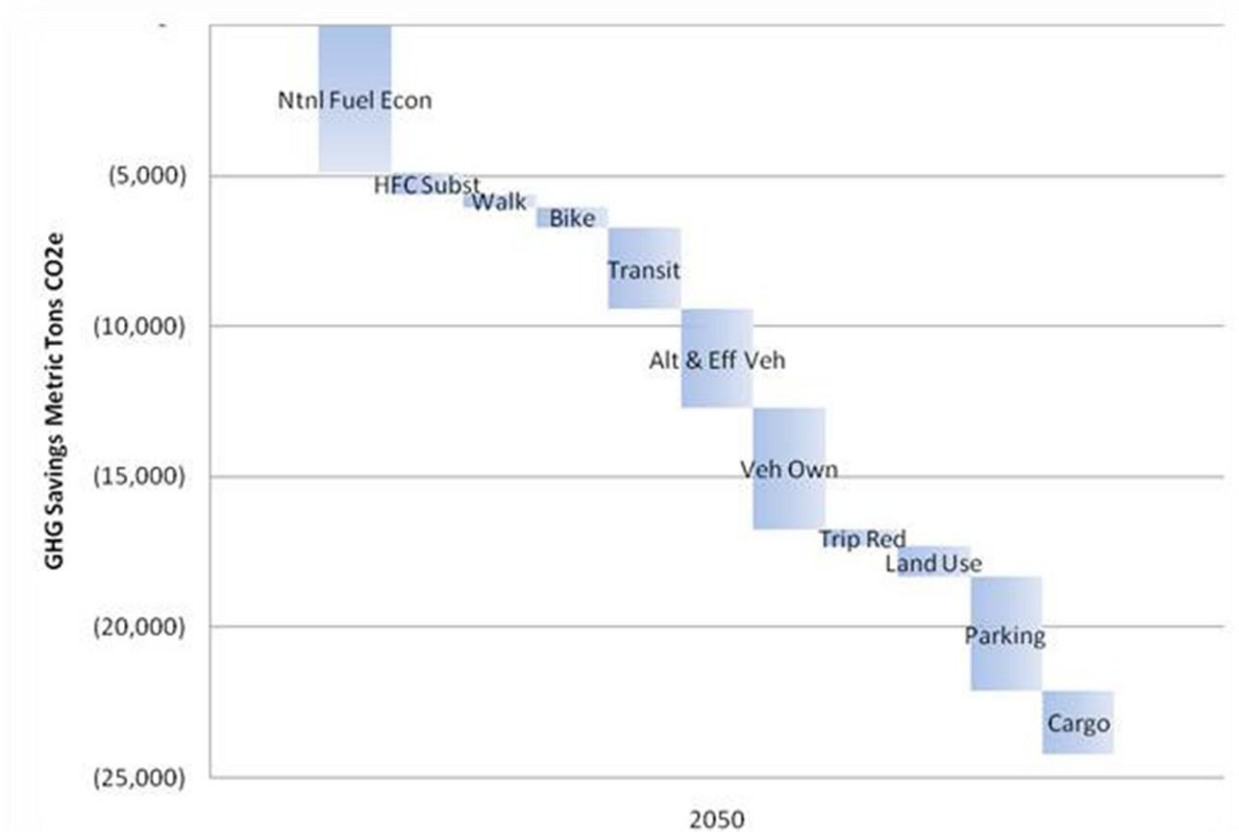
One essential part of reducing on-road emissions will be influencing the travel behavior of visitors to Oberlin. Whether they are coming to give a lecture at the College, work in a local shop, deliver goods, or just to sightsee, if visitors are driving fossil fuel vehicles on local roads they are impacting the community's emissions. Visitors will therefore have access to the many new transportation alternatives to get around town, and they will be encouraged to use these through parking policies that prioritize zero carbon modes of travel.

2.6 2050

This sustainable transportation plan analyzes the scenario of zero carbon emissions for transportation in Oberlin in 2050, a scenario that will require every household, business, and institution in Oberlin to operate differently than they do today. An Oberlin of 2050 with no transportation GHG emissions will have fewer cars on the road. The cars and trucks that do drive will run on clean fuels, including renewable electricity and sustainably generated biodiesel. Visitors to Oberlin will come by transit and bicycle. Those visitors who arrive in fossil

fuel cars will be given incentives to park them and use alternate modes of travel. Transportation options will be more robust than today with a fixed guideway transit system, community-wide car sharing for residents and businesses, and infrastructure for bicycling and walking. Figure 5 shows how the strategies described in this report will get Oberlin from its current annual emissions of over 24,000 metric tons of carbon dioxide equivalent (mtCO₂e) to zero in 2050.

Figure 5. GHG Savings from Transportation Strategies in 2050



Transforming Oberlin into a zero carbon transportation community will not happen overnight. It will require thousands of individual decisions by individual actors—decisions to walk to the store instead of driving, to buy an electric car to replace an old gasoline model, to share rides or cars with neighbors, to combine trips to the store and travel less. It will also require significant community leadership to develop the infrastructure and policies necessary to enable households and business to build Oberlin’s economy without fossil fuels.

The results of such action will be manifold. Beyond the energy security and GHG impacts, zero carbon transportation in Oberlin will bring cleaner air, healthier and more active households, and contribute to the economic development of the community. Providing alternatives to private vehicles for travel will improve accessibility for those who cannot drive, and a focus on

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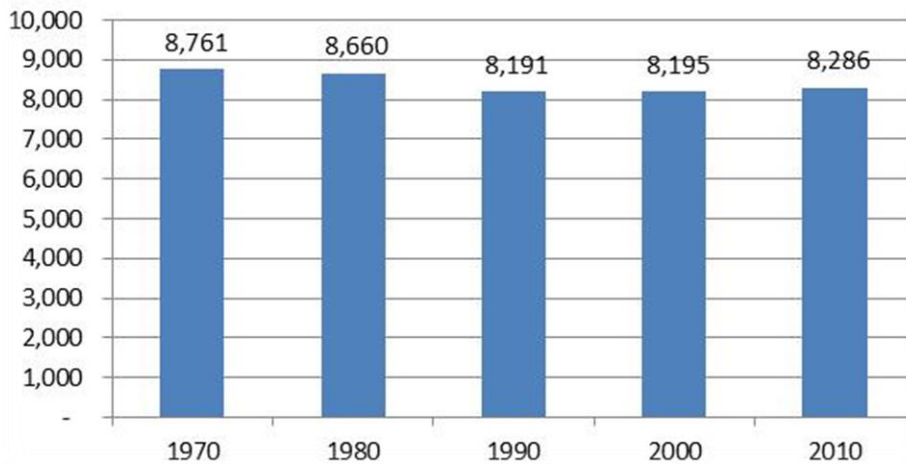
3 Assets and Challenges to Sustainable Transportation

Implementing a sustainable transportation plan in Oberlin will require building on existing assets and strategically overcoming many challenges. This section provides an overview of these issues. They are further addressed in context in the qualitative analysis of each strategy later in this report. Finally, some additional background on Oberlin’s current transportation profile is provided in the Appendix.

3.1 Transportation Demographics

There were 8,286 residents and 2,730 households in Oberlin in 2010 according to the U.S. Census bureau. This is a 1% change from the 2000 population, which is a slower rate of growth than the U.S. average; population Oberlin has been relatively flat over the past few decades (Figure 6). The median age in Oberlin in 2010 was 23, which is quite a bit younger than the U.S. median of 37. But, 15% of Oberlin’s residents were 65 years or older, which is a slightly larger share of the population than the national average.⁶ Seniors have remained a steady share of the population in Oberlin since 2000, but nationally the population is aging and transportation planning has to look to meeting the mobility needs of this cohort in the coming decades by providing alternatives to driving.

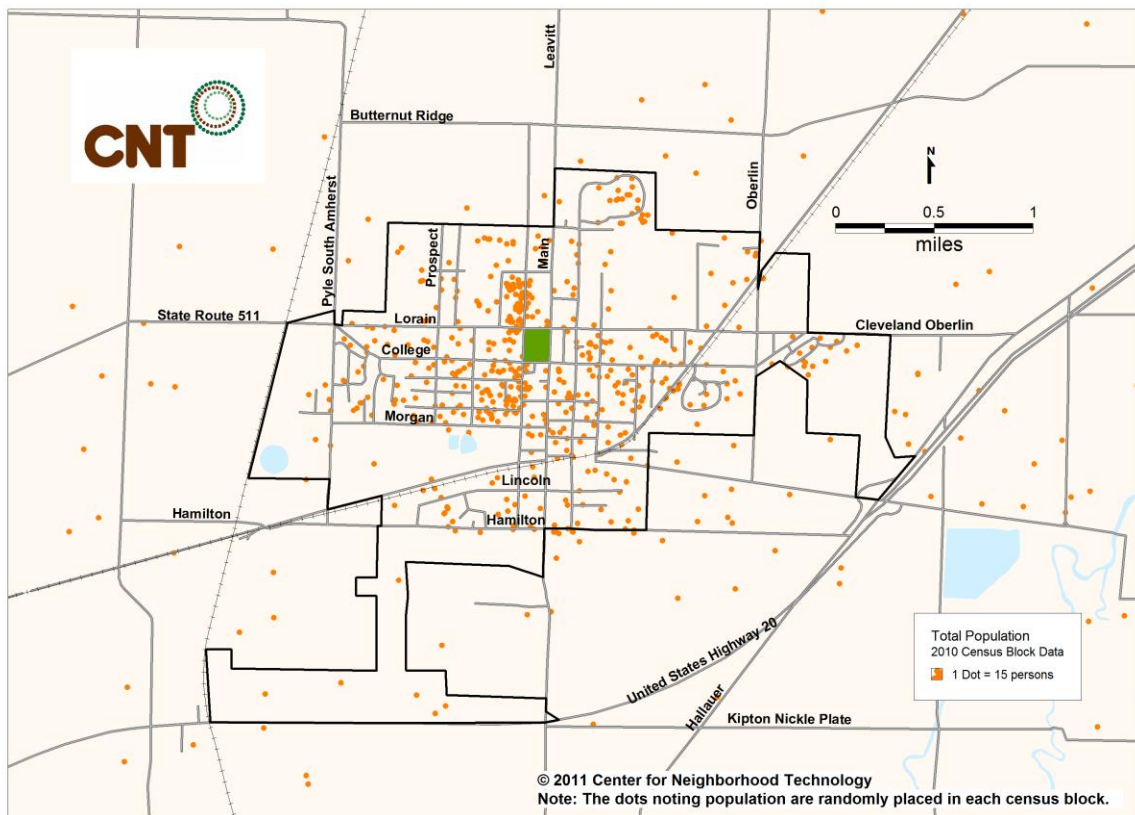
Figure 6. Oberlin Population 1970 to 2010



⁶ U.S. Census Bureau, Census 2010.

Map 1 provides visualizations of how population is dispersed in and around Oberlin. Each dot in the s represents 15 persons and is placed randomly in the census block where it belongs to create a general picture of population density. Looking at population in this way clearly shows the clusters of students in campus housing, where population density is high relative to other parts of town.

Map 1. Oberlin 2010 Population



Median household income in Oberlin is \$50,045, near the national average, but higher than the area median income for the Cleveland region. The median family income is \$72,500, which is higher than the national average. However, 15.5% of the 1,196 families in Oberlin are below the poverty line, a figure which rises to 30% for families with children. In comparison, the poverty rate for all U.S. families is 10% and 15% for those with children.⁷ This suggests that while many

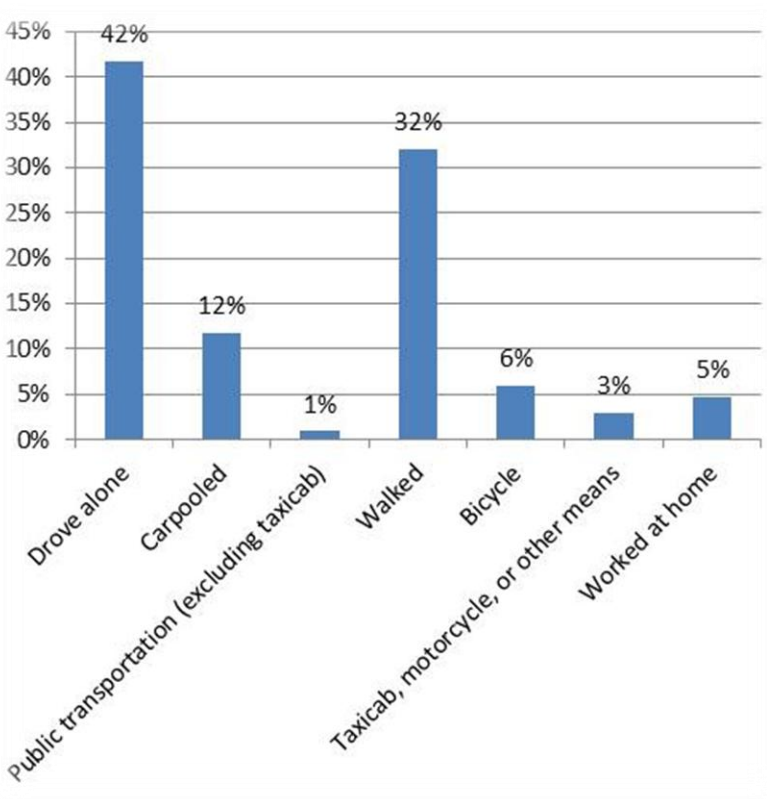
⁷ U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates

families in Oberlin are quite comfortable there is a significant population of households for whom transportation costs are a critical issue, and providing affordable mobility in Oberlin has an important equity component.

Households in Oberlin own 3,200 vehicles.⁸ Add to this the vehicles owned by students, businesses, and institutions and there are an estimated 5,188 vehicles in Oberlin.⁹ Travel on Oberlin’s roads amounted to 40.6 million miles in 2007.¹⁰ Left unchecked, vehicle travel would likely increase gradually in the coming decades.

Most Oberlin workers drive or carpool to their job (Figure 7), but notably 32% of Oberlin walk to work, which is over ten times greater than the national value of 3%. Also significant is the 6% of workers commuting by bicycle, which is a much greater share than the national value of 1%.¹¹

Figure 7. Means of Transportation to Work by Oberlin Workers 2009



⁸ U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates.

⁹ Calculated based on Nathaniel Flaschner Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality,” May 2009.

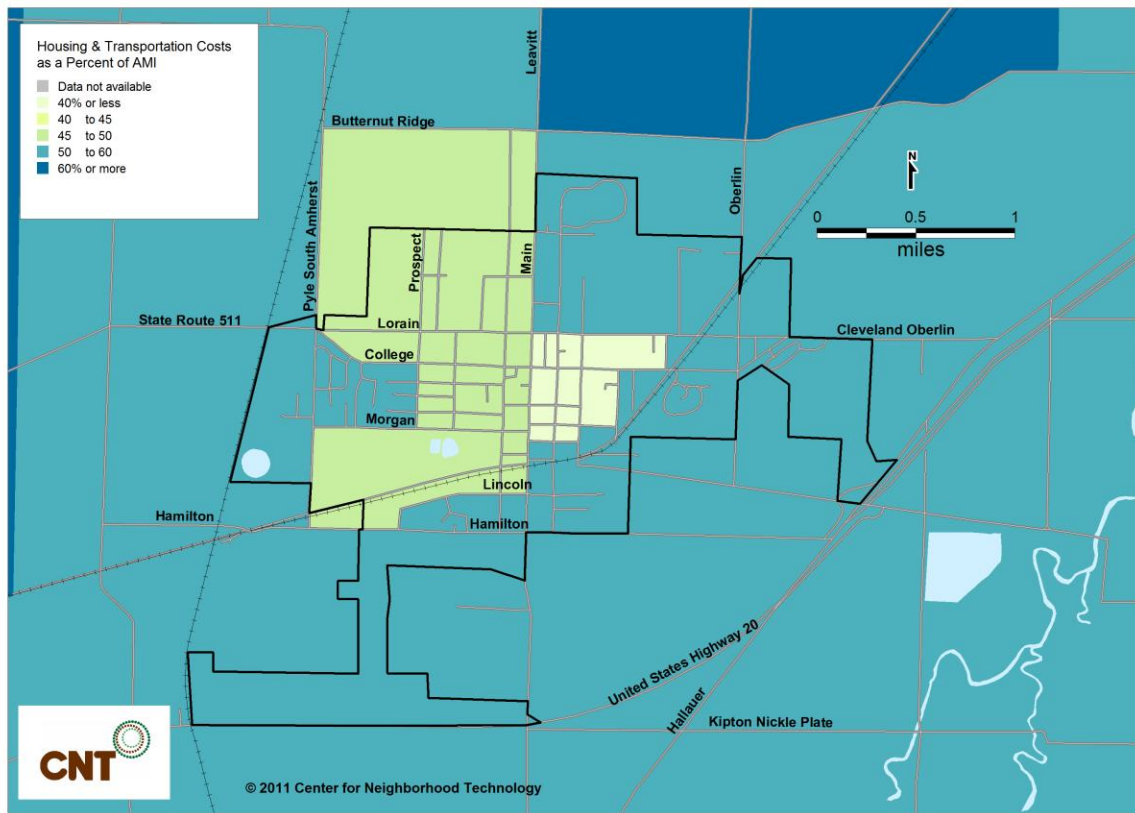
¹⁰ Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin.”

¹¹ U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates.

3.2 Cost of Living

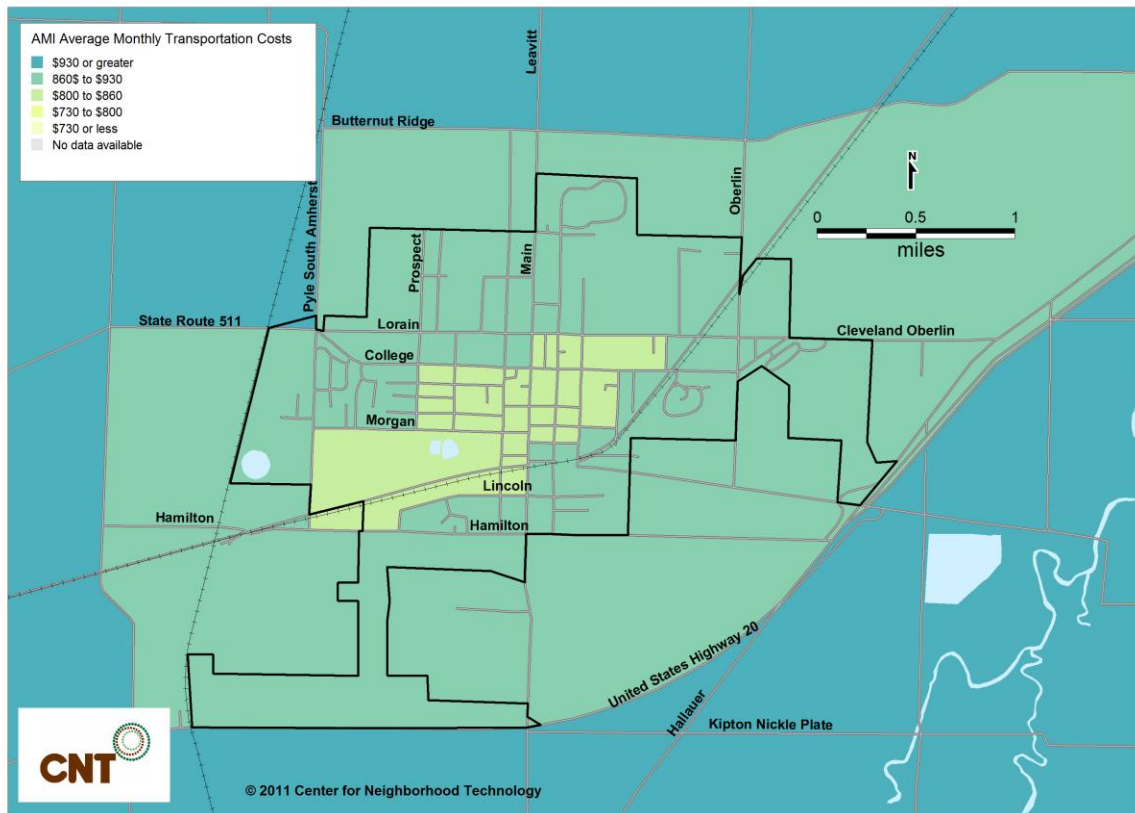
CNT’s Housing + Transportation (H+T®) Affordability Index provides a unique perspective on transportation and the role it plays in the cost of living in Oberlin. While affordability has historically been considered in terms of housing costs, this index also considers the transportation costs associated with living in any particular place. More information on the methods used to create the H+T index is in the Appendix.

Map 2. Housing and Transportation Costs in Oberlin



Map 2 shows that for a household earning the area median income (AMI) of \$42,089, downtown Oberlin is most affordable when considering the combined costs of housing and transportation. Next most affordable is the west side of town. These findings are in keeping with the walkability and bikeability of these areas. Beyond those two parts of town, the remainder of Oberlin has estimated housing and transportation costs that are 50 to 60% of AMI, which is above the 45% that CNT’s research shows is a good benchmark for affordability.

Map 3. Transportation Costs in Oberlin



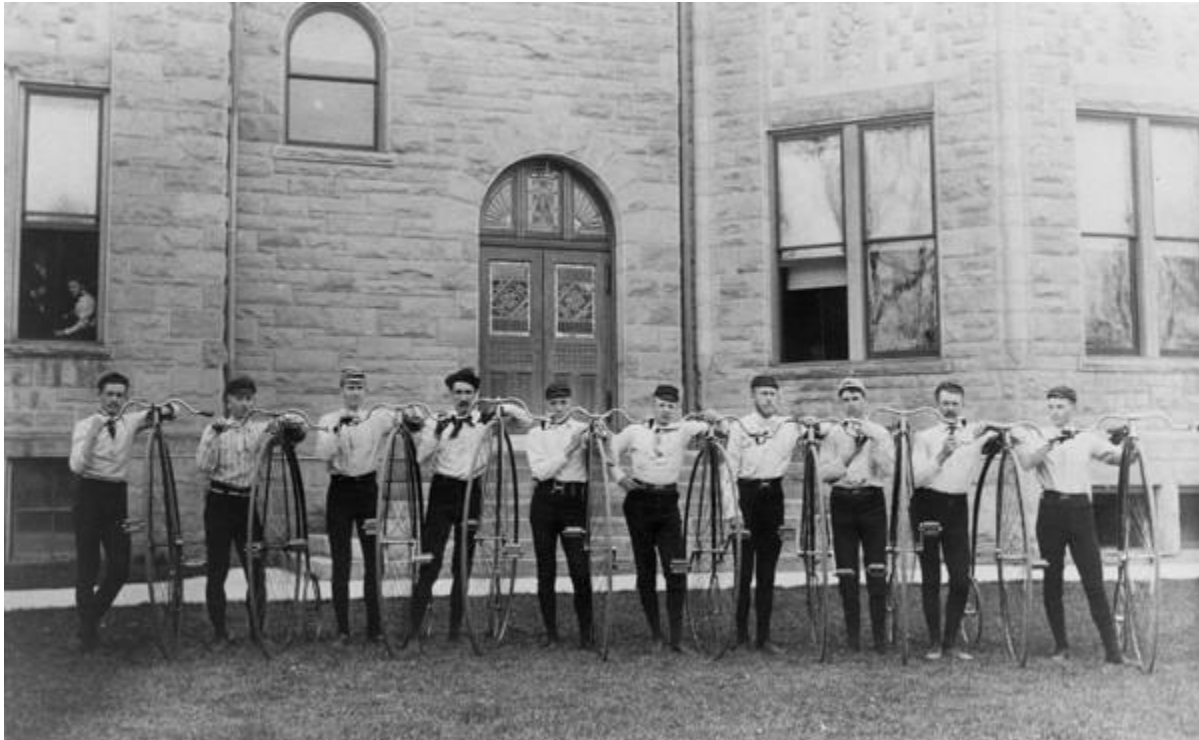
Drilling down to examine transportation expenses alone, as Map 3 does, provides an even clearer picture of transportation in Oberlin. The core areas of town show the lowest transportation costs, while outlying areas, including more recently annexed land with shopping destinations, are areas of higher transportation cost. An average household living in the outer parts of Oberlin might spend \$60 to \$70 more per month on transportation than they would if they lived downtown, where they would need to use a vehicle less. These additional expenses, month after month, in household after household, can make a real impact on Oberlin’s overall economy.

3.3 Transportation Options in Oberlin

For a place its size, Oberlin has a remarkable number of transportation alternatives; showing itself to be a bit of an experimental proving ground with young entrepreneurs setting up small-scale transportation options on campus and in town.

3.3.1 Local and Regional Travel Alternatives

Oberlin has a long history of bicycling, and travelers in and around Oberlin are supported by bicycle infrastructure that is expanding, though it has significant gaps. Harsh winters make bicycling a challenge, but the College has installed at least one snow canopy for bicycle parking.



High Bicycle Club of Oberlin College 1890. Photo courtesy of Oberlin College Archives.

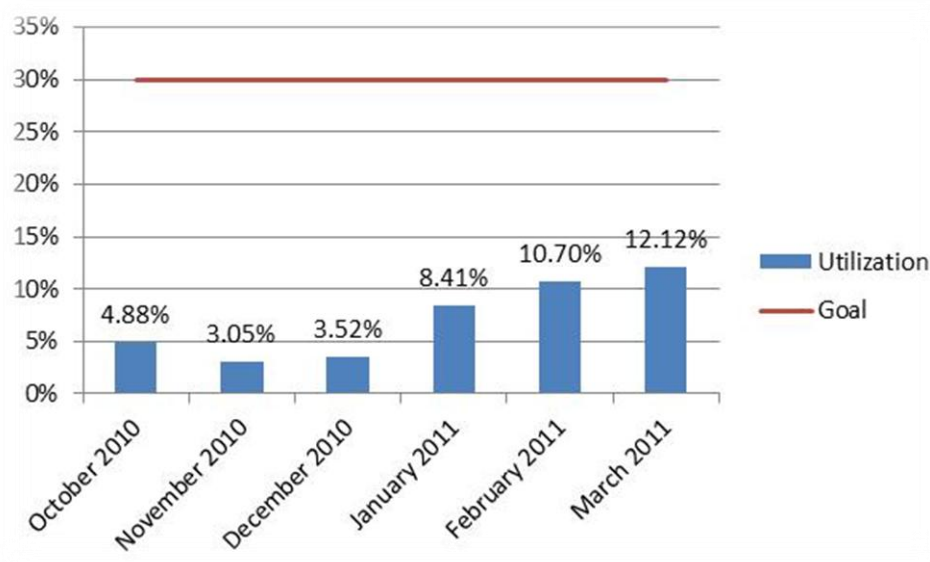
Walking is a major transportation mode in Oberlin. The city's comprehensive plan recognizes a need to preserve walkability and connect new developments with the existing street grid. The city encourages sidewalks and discourages cul-de-sacs and dead end streets in all new developments.¹² The historic street grid and small block sizes make downtown Oberlin very walkable, but outer areas have large blocks and fewer pedestrian amenities.

Due to budget difficulties, LCT reduced its 12 transit routes to 2 and ended regular bus connection from Oberlin to other destinations in the County. After LCT eliminated transit service, the town and College evaluated several mobility alternatives and eventually settled on a Connector bus service. The Oberlin Connector runs on Monday to pre-arranged destinations within Oberlin and alternates between destinations in Elyria and Lorain from 9:00 AM and 3:00 PM. Though this service is limited, ridership has been growing and the bus provides a needed link to shopping destinations, medical appointments, and social services.

¹² City of Oberlin, Ohio, *Comprehensive Plan*.

A few other buses are available for travel in the area. Oberlin College helps supply several transportation alternatives, including a nighttime RideLine bus and shopping shuttles for students. The Airport Oberlin Shuttle is a coach bus that links Oberlin to the Cleveland-Hopkins Airport. Travelers can transfer to the Cleveland Regional Transportation Authority (RTA) system from the airport.

Figure 8. Hertz Connect Utilization in Oberlin



A car sharing service, Connect by Hertz, has three vehicles in town available for use by members by the hour. Membership for students is free. Cars include the cost of gasoline and insurance and are priced by the mile.¹³ Figure 8 shows that use of these cars grew in the first part of 2011, but is not yet meeting the program's target.

Students at the College and residents of the town both find shared rides through the Oberlin classifieds. In addition to students and residents using this service for carpooling, entrepreneurs post ads for paid rides to regional destinations.¹⁴

Northeast Ohio Areawide Coordinating Agency (NOACA) operates *OhioRideShare*, which allows users to identify potential carpool partners to destinations. To promote participation NOACA provides a "Guaranteed Ride Home," which will reimburse carpoolers for the expense of a bus or taxi.¹⁵

¹³ Oberlin College Office of Sustainability, May 2011.

¹⁴ Colin Koffel, Rob Lamppa, and Madeline Marvar.

¹⁵ Northeast Ohio Areawide Coordinating Agency, "Guaranteed Ride Home (GRH) Program," Accessed May 6, 2011. <http://www.noaca.org/grh.html>

3.3.2 Travel Options for Long Distance Travel

Oberlin College's students and faculty come from all over the globe and are part of a worldwide scholarly community, so long-distance travel is more a part of Oberlin's travel profile than many towns its size. There are several long-distance travel options available in the region, but accessing them other than by car can be a challenge. Cleveland-Hopkins International Airport is about 25 minutes from Oberlin and provides direct and connecting service to cities around the world.



Oberlin Ohio Railroad Depot During 1945 Bus Strike. Photo Courtesy of Oberlin College Archives.

Oberlin students and residents can travel 12 miles to use one of Elyria's two Amtrak lines to reach Chicago, Buffalo, New York City, Boston, Pittsburgh, and Washington, DC.¹⁶ Oberlin College estimates that ten students use Amtrak for breaks.¹⁷

¹⁶ Amtrak, "Amtrak – Timetables," Accessed May 2011, <http://www.amtrak.com/servlet/ContentServer/Page/1237405732505/1237405732505>.

¹⁷ Colin Koffel, Rob Lamppa, and Madeline Marvar.

For intercity bus travel there is a Greyhound station in Elyria.¹⁸ Megabus offers low cost direct service from Tower City in Cleveland to Chicago, Pittsburgh, and Toledo several times per day.¹⁹ In 2010, two entrepreneurial graduates began service called Wilder Lines that charters a bus between New York City and Oberlin around major breaks. The service costs \$100 one way or \$150 for a round trip.²⁰

3.4 Land Use

The design of Oberlin—its location, and its mix of homes, businesses, and institutions—affects where residents go and how they get choose to get there. Much research continues to be done on the complex interplay of travel demand and land use, but the basic concepts are simple to understand. When it is easy to walk a few blocks for an errand, more people will do so. If the library, post office, or destination of any other errand is far away, difficult to access, or unsafe, fewer people will walk there. Every day, these individual decisions are shaped in part by the land use of a place and added together they determine the travel patterns for the region.

Oberlin is small and compact, with a land area of 4.4 square miles.²¹ The central configuration of the town includes interconnected streets and a concentration of amenities around downtown Oberlin and the Oberlin College campus. This makes it an inherently very walkable and bikeable place, though large blocks and growing commercial areas at the edge of town pose challenges. Automobile trips within Oberlin are likely to be short, which can make alternative vehicles and fuels an especially good fit. However, Oberlin’s small size means that it is a small market for any transportation alternative. Solutions that require a larger scale of users to become economically viable will require creativity to implement in Oberlin.

Oberlin’s location in the larger region determines transportation patterns as well. The nearest major city, Cleveland, is 35 miles away and difficult to access by means other than an automobile, yet is a destination for students and residents. Oberlin’s relative remoteness also means that it does not benefit from some of the transportation alternatives available in the region; the Greater Cleveland RTA’s rail lines do not extend as far as Oberlin.

3.4.1 Oberlin College and Downtown Oberlin

The configuration of the Oberlin College campus makes it easy for students to access almost all of their destinations without an automobile. Many classrooms, a student union, and Mudd

¹⁸ Oberlin College, “Visiting Oberlin – Transportation,” Accessed May 2011, <http://new.oberlin.edu/visitor/transportation.dot>.

¹⁹ “Megabus US,” Accessed May 2011, <http://us.megabus.com/>.

²⁰ “Wilder Lines,” Accessed May 2011, <http://www.wilderlines.com/>.

²¹ U.S. Census Bureau, Census 2000.

Library overlook the central quad of Wilder Bowl with two clusters of student housing to the north and the south.²²

Historic downtown Oberlin sits across Tappan Square from Wilder Bowl and spans the south side of College Street and both sides of S. Main Street. Most buildings along both streets are relatively dense, compact and occupied, which make it an easy and enjoyable place to walk.²³



Stranded Trolley Cars During The 1913 Oberlin Ohio Snowstorm. Photo Courtesy of Oberlin College Archives.

Downtown Oberlin shoppers can access goods and services, including groceries, books, hardware, banking, and household items. Entertainment options include a movie theater and live music. Oberlin City Hall, the public library, and a post office are also downtown. The growing residential population in Downtown Oberlin has been led by the recent development of Sustainable Communities Associates' East College Street Project, a green building with retail space and 33 residential units, which represents the type of downtown development that enables trip reductions and the use of transportation alternatives.

²² Oberlin College, "Campus Map/Directions," Accessed May 27 2011, <http://new.oberlin.edu/visitor/index.dot>.

²³ City of Oberlin, Ohio, *Downtown Revitalization and Development Plan*.

3.4.2 Other commercial districts

Oberlin has annexed property on the outskirts of town to accommodate development, which has resulted in the creation of non-downtown shopping destinations in Oberlin that are most easily accessed by automobile, as transportation infrastructure for other modes has not kept pace with development. The largest and most recent commercial development in Oberlin is anchored by a Wal-Mart at the intersection of OH-58 and US-20.²⁴

3.4.3 Residential neighborhoods

As a result of the city's historical pattern of development, many residential neighborhoods in Oberlin are clustered around the urban core²⁵ and more than half of Oberlin's population lives within an easy walk of downtown. South of the core of town, the Oberlin Plan Commission encouraged higher density development in some undeveloped land immediately surrounding the Wal-Mart in the hope that it can build an interconnected residential neighborhood here as the housing market recovers.²⁶

3.4.4 Industrial Areas

Located along Artino Street in the northeast quadrant of the city, the Oberlin Industrial Park includes a facility for the Federal Aviation Administration that employs 700 workers and several smaller manufacturers.²⁷ While the FAA facility has been a stable tenant, the Park has lost other, smaller manufacturers over the course of the last decade.²⁸ The park generates significant truck and commuter traffic along OH-511 from US-20, which needs to be considered in any transportation plan for Oberlin.

3.4.5 Parking

Although the College campus and downtown are compact and walkable, a significant amount of land is devoted to parking. College employees receive two free parking permits. The College does not offer incentives for carpooling or a condensed work week for staff.²⁹ Visitors to Oberlin College campus require a temporary parking permit in order to park in visitor-designated spaces.³⁰

²⁴ Google Maps.

²⁵ City of Oberlin, Ohio, *Comprehensive Plan*.

²⁶ Gary Boyle and Eric Norenberg.

²⁷ Moody's Investor Service, "Moody's Assigns MIG 1 Rating to City of Oberlin's (OH) \$1.2 million GoltBod Anticipation Notes, Series 2009." September 9, 2009, <http://www.cityofoberlin.com/Files/Finance/TIF%20E%20College%20St%20Note%209-9-09.pdf>

²⁸ City of Oberlin, Ohio, *Comprehensive Plan*.

²⁹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁰ Oberlin College.

Some steps have been made to address parking as a sustainability issue. The College has designated seven LEED parking spaces for fuel efficient vehicles.³¹ The College has successfully raised student parking permit prices from \$75 to \$100 to dissuade students from bringing vehicles to Oberlin.³² In Kahn Hall, which opened in 2010, students pledge to live without a car for their first year in Oberlin. To build the residence hall, the College requested and was granted a variance by the City to reduce the number of mandated spaces from 180 to 20.³³

In Downtown, two privately-owned lots sit behind the streetscape along College and Main Streets.³⁴ There is free on-street parking, but many students park there rather than in the permitted lots near campus.³⁵ Oberlin also experiences peak parking demand during commencement and special events.³⁶

3.5 Oberlin's Travelers

As a college town and regional destination for shopping and entertainment, many kinds of people come to and from Oberlin for a variety of reasons and at different times of the day and week. Energy-efficient solutions for transportation mobility in Oberlin should consider the needs of all three of these groups:

- **Residents of Oberlin.** Many residents of Oberlin work in surrounding parts of Lorain County and need a car to get to work every day. Residents of Oberlin are much more likely to drive a car for groceries or shopping than Oberlin College students.
- **Students at Oberlin College.** All College facilities are accessible by foot and students appear to be the core market for downtown. Students create demand for long distance, intercity travel during school breaks.
- **Visitors to Oberlin.** People travel to Oberlin for work, downtown shopping and eating, and special events. Few options exist for them to reach Oberlin other than by car.

Wide variation in transportation behavior across these groups has made it difficult to find equitable and cost-effective transportation alternatives. When the city and College considered a more robust Connector service than the one eventually implemented, they found they could not afford to operate at the widespread hours and locations these constituencies demanded.³⁷

³¹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³² Oberlin College Office of Sustainability, "Bicycles and Transportation Survey," Winter 2009.

³³ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁴ Jason Adelman and Krista Long.

³⁵ Gary Boyle and Eric Norenberg.

³⁶ Bryan Burgess and Ken Sloane.

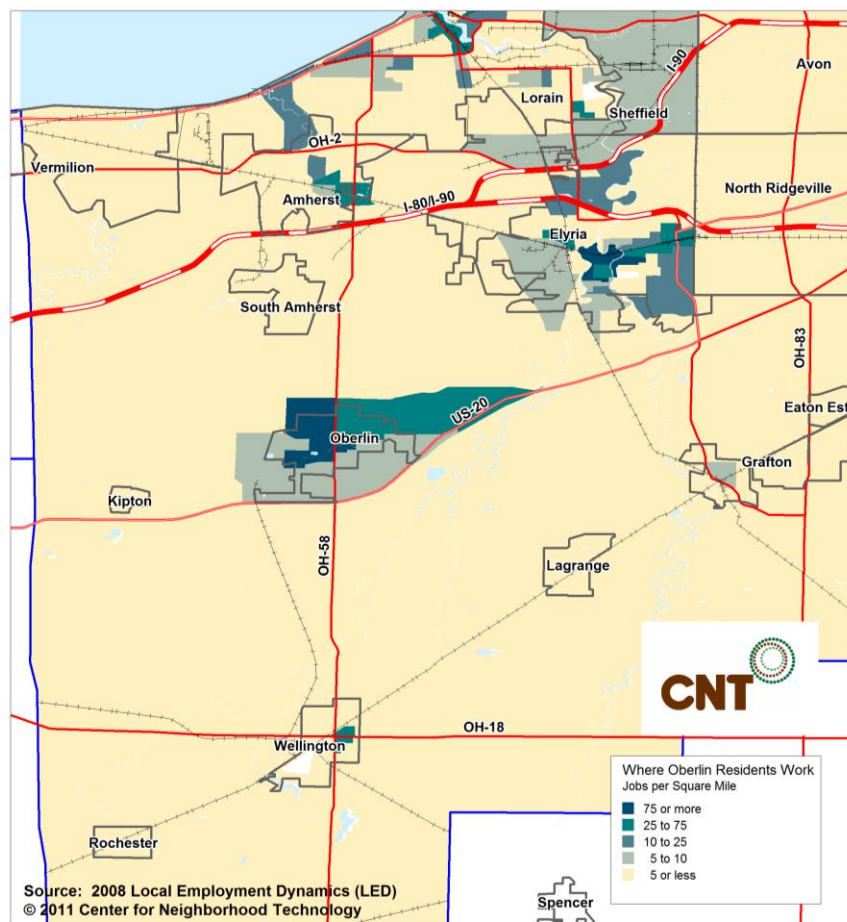
³⁷ Gary Boyle and Eric Norenberg.

3.5.1 Residents of Oberlin

Although Oberlin is a compact place, permanent residents often go elsewhere to work, shop, and access services. Not everybody who lives in Oberlin works there and many of the amenities downtown serve students with a different set of tastes and needs. Residents without access to a car face severely limited choices in daily needs and may be unable to find a job altogether.

A significant number of Oberlin residents work within the city, however. Out of the 1,793 jobs in Lorain County staffed by Oberlin residents in 2008, 1,043 of them, or 58%, were located in and around the city.³⁸

Map 4. Local Employment Destinations for Oberlin Residents in Lorain County



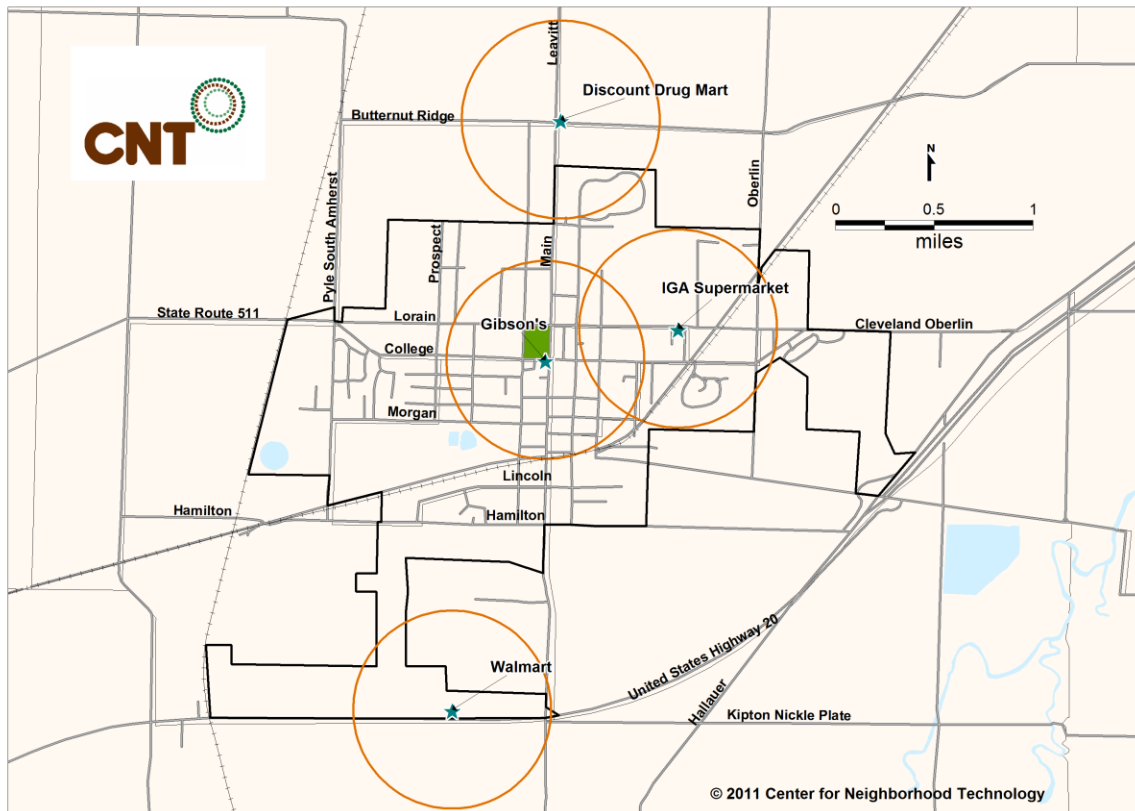
Map 4 shows that the Oberlin residents working elsewhere in Lorain County do not commute to any single destination. Oberlin residents staff 222 jobs in Elyria and 139 jobs in Lorain, but not

³⁸ As defined by the six U.S. Census Block Groups that contain sections of the town of Oberlin.

very many of them work near each other. Another 389 jobs are located elsewhere in Lorain County. This job decentralization will make a fixed-route transit solution extremely challenging to implement.³⁹

After work, the grocery store is the most significant in-town destination for Oberlin residents and it often requires a car.⁴⁰ Six businesses offer groceries in town; three of these are downtown. Most of the food shopping options are not an easy walk from residential neighborhoods. Map 5 displays the location of full-service grocers in Oberlin and a half mile walking distance around them (the three downtown destinations are covered by one circle).

Map 5. Blocks within a Half Mile Walking Distance of Major Grocery Stores in Oberlin



Other destinations for Oberlin residents that create transportation demand are shopping, medical services, and social services. Many residents have to leave Oberlin city limits to meet these needs. Oberlin’s k-12 schools create travel demand as well. The recent Safe Routes to

³⁹ U.S. Census Bureau, Locational Employment Dynamics, 2008.

⁴⁰ Oberlin Resident Focus Groups.

School program the city has undertaken will improve transportation alternatives for these trips, and busing policy states 1st to 8th grade students are expected to walk to school if they live within a mile.⁴¹

3.5.2 Oberlin College Students

Oberlin college students have different travel patterns than residents. Most of students' daily travel occurs in and around campus. According to a College survey, "Recreation, dining and shopping were popular reasons why students leave Oberlin. 80% leave Oberlin less than once per week...Outside of downtown businesses, a majority of students do their business online, at Wal-Mart, or at IGA."⁴²

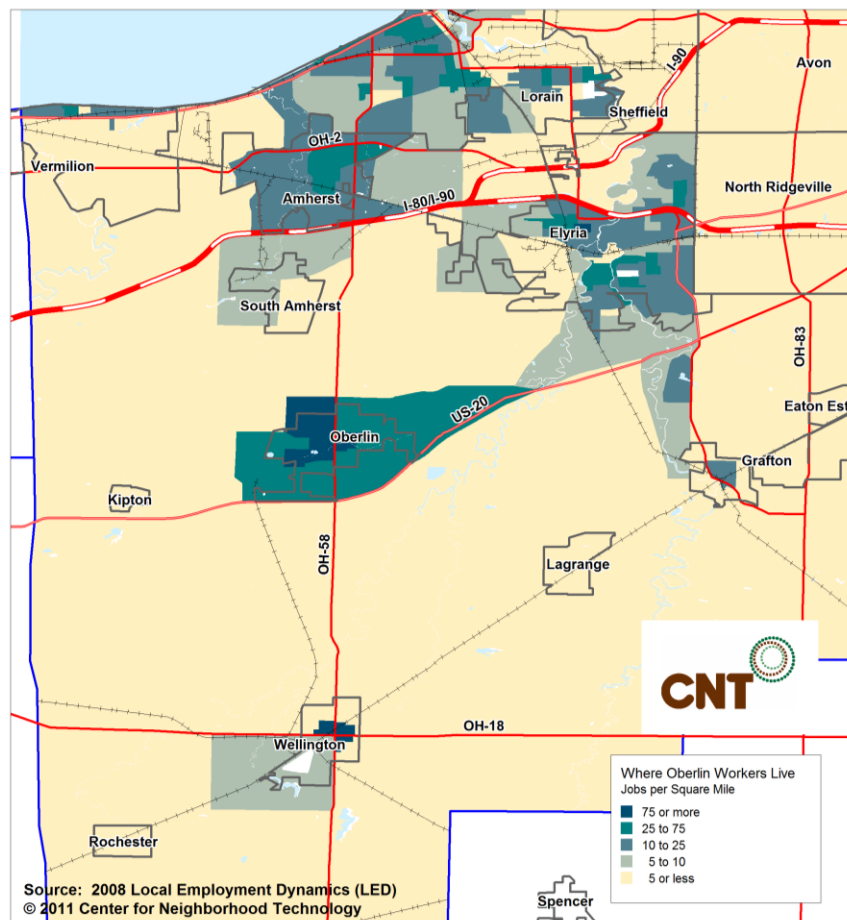
⁴¹ Oberlin School District, *Transportation Guidelines*, Accessed August 2011, http://www.edline.net/pages/Oberlin_City_SD/_Design_Resources/Shortcuts/PARENTAL___COMMUNITY_RESOU RCES/BUS/Bus_Routes_and_Rules

⁴² Oberlin College, "Buy Survey Summary", August 2009.

3.5.3 Oberlin Visitors

Visitors to Oberlin form the third constituency for travel and transportation in Oberlin. Out-of-towners may come to Oberlin daily for work or may come just once for an academic conference. Either way, their travel contributes to Oberlin’s transportation and emissions profile. As Map 6 shows, a significant number of people who work in and around Oberlin live elsewhere. Out of the 3,765 jobs located in and around Oberlin, only 1,043, or 28%, of the workers live in the city.

Map 6. Oberlin Workers Who Lived in Lorain County in 2008



The businesses and restaurants of downtown Oberlin make it a unique destination in Lorain County. Downtown merchants estimate that almost half of their business comes from Cleveland or destinations that are even further away. Almost all of these visitors will choose to

drive because no good alternatives connect one point of Northeast Ohio to another.⁴³ Cultural events at the Oberlin College Conservatory, the Jazz Center, and other venues draw significant numbers of visitors and downtown and College parking lots struggle to accommodate the vehicles from out-of-town visitors during these events.⁴⁴

All of these elements come together to shape travel patterns in Oberlin. The remainder of this report looks to take advantage of Oberlin's existing transportation assets and overcome its challenges to transform travel in town into an energy efficient, zero carbon activity.

⁴³ Jason Adelman and Krista Long.

⁴⁴ Jason Adelman and Krista Long.

4 Sustainable Transportation Strategies

4.1 Overview

The sustainable transportation plan in this report is composed of 10 major strategies that are analyzed quantitatively and qualitatively in this section. Briefly, the strategies are as follows:

11. **Walking**—Promote walking as major mode of transportation in Oberlin.
12. **Bicycling**—Increase bicycling's share of trips in Oberlin.
13. **Transit**—Create shared passenger transportation for Oberlin.
14. **Alternative, Efficient Fuels and Vehicles**—Fuels and vehicles that can make motorized transport zero- or low-carbon.
15. **Reduced Vehicle Ownership**—Promote alternate modes of transportation, fewer trips, and shorter trips through reduced vehicle ownership.
16. **Trip Reduction**—Reduce the number of trips Oberlin workers and residents need to take.
17. **Land Use**—Land use and urban form that supports lower car ownership, fewer and shorter trips, and alternative transportation modes.
18. **Parking**—Change parking infrastructure and policies to incentivize low-carbon transportation.
19. **Cargo**—Low-carbon solutions for cargo transport to and from Oberlin.
20. **Long Distance Travel**—Create options for low-carbon long distance travel to and from Oberlin.

In addition, we have identified an 11th strategy, **Supportive Actions**, which will not be quantified, but will support the success of the plan and discuss reducing GHGs throughout the transportation supply chain and is discussed in the conclusion to this report.

To develop this strategy portfolio CNT compiled an extensive list of transportation and land use policies and programs that may be applicable to Oberlin's energy efficient, low-emissions transportation future. Gathered from literature, best practices in other communities, and interviews and focus groups with Oberlin stakeholders, strategies were assessed in terms of the criteria listed below:

- **GHG Reduction Potential per Trip**—The share of a trip's GHG emissions that will be reduced by the strategy.

- **Community-wide GHG Reduction Potential**—The share of Oberlin’s overall GHG emissions that can be reduced by the strategy if it is adopted at a wide-scale.
- **Implementation Timeframe**—The amount of time to adopt the strategy considering policy, technology, and other issues.
- **Capital Cost**— Upfront capital cost for the strategy.
- **Operation and Maintenance Cost**—Ongoing costs for the strategy.
- **Cost Effectiveness**—Costs as compared to GHG reduction, potential cost savings realized, or other benefits.
- **Feasibility**—Likelihood of strategy being implemented in Oberlin given cost, political factors, and other elements.

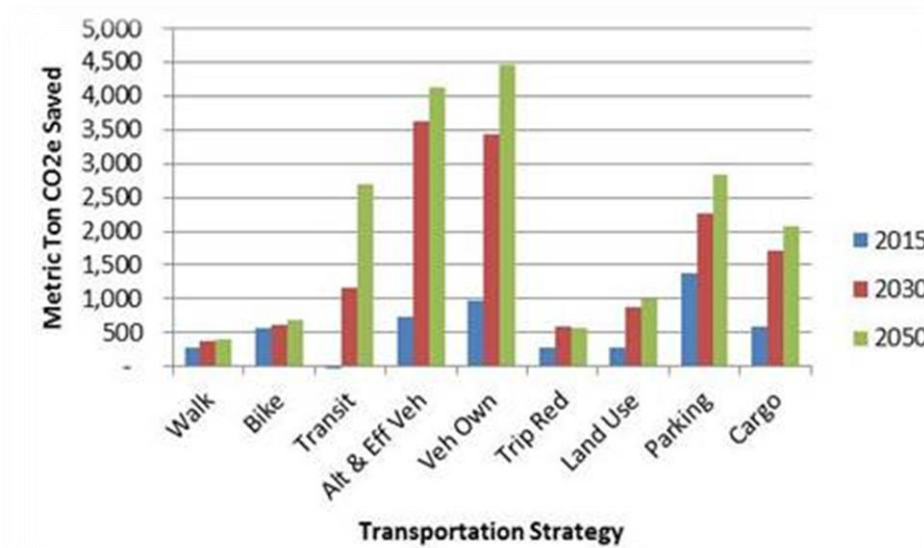
Using these assessments, a portfolio of high ranking strategies with was chosen that could address all major elements of Oberlin’s transportation system. Not every strategy will be applicable to every Oberlin traveler, but taken the together the set of strategies is meant to provide a plan for all types of travel in and around Oberlin. Table 1 shows the total combined impacts of all of the strategies discussed here excluding the Long Distance Travel strategy, which will primarily impact emissions outside of Oberlin.

Table 1. Total Impacts of Strategies in 2015, 2030, and 2050

Year	2015	2030	2050
VMT Eliminated	7,765,239	22,173,623	38,023,256
Gallons of Fossil Fuel Saved	434,690	1,274,931	1,607,193
mtCO ₂ e Saved	5,270	15,198	19,709
Percent Change in CO ₂ e from 2007	25%	75%	100%

The strategies analyzed here do not affect GHG emissions in equal amounts (Figure 9). Some of this is due to the scale of implementation assumed. For example, it is assumed that transit will take several decades to be fully built out to the point that it can maximize ridership, so savings are lower in earlier years. In creating the analysis scenarios in this plan the scale of implementation of any strategy was chosen based on feasibility and potential to meet GHG targets.

Figure 9. GHG Savings from Transportation Strategies



Many of the strategies analyzed create GHG and energy savings by reducing travel in conventional fossil fuel vehicles on Oberlin’s roads. Figure 10 shows the VMT reductions created by each strategy. The alternative, efficient fuels and vehicles strategy achieves GHG and energy savings by making every mile driven less fossil-fuel intensive, so it does not create any VMT savings. Note that the cargo strategy creates higher GHG savings (Figure 9) for the amount of VMT reduced (Figure 10), because the average heavy duty diesel vehicle is so much less efficient on a miles per gallon basis than an automobile.

Figure 10. Vehicle Miles Traveled Reductions from Transportation Strategies

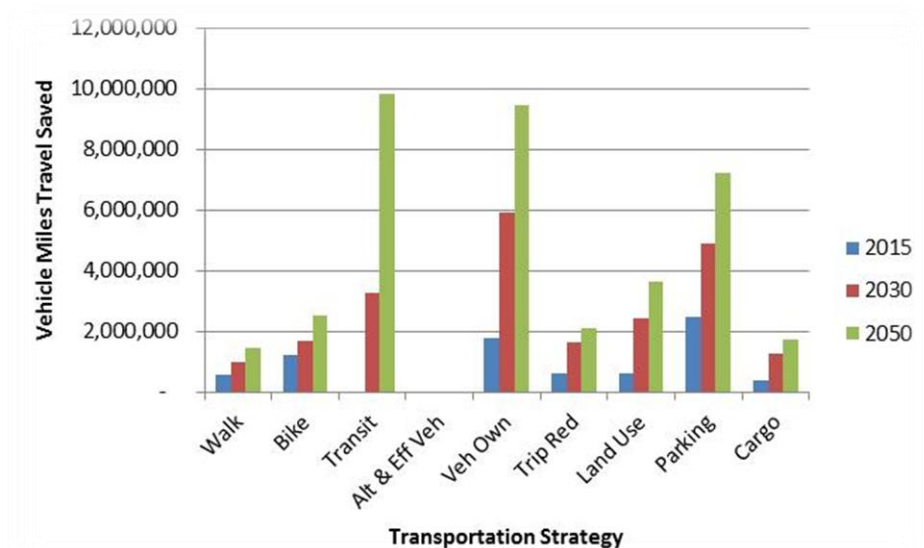
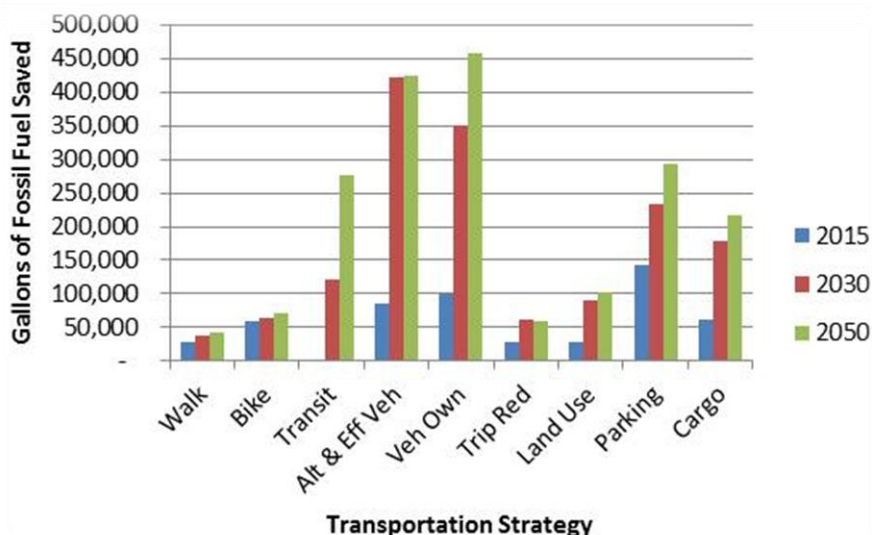


Figure 11 shows the gallons of fossil fuel saved by each strategy in this analysis. Because the relationship between GHG emissions and fossil fuel combustion is basically linear, this chart looks very similar to Figure 9.

Figure 11. Fossil Fuel Savings from Transportation Strategies



Three of the strategies involve replacing fossil fuels with other, lower-carbon fuels. Table 2 shows the total volume of alternative fuels that will be required by alternative vehicles, alternative car share vehicles, and zero-carbon transit vehicles as described in this plan. British Thermal Units (BTUs) allow us to compare different fuels on an apples-to-apples basis. Adding together conventional fuels and alternative in terms of BTUs, the total amount of energy consumed in Oberlin will decrease by more than half by 2050 under this plan, even when accounting for a rise in use of electricity and biofuels. The Long Distance Travel strategy will require additional alternative fuel—biofuel for jets and electricity for rail—but these energy changes will occur outside Oberlin’s borders and outside its GHG inventory boundaries, so the impacts of that strategy are not included here.

Table 2. Alternative Fuel Use

Year	2015	2030	2050
Electricity kWh per Year*	75,333	1,856,610	4,276,451
Biofuel Gallons per Year	63,828	324,019	376,115
Million BTU Alternative Fuel	8,045	45,870	60,483
Total Million BTU All Fuel	252,031	274,850	130,845
Million BTU as Share of 2007 Fuel Use	82%	89%	43%

*Assumes that transit passenger miles are 25% electric fixed guideway in 2050.

4.2 Methods

As described earlier, this project used best practices in other communities, literature, interviews, and focus groups to gather a set of energy efficient transportation solutions that could be applied in Oberlin. The strategies were assessed and ranked, and a portfolio of 10 strategies that address all elements of travel in Oberlin were selected for this plan. This section provides in-depth quantitative and qualitative analysis of each strategy through 2050. The following is a brief overview of the assumptions used in the quantitative sections to help the reader make the best use of that analysis. Calculation methods and coefficients are described in more detail in the Appendix.

4.2.1 Greenhouse Gas Emissions and Energy Use

GHGs are emitted when fossil fuel is combusted for vehicle travel. This report uses as a point of reference Oberlin's 2007 community GHG inventory in, *A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality*, which found that transportation fossil fuel use within Oberlin's geographic boundaries emitted 23,887 mtCO₂e in 2007.⁴⁵ All emissions reductions targets discussed in this report are tracked against this baseline.

GHG inventories for the College and municipal operations have also been conducted. The transportation elements of these are summarized in the Appendix. The operations of these two institutions are not addressed separately in this report, but rather are considered as part of the community-wide strategies. The College has set a goal of climate neutrality of 2025, which will reduce emissions in the portion of the city's inventory that overlaps with the College's.⁴⁶ Moreover, there are considerable efficiencies to be gained if the city and the College work together in developing and implementing emissions reduction strategies.

In addition to fossil fuel use, Oberlin's GHG inventory estimated that vehicle air conditioners emitted 738 mtCO₂e in GHGs in 2007.⁴⁷ The chemicals used in today's vehicle air conditioners are a very potent GHGs. Oberlin should support ongoing research and investment in developing climate neutral alternatives—and there are some in development. But, rather than create a separate strategy for these gases we have assumed for the sake of this analysis that the chemicals are phased out by 2050.

Oberlin's on-road emissions came from combusting 2.4 million gallons of petroleum in vehicles in 2007. The vast majority of this fuel use was motor gasoline, with diesel use at around 18% of the total.⁴⁸ At 2011 retail fuel prices the combined fuel use represents about \$8.5 million of expenditures, most of which are leaving the community, making the value of reducing transportation fuel use in Oberlin clearly evident; that level of expenditure equates to approximately \$1,000 per capita.

⁴⁵ Nathaniel Flaschner Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality," May 2009. (Values converted to metric tons)

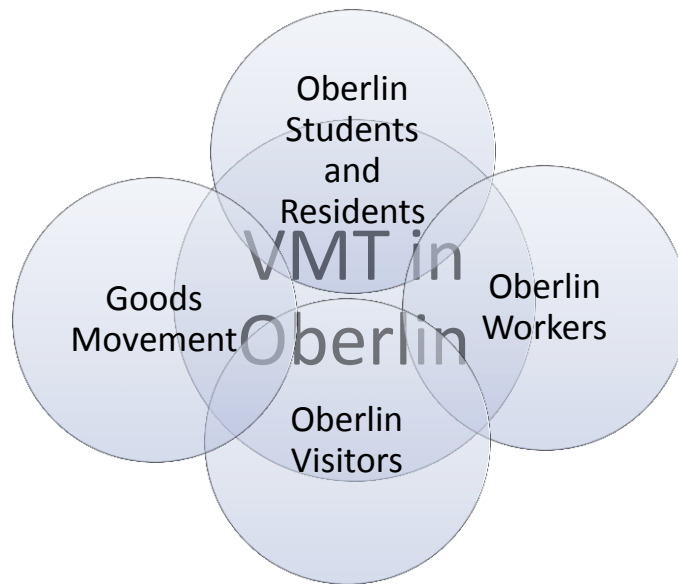
⁴⁶ Oberlin College, "Oberlin College: A Plan to be Carbon Neutral," October 2009.

⁴⁷ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

⁴⁸ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

4.2.2 Defining Travel

Figure 12. Oberlin's Travelers



Addressing all transportation emissions that occur in Oberlin requires looking at all of the types of travel that occur in town. Even if every Oberlin resident were magically given a clean car tomorrow, Oberlin would still have on-road emissions, as some of the driving that occurs on Oberlin's roads originates in other communities. Similarly, Oberlin residents drive on roads in other communities. **Error! Reference source not found.** Figure 12, while not to scale, provides a model of how one can conceptually think about these different travelers in relation to the total VMT on Oberlin's roads. Oberlin's GHG inventory uses the geographic boundary of the community to assign its transportation emissions—which is one of the standard practices—so this analysis focuses on the on-road emissions within Oberlin as well. As a result, strategies are presented that address the transportation emissions of Oberlin residents, as well as those who travel to Oberlin from other areas.

Some of the strategies discussed in this plan will have spill-over benefits to the larger region. GHG reductions that occur on Oberlin's roads because an Oberlin resident has bought a zero emissions electric vehicle will also reduce emissions on Cleveland's roads when that resident drives to an appointment there, but only the reduction for travel within Oberlin is counted in this report. Similarly, a robust regional transit system will attract riders from every town in the area, but only those rides taking place in Oberlin are counted in this analysis as emissions reductions. While these accounting issues are complicated, their goal is to avoid double counting the benefits of action, and the overall result is that Oberlin's climate leadership will

improve transportation energy efficiency across the region, which will benefit everyone in the long run.

4.2.3 Assumptions

This report creates low-carbon transportation scenarios for Oberlin in 2015, 2030, and 2050. These projections include many assumptions about Oberlin's future that affect the outcomes of the analysis as described below.

- **Flat population**—It is assumed that Oberlin's population will stay flat relative to the 2007 baseline value and, barring climate action, vehicle travel would have increased slightly while the number of vehicles in Oberlin would have remained flat.
- **Clean biofuels and electricity**—When the strategies suggest using biofuel it is expected that a zero carbon, sustainably sourced biofuel is available to Oberlin. The waste vegetable oil sold by Full Circle Fuels is such a fuel. To get to the scale needed in this report Oberlin will need to pursue some innovative local biofuel development. Similarly, it is assumed that Oberlin achieves zero carbon electricity by 2050.
- **No offsets**—The climate targets in this analysis are achieved without buying emissions offsets.
- **Direct emissions only**—This plan focuses on reducing the transportation emissions in Oberlin's GHG inventory, which includes only the direct emissions from fossil fuel combustion and vehicle air conditioners. Indirect emissions from electricity generation are included where appropriate, but lifecycle GHG emissions from extraction, refining, and transport of vehicle fuels are not included here. Nor is the imbedded carbon in Oberlin's transportation infrastructure and vehicles. These would be useful elements for further study, and many of the actions presented here will aid in reducing lifecycle emissions.
- **Savings independent of state or federal action**—All of the savings discussed here could be attained without state or federal climate policy. The passage of a federal climate law would certainly help Oberlin achieve the goals discussed here, but it is not necessary for Oberlin's success.
- **Improving fuel economy**—The model used in this analysis assumes that average on-road fuel economy will improve 50% by 2050 even before Oberlin works to add more efficient vehicles to its roads.

4.2.4 Organization

Each of the strategies that follow are organized the same way. They begin with a brief overview and description, followed by a quantitative analysis and a qualitative analysis. The quantitative analysis looks at the GHG and energy savings of each strategy at a given scale within a set of

described parameters. Strategies are analyzed against the hypothetical goals of a 25% reduction in emissions by 2015, 75% by 2030 and climate neutrality by 2050.

The qualitative section analyzes the strategy more generally and discusses its key actors, timeline, assets, and challenges. The qualitative analysis also looks at a set of high priority actions that could be taken to implement the strategy—policies and programs that have relatively high feasibility in Oberlin to achieve emissions reductions. These are provided in table format with information on potential implementers and financing models for each. A discussion of the actions follows including examples of best practices from other communities. Each qualitative section closes with a discussion of feasibility, cost, and replicability to other small communities and communities in Northern Ohio.

WALKING

Strategy 1. Walking

Promote walking as major mode of transportation in Oberlin.

Table 3. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
High	Low	Near-term	Intermediate	Intermediate	Intermediate	High

Description

Increasing walking around Oberlin and celebrating its status as a compact, pedestrian-friendly community will deliver high GHG savings per trip as travelers replace motorized trips with non-motorized ones. However, only some trips in Oberlin can be replaced by walking, so the community-wide GHG savings are low. Walking is nevertheless an important part of Oberlin’s sustainable transportation strategy, as it is cost effective, promotes health, and helps travelers engage with the community and environment around them. One half of Oberlin households live within a ten minute walk of downtown, and Oberlin already has a high rate of walking as a mode of travel, so increasing walking is very feasible for Oberlin.

Quantitative Assessment

Table 4. GHG and Energy Savings

Year	Annual Savings			Savings per Mile Walked		
	2015	2030	2050	2015	2030	2050
Increase Share of Commuters Walking to Work to:	42%	50%	55%			
Additional Miles Walked	182,400	328,320	419,520			
Gallons of Gasoline Saved*	7,612	11,774	12,272	0.042	0.036	0.029
mtCO ₂ e saved*	74	115	120	0.00041	0.00035	0.00028
Oberlin Residents and Visitors Replace a 2 Mile Solo Driving Trip Daily with Walking	600 Walkers	1,000 Walkers	1,500 Walkers			
Miles Walked	438,000	730,000	1,095,000			
Gallons of Gasoline Saved	20,654	26,968	30,851	0.047	0.037	0.028
mtCO ₂ e saved	201	263	300	0.00046	0.00036	0.00027
Walking Total						
Participants	965	1,657	2,339			
Vehicle Miles Saved	599,416	1,020,549	1,466,257			
Gallons of Gasoline Saved	28,265	37,701	41,311			
mtCO ₂ e saved	275	367	402			

* Gallons and CO₂e saved include average occupancy adjustment of 1.13 passengers per vehicle.

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Walking creates GHG and energy savings when it is used to get around in place of a fossil fuel vehicle. This strategy is analyzed in two parts. Commute trips are looked at first; the U.S. Census provides data on travel to and from work, giving us a good understanding of those who walk to work today and how much potential there is to increase the share of workers who walk. Today, 32% of Oberlin residents that work commute by walking. If this value is increased to 55% by 2050, with 839 additional walkers, 105 mtCO₂e would be reduced annually.

Secondly, non-work trips are considered. There is less data available for this type of travel so we do not know how many people walk in Oberlin on a given day today, but commute trips are just 16% of all household trips nationwide, which suggests there is plenty of capacity for additional walking in Oberlin.⁴⁹ Vehicle trips of two miles are often easily replaced with walking, so we use that as a metric and consider the scenario of 600 Oberlin residents and visitors replacing a two mile solo driving trip with walking each day in 2015. This is increased to 1,000 and 1,500 daily walkers in 2030 and 2050 leading to 300 mtCO₂e and 30,851 gallons of gasoline saved in 2050.

Replacing vehicle travel with walking has the greatest GHG benefit on a per-mile basis in the near term as compared to later years, because miles walked today replace miles driven in today's lower fuel economy vehicles. Nevertheless, walking remains a significant strategy throughout Oberlin's low-carbon future. In this scenario the number of walkers is assumed to increase over time as pedestrian infrastructure is improved and the culture of walking grows.

Qualitative Assessment

Key Actors: A successful walking strategy would replace car trips with pedestrian trips within Oberlin to downtown, the College, and other central destinations. The City of Oberlin would install additional pedestrian infrastructure and improvements, while the business community and community volunteers could organize special events that celebrate the culture of walking around town.

This strategy will encourage residents to walk to local amenities and jobs more frequently; it will not increase transportation options for those residents to employment opportunities elsewhere in Lorain County and Northeast Ohio.

Timeline: Near-term. Pedestrian improvements may be less costly and faster to install than other transportation improvements. The high level of walking in Oberlin today could make it easier to promote as a viable daily transportation alternative than in other communities. To

⁴⁹ U.S. Department of Transportation. *2009 National Household Travel Survey: Summary of Travel Trends*. June 2011.

WALKING

make deep changes in the pedestrian landscape, such as by altering urban form in non-downtown areas, will be a longer-term project.

Context: Strengths and Assets:

- **Mode Share:** A total of 32% of Oberlin workers already walk to work, which is a much greater share than the national value of 1%.⁵⁰
- **Short Commutes:** A total of 53% of Oberlin commuters travel less than ten minutes to work. A total of 41% of those drive or carpool, so there is great potential for additional walking among this population.⁵¹
- **Municipal Vision:** The city's comprehensive plan recognizes a need to preserve walkability and connect new developments with the existing street grid. The city encourages sidewalks and discourages cul-de-sacs and dead end streets in all new developments.⁵²
- **College Configuration:** Numerous pedestrian paths connect the buildings of the campus across attractive open spaces and regularly intersect with sidewalks in the remainder of the town.
- **Downtown Walking Environment:** The downtown Oberlin streetscape includes brick pavers, trees, and other amenities. Recent investments include curb cuts, pedestrian walking signals, and crosswalk markings. Mixed-use paths connect downtown to nearby neighborhoods.⁵³

Context: Challenges and Barriers:

- **Age of Streetscape:** Most elements in the downtown Oberlin streetscape were installed in the 1980s and will need replacement soon.⁵⁴
- **Large Blocks:** The overall potential for walking in Oberlin is limited in part by its land use patterns. Outlying areas with big blocks and few intersections will make walking less feasible. Improving pedestrian amenities with pedestrian paths that cut through blocks and reduce pedestrian travel distance will increase walking.
- **Gaps in Sidewalks:** There are some gaps in sidewalk coverage in newer neighborhoods, especially developments built between 1950 and 1980. Sections of OH-511 and OH-58 maintained by the Ohio Department of Transportation (ODOT) also lack sidewalks.⁵⁵

⁵⁰ U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates.

⁵¹ U.S. Census Bureau. 2005-2009 ACS.

⁵² City of Oberlin, Ohio, *Comprehensive Plan*, January 3, 2005.

⁵³ City of Oberlin, Ohio, *Downtown Revitalization and Development Plan: Update 2010*, May 13 2010.

⁵⁴ Oberlin Resident Focus Groups, Conducted by Kyle Smith, Oberlin, OH, May 16, 2011 and May 17, 2011.

⁵⁵ Bryan Burgess and Ken Sloane, interviewed by Kyle Smith, Oberlin OH, May 16 2011.

WALKING

- **Access to Commercial Districts:** Focus groups suggested that permanent residents rely on commercial districts along OH-511 and OH-58, but their distance and the lack of a paved route make it more challenging to replace a car trip with a walking trip.⁵⁶
- **Ohio Winters:** Icy sidewalks make it difficult for seniors and other residents with mobility constraints to walk to destinations year-round.⁵⁷

Priority Actions

Table 5. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Employee Commute Incentives	Financial incentives and information for employees to encourage lower-carbon commutes.	Business community and institutions	Savings from reduced parking for employees; Federal pretax transit benefit
Improve Sidewalks	Improve sidewalks, street crossings, and other pedestrian amenities to encourage walking.	City	Capital improvement fund; Transportation Community and System Preservation Program (TCSP), Transportation Enhancements Program (TE), Highway Safety Improvement Program (HSIP)
Connect Outlying Retail by Foot	Create paved pedestrian paths to outlying retail districts.	City or ODOT, depending on route	Capital improvement fund; State capital assistance; TCSP; USDOT Recreational Trails Program (RTP)
Safe Routes to School	Pedestrian amenities and safety improvements to enable walking by students.	City	ODOT Safe Routes to School Program
Sunday Streets	Closing off streets for a day to enable safe recreational use.	City and community volunteers	Capacity of municipal staff and volunteers, Sponsorship of local businesses
Low-carbon Shopping	Local merchants give perks for shoppers that walk.	Business community and volunteers	Capacity of merchants and volunteers
Mode Shift Contests	Use game dynamics and incentives to encourage shift to lower-carbon modes.	City, college, business community, volunteers	Grant funding

Action Discussion: Infrastructure improvements should strengthen the network of sidewalks and pedestrian paths around the College and older neighborhoods in the City and eliminate gaps in newer developments. The City owns a right-of-way that connects the retail center along US-20 to residential neighborhoods and it could be resurfaced as a paved multiuse trail. Focus

⁵⁶ Oberlin Resident Focus Groups.

⁵⁷ Oberlin Resident Focus Groups.

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groups interviewed for this project also believed that the resurfacing of bumpy sidewalks could make it easier to walk around Oberlin.⁵⁸

Since a large number of residents already get to work by foot, special events could help them encourage their neighbors to walk even more often. These events, like Sunday Streets or a low-carbon shopping promotion, depend greatly on the energy and capacity of volunteers to run them and could effectively channel the enthusiasm and spirit of community among Oberlin residents.

Examples and Best Practices: Tigard, Oregon has made the closure of pedestrian gaps a priority in its Capital Improvement Plan. The City prioritizes sidewalks and off-street connections against other potential investments based on a combination of need, improvement to safety, and increased mobility for residents.⁵⁹

During Sunday Streets in San Francisco, the City of San Francisco prohibits automobile traffic from select corridors to open them to pedestrian and bicycle traffic. Volunteers manage activities that encourage walking and biking to Sunday Streets participants, including free rentals and free safety and maintenance programs.⁶⁰

Feasibility and Cost: While it is less capital intensive than automobile infrastructure, sidewalk improvements would come, in part or in full, from the City capital fund, which has decreased during the recent economy. Pedestrian improvements align with the City's comprehensive plan.⁶¹

Replicability: Actions that succeed in Oberlin will fit well in other smaller communities with similar development histories and urban form. Fewer residents may walk to work in those communities right now, but this could generate great savings in the long term.

⁵⁸ Oberlin Resident Focus Groups.

⁵⁹ City of Tigard, Oregon. "Capital Improvement Program", Accessed August 2011, http://www.tigard-or.gov/city_hall/departments/finance/cip_program.asp.

⁶⁰ "This is Sunday Streets", Accessed August 2011, <http://www.sundaystreetsf.com/>.

⁶¹ City of Oberlin, Ohio, *Comprehensive Plan*.

BICYCLING

Strategy 2. Bicycling

Increase bicycling's share of trips in Oberlin.

Table 6. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
High	Low	Near-term	Low to Intermediate	Low to Intermediate	Intermediate to High	Intermediate to High

Description

Oberlin has a long history of bicycling, and new regional bike paths make longer-distance bicycling increasingly accessible to Oberlin residents and visitors. As with walking, replacing vehicle trips with bicycling eliminates GHG emissions for that trip. But, bicycling is not feasible for all Oberlin residents, so community-wide GHG savings from this strategy are limited. Nevertheless, bicycling is an important piece of Oberlin's sustainable transportation strategy as it is cost effective, promotes health, and helps travelers engage with the community and environment around them.

Quantitative Assessment

Table 7. GHG and Energy Savings

Year	Annual Savings			Savings per Mile Bicycled		
	2015	2030	2050	2015	2030	2050
Increase Share of Commuters Biking to Work to:	10%	13%	15%			
Additional Miles Bicycled	182,400	319,200	410,400			
Gallons of Gasoline Saved	7,612	10,435	10,233	0.042	0.033	0.025
mtCO ₂ e Saved	74	102	100	0.00041	0.00032	0.00024
Oberlin Residents and Visitors Replace a 5 mile Solo Driving Trip Every Day with Bicycling	600 Bikers	800 Bikers	1200 Bikers			
Additional Miles Bicycled	1,080,397	1,440,529	2,160,793			
Gallons of Gasoline Saved	50,946	53,217	60,880	0.047	0.037	0.028
mtCO ₂ e Saved	496	518	593	0.00046	0.00036	0.00027
Total						
Participants	746	1055	1528			
Vehicle Miles Saved	1,241,812	1,723,007	2,523,979			
Gallons of Gasoline Saved	58,558	63,652	71,112			
mtCO ₂ e Saved	570	620	693			
* Gallons and CO ₂ e saved include average occupancy adjustment of 1.13 passengers per vehicle.						

BICYCLING

Bicycling creates GHG savings when it is used in place of motor vehicle transportation. Bicycles' efficiency and speed enable them to be used for longer trips than walking in the same amount of travel time. As with walking, bicycling in Oberlin will have the largest GHG benefit on a per-mile basis in the near term when fuel economy is relatively low. However, as bicycle infrastructure improves and supports more of Oberlin's residents and visitors in bicycling, the community-wide benefit of this strategy can grow.

Bicycling to work is considered first in this strategy. Through the U.S. Census we know that 6% of Oberlin workers already bike to work.⁶² This solid foundation is built upon to achieve rates of bicycling to work at 10% in 2015, 13% in 2030, and 15% in 2050, a relatively small rate of growth, but reasonable considering the large number of walking commuters and those that have commutes of reasonable bicycling distance. This level of bicycle commuting can achieve 100 mtCO₂e and 10,233 gallons of gasoline savings in 2050.

Non-work trips will be a larger share of bicycling in Oberlin. The destination of the trip is not important for the GHG and energy savings benefit. Bicycling to church, a friend's house, or the library in place of driving will all create savings. This strategy focuses on travelers replacing a five mile driving trip each day with bicycling. The strategy begins with 600 travelers in 2015, grows to 800 in 2030, and reaches 1,200 in 2050 achieving 593 mtCO₂e and 60,880 gallons of gasoline savings in 2050.

Qualitative Assessment

Key Actors: This strategy relies on a combination of targeted investments by the City and other major institutions. As with walking actions, special events organized by community volunteers may effectively channel community spirit and encourage more residents and visitors to bike to a wider array of destinations.

If successful, a cycling strategy would allow permanent residents and students to replace car trips with bicycle trips to local and some regional destinations. The Elyria-Kipton Trail connects Oberlin to Elyria and, once extended, Lorain, although several employment destinations are not always within a short distance of it.⁶³ Physically disabled and elderly residents may be less able to bike to all destinations in town, especially in winter.

Timeline: Near-term. Bicycle improvements and amenities will generally be easier to plan and install than other capital improvements. Additionally, a good network of infrastructure and

⁶² U.S. Census Bureau.2005-2009 ACS.

⁶³ Lorain County Metro Parks, "North Coast Inland Trail," accessed May 2011, <http://www.metroparks.cc/reservation-north-coast-inland-trail.php>.

BICYCLING

services already exists. Oberlin's history and culture of bicycling suggest that the new infrastructure would be utilized.

Context: Strengths and Assets:

- **Mode Share:** A total of 6% of workers in Oberlin bike to work.⁶⁴ This is a much greater share than the national value of 1% and on par with many of the communities rated as great smaller bicycling cities by *Bicycling Magazine*.⁶⁵
- **Short Commutes:** A total of 53% of Oberlin commuters travel less than ten minutes to work.⁶⁶ A total of 41% of those drive or carpool, so there is great potential for more bicycling among this population.
- **Existing Infrastructure and Services:** The City and College have installed numerous bicycle racks in key locations to support bicycling. Two bicycle shops and a co-op offers bikes for sale or rental as well as repair and educational services.
- **North Coast Inland Trail:** The trail connects Oberlin to Kipton and Elyria.⁶⁷ It will be extended northward to the City of Lorain. When Lorain County Metro Parks extends the trail north to Lorain, it will connect Oberlin with the two largest destinations in the county.
- **Creativity and Enthusiasm:** Oberlin College has tried many creative policies to encourage more bicycling, including a bike giveaway program, bicycle sharing program, and covered canopies.⁶⁸ The College has tapped into the energy and enthusiasm of the student body in a design studio for a new covered canopy design.

Context: Challenges and Barriers:

- **Lack of Regional Infrastructure:** Lorain County still lacks the infrastructure to allow bicycling to be a realistic alternative for most regional car trips. Only one street that intersects with the Kipton-Elyria trail has a marked lane. Many shopping and work destinations in Lorain and Elyria are not located along the trail.
- **Access to Commercial Districts:** Focus groups suggested that permanent residents rely on commercial districts along OH-511 and OH-58, but these roads are engineered for automotive traffic.⁶⁹ The City owns an unpaved right-of-way that connects retail development at US-20 and OH-58 to the residential street network.

⁶⁴ U.S. Census Bureau.2005-2009 ACS.

⁶⁵ Christine Mattheis, "5 Small Bike-Friendly Cities," *Bicycling Magazine*, accessed May 2011, <http://www.bicycling.com/news/featured-stories/5-small-bike-friendly-cities>.

⁶⁶ U.S. Census Bureau.2005-2009 ACS.

⁶⁷ Lorain County Metro Parks, "North Coast Inland Trail," accessed May 2011, <http://www.metroparks.cc/reservation-north-coast-inland-trail.php>.

⁶⁸ Colin Koffel, Rob Lamppa, and Madeline Marvar, interviewed by Kyle Smith, Oberlin OH., May 16 2011

⁶⁹ Oberlin Resident Focus Groups.

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- **Ohio Winters:** Winters in Oberlin are icy and snowy, so bicycling may not be a year-round transportation option for some residents.⁷⁰
- **Conflicts with Other Modes:** Students lock bikes to elements of the downtown streetscape and reportedly make it harder to walk.⁷¹ Additionally, focus group participants suggested that inattentive cyclists made walking around Oberlin feel unsafe.⁷²

Priority Actions

Table 8. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Bicycle Delivery	Courier partners with local restaurants to enable free delivery by bicycle in San Francisco. The service also provides other deliveries for a fee.	Local entrepreneur or not-for-profit	Membership dues from participating restaurants, Seed money from foundations
Safe Routes to School	Bicycle amenities and safety improvements to enable biking by students.	City	ODOT Safe Routes to School Program
Mode Shift Contests	Use game dynamics and incentives to encourage shift to lower-carbon modes.	City, college, business community, volunteers	Grant funding
Install Wayfinding Signage for Bicyclists	Pedestrian and cyclist-oriented signage pointing to major destinations and the Elyria-Kipton Trail.	City	Capital improvement fund, NOACA Transportation for Livable Communities Initiative (planning only), Surface Transportation Program (STP), TE
Connect Outlying Retail by Bike	Create a paved bike path to outlying retail districts.	City	Capital improvement fund; STP; RTP; CMAQ; TCSP; Wal-Mart Foundation (501(c)3s only)
Sunday Streets	Closing off streets for a day to enable safe recreational use.	City and community volunteers	Capacity of municipal staff and volunteers
Bicycle Tourism Program	Promote visitors to Oberlin to come on bicycle through outreach including maps, tour groups, and wayfinders.	Oberlin Main Street/Chamber or City	USDOT Scenic Byways Program, CMAQ, Business contributions, Capacity of Main Street/Chamber and community volunteers
Valet Bike Parking at Events	Provide volunteer or paid valets to park bicycles at events.	College and community volunteers	Capacity of College and community volunteers

⁷⁰ Oberlin Resident Focus Groups.

⁷¹ Jason Adelman and Krista Long, interviewed by Kyle Smith, Oberlin OH, May 16 2011.

⁷² Oberlin Resident Focus Groups.

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Action Discussion: Additional infrastructure and improvements like way-finding signage would supplement the general suitability of local streets for bicycling and the trail between Elyria and Kipton. For example, way-finding signage around the trail could help out-of-town visitors easily reach downtown Oberlin. A paved mixed-use trail to the retail development at US-20 could also accommodate bicycles and connect this area to the rest of the community using lightly trafficked residential streets.

As with walking, actions that promote this mode in Oberlin would build upon the high rate of bicycling, enthusiasm, and community spirit to help residents convince their neighbors to bike more often to more destinations. These programs and events, such as Sunday Streets or valet bike parking at College events, would leverage the energy and time of volunteers.

Examples and Best Practices: Following the construction of the Elroy-Sparta trail in Wisconsin, the city of Sparta has promoted itself as the “Bicycle Capital of America.” The Sparta Area Chamber of Commerce provides a list of accommodations, dining, bicycle shops, and shopping for cyclists riding the trail.⁷³

TCB Courier in San Francisco provides bicycle delivery for local restaurants. Participating restaurants pay a fee for the service and customers pay no delivery charge. The low cost of bicycle maintenance and operations translates into relatively low overhead for participating businesses.⁷⁴

Feasibility and Cost: Bicycle infrastructure costs less than infrastructure investments for transit or personal vehicles. Although some federal programs exist, bicycle improvements would need to come in part from the City capital fund.

Replicability: A greater share of Oberlin residents bike compared to the regional average, so residents in other communities may not use new infrastructure as frequently at first. In the long term, though, as people become more comfortable with biking as a mode of transportation, this strategy should produce results in other smaller communities with similar land uses.

⁷³ Sparta Area Chamber of Commerce, “Bicycling Capital of America”, Accessed August 2011, <http://www.bikesparta.com/>.

⁷⁴ TCB Courier, “TCB Courier”, Accessed August 2011, <http://www.tcbcourier.com/>.

Strategy 3. Transit

Create shared passenger transportation for Oberlin.

Table 9. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
Intermediate	Varies	Medium to Long	High	High	Intermediate	Intermediate

Description

Public transportation, or transit, is often a cornerstone of a community’s low-carbon transportation strategies. Shared transportation can have lower emissions on a per passenger mile basis. Access to frequent, reliable, affordable transit also enables households to own fewer cars and drive less. Transit can have ancillary benefits by supporting efficient land use patterns that enable households to travel shorter distances and take fewer trips. Transit is a vital resource to those who cannot drive, whether because of age or disability, as well as those who cannot afford vehicle ownership, so transit access has an important social justice and equity component. However, Oberlin has struggled to maintain a transit system in recent years and establishing transit in Oberlin will likely be a longer-term process that requires innovation and inter-community collaboration. Ridesharing is considered here as well, as shared rides can supplement transit service in the near term.

Quantitative Assessment

Table 10. GHG and Energy Savings

Year	Annual Savings			Savings per Passenger Mile		
	2015	2030	2050	2015	2030	2050
Increase Transit Service	Connector 360 Days per Year	Zero-Carbon Regional Daily	Zero-Carbon Fixed Guideway			
Passenger Miles Traveled	41,400	5,334,698	12,036,837			
Gallons of Gasoline Saved*	(430)	118,246	271,307	(0.010)	0.022	0.023
mtCO ₂ e Saved*	(5)	1,152	2,643	(0.00011)	0.00022	0.00022
Ridesharing	2,000 Riders	20,000 Riders	50,000 Riders			
Passenger Miles Traveled	10,000	100,000	250,000			
Gallons of Gasoline Saved*	160	2,217	5,635	0.016	0.022	0.023
mtCO ₂ e Saved*	2	22	55	0.00016	0.00022	0.00022
Total						
Passenger Miles	51,400	5,434,698	12,286,837			
VMT Reduced	17,476	3,260,819	9,829,469			
Gallons of Fuel Saved*	(270)	120,462	276,942			
mtCO ₂ e Saved*	(3)	1,173	2,697			

* Gallons and CO₂e saved include mode shift factor of 0.34 in 2015, 0.6 in 2030, and 0.8 in 2050.

Transit in Oberlin is analyzed in three stages. In the near-term transit is not a large GHG or energy reduction strategy—in fact, GHG emissions increase slightly as Oberlin Connector service is expanded by 2015 to provide mobility to those who do not drive today. But over the longer term, a robust transit system has significant potential to replace personal vehicle travel by all those who travel in Oberlin and reduce emissions community-wide. Frequent, reliable transit service that is connected to regional transit will provide a low-carbon transportation alternative to Oberlin residents as well as those who work and visit Oberlin.

This scenario imagines a bus transportation network that supports over 5 million passenger miles of travel on Oberlin’s roads by 2030, an aggressive goal that will require innovation and determination to meet. By 2050, this scenario considers a fixed guideway transit system supported by a network of buses that transport Oberlin residents, visitors, students and workers 12 million passenger miles each year. Fixed guideway could be one of many types of transit service including streetcars, light rail, or bus rapid transit. The benefit of a fixed guideway system is that it can have high capacity, a right of way to enable faster travel times, and provides a backbone of transit infrastructure that the community can build upon and around over the long-term.

To maximize the GHG reduction potential of this strategy, zero carbon alternative fuels are used in 2030 and 2050. A zero carbon transit system could be run on electricity or biofuel. As hydrogen fuel cell technology advances, fuel cell buses with renewably produced hydrogen

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could be another potential low-carbon option (conventional hydrogen is made from natural gas, so has a significant emissions profile). With clean fuel, transit could create 276,942 gallons of gasoline savings and 2,679 mtCO₂e reductions in 2050, which is 14% of the total savings required to get to climate neutral travel.

If biofuels are used to power buses approximately 141,000 gallons would be required in 2030 and 239,000 gallons in 2050. If an electrically powered fixed guideway system is used to meet 25% of passenger mile demand it would use about 693,000 kWh of electricity in 2050.

Qualitative Assessment

Key Actors: In the short term, the City of Oberlin should stabilize or expand the Connector system to help residents meet needs and maintain a constituency for the service. Ultimately, though, a regional transit solution will require a sustainable funding source and political buy-in beyond city boundaries, perhaps even at a regional level.

A countywide transit solution could provide the 42% of Oberlin residents who work in other parts of Lorain County with a more energy-efficient way to get to work. If transit served destinations at Midway Mall and County Line Road, residents with special needs may have a cheaper and more reliable option to reach employment facilities in those areas once more.⁷⁵ Carpooling will be institution and employer led, but education for employers could come from the city or volunteers.

Timeline: Medium to Long. Mass transportation projects require significant time and money to deploy, from preliminary planning and community outreach to financing and capital purchases. Stakeholders can prepare for those steps now by maintaining a constituency for transit service through services such as the Oberlin Connector.

Context: Strengths and Assets:

- **Oberlin Connector:** The Oberlin Connector runs on Monday to pre-arranged destinations within Oberlin and alternates between destinations in Elyria and Lorain from 9:00 AM and 3:00 PM.⁷⁶ It provides a transportation alternative for residents with mobility constraints.
- **RideLine:** Oberlin College operates a stop-to-stop vehicle escort service for students called RideLine that runs along a fixed route around the campus.⁷⁷ It operates between 9:00 PM and 2:00 AM daily.

⁷⁵ Oberlin Resident Focus Groups.

⁷⁶ City of Oberlin, "Oberlin Connector Transit Service," Accessed May 2011.

<http://www.cityofoberlin.com/files/city%20manager/oberlin%20connector%2012-16-10.pdf>.

⁷⁷ Oberlin College. "Transportation Options for Students: Get Around Campus," Accessed May 2011.

<http://new.oberlin.edu/transportation/get-around-campus.dot>.

- **Cleveland Rapid:** While the RTA does not offer direct service to Oberlin, the RTA Red Line is about 25 miles away and provides rail connections to Tower City, University Circle, and West Side Market. The Airport Oberlin Shuttle (AOS) provides a direct connection between Oberlin and the RTA system.
- **Land Use:** Oberlin is compact and walkable, so transit riders from outside Oberlin could potentially access many in-town destinations by foot for the “last mile” of their journey.
- **Community Engagement:** Oberlin residents enjoy a high level of engagement about transit and could advocate for greater regional transit funding or consolidation in the future. Focus group participants energetically communicated about their transportation needs.⁷⁸
- **Mode Share for Carpooling:** Among those who drove to work, the rate of carpooling is higher than the national average; 22% of car commuters in Oberlin carpool, compared to 12% nationally.⁷⁹
- **OhioRideShare:** NOACA, along with two other regional planning agencies, operates this service, which helps users identify carpool partners and provides a “Guaranteed Ride Home” program that subsidizes bus or taxi fare in case an issue arises.⁸⁰

Context: Challenges and Barriers:

- **Mode Share:** Only 1% of Oberlin’s workers use transit for their commute, which reflects the current lack of transit service in the area.⁸¹
- **Eliminated Service:** Due to budget difficulties, LCT reduced its twelve transit routes to two and ended regular bus connections from Oberlin to destinations in Lorain County.⁸²
- **Revenue Source:** No revenue source for transit exists in Lorain County and it competes with other services like education and health care.⁸³
- **Limited Connector Service:** Due to financial constraints, the Connector operates twice weekly and does not fully address transportation issues for residents, especially those with medical appointments during other days or at other destinations.⁸⁴
- **Decentralized Destinations:** Significant numbers of Oberlin residents of all incomes work elsewhere in Lorain County, but they do not commute to any single destination in either

⁷⁸ Oberlin Resident Focus Groups.

⁷⁹ U.S. Census Bureau.2005-2009 ACS.

⁸⁰ Colleen Donnelly, “OhioRideShare service request,” Email to Kyle Smith, May 9 2011.

⁸¹ U.S. Census Bureau.2005-2009 ACS.

⁸² Cindy Leise, “County’s transit plan reduces LCT to two routes.” *The Chronicle-Telegram*, December 31, 2009.

<http://chronicle.northcoastnow.com/2009/12/31/countys-transit-plan-reduces-lct-to-two-routes/>

⁸³ Richard Enty, interviewed by Kyle Smith, Oberlin OH, May 17 2011.

⁸⁴ Oberlin Resident Focus Groups.

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Elyria or Lorain.⁸⁵ This makes a short term fixed-route solution more challenging to implement.

Priority Actions

Table 11. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Streetcar	Rail transit, typically on-street, for local transport.	City, LCT, or independent not-for-profit entity	Capital improvement fund, Tax Increment Financing, USDOT TIGER III, USDOT Urban Circulator Grants, ODOT Major New Capacity program, STP, CMAQ, Naming rights, Endowment from corporation or business
Regional Transit Coordination	Coordinate with other communities in the region to provide alternative transportation options.	City	Northeast Ohio Sustainable Communities Consortium
Expand Oberlin Connector	Expand the operating hours and coverage of the Oberlin Connector.	City or independent not-for-profit entity	Capital improvement fund, Fairbox revenues, Per household fee, Special Improvement District (SID), Transit Management Associations (TMAs), USDOT Bus and Bus Facilities Livability Program, STP, Endowment from corporation or business
Fixed Guideway Transit	A regional system of rail or bus vehicles that operates on a dedicated right-of-way that is often separated from vehicular traffic. Fixed guideway transit could be light rail or Bus Rapid Transit (BRT).	LCT	Capital improvement fund, STP, CMAQ, Bus and Bus Facilities Livability Program, TIGER III, FTA Section 5309 Capital Investment Program (New Starts), FTA Urbanized Area Formula Program (5307), ODOT Major New Capacity Program
Student Transit Pass	Student fee pays for annual transit pass. Oberlin College secures a lower monthly rate by buying the passes in bulk.	College and LCT	College tuition and fees
Shopping Shuttle	Work with local businesses to create transit to shopping destinations.	Transportation Management Association	SID, Contributions from local businesses
Employee Commute Incentives	Financial incentives to employees to encourage lower-carbon commutes.	Major employers	Federal tax free transit/vanpool benefit
Carpooling	Increase vehicle occupancy through shared trips.	Residents and commuters	NOACA RideShare, Oberlin College classifieds

Action Discussion: The stabilization of Oberlin Connector service should be the first step. The expansion of the Connector or a shopping shuttle financed by contributions from local

⁸⁵ U.S. Census Bureau, Locational Employment Dynamics, 2008.

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businesses would help increase access to outlying retail and services for those with constraints and build additional local support for expanded transit in Lorain County.

Consistent service in town helps build a constituency for and momentum towards a regional solution by 2050. This decision will need to occur beyond municipal borders. Collaboration and consolidation between LCT, the Greater Cleveland RTA and other transit agencies could provide a larger scope of service, buying power, and economy of scale and make it easier to reinstate service than if every county continued to fund and operate service independently. In the long run, Oberlin needs to be connected to the Cleveland RTA by frequent transit service to enable low-carbon travel in the region.

For shared rides, the federal pre-tax benefit for transit allows employees to pay for a vanpool service before payroll taxes are deducted and requires little overhead after it is initiated. Ridesharing infrastructure using smart phones and a calling system could help arrange real-time shared rides and increase participation.

Examples and Best Practices: To provide better access for their employees and shoppers, businesses have funded transit through Transit Management Associations (TMAs). In Emeryville, CA, for example, a TMA operates the Emery Go-Around, which connects its retail districts with an Amtrak station and a rail station in Oakland.⁸⁶ It is financed through a Business Improvement District. Businesses in the Lake-Cook Road business district in suburban Chicago pay membership dues to fund the TMA of Lake Cook, which operates shuttle service to transit connections for their employees.⁸⁷

Feasibility and Cost: The expansion of Connector service will require additional operating revenue. Farebox revenues supplemented by an annual transit pass for College students could cover 25% of operating expenses, with public and private commitments financing the remaining expenses. Although the City of Oberlin cannot levy additional taxes by state law⁸⁸, it could establish a per-household fee to fund transit. Local businesses could fund the outstanding gap, either through voluntary contributions or through a small increase in property taxes in a special taxing district such as a SID.

The reestablishment of transit service at the county level will require an independent revenue stream in Lorain County to ensure a local match for federal funds in the form of a tax increase,

⁸⁶ Emeryville Transportation Management Association, "Emery Go-Round: A free shuttle service provided by Emeryville Business", Accessed August 2011, <http://www.emerygoround.com/>.

⁸⁷ Transportation Management Association of Lake Cook, "TMA of Lake-Cook", Accessed August 2011, <http://www.tmalakecook.org/>.

⁸⁸ Bryan Burgess and Ken Sloane.

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which has not succeeded in previous ballot initiatives.⁸⁹ Additionally, the consolidation of services between regional transit agencies may require lengthy and complex conversations. The federally funded Northeast Ohio Sustainable Communities Consortium could be one mechanism to start that process.

Commute-oriented incentives come at a relatively low cost. The federal pre-tax benefit requires minor administrative overhead once it is initiated for employees.

Replicability: The story of transit cuts in Oberlin may resonate with smaller communities across northern Ohio. Destinations have become regional in nature and tightening budgets have threatened many existing systems. A workable short term solution in Oberlin could be a model for neighboring towns. The replication of the model could help build a broader long term regional constituency that leads to collaboration and consolidation of transit service.

Employee incentives to reduce commute trips should be replicable across northern Ohio, although it may be easier to offer these options to staff at office and service businesses than at other types of workplaces.

⁸⁹ Richard Enty.

Strategy 4. Alternative, Efficient Fuels and Vehicles

Fuels and vehicles that can make motorized transport zero- or low-carbon.

Table 12. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
High if Renewable/Sustainable	High if Renewable/Sustainable	Medium	Intermediate to High	Intermediate	Intermediate	Intermediate

Description

Combustion of fossil fuels is the primary source of GHG emissions from transportation today. Anything that allows us to use fewer fossil fuels will likely help reduce emissions. Improving the efficiency of vehicles and enabling the use of alternative, low-carbon fuels will allow motorized vehicle travel to continue in Oberlin where it is still needed, while reducing transportation’s carbon footprint. Two strong candidates for alternative fuel will be renewable electricity and biofuels, especially if biofuel production is locally sourced. Vehicle efficiency will be aided by national standards to improve vehicle performance that should make high-efficiency vehicles more widely available.

ALTERNATIVE, EFFICIENT FUELS AND VEHICLES

Quantitative Assessment

Table 13. GHG and Energy Savings

Year	Annual Savings			Savings per Mile		
	2015	2030	2050	2015	2030	2050
High Efficiency Light Duty Vehicles	100 Vehicles	750 Vehicles	-			
New Vehicle mpg	54	61	-			
Gallons of Gasoline Saved	11,659	67,048	-	0.031	0.024	-
mtCO ₂ e Saved	114	653	-	0.00030	0.00023	-
Electric Vehicles	50 Vehicles	1,250 Vehicles	2,500 Vehicles			
kWh of Electricity Consumed	75,333	1,856,610	2,988,220	-0.067	-0.667	-1.000
Gallons of Fuel Saved	10,638	221,341	302,938	0.056	0.048	0.041
mtCO ₂ e Saved	66	1,914	2,951	0.00035	0.00041	0.00039
Biofuel Vehicles	300 Vehicles	750 Vehicles	1,000 Vehicles			
Gallons of Biofuel Consumed	63,828	132,804	121,175	-0.056	-0.048	-0.041
Gallons of Fossil Fuel Saved	63,828	132,804	121,175	0.056	0.048	0.041
mtCO ₂ e Saved if Biofuel is Sustainable	620	1,290	1,177	0.00055	0.00046	0.00039
Total	450 Vehicles	2,750 Vehicles	3,500 Vehicles			
Miles Driven per Vehicle per Year within Oberlin	3,767	3,713	2,988			
Gallons of Fossil Fuel Saved	86,125	421,193	424,113	0.051	0.041	0.041
mtCO ₂ e Saved	800	3,857	4,128	0.00047	0.00038	0.00039

Reducing GHG emissions and energy use from transportation is often thought of a three legged stool: 1) Reducing vehicle travel; 2) Improving the fuel economy of vehicles; and 3) Decarbonizing the transportation fuel supply. Most of the strategies in this plan focus on the first leg, because reducing vehicle travel can be affordable, quickly implemented, and bring other sustainability benefits. Moreover, Oberlin as a community is far more likely to be able to influence the vehicle travel patterns of visitors and workers traveling in Oberlin than the type of vehicles these non-residents own. This Alternative, Efficient Fuels and Vehicles strategy focuses the second two legs of the stool by transforming the vehicles owned by Oberlin residents, businesses, and institutions into a zero carbon fleet.

Without any specific action by Oberlin, the average on-road fuel economy of vehicles on its roads would improve gradually over time as federal fuel economy standards improve and vehicle technology advances. But this advance is not large enough to meet a zero emissions target by 2050—the U.S. Department of Energy estimates that the average light duty vehicle on the road in 2030 will get 27 miles per gallon, a trend that would mean 33 miles per gallon in

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2050, which is a significant improvement over today's 20.4 mpg, but is not zero emissions. Yet, a 54 mpg hybrid vehicle can be purchased today, and the U.S. Department of Transportation projects that hybrid vehicles could get 61 mpg by 2030.⁹⁰

Three actions are analyzed for this strategy: 1) Near-term addition of high efficiency gasoline vehicles; 2) Biofuel vehicles; and 3) Electric vehicles. As infrastructure for alternative fuel vehicles expands, the vehicles registered in Oberlin are transformed to a clean fleet. All told, a fleet of 3,500 renewable electric and sustainable biofuel vehicles could save 424,113 gallons of fossil fuel and 4,128 mtCO_{2e} in 2050.

The use of renewable electricity for this strategy is important to its GHG saving benefits. If the electricity powering vehicles has a significant carbon footprint the vehicles will as well. Similarly, the sustainability of the biofuels selected for this strategy will affect its overall carbon impact. Biofuels emit GHGs when combusted, just like gasoline does, but the global warming impact of those GHGs can be countered if the crop that created the biofuel is sustainably renewed and allowed to absorb carbon from the atmosphere again. Non-sustainable, fossil fuel driven agriculture, refining, and transportation of biofuels undercut their overall GHG reduction potential from a lifecycle perspective. Conventional biodiesel offers just a 22% lifecycle GHG savings as compared to petroleum diesel.⁹¹ So if biofuels are going to be explored in Oberlin as a transportation solution at scale a sustainable supply system must be established. Waste vegetable oil and grease sustainable fuels that are currently available in Oberlin, but cannot be scaled up to the volume needed for the entire community.

Oberlin travelers are already using some of the alternative fuels and vehicles described in this report—hybrid cars, biofuels, and electric vehicles. But usage is very limited relative to the size of Oberlin's conventional vehicle traffic, and data are not available on alternative fuel volumes at this time, so these were not included in the 2007 baseline. 2007 GHG emissions would be slightly higher—and climate neutrality slightly more challenging—if conventional vehicles were in use instead of these alternative vehicles. Care should be taken in future years not to double count the benefit of alternative vehicles already on the road as their savings are implicitly included in the baseline already.

Qualitative Assessment

- **Key Actors:** Vehicle owners, including households, institutions, businesses, and the Oberlin government will have to make the decision to purchase efficient and alternative fuel

⁹⁰ U.S. Department of Transportation, *Transportation's Role in Reducing U.S. Greenhouse Gas Emissions: Report to Congress*, April 2010.

⁹¹ U.S. Environmental Protection Agency, *Regulatory Impact Analysis: Renewable Fuel Standard Program*, April 2007, <http://www.epa.gov/otaq/renewablefuels/420r07004.pdf>

vehicles. The city may choose to incentivize those choices. The Oberlin Municipal Light and Power System will help enable residents and businesses to access clean electricity for vehicle charging. The city, College, and businesses can support electric vehicle adoption by installing vehicle charging stations. Full Circle Fuels and other entrepreneurs will provide biofuel vehicle conversions and fueling stations for travelers.

- **Timeline:** Medium. High efficiency gasoline hybrid vehicles are available today, as are electric and biofuel vehicles. But it will take time to build up the infrastructure that supports community-wide use of alternative fuels.

Context: Strengths and Assets:

- **Biofuel Expertise and Infrastructure:** Since 2004, Full Circle Fuels in Oberlin has converted over 300 cars, trucks, big rigs, and tractors to run on straight vegetable oil (SVO). Full Circle Fuels operates two gas pumps for biodiesel and for SVO. About half of the roughly one dozen restaurants in town that produce vegetable oil export it to Full Circle for use as SVO.⁹²
- **Electric Vehicle Infrastructure:** The College has electric charging capacity in one parking lot and the city is investigating installing electric vehicle charging stations downtown. The City has installed capacity for one or two charging stations downtown.⁹³ Also, Oberlin College mail service has a plug-in electric cargo van.⁹⁴
- **Biofuel Vehicles in Use:** Some vehicles in Oberlin have been converted to alternative fuels. Oberlin College grounds vehicles use 20% biodiesel and a few tractors can use SVO.⁹⁵
- **Efficient Vehicles in Use:** The College has hybrid electric vehicles in its fleet. The City of Oberlin has begun switching its fleet to more fuel efficient vehicles and purchased two hybrids in 2010.⁹⁶

Context: Challenges and Barriers:

- **Limited Fueling Capacity:** Full Circle Fuels only operates between 9 AM and 5 PM, and biofuel sales are a secondary focus of its business. Oberlin only has a handful of electric vehicle charging stations.
- **Access to Sustainable Fuel:** The alternative fuels that are available at scale today are not climate neutral.

⁹² "Full Circle Fuels," accessed May 26 2011, <http://www.fullcirclefuels.com/>.

⁹³ Bryan Burgess and Ken Sloane.

⁹⁴ The College Sustainability Report Card, "Report Card 2011: Oberlin College," accessed May 2011, <http://www.greenreportcard.org/report-card-2011/schools/oberlin-college/surveys/campus-survey>.

⁹⁵ Colin Koffel, Rob Lamppa, and Madeline Marvar, interviewed by Kyle Smith, Oberlin OH., May 16 2011

⁹⁶ Bryan Burgess and Ken Sloane.

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- **Vehicle Performance and Choice:** The number of alternative vehicle models available are limited and may not suit all driving purposes. The Oberlin Police Department resisted purchasing hybrid vehicles out of concern that the engines are too weak for public safety needs.⁹⁷ Today's electric vehicles have a very limited driving range before they need recharging.
- **Cost:** Alternative and efficient vehicles remain quite expensive. A 2011 Nissan Leaf electric car is listed at \$35,000.⁹⁸

Priority Actions

Table 14. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Hybrid Vehicles	Vehicles that can operate on both fossil fuels and electricity, typically with regenerative braking to capture wasted energy.	Households, Businesses, Institutions, City Fleet	Capacity of vehicle purchaser, federal tax credit of \$7,500 for plug-in hybrid
Plug-In Electric Vehicles	Vehicles that charge from electric grid and operate off of battery power.	Households, Businesses, Institutions, City Fleet	Capacity of vehicle purchaser, federal tax credit of \$7,500
Biofuel Vehicles	Vehicles that use biofuels, such as biodiesel or SVO instead of petroleum.	Households, Businesses, Institutions, City Fleet, Full Circle Fuels	Capacity of vehicle purchaser
Efficient Vehicle Incentives	Provide incentives for use of efficient and alternative vehicles, such as priority parking, shopping discounts.	City, Local Businesses	Capacity of local business
Eco Driving	Train drivers to improve vehicle efficiency through driving behavior.	City, Volunteers	Grant funding, volunteers
Sustainable Biodiesel	Vehicle fuel generated from waste oils, vegetable oils, and animal fats. Can be used in diesel engine.	Full Circle Fuels, Local Entrepreneurs	Link to green belt and agriculture protection programs, US Department of Energy Grants, Small Business Administration Loans, Private Capital, Foundation Program Related Investment, Venture Capital
Biofuel Pumping Station	Biofuel station that operates long hours and accepts credit cards, like a conventional gas station.	Full Circle Fuels, Local Entrepreneurs	Private Capital
Straight Vegetable Oil	Reuse of vegetable oil for vehicle fuel. Requires conversion of vehicle.	Full Circle Fuels	Capacity of Full Circle Fuels, Grant Funding, Private Capital

⁹⁷ Bryan Burgess and Ken Sloane.

⁹⁸ Nissan, Nissan Leaf, Accessed August 2011 <http://www.nissanusa.com/leaf-electric-car/index#/leaf-electric-car/index>.

Action Discussion: Three main alternatives to conventional vehicles are considered. In the near term Oberlin can incentivize purchase of high efficiency fossil fuel vehicles. Longer-term, sustainable biofuel and electric vehicles can be pursued, to the point that they make up the entire fleet of vehicles registered in Oberlin in 2050. Providing the infrastructure for refueling will play a big role in this strategy and Oberlin already has a strong partner in Full Circle Fuels. Factors that can influence vehicle purchasing decisions will include financial incentives, affordable electric vehicle charging rates, parking prioritization, and shopping discounts. Developing a supply of carbon-neutral biofuel will be a big component of realizing the GHG benefit of this strategy, and will require research and development, innovation and entrepreneurship to make happen. Collaboration with area farmers to develop a crop waste to fuel system could be a way to expand fuel supply and support the regional economy. Oberlin can meet a lot of its future travel needs with renewable electricity, but not all trips are suited to electric vehicles due to their limited battery capacity, long charging times, and the incomplete charging infrastructure in the U.S.

Examples and Best Practices: Solar City has installed over 2,500 solar powered electric vehicle charging stations.⁹⁹ The CNT's affiliate I-Go Car Sharing in Chicago is in the process of installing solar canopy electric vehicle charging stations for some of its cars in Chicago. New York City has recently completed a study on incentivizing electric vehicle adoption and found a set of nine priority, low cost incentives the city can help deploy including charging infrastructure.¹⁰⁰ Seattle has changed its purchasing policies for biofuels based on the sustainability of its sourcing.¹⁰¹ A local sustainable biofuel business in the Seattle area has established a co-op to help fund its operations.¹⁰²

Feasibility and Cost: Efficient vehicles are available today, and some high mpg vehicles are quite affordable; it may just be a matter of incentivizing use in town. Biofuel vehicle conversions and fuel sales are already happening in Oberlin some private capital injection may be required to bring Fuel Circle Fuels or other local entrepreneurs to the next level of volume. Meeting the large-scale renewable fuel demand in 2030 and 2050 will require development of a new supply chain for sustainably produced biofuels. Initial investment could create a business model that is franchisable to other communities. It appears that OMLPS will have renewable

⁹⁹ Solar City, Electric Vehicle Charging Stations, Accessed August, 2011, <http://www.solarcity.com/residential/electric-vehicle-charging-stations.aspx>

¹⁰⁰ City of New York, *Exploring Electric Vehicle Adoption in New York City*, January 2010, http://www.nyc.gov/html/om/pdf/2010/pr10_nyc_electric_vehicle_adoption_study.pdf

¹⁰¹ Chris Grygiel, "City of Seattle Halts Biodiesel Purchases, Looks for Greener Fuel," *Seattle Post-Intelligencer*, Thursday, June 18, 2009, <http://www.seattlepi.com/local/article/City-of-Seattle-halts-biodiesel-purchases-looks-1304641.php>

¹⁰² Dr. Dan's Biodiesel, *Sustainable Fuel Co-Op Kickoff Event*, February 4, 2011, <http://drdansbiodiesel.wordpress.com/2011/02/04/sustainable-fuel-co-op-kickoff-event/>

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capacity to spare in the coming years that can be absorbed by electric vehicles; longer-term climate neutral electricity transportation will require significant investment in generation and infrastructure.

Replicability: If Oberlin can develop a model that enables all vehicles in the community to be alternative fuel vehicles by 2050 it will have a model that communities around the world will want to replicate. If sustainable biofuel can be developed while preserving local agriculture and greenspace the ecological and economic development benefits would be substantial and replicability around the region would improve energy security for all of Northern Ohio.

REDUCED VEHICLE OWNERSHIP

Strategy 5. Reduced Vehicle Ownership

Promote alternate modes of transportation, fewer trips, and shorter trips through reduced vehicle ownership.

Table 15. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
High	Intermediate	Medium	Intermediate	Intermediate	High	Intermediate to High

Description

Reducing vehicle ownership among Oberlin students, residents, and businesses can reduce energy use and emissions by promoting other modes of travel, shared rides, and reduced travel. Vehicle ownership is also costly; households must pay for fuel, maintenance, insurance, registration, and vehicle purchase. The community also pays a price through demand for parking spaces, wear and tear on roads, and the impacts of air pollution and carbon emissions from fuel use. Enabling households to own fewer cars will support sustainability from both an environmental and economic perspective.

Quantitative Assessment

Table 16. GHG and Energy Savings

Year	Annual Savings			Savings per Member		
	2015	2030	2050	2015	2030	2050
Car Share Members	750	2,500	4,000			
Vehicles Shed or Avoided Purchase by Car Share Members	338	1,125	1,800	0.45	0.45	0.45
Car Share Vehicles	30	100	160			
Gallons of Biofuel Used		50,252	16,396			
KWh of Electricity Used			595,242			
Net Vehicles Reduced	308	1,025	1,640	0.41	0.41	0.41
Miles Saved	1,776,638	5,922,125	9,475,400	2,369	2,369	2,369
Gallons of Gasoline Saved	99,472	351,650	458,951	133	141	115
mtCO ₂ e Saved	969	3,425	4,470	1.3	1.4	1.1

Reducing vehicle ownership is a GHG and energy saving strategy in that individuals are often induced to drive, even when a trip is unnecessary or could be made by another means, when they have a car. While a few households may be able to give up a car and never drive again, most may need access to a car from time-to-time. This occasional car use could come in the

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form of borrowing a friend's vehicle, renting a car for a few days, or even taking a taxi. Car sharing—essentially, local hourly car rental—gives households easy, reliable access to a vehicle when they need it, so it is a useful tool for households that are reducing their vehicle ownership.

From an analytical perspective, we use car sharing as a proxy for any type of shared car usage, because there are studies available about the travel behavior of car share organization members. A study of San Francisco car sharing members showed that the average car share member drove 2,369 fewer miles than a non-member. Both groups had relatively low driving rates, likely because a many car share users are able to share a car specifically because they do not need to drive to work, and the nonmember control group had similar characteristics.¹⁰³ Moreover, the San Francisco study finds that car share vehicles are typically newer and more efficient than personal vehicles, so driving done in the car share vehicle saves fuel and GHGs. The other key study used here is a national survey of car sharing members that found that 45% of car share members either get rid of a car or forego a purchase.¹⁰⁴

We analyze the impact of an expanded car sharing program in Oberlin and find that at a membership level of 4,000—which could include Oberlin residents, students, and employees that work in town—would enable 1,640 fewer vehicles on the road. Assuming that the car share fleet is composed of high efficiency vehicles in 2015 and zero emissions vehicles by 2030, energy and GHG savings in this strategy come not only from reduced vehicle travel, but from car sharing members traveling in more efficient vehicles. In total, this strategy could have substantial impacts by 2050; saving 458,951 gallons of gasoline and 4,470 mtCO₂e.

At this rate of participation, reducing vehicle ownership could be the largest contributor to meeting a zero emissions target of any of the strategies discussed here, and the savings could begin quickly as Oberlin already has a car share program to build on. However, it should be stated that these benefits cannot occur in isolation. Households will not give up their vehicles unless they have substantial transportation alternatives and the community works to enable individuals to meet their daily needs without a private vehicle. Unless this strategy is implemented in concert with the others in this sustainable transportation plan, it is unlikely to succeed.

¹⁰³ Robert Cervero, Aaron Golub, and Brendan Nee, San Francisco City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts, Working Paper 2006-07, 2006.

¹⁰⁴ Elliot Martin, Susan Shaheen, and Jeffrey Lidicker, Carsharing's Impact on Household Vehicle Holdings: Results from a North American Shared-Use Vehicle Survey, March 15, 2010.

Qualitative Assessment

Key Actors: For these actions, institutions expand existing car sharing services by utilizing them for their own fleet or making them a more convenient option for residents and students. As with other strategies, the community could channel its engagement and enthusiasm for environmental issues to organize special events that celebrate living car-free or “car-lite.”

Shared cars provide alternatives for residents and students to take occasional trips to out-of-town destinations like Midway Mall and Crocker Park. Residents who do not own a vehicle at all today will consume more fuel and generate GHG emissions if they use shared cars to increase their driving, but car sharing can improve their mobility. This strategy does not directly address employment access for residents.

Timeline: Medium. These strategies expand on existing car-sharing services but increased membership and vehicle utilization takes time to achieve. A peer-to-peer car sharing service could speed up adoption rates as it can lower the cost of capital for start-up since cars are individually financed. However, policy barriers need to be overcome in order to enable that, which could take a few years.

Context: Strengths and Assets:

- **Vehicles per Household:** According to the 2000 Census, there were 1.5 vehicles per household in Oberlin that year, which is slightly lower than the U.S. average of 1.7 vehicles per household.¹⁰⁵ A typical Oberlin household has just one car (51% of households) with two cars (32%) and no cars (13%) being the next most common among households.¹⁰⁶
- **Existing Car Sharing Fleet.** All three cars are located on the edge of Oberlin College campus within walking distance to residential neighborhoods.¹⁰⁷ After six months of service, Oberlin membership in Hertz Connect increased from 17 to 91 and utilization increased accordingly.¹⁰⁸
- **College Support for Car Sharing:** Car sharing membership for College students is free. The College has considered auto-enrolling first year students into the program as a part of the tuition and fees.¹⁰⁹
- **College Policies for Student Vehicles:** The College raised permit prices from \$75 to \$100 to dissuade students from bringing vehicles and has discussed preventing freshmen from

¹⁰⁵ U.S. Census Bureau, Census 2000.

¹⁰⁶ U.S. Census Bureau, 2005-2009 ACS.

¹⁰⁷ Hertz, “Connect by Hertz,” Accessed May 2011, <http://www.connectbyhertz.com/>.

¹⁰⁸ Hertz, Monthly Reports, Accessed May 2011.

¹⁰⁹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

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bringing cars to campus at all.¹¹⁰ First year students pledge to live without a car for their first year at Oberlin at Kahn Hall and a nearby car share vehicle sees high utilization.

Context: Challenges and Barriers:

- **Insurance Concerns:** In the past, the City attempted to coordinate a volunteer car sharing program among local residents, but it failed due to legal concerns about insurance in the event of an accident.¹¹¹
- **Vehicle Ownership as Norm:** Even in Oberlin, where alternative forms of transportation are commonly used, vehicle ownership is still the norm and moving away from that model requires a leap of faith for many households.
- **Capital and Operating Costs:** Buying or leasing a fleet of vehicles and paying for maintenance, gasoline, and insurance requires significant financial investment and shared vehicles must see regular usage to make the service break even.

¹¹⁰ Colin Koffel, Rob Lamma, and Madeline Marvar.

¹¹¹ Bryan Burgess and Ken Sloane.

REDUCED VEHICLE OWNERSHIP

Priority Actions

Table 17. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Peer to Peer Car Sharing	Private vehicle owners allow others to use their vehicles.	Vehicle owners; Hertz Connect, CityWheels, or new organization	Private financing, grants, Small Business Administration loans, foundation program related investments, self-financing by members
Increase Car Sharing Participation	Increase participation in car sharing program, including by Oberlin residents.	Hertz Connect, CityWheels, or new organization	Capacity of car sharing firm, private financing, grants, foundation program related investment
Car Sharing for Fleets	Encourage use of car sharing for city, college, and corporate vehicles.	City and College	Savings from capital and depreciation costs of fleet
Car-free Days	Voluntary program to have drivers pick one weekday as a no-driving day.	City, College, business community, volunteers	Capacity of institutions and volunteers
Restrict Car Ownership Among College Freshmen or Undergraduates	Restrict students from owning cars to reduce total vehicles and acclimate them to living car-free.	College	Not applicable
Car-free Visitor Program	Enable Oberlin visitors to enjoy their visit without a car.	Oberlin Main Street/Chamber or new not-for-profit with support from City and College	Capacity and support of institutions

Action Discussion: Most of these actions emphasize strengthening and expanding car sharing options in Oberlin to enable households to give up a vehicle without sacrificing all of their mobility. Both the City and College may be able to eliminate some non-emergency vehicles in their fleet by providing a car sharing membership option for employees as an alternative. This could also increase utilization of the vehicles during daytime periods when they are used less often and make it more economical to provide more shared cars. Additionally, Oberlin could adapt a peer-to-peer car sharing network in which existing vehicle owners allow their car to be rented by other drivers in the community.

As with actions linked to other strategies, the level of enthusiasm and community participation in Oberlin lends itself to events and promotions linked to environmental stewardship. A car free visitor program could be combined with other suggested tourism-related actions and managed by either existing institutions or a new not-for-profit. Similarly, a car-free day could be organized by volunteers within the community.

Examples and Best Practices: CarFree San Luis Obispo is a partnership sponsored by the San Luis Obispo Air Pollution Control District, San Luis Obispo Regional Rideshare, Amtrak, the City of San Luis Obispo Promotional Coordinating Committee and the San Luis Obispo Chamber of Commerce.¹¹² Visitors who pledge to visit the area without an automobile receive discounts on travel and from participating businesses. The partnership also publishes maps for car-free itineraries.

RelayRides is the first peer-to-peer car sharing network in the United States and allows vehicle owners in San Francisco, Cambridge, and Boston to open their cars to rental to members.¹¹³ RelayRides provides the in-vehicle technology to enable car sharing and the insurance on the vehicles during the rental period.

Feasibility and Cost: Several of these actions build on existing car sharing services, which have seen a consistent rise in membership and vehicle utilization, so the capital costs are lower than if no car sharing service existed at all. A peer-to-peer car sharing initiative would utilize existing personal vehicles around town but would need to address insurance concerns in the case of an accident before implementation.

Replicability: Students at Oberlin College have different transportation needs than residents with full-time jobs, so a car sharing provider may need to adopt a different business model to effectively serve other communities in northern Ohio. The conversion of municipal fleets to car share vehicles and the establishment of peer-to-peer car sharing among permanent residents could demonstrate two ways in which a provider could establish service in neighboring smaller cities.

¹¹² San Luis Obispo Car Free Program, "CarFree San Luis Obispo", Accessed August 2011, <http://www.slocarfree.org/>.

¹¹³ "RelayRides Neighbor-to-Neighbor Car sharing", Accessed August 2011, <http://www.relayrides.com/>

TRIP REDUCTION

Strategy 6. Trip Reduction

Reduce the number of trips Oberlin workers and residents need to take.

Table 18. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
Intermediate to High	Intermediate	Near-term	Low to Intermediate	Intermediate	High	High

Description

The most sustainable trip is the trip not made. Enabling residents and businesses to avoid travel will reduce fossil fuel use and GHG emissions. Telecommuting, videoconferencing, or combining multiple trips into one are all types of trip reduction actions. It may seem inconceivable to expect Oberlin residents and employees to simply travel less, but there are simple ways to make it possible, such as allowing residents to conduct city business online and encouraging shoppers to make several weeks' worth of purchases at once in place of multiple trips to the store. Perhaps more importantly, there is already evidence that Americans are doing this. VMT has declined nationwide in the past several years, and while some of this is likely due to the economic downturn, the rise of electronic communication may be a major factor. If Oberlin residents are challenged to reduce their travel by cutting out unnecessary trips, it is likely many will find easy ways to do so.

TRIP REDUCTION

Table 19. GHG and Energy Savings

Year	Annual Savings			Savings per Mile		
	2015	2030	2050	2015	2030	2050
Share of Employees in Oberlin Telecommuting 1 Day a Week	5%	15%	18%			
Employees Telecommuting	188	565	678			
Vehicle Miles Saved	416,482	1,249,447	1,499,336			
Gallons of Gasoline Saved	19,639	46,158	42,243	0.047	0.037	0.028
mtCO ₂ e Saved	191	450	411	0.00046	0.00036	0.00027
Trip Reduction Actions Lead to Eliminating 5 mile Solo Driving Trips	40,000 Trips	80,000 Trips	120,000 Trips			
Vehicle Miles Saved	200,000	400,000	600,000			
Gallons of Gasoline Saved	9,901	16,209	19,833	0.050	0.041	0.033
mtCO ₂ e Saved	96	158	193	0.00048	0.00039	0.00032
Total						
Vehicle Miles Saved	616,482	1,649,447	2,099,336			
Gallons of Gasoline saved	29,070	60,934	59,148			
mtCO ₂ e Saved	283	593	576			

*** Gallons and CO₂e saved include average occupancy adjustment of 1.13 passengers per vehicle.**

Trip reduction is a strategy is analyzed in two parts, the first of which is telecommuting. This is examined separately because the commute to work is a discreet trip type that can be immediately affected by employer policy to enable telecommuting. Just as effective from a trip reduction perspective would be an employer policy that enabled employees to work four days per week instead of five, thereby eliminating one round trip commute per week. If 18% of employees were able to do this in 2050, nearly 1.5 million vehicle miles would be taken off the road and the savings would be 42,243 gallons of gasoline and 411 mtCO₂e.

The second type of trip reduction analyzed here is a general solo driving trip of five miles for any purpose. We analyzed a target of 40,000 trips eliminated in 2015, which would equate to 9% of Oberlin’s population eliminating a trip every week that year. Not all of the trip reduction needs to be done by residents, however. Any traveler on Oberlin’s roads that eliminates a trip would help reduce emissions in the community—an employee at a local business that brings a brown bag lunch instead of driving downtown, for example.

Eliminating 40,000 trips saves 96 mtCO₂e and 9,901 gallons of gasoline in 2015. As with the other strategies, the emissions and energy use reduction benefit per unit of action—per trip eliminated—decreases over time as fuel economy improves and the vehicle not driven would have used less fuel for the trip than in previous years. In 2050, the result of eliminating 120,000 trips is 193 mtCO₂e and 19,833 gallons of fuel saved.

TRIP REDUCTION

All told, this strategy implemented at this level would eliminate over two million miles of travel and lead to a savings of 59,148 gallons of fuel and 576 mtCO₂e. This is just 3% of the total savings required to get to carbon neutral travel, but trip reduction remains a significant strategy as every mile reduced is one less mile that needs to be addressed with low-carbon transportation options.

Qualitative Assessment

Key Actors: Institutions will implement the commuting actions. They provide alternatives for their workers and customers to avoid travel trips and incentives for them to take them. Expanded telecommuting and teleconferencing options may expand employment opportunities for residents with mobility constraints that must arrange transportation to get to work. A carbon tax would be implemented by the city. Trip reduction contests could be led by community volunteers.

Timeline: Near-term. Most of these actions require policy changes at the College and other institutions with some overhead costs. A carbon tax would take considerably more time to develop, generate support for, and implement.

Context: Strengths and Assets:

- **College Teleconferencing:** The College has installed teleconferencing technology, although it has not yet been not heavily adopted.¹¹⁴
- **Community Enthusiasm:** The enthusiasm of Oberlin residents for issues of sustainability and climate change could energize an initiative to reduce travel in town.

Context: Challenges and Barriers:

- **Benefits for College Employees:** The College does not currently offer incentives for telecommuting or a condensed work week for staff.¹¹⁵
- **Food Access:** After work, the grocery store is the most significant in-town destination for some Oberlin residents.¹¹⁶ Some neighborhoods sit more than one half mile from one of the grocery destinations in town.

¹¹⁴ Colin Koffel, Rob Lamppa, and Madeline Marvar.

¹¹⁵ Colin Koffel, Rob Lamppa, and Madeline Marvar.

¹¹⁶ Oberlin Resident Focus Groups.

TRIP REDUCTION

Priority Actions

Table 20. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Trip Reduction Challenge	Participants pledge or compete to reduce travel.	Volunteers	Grants, business in-kind prize donations or charitable donations
Video Conferencing	Use of video conferencing in place of travel.	College	USDA Distance Learning and Telemedicine Program
Telecommuting	Enabling employees to work from home.	College, City, and other major employers	USDA Distance Learning and Telemedicine Program
Shared Food Delivery Service	An entrepreneur delivers food from multiple downtown establishments to people in Oberlin.	Local entrepreneur	Membership dues or per delivery fee
Carbon Tax	Per-unit fee on carbon purchases, such as petroleum.	City	Municipal tax increase

Action Discussion: Financial incentives may convince regional and in-town travelers to weigh alternative options or avoid taking their trip at all. A municipal carbon tax could convince residents to take fewer unnecessary trips by attaching a climate cost to them.

Additionally, the College and other major employers can provide transportation alternatives both for staff commutes. Telecommuting allows workers to avoid lengthy and energy-intensive commutes, although there may be added network security costs for businesses with confidential information. Academic travelers could replace some long-distance trips with webinars to deliver presentations.

Trip reduction challenges can introduce gaming dynamics—a popular recent strategy to drive behavior change in many contexts from health to energy efficiency.

Examples and Best Practices: The Undriving initiative encourages travel behavior change by giving participants “Undriving Licensees” and having them make pledges to change their transportation patterns¹¹⁷ The Clif Bar 2 Mile Challenge is a competition to have participants

¹¹⁷ Undriving Website, Accessed August 2011, <http://undriving.org>.

TRIP REDUCTION

replace car trips with biking, and raises money for charity.¹¹⁸ This model could be adapted for trip reduction.

Boulder, Colorado implemented the first carbon tax in the U.S. and uses the funds to implement its climate action plan. While not transportation oriented—the tax is leveled on utility bills—the model could be adapted. While a strong tactic, taxes are shown to induce behavior changes and such a community-wide policy might be required to meet an aggressive GHG reduction goal for Oberlin.¹¹⁹

Feasibility and Cost: Commute-oriented incentives come at a relatively low cost. Services like GoToMeeting and Skype make teleconferencing a relatively affordable solution for businesses and organizations where video conferencing can occur. The federal pre-tax benefit requires minor administrative overhead once it is initiated for employees. A trip reduction competition could be organized by students and volunteers at low cost. A carbon tax faces the most barriers to adoption, but using the funds to reduce the cost of alternative transportation costs for households—such as by providing transit passes—could improve feasibility.

Replicability: Employee incentives to reduce commute trips should be replicable across northern Ohio. A successful trip reduction challenge would be replicable in schools and communities across the country. Other trip incentives like a carbon tax could be a model for all Ohio communities of Oberlin's size.

¹¹⁸ Clif Bar, "CLIF BAR 2 Mile Challenge Inspires Nearly 385,000 Miles of Bike Travel Instead of Car Trips in Effort to Combat Climate Change: Also Awards Bonus Grant to 'Trips for Kids' Mountain Bike Non-Profit," Press Release, November 1, 2010, http://www.clifbar.com/press/release/clif_bar_2_mile_challenge_inspires_nearly_385000_miles_of_bike_travel_inste/ and Clif Bar, "Clif Bar 2 Mile Challenge," Accessed June 8, 2011, <http://2milechallenge.com/>

¹¹⁹ City of Boulder Colorado, *Climate Action Plan Tax*, January 28, 2011, http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=7698&Itemid=2844

LAND USE

Strategy 7. Land Use

Land use and urban form that supports lower car ownership, fewer and shorter trips, and alternative transportation modes.

Table 21. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
Intermediate to High	Intermediate to High	Long	Intermediate to High	Low	Intermediate to High	Intermediate

Description

Oberlin has many land use assets for sustainable transportation, from its historic street grid and downtown core to the walkability of Oberlin College for faculty, staff and students. However, over time the less dense and walkable parts of Oberlin have been sites for development, and the annexation of outlying land and development of shopping destinations on the outskirts of the community are examples of land use that have created transportation challenges. Oberlin can take advantage of its community design assets by channeling growth to its more location efficient areas, and improve the walkability of other areas with pedestrian infrastructure, mixed use development, and other land use improvements.

Table 22. GHG and Energy Savings

Year	Annual Savings			Annual Savings per Unit		
	2015	2030	2050	2015	2030	2050
Location Efficient Units	100	400	600			
Reduced Vehicle Miles Traveled	609,025	2,436,100	3,654,150	6,090	6,090	6,090
Gallons of Gasoline Saved	28,719	89,995	102,954	287	225	172
CO ₂ e Reduced	280	877	1,003	2.8	2.2	1.7

The CNT’s research, which is supported by other recent scholarly literature, shows that location efficient households—those with access to transportation alternatives and located near employment and services—own fewer cars, drive less, and emit fewer GHGs than the average household. To that end, making more households in Oberlin location efficient will support sustainable transportation choices in the community over the long-term.

A challenge for this strategy is that one of the baseline assumptions for this analysis is Oberlin’s population is not expected to change substantially over the next several decades. Therefore, this strategy looks at improving the location efficiency of existing housing units, rather than new development. This can be done by improving alternative transportation infrastructure and

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supporting mixed uses so that shops, employment and services are located near where people live.

CNT's Housing+Transportation (H+T[®]) Affordability Index models household vehicle ownership and vehicle travel in order to determine the combined costs of housing and transportation, which can show the true affordability of a living in a given place.¹²⁰ The H+T method is explained further in the Appendix. In Oberlin, H+T shows that an average household will own fewer cars and drive less if they live downtown than in an outlying area. The difference is substantial—6,090 VMT per year per household. At this rate, if outlying areas of Oberlin could be made more location efficient such that 600 households change their travel patterns to match those of downtown households, 102,954 gallons of gasoline and 1,003 mtCO₂e could be saved in 2050.

Oberlin can also provide location efficient housing by building new units downtown where land use and urban design support transportation alternatives, but to the extent that this increases population and draws in new households from other communities, it will likely increase Oberlin's emissions. Unless a housing unit is demolished in an outlying part of town for every unit built downtown, new location efficient units will lead to growth. Oberlin may choose to pursue this strategy anyway, with an eye toward reducing emissions in the larger region, since a household living in downtown Oberlin is likely to have a lower emissions profile than one living in an unincorporated area of the county, but such a scenario is outside the bounds of this analysis.

Qualitative Assessment

Key Actors: Land use actions give investors “carrots” in the form of incentives for development in priority areas and “sticks” in the form of regulations and barriers to development that is automobile-oriented or inaccessible. Regulatory actions may require policy or zoning changes at the City of Oberlin and Oberlin College.

Over time, local land use changes within Oberlin can lead to more efficiently located amenities, which in turn will make it more convenient for residents and students to get around Oberlin without a car. Residents who can't travel to daily conveniences may have more options to do so. And regional land use changes may put more jobs within walking distance of transit, if service is reinstated.

Timeline: Long. Changes in the character of neighborhoods will require new development, which can take years to plan, finance and build even in a strong economy.

¹²⁰ Center for Neighborhood Technology, *Housing+Transportation Affordability Index*, <http://htaindex.cnt.org/>.

Context: Strengths and Assets:

- **Compactness:** At 4.4 square miles, Oberlin remains small and compact.¹²¹
- **Accessibility to Downtown:** A total of 4,857 out of 8,761 people (55%) lived within a ten minute walk of downtown in 2010, so many residents already live within proximity to shopping, amenities, and jobs.¹²²
- **Zoning:** Downtown Oberlin is zoned C-1, which permits residential units on the second story of buildings.¹²³ There are no parking requirements. Vacant spaces in five downtown buildings could accommodate additional residential units as the market recovers.¹²⁴
- **East College Street Project:** This successful mixed-use project represents the kind of development that allows residents to chain trips and cut down on their travel time and vehicle use. It demonstrates that mixed-use development can succeed in a recovering economy and a community the size of Oberlin.
- **Banked Land:** The city has demolished several derelict properties in these neighborhoods and believes they can be redeveloped as the housing market improves.¹²⁵ Infill development on these sites would put more Oberlin households within walking distance of downtown.

Context: Challenges and Barriers:

- **Large Blocks:** The outer areas of Oberlin have very large blocks and low intersection density, a land use form that supports automobile travel over other modes. One land use change Oberlin can make is to carve up large blocks with pedestrian paths to make these areas more walkable.
- **Outlying Commercial Districts:** Commercial developments around the periphery of the community are automobile-oriented in nature. Wal-Mart and Discount Drug Mart are more than one half mile from most residential blocks in Oberlin.
- **Grocery Destinations:** Most in-town grocery destinations are not an easy walk from residential neighborhoods. While IGA is within a half mile of some residential neighborhoods, focus groups surveyed for the project found it hard to access by foot because of truck traffic along OH-511.¹²⁶

¹²¹ U.S. Census Bureau, Census 2000.

¹²² U.S. Census Bureau, Census 2010.

¹²³ City of Oberlin, Ohio, *Comprehensive Plan*.

¹²⁴ City of Oberlin, Ohio, *Downtown Revitalization and Development Plan*.

¹²⁵ Gary Boyle and Eric Norenberg, interviewed by Kyle Smith, May 25 2011.

¹²⁶ Oberlin Resident Focus Groups.

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- **Downtown Shopping Options:** A Buy Survey conducted in 2010 found that 80% of respondents shop outside of Oberlin due to lack of selection.¹²⁷ Focus group participants for the project suggested that some downtown businesses cater to students in terms of their variety and price.
- **Regional Context:** Land uses outside of Oberlin affect the travel behavior of residents. While the City enjoys two “recession proof” employers in the College and the Federal Aviation Administration,¹²⁸ more than half of Oberlin workers travel elsewhere to earn their paycheck.¹²⁹ Residents also leave town for shopping at destinations like Midway Mall and Crocker Park.
- **Lack of Specialized Medical Services:** While there are a few medical offices and a hospital in Oberlin, fewer doctors are holding office hours in town and most medical specialists are located elsewhere in Lorain County.¹³⁰

¹²⁷ Oberlin College, “Buy Survey Summary”, August 2009.

¹²⁸ Moody’s Investor Service, “Moody’s Assigns MIG 1 Rating to City of Oberlin’s (OH) \$1.2 million GoltBod Anticipation Notes, Series 2009.” September 9, 2009.

¹²⁹ U.S. Census Bureau, Locational Employment Dynamics, 2008.

¹³⁰ Gary Boyle and Eric Norenberg.

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Priority Actions

Table 23. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Expedited Approval Process	Buildings in location efficient areas receive approval within 90 days of an application.	City	Existing staff capacity
Form Based Code	Regulates land use by form, rather than use, thus encouraging more walking and biking.	City	USHUD/USDOT Sustainable Community Challenge Grants; USEPA Smart Growth Implementation Assistance; NOACA TLCI
Infill development	Redeveloped city-owned properties within walking distance of downtown.	Private or not-for-profit developer	Private investors; Tax-incremented Financing; Low Income Housing Tax Credits; New Market Tax Credits; Ohio Historic Preservation Tax Credits; Donation of existing infill sites acquired by city
Location Efficient Development Incentives	Focusing development in areas that reduce travel demand.	City and Lorain County	Existing property and income tax revenues; Tax-incremented financing
Greenbelt	Establish greenbelt or agricultural preservation area around city to act as a de facto growth boundary and encourage infill.	City	Transfer of Development Rights program (TDR); HUD Sustainable Communities Challenge Grants
Complete Streets	Ensure that roadways are safe and attractive for all modes, not just vehicles.	City	Capital improvement fund; TCLI (planning only); CMAQ; STP; TCSP; HSIP; TE
Employer Assisted Housing	Incentives for living near work.	College and private employers	Contributions from employers; Foundation funding
Block Size Reduction	Add pedestrian paths and alleys to carve up large blocks and improve walkability in outlying areas.	City	Capital improvement fund

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Action Discussion: Encouraging infill development in compact, walkable areas often requires a combination of “carrots” that incentivize developers to build and “sticks” that requires their developments to match the vision of the community. Because time is money for those in real estate development, one cost-effective and easily implemented incentive is a pledge to approve all projects in priority infill locations in sixty days or less. Additionally, the cost of infill development can be higher than for traditional single-use projects, so financial subsidies may be required to make them viable.

Regulatory changes include options such as form based codes, which regulate the urban form of neighborhoods rather than their land use and which can encourage more walkable and bikeable neighborhoods as a result. Although changes to land use regulations take time to develop and approve, new federal resources such as the Community Challenge grant program managed by HUD have been awarded to fund these activities in other communities.

Examples and Best Practices: In 2010, the City of Crystal City, Missouri passed a Complete Streets ordinance that requires consideration for pedestrian and bicyclists in all public and private transportation projects in its planning review process when it is feasible.¹³¹ The National Complete Streets Coalition cited this ordinance as a national best practice and the only one from a jurisdiction with a population under 10,000.¹³²

The major educational and medical institutions around University Circle, Cleveland have partnered with the Cleveland and Surdna Foundations to establish the Greater Circle Living Program for their employees.¹³³ The program offers a \$5,000 to \$10,000 forgivable loan for down payment and closing costs for full-time employees if they purchase a home in the area. Fairfax Renaissance Development Corporation and University Circle Inc. have partnered to manage and market the program.

Feasibility and Cost: The City comprehensive plan already includes land use elements such as permitted mixed-use development and accessory residential units in downtown.¹³⁴ However, even in a progressive regulatory environment, it can be difficult to finance and underwrite infill development without some public assistance, especially in the current real estate market. The East College Street Project could provide comps for investors that will make it easier for developers to raise equity for other infill projects.

Replicability: Most regulatory changes regarding land use could be replicated in other northern Ohio communities the size of Oberlin.

¹³¹ National Complete Streets Coalition, “MO Crystal City ordinance”, accessed August 2011, <http://www.completestreets.org/webdocs/policy/cs-mo-crystalcity-ordinance.pdf>.

¹³² National Complete Streets Coalition, *Complete Streets Policy Analysis 2010: A Story of Growing Strength*, 2010.

¹³³ Fairfax Renaissance Development Corporation, “Greater Circle Living: An Incentive to Live Near Work”, Accessed August 2011, <http://fairfaxrenaissance.org/gcl/index.html>.

¹³⁴ City of Oberlin, Ohio, *Comprehensive Plan*.

PARKING

Strategy 8. Parking

Change parking infrastructure and policies to incentivize low-carbon transportation.

Table 24. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
Intermediate	Intermediate	Near-Term	Low	Low	High	High

Description

Recent research in the transportation field has shown definitively that restructuring parking design and costs can have large impacts on travel behavior and overall community sustainability. Oberlin can incentivize sustainable travel by altering its parking policies and pricing parking to create economic incentives for alternate modes of travel. Over the long-term this may be one of the primary strategies Oberlin has to incentivize low-carbon travel by visitors to Oberlin.

Quantitative Assessment

Table 25. GHG and Energy Savings

Year	Annual Savings			Savings per Mile		
	2015	2030	2050	2015	2030	2050
Parking Actions Targeting Conventional Vehicles Eliminate Vehicle Miles Traveled (VMT)	2,512,448 Miles Eliminated	4,890,140 Miles Eliminated	7,222,102 Miles Eliminated			
Gallons of Fuel Eliminated	141,917	233,196	292,863	0.056	0.048	0.041
mtCO ₂ e Saved	1,379	2,266	2,846	0.00055	0.00046	0.00039

This strategy supposes that parking requirements cause reductions in vehicle miles traveled by inefficient vehicles, likely Oberlin visitors and workers from neighboring communities. Whereas Oberlin has the capacity to influence the energy intensity of vehicle purchases by local residences, institutions and businesses, it has less capacity to do so for those vehicles that drive on Oberlin's roads but do not reside in Oberlin. Parking strategies are therefore assumed to be a primary tool for eliminating fossil fuel travel in Oberlin by 2050. In the near term, parking restrictions are assumed to reduce inefficient VMT by 2.5 million miles, or 6% of business as usual travel levels. Over the longer-term clean vehicles could be given a parking pass that allows them to park in Oberlin, while inefficient fossil fuel vehicles are required to park at the edge of town. If this strategy were to remove 7.2 million miles of inefficient vehicle travel from

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Oberlin's roads in 2050—15% of the total— the savings would be substantial: 2,846 mtCO₂e and 292,863 gallons of fuel.

Qualitative Assessment

Key Actors: The College, downtown, and remainder of the City experience peaks in demand for parking at different points of the year. These actions help institutions meet their peak needs while reducing the supply of and demand for parking at other times of the year.

Parking actions are likely to decrease the number of student vehicles and reduce the amount of in-town driving for local residents and visitors to Oberlin. Although these actions may convince travelers to use alternative modes of transportation for existing trips, they will not provide new options for residents to reach jobs and amenities outside of town.

Timeline: Near-term. The implementation timeframe for most of these actions is relatively short and some regulatory changes could be instated almost immediately. However, it will take time for them to accrue benefits in the form of parking spaces saved and vehicle trips avoided.

Context: Strengths and Assets:

- **College Parking Configuration:** Many designated lots are located around the edge of campus and do not discourage walking from one area to another. At Kahn Hall, students pledge to live without an automobile altogether.¹³⁵
- **Downtown Streetscape:** Most downtown parking is located behind the streetscape and makes it an easy and enjoyable place to park and walk to multiple destinations.
- **Parking Requirement Policies:** There are no parking requirements for developments in downtown Oberlin.¹³⁶ The City also granted the College a variance to reduce the number of mandated spaces at Kahn Hall from 180 to 20.¹³⁷

Context: Challenges and Barriers:

- **Subsidized Parking Permits:** College employees receive two free parking permits, which may encourage them to drive to work.¹³⁸
- **Special Events:** Oberlin experiences peak parking demand during commencement and other special events and this requires more capacity than at other times of the year.
- **Conflicting Needs:** It can be tricky to manage parking capacity for College students and for downtown businesses. Some students park in the free parking managed by businesses or by the City rather than the permitted lots near campus.¹³⁹

¹³⁵ Colin Koffel, Rob Lamppa, and Madeline Marvar.

¹³⁶ City of Oberlin, Ohio, *Comprehensive Plan*.

¹³⁷ Colin Koffel, Rob Lamppa, and Madeline Marvar.

¹³⁸ Colin Koffel, Rob Lamppa, and Madeline Marvar.

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Priority Actions

Table 26. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Parking Cash Out	Employers provide employees option of payment equal to value of free or subsidized parking.	College and private employers	Capacity of human resources staff to adjust payroll codes
Allow Bike / Car Parking Swaps	Allow developers to address parking requirements through bicycle parking.	City	Staff capacity
Green Parking for Events	Use vegetated open space or turf pavement for event parking, such as at commencement.	College	Capacity of College
Remove Minimum Parking Requirements	Remove minimum parking required for development to reduce incentives for vehicle ownership.	City	Staff capacity
Event Parking Fees or Limits	Limit or charge for event parking to encourage carpooling and to pay for mitigation measures.	College and business community	Not applicable
Parklets	Turn parking spaces into open spaces by creating mini-parks.	College and business community	Contributions from College or local businesses; SID; USHUD/USDOT Sustainable Communities Challenge Grants

Action Discussion: Regulatory actions could reduce the supply of parking if developers elect to respond to them. For example, the City could eliminate parking requirements for new developments communitywide, which may convince investors to provide fewer spaces for new residential units. Under a bicycle parking swap program, meanwhile, developers can elect to meet all or part of existing parking requirements by providing additional parking for bicycle or scooters.

The College and major employers can also reduce parking demand by providing alternatives for employees and repurposing their underused lots for part of the year. Although special events like Commencement require a large number of parking spaces maintained by the College and by the downtown business community, these could be converted into small “parklets” that provide additional open or civic space. The College and other major employers could offer their staff a monthly cash

¹³⁹ Jason Adelman and Krista Long.

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benefit in lieu of the cost of constructing and maintaining that space. This would help reduce the daily need for parking as more workers take the benefit.

Examples and Best Practices: The City of Fayetteville, Arkansas allows developers to provide bicycle or scooter parking in lieu of vehicular parking in developments within a half mile of a transit station or an expanding system of recreational trails.¹⁴⁰ As of March 2011, planners in the city felt that the option had been well utilized by developers in close proximity to the trails.

The Pavement to Parks program in San Francisco is a collaboration between the Mayor's Office, Department of Public Works, the Planning Department, and the Municipal Transportation Agency.¹⁴¹ The program temporarily converts transportation rights-of-way into plazas, parks, and other public spaces with inexpensive materials and designs. These "parklets" are used for street furniture, outdoor seating for local businesses, and other public purposes.

The National Park Service has instituted shuttle services in some heavily visited parks that may serve as a model for a parking policy that prevents visitors from driving inefficient vehicles in town. Travel on Zion National Park's Scenic Drive is permitted for park affiliated shuttle buses only in the summer months; visitors must park their cars and ride the shuttles.¹⁴² Similarly, the Grand Canyon closes several popular routes to private vehicles during peak summer months and provides a free shuttle to control traffic.¹⁴³ These may seem like extreme measures, but to get to climate neutral travel in Oberlin drivers of fossil fuel vehicles must be given an incentive to choose another mode of travel while they are in town.

Feasibility and Cost: The costs of these actions vary. Revisions to parking requirements would necessitate regulatory changes. A business will need some overhead to launch a parking cash out benefit, but will save money over the long term as it will need to provide fewer spaces for staff.

Replicability: As a destination for academics, students, and visitors for special events, Oberlin experiences peak parking needs that differ from those of communities that lack an educational institution. However, all communities manage and regulate their parking supply and so neighbors across northern Ohio should be able to fit these actions into their local context.

¹⁴⁰ John Coleman and Jeremy Pate, City of Fayetteville, AR, interviewed by Kyle Smith, March 18 2011.

¹⁴¹ "Pavement to Parks San Francisco", accessed August 2011, <http://sfpavementtoparks.sfplanning.org/>.

¹⁴² National Park Service, *Zion National Park Map and Guide*, Summer 2011, <http://www.nps.gov/zion/parknews/upload/ZionSummerMG2011.pdf>

¹⁴³ National Park Service, Grand Canyon Road Closures, January 12, 2011, <http://www.nps.gov/grca/planyourvisit/roadclosures.htm>

CARGO

Strategy 9. Cargo

Low-carbon solutions for cargo transport to and from Oberlin.

Table 27. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
High	Low	Near- to Medium-term	Low to Intermediate	Intermediate to High	Low to Intermediate	Intermediate to High

Description

Cargo, or the movement of goods to, from and around Oberlin, is not a large source of community transportation emissions, but it typically requires separate and targeted actions. As Oberlin is not a major transportation hub, cargo transportation in the Community is mainly demand driven. Therefore, the residents, businesses and institutions in Oberlin that create demand for cargo traffic will likely serve as the primary actors for change in this area.

Quantitative Assessment

Table 28. GHG and Energy Savings

Year	Annual Savings			Savings per Heavy Duty Vehicle Mile		
	2015	2030	2050	2015	2030	2050
Share of Heavy Duty Vehicle Miles Eliminated	18%	55%	70%			
Heavy Duty Vehicle Miles Eliminated	391,942	1,271,436	1,752,563			
Gallons of Diesel Saved	61,200	178,323	216,496	0.16	0.14	0.12
mtCO ₂ e Saved	588	1,713	2,080	0.0015	0.0013	0.0012

Qualitative Assessment

Many locally-owned heavy duty diesel vehicles will be converted to biofuel by 2050 under the alternative fuels portion of this plan, but for vehicles that are coming from outside the community strategies must be in place to eliminate the carbon impact of their travel by 2050. This strategy assumes that actions taken by local businesses and residents reduce cargo delivery by 70% by 2050 leading to 2,080 mtCO₂e in emissions reductions and 216,496 gallons of diesel saved. The impact of reducing a mile of heavy duty diesel traffic is significant, as today's freight trucks only get 5-6 mpg. Though new fuel economy standards are coming online for these vehicles, overall fuel economy is not expected to improve enough in coming decades to meet Oberlin's sustainability targets.

Key Actors: Businesses and major institutions create the most demand for cargo in Oberlin and will lead the implementation of these actions to reduce the energy use associated with it. The Oberlin Main Street/Chamber could be a lead implementer for the downtown business community.

CARGO

These actions provide an opportunity for local businesses and major employers to demonstrate their leadership in environmental stewardship. They do not address issues of transportation mobility or employment access.

Timeline: Near-term. These actions require business planning on the part of major implementers.

Context: Strengths and Assets:

- **Activism around Local Food:** Oberlin College launched a Farm to Fork program and partners with 23 local farms to provide local produce, meat, honey, and other items in campus dining halls.¹⁴⁴ Stakeholders interviewed for this project expressed an interest in food delivery solutions.
- **Oberlin Project:** The proposed Greenbelt around Oberlin could supply the community with some food, wood, and biofuel products that currently arrive by tractor trailer.¹⁴⁵

Context: Challenges and Barriers:

- **Reliance on Trucks:** Around twenty to thirty 54-foot trucks deliver goods to retail stores and restaurants in downtown Oberlin each week.¹⁴⁶ Wal-Mart also typically relies on tractor trailers.
- **Local Supply Chain:** Oberlin does not manufacture many consumer items, so downtown stores and restaurants are largely reliant on regional and national suppliers that distribute by truck.¹⁴⁷

¹⁴⁴ Oberlin College, "Dining – Local Foods," Accessed May 2011, <http://www.oberlin.edu/cds/social/vendors.html>.

¹⁴⁵ Jason Adelman and Krista Long.

¹⁴⁶ Jason Adelman and Krista Long,

¹⁴⁷ Jason Adelman and Krista Long.

Priority Actions

Table 29. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Cargo Bikes and Trailers	Make cargo bikes and bike trailers available for lending or renting to encourage use of bicycles for cargo.	Local bicycle stores or Oberlin Main Street/Chamber	Capital purchases by local businesses; SID
Low-carbon Cargo Delivery	Encourage local companies to develop sustainability plans for their supply chains that include low-carbon cargo delivery, such as through biofuels and local sourcing.	Local businesses, shippers	Shippers, cooperatives, private finance
Combining Shipments	Combine shipments to reduce the number of truck trips into and out of Oberlin	Local businesses, shippers	Capacity of shippers and local businesses
Buy Local	Encourage Oberlin Shoppers to buy locally sourced products that do not need to be delivered by freight truck.	Residents, volunteers, local businesses	Capacity of shoppers

Action Discussion: These solutions focus on lower carbon alternatives to truck transportation, especially within the borders of Oberlin. Delivery by bike or bike trailer provides an inexpensive and low energy alternative to local transportation that could be managed by one of Oberlin’s bicycle stores. Sustainability plans for supply chains can help local businesses uncover similar opportunities in the broader regional context.

Encouraging businesses to change their logistics to combine shipments and use lower-carbon shipping methods will also help Oberlin achieve a more energy efficient transportation system. Fossil fuel-based shipping is such a cornerstone of our economy today that making changes will require time and ingenuity, but addressing emissions associated with goods movement is necessary if Oberlin is to achieve a sustainable transportation system.

Examples and Best Practices: Businesses for Social Responsibility has a Clean Cargo Working Group that addresses issues of shipping energy and carbon intensity.¹⁴⁸ The GHG Protocol has recently issued standards that help businesses calculate the upstream emissions associated with their products and business operations.¹⁴⁹ While both of these are aimed at larger

¹⁴⁸ Businesses for Social Responsibility, *Clean Cargo*, Accessed August 2011, <http://www.bsr.org/en/our-work/working-groups/clean-cargo>

¹⁴⁹ Greenhouse Gas Protocol website, Accessed August 2011, <http://www.bsr.org/en/our-work/working-groups/clean-cargo>

CARGO

businesses, they speak to a growing movement to address the carbon intensity of the supply chain among businesses and consumers alike. Green procurement standards can require suppliers to reveal the carbon intensity of their supply chain and allow purchasers to select goods with lower-carbon lifecycles. One of the leading businesses in this area has been Wal-Mart, which may provide an avenue for collaboration in Oberlin. Wal-Mart's Sustainability Index tracks carbon through the supply chain of its suppliers and is part of Wal-Mart's larger sustainability initiative, which has included inducing suppliers to change packaging to reduce shipping volumes and energy use.¹⁵⁰

Feasibility and Cost: The feasibility and costs of these actions will vary depending on the business that is implementing them. For example, there may be more opportunity for a grocer or a restaurant to purchase locally sourced food than an office supply store to purchase inventory produced in Lorain County.

Replicability: These actions should be replicable for businesses in other northern Ohio that rely on trucks to ship their inventories and meet other needs. To the extent that these shipping changes end up saving money for local businesses replicability will be more feasible. It may be more difficult for towns that lack the cycling infrastructure and services of Oberlin to easily implement a bicycle cargo solution.

¹⁵⁰Walmart Incorporated, *Sustainability Index*, Accessed August 2011, <http://walmartstores.com/sustainability/9292.aspx>

LONG DISTANCE TRAVEL

Strategy 10. Long Distance Travel

Create options for low-carbon long distance travel to and from Oberlin.

Table 30. Summary

GHG Reduction Potential per Trip	Community-wide GHG Reduction Potential	Implementation Timeframe	Capital Cost	Operation and Maintenance Cost	Cost Effectiveness	Feasibility
Intermediate	Low	Medium to Long	High	High	Intermediate to High	Low to Intermediate

Description

Oberlin is the source of a significant amount of long distance travel, and though much of the emissions production and fossil fuel consumption associated with a long distance trip will not occur within the geographic boundaries of Oberlin, addressing Oberlin's role in creating this travel demand is an important part of a sustainable transportation strategy.

LONG DISTANCE TRAVEL

Quantitative Assessment

Table 31. GHG and Energy Savings

Year	Annual Savings			Savings per Flight Avoided		
	2015	2030	2050	2015	2030	2050
Flights Replaced with Videoconferencing	100 Flights	2,000 Flights	5,000 Flights			
Flight Miles Saved	73,369	1,467,380	3,668,449	734	734	734
Gallons of Fuel Saved	2,141	42,826	107,064	21	21	21
mtCO ₂ e Saved (includes radiative forcing)	57	1,139	2,848	0.57	0.57	0.57
Flights Replaced with Motor Coaches	250 Flights	3,000 Flights	500 Flights			
Flight Miles Saved	183,422	2,201,069	366,845	734	734	734
Gallons of Fuel Saved	4,057	64,239	10,706	16	21	21
mtCO ₂ e Saved	130	1,709	285	0.52	0.57	0.57
Flights Replaced with Rail (Conventional Rail 2015 and 2030, High Speed Rail 2050)	250 Flights	5,000 Flights	5,000 Flights			
Flight Miles Saved	183,422	3,668,449	3,668,449	734	734	734
Gallons of Fuel Saved	1,693	33,854	64,510	7	7	13
mtCO ₂ e Saved	107	2,145	2,439	0.43	0.43	0.49
Flights Replaced with Biofuel Airplanes			3,000 Flights			
Flight Miles Saved			2,201,069			734
Gallons of Fuel Saved			64,239			21
mtCO ₂ e Saved			1,709			0.57
Total						
Flights	600	10,000	13,500			
Flight Miles Saved	440,214	7,336,898	9,904,812			
Gallons of Fuel Saved	7,891	140,919	246,520			
mtCO ₂ e Saved	294	4,993	7,281			

Long distance travel is not included in the 2007 GHG inventory for Oberlin, because most of the emissions from a long distance trip occur elsewhere. (Oberlin College accounts for air travel for college-related business in its institutional GHG inventory, which is usual practice under organizational GHG accounting rules.) Because Oberlin's community GHG inventory does not include air travel, efforts to reduce it will not help toward meeting any emissions reduction targets. However, Oberlin is a globally connected city and attracts visitors from near and far, so it is a responsible to consider how travelers are getting to and from Oberlin as part of a sustainable transportation plan.

This strategy focuses on air travel. While buses and trains are used for some long distance travel to and from Oberlin their volume is not significant today. Driving long distance is more

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common, but not analyzed here, and many of the actions taken to reduce air travel emissions can also be used to address long distance passenger trips. The cargo strategy elsewhere in this plan will help address long distance freight trips.

It is unknown exactly how many flights are associated with travel to and from Oberlin today. An estimate has been made here based on passenger traffic at the Cleveland-Hopkins International Airport, Oberlin's share of regional population, Oberlin College reported air travel emissions, and the number of out-of-state students at the College, leading to an estimated 13,500 one way flights per year. This level of air travel would use 289,353 gallons of fuel and emit 7,697 metric tons of CO₂e a value that is 31% of Oberlin's total transportation GHG inventory. The large GHG impact of air travel is a combination of the distance of trips (the average airplane trip is 734 miles one way),¹⁵¹ the inefficiency of today's airplanes, and the increased impact of GHG emissions that are emitted in the atmosphere during flights (GHG emissions from flying are multiplied by 2.7 to account for this).¹⁵²

Five ways of reducing air travel emissions are considered in this scenario: 1) The replacement of air travel with video conferencing; 2) Substitution with intercity motor coaches; 3) Substitution with conventional rail; 4) Substitution with high speed rail; and 5) Use of biofuel for aircraft. In the near term, video conferencing has the largest emissions reduction per trip, but is an imperfect substitute for all forms of travel. Motor coaches are quite efficient, and a zero carbon biofuel motor coach could eliminate the direct GHG emissions associated with long distance travel, but travel times are greatly increased as compared to air. Over the long term, high speed rail has the greatest potential to substitute for air at a large scale, and though the type of high speed rail currently proposed in the U.S. is not emissions free, it can be quite efficient on a per-passenger mile basis. Biofuels are currently being tested in airplanes, but their widespread use is a long way off, and biofuels used at the same rate as today's jet fuel would be very difficult to make sustainable. To get to zero emissions for long distance travel would therefore require a push for carbon neutral high speed rail or large scale carbon neutral biofuels for aircraft.

Qualitative Assessment

Key Actors: Long distance travel options connect Oberlin to other points of the country and the world, so many key implementers will be located outside municipal boundaries. A competitive rail network can provide significant benefits, but it probably will require significant financial commitments from the state and federal governments.

¹⁵¹ U.S. Department of Transportation, Bureau of Transportation Statistics, *U.S. Air Carrier Traffic Statistics Through May 2011*, Accessed August 2011.

¹⁵² Clean Air-Cool Planet, *Campus Carbon Calculator, Version 6.7*, Accessed August 2011.

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As an educational institution, Oberlin College generates a significant amount of air travel for special events and as academics visit other locations. Because restrictions on air travel are not an effective business solution for the College, alternative transportation modes may be the best option for it to promote an environmental mission.

Timeline: Medium to long term. The implementation timeframe largely depends on the cost and planning process for the solution. For example, passenger rail could require right-of-way acquisition and station construction, while bus service utilizes limited-access highways.

Context: Strengths and Assets:

- **Amtrak:** Oberlin College students and residents can use one of Elyria's two Amtrak lines to directly reach Chicago, Buffalo, New York City, Boston, Pittsburgh, and Washington, DC.¹⁵³
- **Intercity Bus Services:** In 2010, two entrepreneurial graduates began service called Wilder Lines that charters a bus between New York City and Oberlin around major breaks.¹⁵⁴ Greyhound and Megabus also offer intercity service departing from Elyria and downtown Cleveland respectively.^{155,156}
- **Federal Investments in Rail:** Three members of Congress recently met with the U.S. Department of Transportation and Amtrak to discuss improvements that would reduce delays to existing services through station re-design.¹⁵⁷ Sometime in 2011, Amtrak will offer a direct ride between Philadelphia and Elyria.¹⁵⁸

Context: Challenges and Barriers:

- **"Last Mile" Connections:** The Greyhound and Amtrak stations in Elyria are each more than ten miles from Oberlin and it may require a car to reach them.¹⁵⁹
- **Academic Travel and Special Events:** Oberlin has a very highly connected population of residents and scholars that generates significant long distance travel. A large number of parents, former students, and other visitors come to Oberlin for Commencement weekend.

¹⁵³ Amtrak, "Amtrak – Timetables," Accessed May 2011, <http://www.amtrak.com/servlet/ContentServer/Page/1237405732505/1237405732505>.

¹⁵⁴ "Wilder Lines," Accessed May 2011, <http://www.wilderlines.com/>.

¹⁵⁵ Oberlin College, "Visiting Oberlin – Transportation," Accessed May 2011, <http://new.oberlin.edu/visitor/transportation.dot>.

¹⁵⁶ "Megabus US," Accessed May 2011, <http://us.megabus.com/>.

¹⁵⁷ All Aboard Ohio, *Passenger Rail News*, Issue 175, Spring 2011.

¹⁵⁸ Amtrak, *PIIRA Section 210 Report: Capitol Limited Performance Improvement Plan*, September 2010.

¹⁵⁹ Oberlin College, "Visiting Oberlin – Transportation," Accessed May 2011, <http://new.oberlin.edu/visitor/transportation.dot>.

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- **State Support for Rail:** Students and the College have expressed support for new investments in passenger rail, but this will require state investment before it can become a more competitive transportation option.

Priority Actions

Table 32. Actions

Action	Description	Potential Oberlin Implementer	Financing Options
Motor Coaches	Buses for long distance travel.	Wilder Lines; Megabus	Private investment
Conventional Rail	Buses for long distance travel.	Amtrak	Federal investment
High Speed Rail	Long-distance rail that is time competitive with air travel.	Federal Rail Administration and ODOT	Railroad Rehabilitation and Improvement Financing (RRIF); TIGER III; Potential future federal funding
Videoconferencing	Use of electronic meeting tools to eliminate long distance trips	College, city, local businesses	Shared videoconferencing facilities, capacity of organizations
Biofuel Airplanes	Use of zero carbon biofuels in airplanes, especially for international trips	Airlines, airports	Capacity of airlines

Action Discussion: Bus and rail service both consume relatively less energy than air travel. Buses utilize the existing highway system, which requires less state investment and a shorter implementation timeframe. Trains provide higher passenger capacity and may have greater potential for energy savings in the long-term. Upgrades to the existing Amtrak line would enhance the level, frequency and speed of service from Lorain County to several large metropolitan areas in the Northeast and the Midwest. Additionally, the construction of the “3C” corridor from Cleveland to Cincinnati would help travelers reach Oberlin from several Ohio destinations, especially if a station were constructed near Cleveland-Hopkins Airport. Biofuel is currently being tested to reduce the carbon intensity of air travel, which could provide a solution for international flights. European Union regulations on airplane carbon emissions are likely to drive efficiency improvements in the industry.

Examples and Best Practices: Oberlin’s own Wilder Lines provides an example of best practices for lower-carbon intercity travel. Building on the experience of that enterprise to replace more air travel trips with increased service could advance Oberlin’s sustainability by reducing its transportation carbon impact beyond the community’s borders.

Feasibility and Cost: A large scale low-carbon solution for long distance travel will require significant upfront capital to start and enhance service. Passenger rail will require increased federal and possibly state investment to enhance and expand service beyond the levels

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currently provided by Amtrak. A recently declined federal grant for the 3C corridor makes immediate state investment less likely and diminishes its feasibility. This is not a strategy Oberlin can undertake alone, but will require regional advocacy and coordination.

Replicability: Solutions for long distance travel are regional and national in nature and will create options that neighboring communities can also use. However, because Oberlin experiences demand for student and academic travel that may not occur in neighboring communities, transportation solutions at peak periods may not apply elsewhere. This is not a strategy Oberlin can undertake alone, but will require regional advocacy and coordination.

5 Conclusion and Supportive Actions

The Energy Efficient Transportation Plan described here will bring environmental, equity and economic benefits to Oberlin and Northern Ohio, but implementing it will be a big challenge. Achieving climate neutral transportation by 2050 will require leveraging Oberlin's substantial enthusiasm, expertise and creativity, as well as making hard decisions and investing real money. Climate change and fossil fuel dependence are not problems we created overnight and they will not be solved quickly. However, with commitment, Oberlin could become an international leader in sustainable transportation and help transform itself as well as small and large communities around the world.

Travelers in Oberlin are a diverse group with a large range of transportation needs, so no one strategy is going to meet all of the community's goals of mobility, access, equity, and sustainability. Rather, a coordinated multifaceted effort will be required. By providing a portfolio of alternatives to fossil fuel vehicle travel Oberlin will be able to give travelers choices they lack today. With this transportation plan in place, rather than sitting behind the wheel of a car, Oberlin travelers will be able to choose to ride a clean transit vehicle, share a ride with a neighbor, take advantage of expanded pedestrian amenities, or take care of business online rather than traveling at all.

The additional benefits that implementing an energy efficient sustainable transportation plan will bring are substantial. Increased exercise, improved air quality, additional community engagement, and reduced cost of living are just some of the potential improvements Oberlin will see. Reaching for a high level of sustainability will require innovation that leads to new business opportunities. It will create economic development opportunities as other communities seek to adopt the cutting edge technologies and services Oberlin has pioneered.

This transportation plan has discussed 10 strategies. But in fact there is an 11th strategy that will improve the success and impact of every one of the 10 other strategies in this plan: "Supportive Actions," which are policies and programs that have direct emissions savings that are difficult to quantify. The actions associate with this 11th strategy are listed below.

Measurement and Program Evaluation: One crucial element that will help Oberlin have a better chance at succeeding at building a sustainable transportation system is to improve data availability. The 2007 GHG inventory included some remarkable data gathering, but still lacks some of the detailed information that Oberlin will want as it moves toward implementing a sustainable transportation plan. Traffic counts, travel diaries, and travel surveys are all valuable transportation planning tools. Annual GHG inventories to track progress can create fast feedback loops, improve learning rates, and enable course corrections. Solid analytical evaluation of programs as they are implemented can help ensure that programs that are succeeding get energy and investment, while money is not wasted on programs that are not

creating expected benefits. Oberlin has a tremendous asset in the environmental analysis capacity of its resident student population and should leverage that throughout this process.

Education and Outreach: Few of the strategies discussed here will be possible without a great deal of communication with residents, businesses, students, visitors, and other Oberlin travelers. Travelers should be given clear information on the transportation options available to them and the benefits—economic, environmental and otherwise—to choosing a transportation alternative. Oberlin can make use of its existing networks and institutions, such as schools, employers, and community organizations to provide outreach. Transportation counselors could be trained to help households plan to meet their travel needs with transportation alternatives. Friendly competitions can motivate action and make travel reduction seem like a fun challenge.

Engage Stakeholders and Experts Oberlin has a remarkable number of local stakeholders interested in sustainable transportation and local experts on transportation, climate, and land use that it can leverage to help make this plan a reality. Additionally, the recent U.S. Department of Housing and Urban Development grant to the region through the Sustainable Communities Regional Planning Grant to NOACA provides a forum for regional dialogue and coordination on the issues in this plan.

Low-carbon Lighting: Streetlights and parking lot lights are not included in the transportation portion of Oberlin’s GHG inventory, but they are part of the transportation infrastructure and improving efficiency will reduce emissions and save the city on its utility costs.

Green Infrastructure As Oberlin reduces the number of cars on its roads and improves transit, pedestrian and bicycle infrastructure it has a chance to rethink the sustainability of its pavement. Green infrastructure that allows stormwater to infiltrate into the ground can be incorporated into transportation infrastructure using permeable pavement, greenways and other tools to support climate adaptation and water management.

Low-carbon Infrastructure: As with green infrastructure, the changes in transportation infrastructure that will occur under this plan will enable Oberlin to evaluate the lifecycle GHG impacts of the materials it uses in its roads and sidewalks. Reducing the lifecycle carbon impact of transportation infrastructure, such as through the use of fly ash and recycled concrete, would increase the sustainability of this plan even further.

Oberlin already has many of the attributes needed to make this plan a reality. The path to becoming the most sustainable community in the country—perhaps even the world—begins with things some Oberlin residents already do: walking to work, bicycling to the store, riding transit to an appointment, carpooling with a neighbor, or using sustainable biofuel to fuel a car. With perseverance and ingenuity Oberlin can expand on the transportation options available and return to its roots as a community with a solid backbone of transit and a network of low-

carbon transportation options for residents, students, workers, and visitors. All the while showing the world what it means to be a sustainable, economically thriving community into the second half of the 21st century.



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ELYRIA-OBERLIN TROLLEY, 1887. Photo Courtesy of Oberlin College Archives.

Appendix A: Modeling Methods

Modeling GHG and Energy Savings

The basic formula for calculating the energy savings for any transportation strategy is:

$$\text{Activity Savings} \times \text{Energy Use per Unit of Activity} = \text{Energy Savings}$$

GHG savings are calculated as:

$$\text{Energy Savings} \times \text{GHG Emissions per Energy Unit} = \text{GHG Savings}$$

So, 100 miles of vehicle travel avoided in a 20 mile per gallon vehicle would save 5 gallons of fuel:

$$100 \text{ miles saved} \times 1 \text{ gallon} / 20 \text{ miles} = 5 \text{ gallon of fuel saved}$$

Gasoline produces about 9 kg of CO₂ per gallon when it is burned, so 5 gallons of fuel saved reduces 45 kg of CO₂, or 0.045 mtCO₂.

$$5 \text{ gallons gasoline} \times 9 \text{ kg CO}_2 \text{ per gallon} = 45 \text{ kg CO}_2 \times 1 \text{ metric ton} / 1,000 \text{ kg} = 0.045 \text{ mtCO}_2$$

In addition to producing CO₂, gasoline combustion emits the GHGs nitrous oxide (N₂O) and methane (CH₄). To add different GHGs together on an equivalent basis each is multiplied by its global warming potential (GWP)—its global warming impact over 100 years as compared to CO₂, which has a GWP of 1—and the resulting values can be summed and expressed as CO₂e. N₂O has a GWP of 310 and CH₄ has a GWP of 21. So, emissions of 1 kg of CO₂, 1 kg of N₂O, and 1kg CH₄ would be expressed as 332kg CO₂e.

$$(1 \text{ kg CO}_2 \times 1) + (1 \text{ kg N}_2\text{O} \times 310) + (1 \text{ kg CH}_4 \times 21) = 332 \text{ kg CO}_2\text{e}$$

In actuality, N₂O and CH₄ are emitted in far smaller amounts than CO₂ in the combustion of fossil fuels. Moreover, their emissions are often dependent on vehicle air pollution control technology. So while CO₂ emissions are typically calculated on the basis of the amount of fossil fuel combusted, N₂O and CH₄ emissions are usually analyzed on a per vehicle mile basis. For the sake of simplicity, emissions factors are presented here on a per gallon basis. This shortcut does not make a material impact on the analysis as CH₄ and N₂O only represented 3% of Oberlin's gasoline and diesel emissions on a CO₂e basis in 2007.

Different sources provide slightly different values for the emissions factors and other coefficients used in this study. Some of this variability is legitimate; the exact amount of CO₂ produced by burning a gallon of fuel can vary depending on the gasoline formulation, its origin, and other factors. Where there was a choice to be made, the values used for this analysis were

APPENDICES

selected to match those used in the 2007 GHG inventory for Oberlin in order to provide a consistency in this analysis to that baseline. That study used ICLEI-Local Governments for Sustainability's Clean Air and Climate Protection (CACP) software. Business as usual fuel economies for vehicles were developed using the U.S. Department of Energy Annual Energy Outlook projections to 2030 and adjusting them to proportionately to CACP values for 2007.¹⁶⁰

¹⁶⁰ U.S. Department of Energy, Energy Information Administration, Annual Energy Outlook 2011, April 2011.

APPENDICES

Table 33. Coefficients

Scenario	Baseline	Business as Usual			After Actions		
	2007	2015	2030	2050	2015	2030	2050
Population	8,398	8,398	8,398	8,398	8,398	8,398	8,398
Number of Vehicles	5,188	5,188	5,188	5,188	4,911	4,063	3,388
Vehicle Miles Traveled per Year	40,559,100	41,874,131	44,455,819	48,147,346	34,108,892	22,282,196	10,124,090
Annual Miles per Vehicle	7,818	8,071	8,569	9,281	6,946	5,484	2,988
Gallons of Gasoline Consumed per Year	2,023,668	1,947,052	1,745,113	1,607,193	1,512,362	470,183	-
Gallons of Diesel Consumed per Year	434,688	418,231	374,854	345,228	319,864	92,676	-
Total Gallons of Fossil Fuel Consumed per Year	2,458,356	2,365,283	2,119,967	1,952,421	1,832,226	562,859	-
Vehicle Miles Per Gallon--All On Road Vehicles	16	18	21	25	19	23	29
Vehicle Miles Per Gallon--Light Duty Vehicles	19	20	25	30	21	27	35
Vehicle Miles Per Gallon--Heavy Duty Freight Vehicles	5.6	6.1	6.5	6.9	6.4	7.1	8.1
mtCO ₂ e per Gasoline Gallon	0.009740	0.009740	0.009740	0.009740	0.009740	0.009740	0.009740
CO ₂ e per Diesel Gallon	0.009608	0.009608	0.009608	0.009608	0.009608	0.009608	0.009608
CO ₂ e per Fossil Fuel Gallon	0.009717	0.009717	0.009717	0.009717	0.009717	0.009717	0.009717
CO ₂ e per kWh	0.0008700	0.0005003	0.0001305	-	0.0005003	0.0001305	-
mtCO ₂ e Gasoline per Year	19,710	18,964	16,997	15,654	14,730	4,580	-
mtCO ₂ e Diesel per Year	4,177	4,019	3,602	3,317	3,073	890	-
mtCO ₂ e Fossil Fuel per Year	23,887	22,983	20,599	18,971	17,803	5,469	-
mtCO ₂ e Electricity for Transportation per Year	-	-	-	-	94	485	-
mtCO ₂ e HFC-134a per Year	738	738	738	738	554	185	-
Total mtCO ₂ e per Year	24,624	23,721	21,337	19,709	18,451	6,139	-
Percent Change in CO ₂ e from 2007	0%	4%	13%	20%	25%	75%	100%

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Table 33 shows the coefficients used in this analysis. The data are divided into three scenarios. The Baseline scenario includes factors used in the 2007 GHG inventory for Oberlin. The Business as Usual scenario projects coefficients for 2015, 2030, and 2050 if Oberlin takes no action to reduce emissions and improve transportation energy efficiency. The After Actions scenario shows the coefficients after the strategies in this plan are implemented.

The After Actions coefficients are used to calculate energy and emissions savings for most of the analysis in this report. This is necessary because the different strategies in this transportation plan impact each other—as the average fuel economy of vehicles improves, the gallon of gasoline saved by avoiding a mile of travel goes down.

Consider the trip reduction strategy; eliminating 600,000 miles of travel in light duty vehicles would save 20,000 gallons of gasoline if the average vehicle were getting 30 miles per gallon. But if the average vehicle improves to 35 miles per gallon because Oberlin is taking steps to increase the efficiency of vehicles on its roads, savings are just 17,000.

Looping back in the results of the other strategies like this reduces double counting and helps provide a full account of the scale of action required to meet the emissions and energy goals. Think of it this way, one should not claim GHG savings from reduced gasoline use when buying an electric vehicle and then claim those same savings a second time when choosing to walk instead of driving the electric vehicle. The After Actions coefficients keep one from doing that. But, it should be noted that the After Action values are specific to the scale and scope of strategies as they are described in this report—they are the modeled results of the impacts of the strategies as described here. Implementing a different set of strategies, or changing the scale at which these are implemented will change those values, so care should be used when modeling alternate future scenarios.

Housing and Transportation Affordability Index



True Affordability and Location Efficiency

H+T[®] Affordability Index

Methodology

The Housing + Transportation Affordability Index is an innovative tool that measures the true affordability of housing by calculating the transportation costs associated with a home's location. Planners, lenders, and most consumers traditionally measure housing affordability as 30% or less of income. The H+TSM Index, in contrast, suggests that 45% of income is a conservative estimate for combined housing and transportation expenditures, and a reasonable goal that helps insure adequate funds remain for other household necessities.

The H+T Index was developed by CNT with the support of The Brookings Institution's Urban Markets Initiative, and was expanded to cover 337 metro areas with the support of the Rockefeller Foundation.

Transportation Model

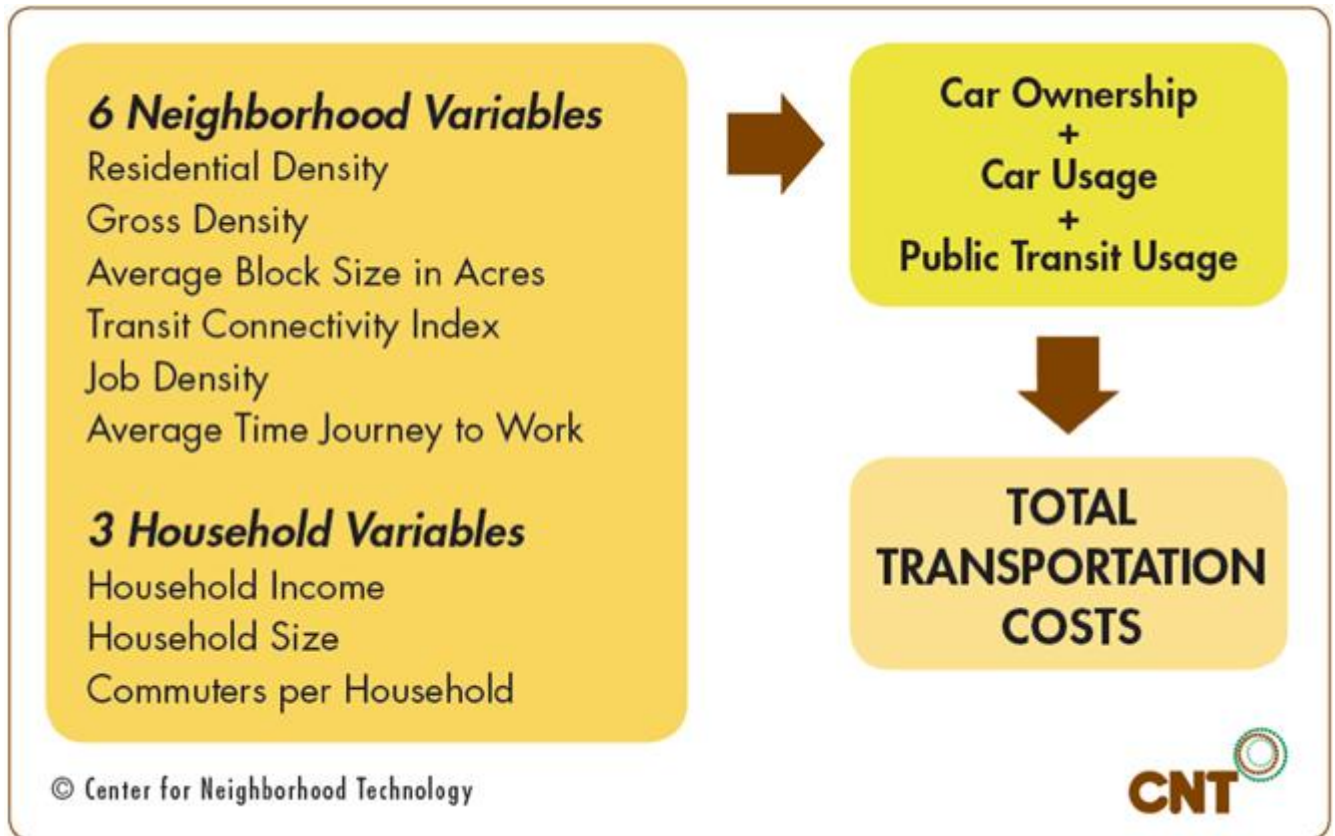
The transportation costs estimated in this model are more than the costs of commuting to and from work. They also include all other travel that is part of the household daily routine. The methods for the cost model are drawn from peer reviewed research findings on the factors that drive household transportation costs. The model assumptions, calculations, and methods have been reviewed by practitioners at the metropolitan Council in Minneapolis-St. Paul, fellows with the Brookings Institution, and academics from the university of Minnesota, Virginia Polytechnic, Temple University, and elsewhere, specializing in transportation modeling, household travel behavior, community indicators, and related topics.

Several publications have been published as part of the H + T research, including *The Affordability Index: A New Tool for Measuring the True Affordability of a Housing Choice* in 2006, and [Estimating Transportation Costs by Characteristics of Neighborhood and Household](#) in the *Transportation Research Record* in 2008.

The household transportation model is based on a multidimensional regression analysis, in which a formula describes the relationship between three dependent variables (auto ownership, auto use, and transit use) and nine main independent household and local environment variables. Neighborhood level (Census block group) data on household income (both average and median), household size, commuters per household, journey to work time

(for all commuters, transit commuters, and non-transit commuters), household density (both residential and gross), block size, transit access, and job access were utilized as the independent, or predictor variables.

A more complete discussion of the methods can be found online at <http://htaindex.cnt.org/downloads/Methods.3.3.11.pdf>



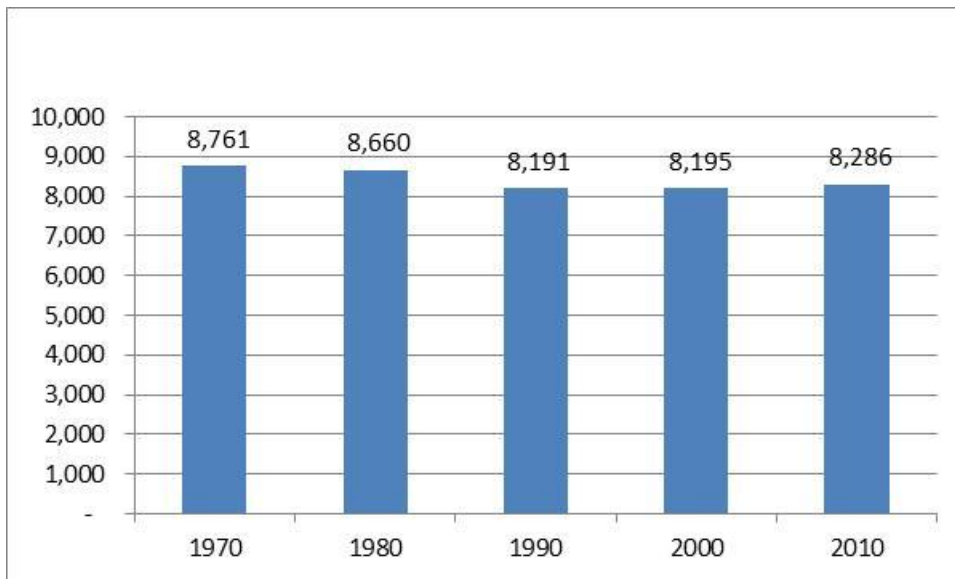
Appendix B: Expanded Oberlin Present-Day Transportation Profile

For the sake of brevity, the material in Section 3 of the report on Assets and Challenges is a small slice of what was gathered as background for this project. More detailed transportation profile data is provided in this Appendix for reference.

Population and Households: 8,286 Residents

There were **8,286 residents in Oberlin in 2010** according to the U.S. Census bureau. This is a 1% change from the 2000 census population. Oberlin has seen a slower rate of growth than the national average; population in the U.S. grew 9.7% between 2000 and 2010. As Figure 13 shows, Oberlin’s population has remained quite stable in recent decades.¹⁶¹

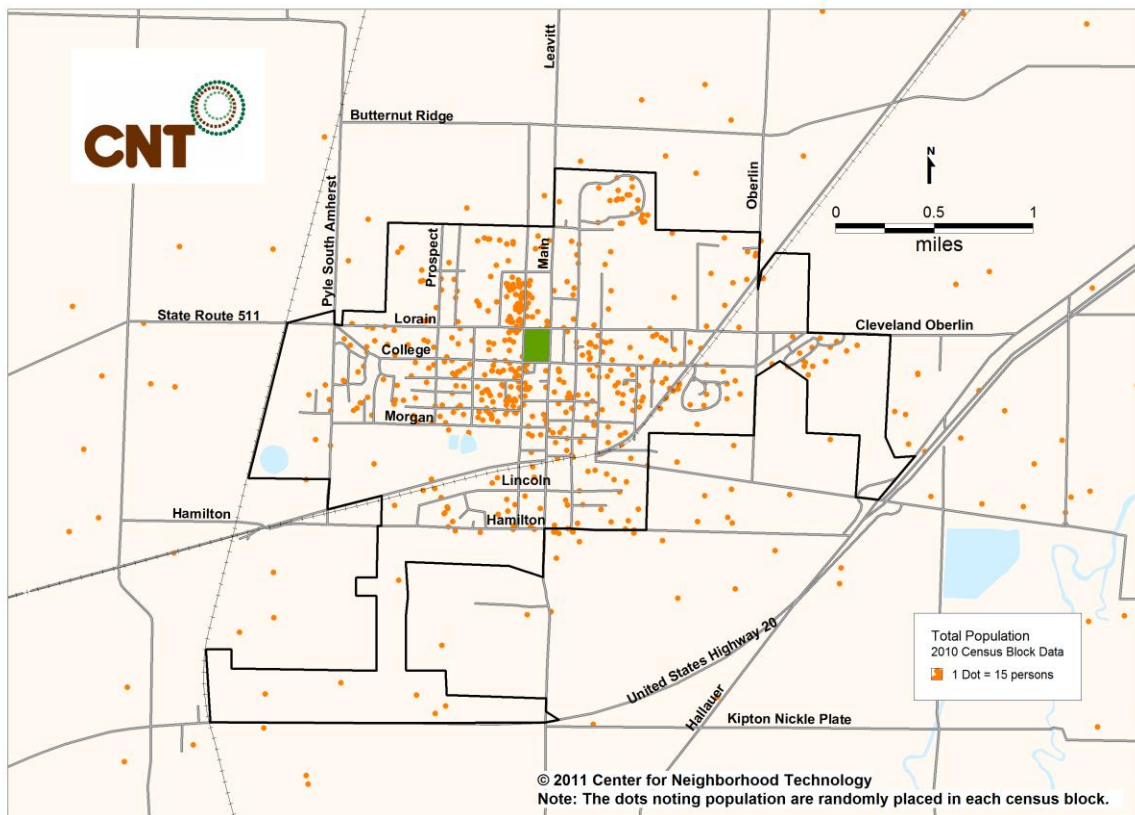
Figure 13. Oberlin Population 1970 to 2010



¹⁶¹ U.S. Census Bureau, Census 2000. U.S. Census Bureau, Census 2010, and U.S. Census Bureau, “1990 Census of Population and Housing: Population and Housing Unit Counts United States,” Table 45, August 1993, <http://www.census.gov/prod/cen1990/cph2/cph-2-1-1.pdf>.

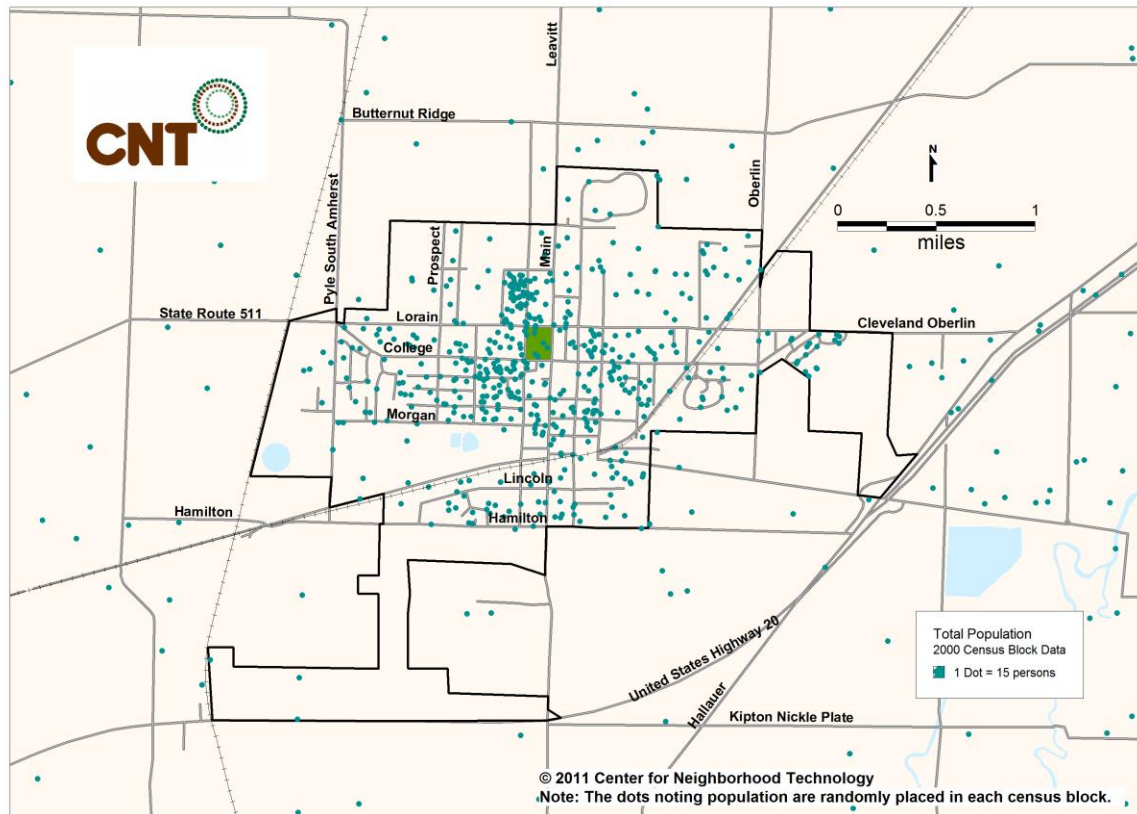
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Map 7. Oberlin 2010 Population



Map 7 and Map 8 provide visualizations of how population is dispersed in and around Oberlin. Each dot in the maps represents 15 persons and is placed randomly in the census block where it belongs to create a general picture of population density. Looking at population in this way clearly shows the clusters of students in campus housing, where population density is high relative to other parts of town.

Map 8. Oberlin 2000 Population



There were **2,730 households** in Oberlin in 2010,¹⁶² which is a 2% change from the 2,678 households in 2000.¹⁶³ As with population, the number of households has remained fairly steady over recent decades. The slight increase in households since 1970 may be in keeping with national trends of decreasing household size resulting in higher household numbers.

A college town like Oberlin cannot be fully characterized by using the census's analysis of households alone, however, because students living in dormitories are not considered households. Students in dormitories are counted as part of the Census's "group quarters" population. 2010 census data on this are not yet available, but in 2000, the census showed **2,018 people in group quarters**, of which 1,871 were categorized as "noninstitutionalized" most of which were likely students.¹⁶⁴ According to the Census Bureau, "[The census] classifies all people not living in households as living in group quarters. There are two types of group quarters: institutional (for example, correctional facilities, nursing homes, and mental hospitals)

¹⁶² U.S. Census Bureau, Census 2010.

¹⁶³ U.S. Census Bureau, Census 2000.

¹⁶⁴ U.S. Census Bureau, Census 2000.

and non-institutional (for example, college dormitories, military barracks, group homes, missions, and shelters).”¹⁶⁵

Vehicles: 3,200 Residential Vehicles

The American Community Survey (ACS) estimates **household vehicle ownership in Oberlin at 3,200** from 2005 to 2009 with a margin of error of plus or minus 602 vehicles.¹⁶⁶ The U.S. Census American Community Survey is a new type of study from the census that uses sampling data to estimate demographic characteristics more frequently. The use of sampling data results in a higher margin of error than the traditional decennial census, so the decrease in vehicles between the 2000 census data and the more recent ACS data cannot be identified as a definitive trend. The 2000 census found that there were 3,985 vehicles in Oberlin households, which excludes vehicles owned by the student population living in dormitories.¹⁶⁷

The CNT’s research has shown that households that live in location efficient neighborhoods—those areas with transportation alternatives and nearby amenities—own 1 less vehicle per household on average. As a result, households in location efficient areas spend less of their income on transportation. A typical Oberlin household has just 1 car (51% of households) with 2 cars (32%) and no cars (13%) being the next most common households.¹⁶⁸ According to the 2000 Census, there were 1.5 vehicles per household that year, which is slightly lower than the U.S. average of 1.7 vehicles per household.¹⁶⁹

In addition to household vehicle ownership, the City of Oberlin and Oberlin College have fleets of vehicles that are part of the community’s transportation profile. Commercial vehicles are another important piece of the transportation picture, though one that is harder to quantify. In total, there are **approximately 5,000 vehicles** registered in Oberlin,¹⁷⁰ a figure that may undercount student vehicles that are registered to other states and localities.

Vehicle Miles Traveled: 40.6 million miles

In addition to the number of vehicles, it is important to understand their use if one is trying to get a picture of motor vehicle travel in Oberlin. Annual VMT per vehicle is a primary measure of vehicle use. There is more than one way to consider VMT for a community. Three of these methods are particularly relevant to this profile:

¹⁶⁵ U.S. Census Bureau, American Factfinder Glossary, accessed May 5, 2011, http://factfinder.census.gov/home/en/epss/glossary_a.html.

¹⁶⁶ U.S. Census Bureau, 2005-2009 American Community Survey 5-Year Estimates.

¹⁶⁷ U.S. Census Bureau, Census 2000.

¹⁶⁸ U.S. Census Bureau, 2005-2009 ACS.

¹⁶⁹ U.S. Census Bureau, Census 2000.

¹⁷⁰ Calculated based on Nathaniel Flaschner Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality,” May 2009.

The method used for many GHG inventories and climate action plans is to count **all vehicle travel on roads within a community's geographic boundaries**. This essentially puts a bubble over the community and counts all vehicle movement within that bubble.

Alternatively, one can estimate the **travel of vehicles owned by a community's residents**—wherever those vehicles go within a region—and assign those VMT to the place where the vehicle is owned. This can be useful in considering measures to change household travel behavior and household transportation costs.

Finally, **origin/destination models** can be used to understand the travel to and from a community by residents and non-residents alike. Such models are helpful for a more nuanced understanding of transportation in a region.

Using the first method of on-road vehicle travel within the community, VMT in Oberlin was an estimated **40.6 million miles in 2006** according to data provided by the Northeast Ohio Areawide Coordinating Agency (NOACA) and reported in *A Baseline Greenhouse Gas Inventory for Oberlin: Stepping Up to the Challenge of Climate Neutrality*.¹⁷¹ This averages to approximately 15,000 vehicle miles per household, though not all travel on Oberlin's roads is done by Oberlin residents.¹⁷²

2006 vehicle travel in Oberlin was a 2.5% increase from the 2000 level of 39.6 million miles traveled.¹⁷³ Over that same period, VMT grew 10% nationally from 2.7 billion miles in 2000¹⁷⁴ to 3 billion miles in 2006.¹⁷⁵ Oberlin's slower growth in VMT is correlated to its slower growth rate in population than the national average, though this correlation may not be a causal relationship.

The error involved in downscaling a regional travel model to a small place like Oberlin means that the vehicle travel figures for the city have a great deal of uncertainty. Moreover, the GHG inventory states,

“It seems likely that NOACA has underestimated annual VMT within Oberlin's city limits, but [NOACA staff did not] provide any opinion regarding the directionality of NOACA's error. Furthermore, several other factors specific to Oberlin are somewhat problematic. Oberlin is a 'significant non-workplace

¹⁷¹ Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin.”

¹⁷² U.S. Census Bureau, Census 2010.

¹⁷³ Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin.”

¹⁷⁴ U.S. Department of Transportation, Federal Highway Administration, “Annual Vehicle Distance Traveled in Miles and Related Data-2000,” <http://www.fhwa.dot.gov/ohim/hs00/pdf/vm1.pdf>.

¹⁷⁵ U.S. Department of Transportation, Federal Highway Administration, “Annual Vehicle Distance Traveled in Miles and Related Data-2006,” <http://www.fhwa.dot.gov/policy/ohim/hs06/htm/vm1.htm>.

destination' throughout the seven-day week and has an irregular boundary, both of which increase the potential for error using NOACA's modeling."¹⁷⁶

CNT's Housing and Transportation Affordability Index, which is described further in the appendix, models household vehicle travel using the second method described above—assigning vehicle travel to the household that owns the vehicle. Using this method, a median income household in the Cleveland--Lorain—Elyria region would have driven an average of 17,242 miles in 2000, while that same household in Lorain County would have driven an average of 19,906 vehicle miles.

Origin/destination modeling, the third type described above, is used within the NOACA transportation model that was the basis for estimates of on-road VMT in Oberlin for the GHG inventory. Additionally, origin destination modeling is used later in this report to look at the locations of jobs for employees coming to and from Oberlin for work.

Mode Share: 32% Walking to Work

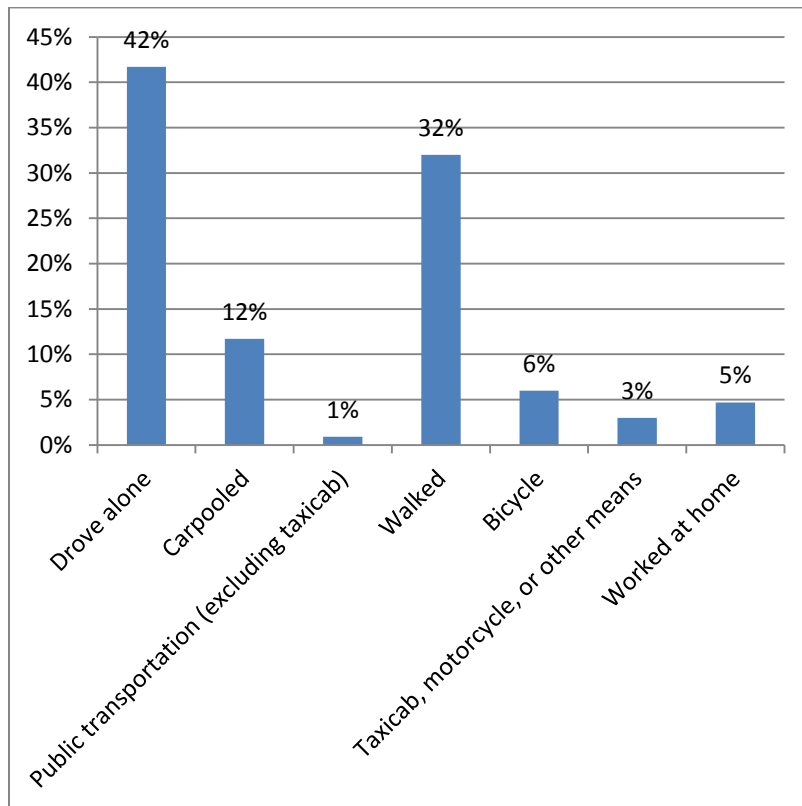
Oberlin residents, businesses, and visitors use more than just automobiles to meet their transportation needs. A complete picture of transportation for the area has many different transportation modes, including bicycles, walking, taxis, and carpooling. The U.S. Census Bureau collects data on the means of transportation to work. A community's transportation profile is made up of much more than just the commute patterns of its residents, so the census data provides an incomplete picture of transportation in Oberlin. Yet, it is useful to consider commute patterns by mode, as it provides indications for the mode share among all travel in the town. Moreover, these are trips that can often be shifted to other modes with the provision of transportation alternatives, incentives, and education.

The U.S. Census Bureau American Community Survey finds that a majority of workers in Oberlin, 53%, drive to work, which is considerably lower than the national average of 86%.

¹⁷⁶ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

Figure 14 shows that driving alone is the most common form of transportation at 42% of all workers.¹⁷⁷

Figure 14. Means of Transportation to Work



Among those who drove to work, the rate of carpooling is higher than the national average; 12% of car commuters in Oberlin carpool. Very few of Oberlin’s workers use transit for their commute, which reflects the current lack of transit service in the area. Notably, 32% of Oberlin workers walk to work, which is over ten times greater than the national value of 3%.¹⁷⁸

Behind carpooling, the next most common commute mode in Oberlin is bicycling at 6% of workers, which is a much greater share than the national value of 1%.¹⁷⁹ Oberlin’s rate of bike commuters is on par with many of the communities rated as great smaller bicycling cities by *Bicycling Magazine*, and greater than even many of the top bike cities of any size (

¹⁷⁷ U.S. Census Bureau.2005-2009 ACS.

¹⁷⁸ U.S. Census Bureau.2005-2009 ACS.

¹⁷⁹ U.S. Census Bureau.2005-2009 ACS.

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Figure 15 and Figure 16).¹⁸⁰ Some of those bicycling cities, such as Davis, California and Boulder, Colorado, have significantly higher shares of bicycling commuters than Oberlin, which shows that there may be room to grow Oberlin’s bike commute population.

Figure 15. Share of Commuters Bicycling in Oberlin and Bicycling Magazine's Top 5 Bike Cities under 100,000 Population

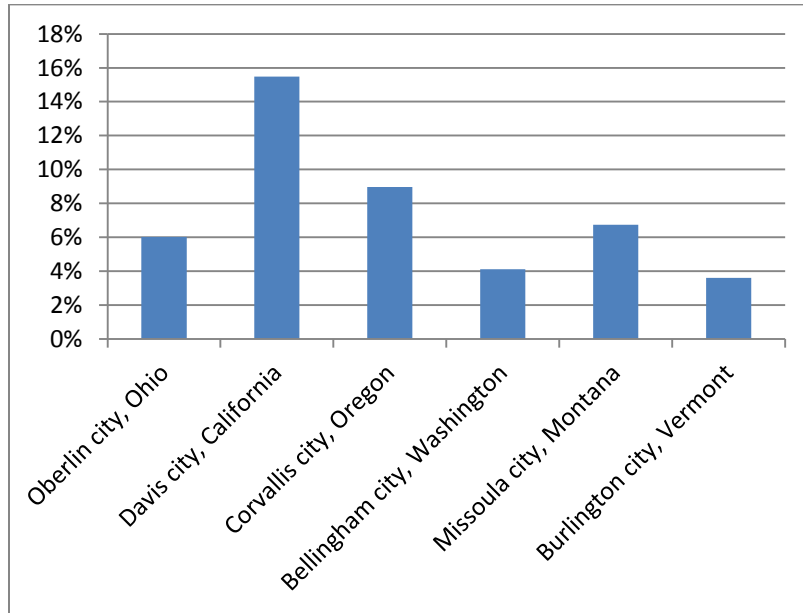
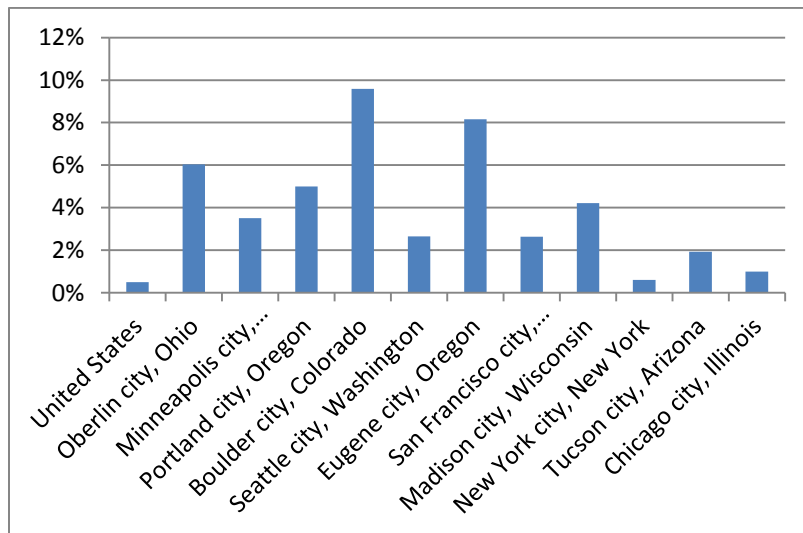


Figure 16. Share of Commuters Bicycling in US, Oberlin, and Bicycling Magazine's Top 10 Bike Cities



The average Oberlin commuter has a very short commute; 53% of Oberlin commuters travel under 10 minutes to work, as compared to 27% nationwide. A significant share of those with

¹⁸⁰ Christine Mattheis, “5 Small Bike-Friendly Cities,” Bicycling Magazine, accessed May 2011, <http://www.bicycling.com/news/featured-stories/5-small-bike-friendly-cities>.

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short commutes are walking and biking, but 41% of those in Oberlin with commutes of 10 minutes or less are driving or carpooling, so there is great potential for shifting to lower-carbon transportation modes among this population.¹⁸¹

Freight and Deliveries

As is typical for the national transportation system, goods that are delivered to Oberlin businesses arrive primarily by truck from other destinations in the global supply chain. An estimate of twenty to thirty 54-foot trucks deliver goods to retail stores and restaurants in downtown Oberlin each week.¹⁸² While no data was collected for Wal-Mart for this project, the company maintains a vast and decentralized distribution system that relies heavily on tractor trailers.¹⁸³ UPS sends several delivery trucks to both the College and the downtown on a daily basis.¹⁸⁴ OH-58 and OH-511 carry most of the truck traffic through town.¹⁸⁵

Oberlin does not manufacture many consumer items, so downtown stores and restaurants are largely reliant on regional and national suppliers that distribute by truck.¹⁸⁶

¹⁸¹ U.S. Census Bureau. 2005-2009 ACS.

¹⁸² Jason Adelman and Krista Long, interviewed by Kyle Smith, Oberlin OH, May 16 2011.

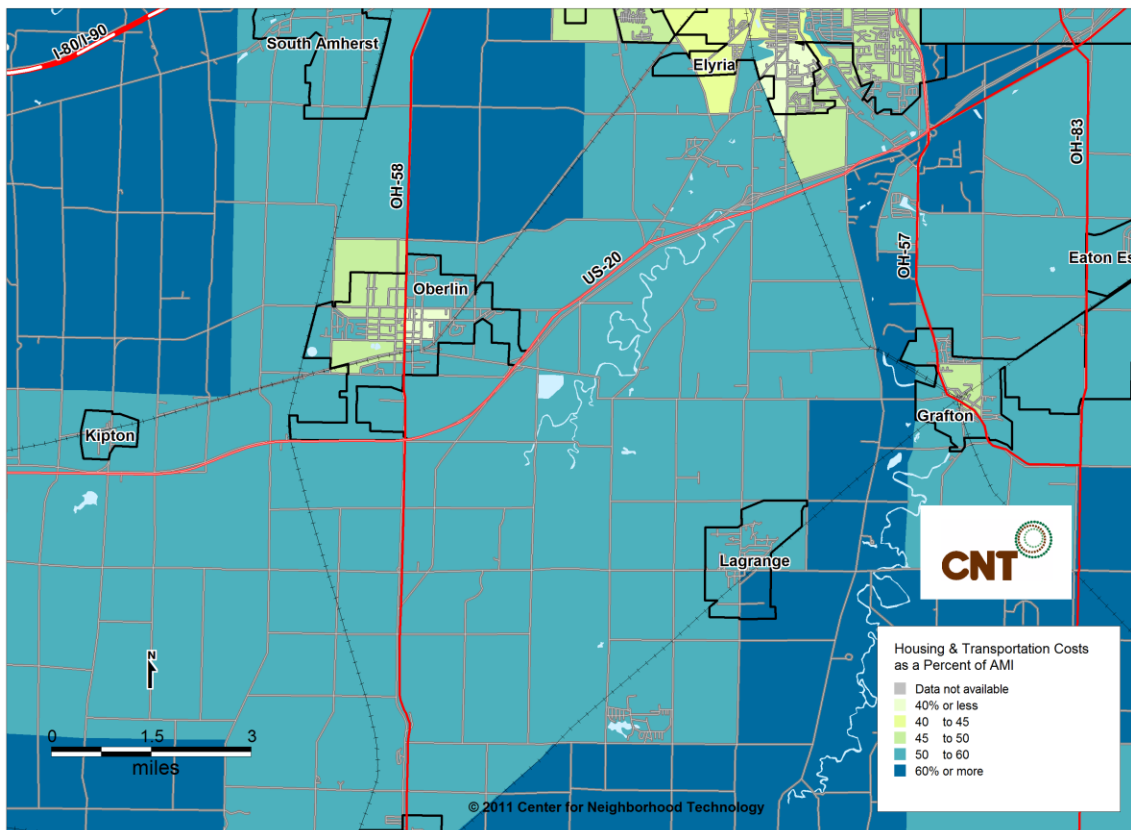
¹⁸³ P. Mohan Chandran, "Wal-Mart's Supply Chain Management Practices," *ICFAI Center for Management Research*, 2003.

¹⁸⁴ Jason Adelman and Krista Long.

¹⁸⁵ Oberlin Resident Focus Groups, Conducted by Kyle Smith, Oberlin, OH, May 16, 2011 and May 17, 2011.

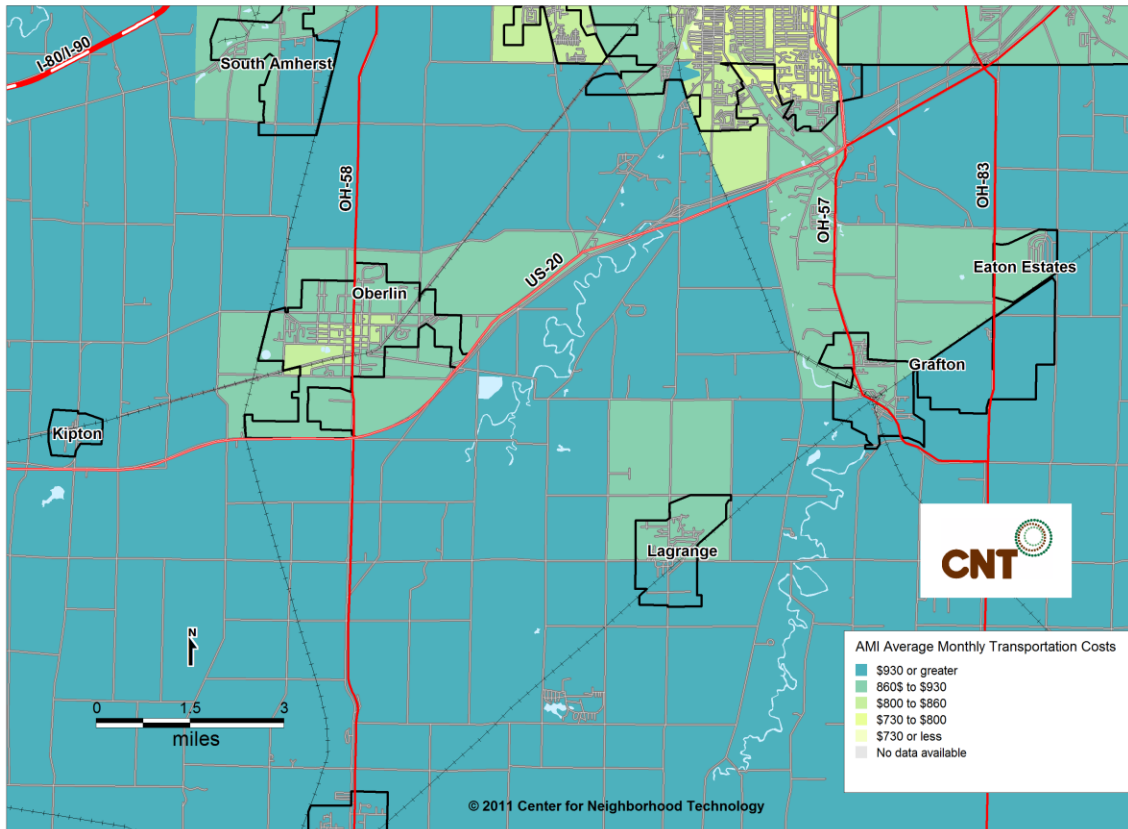
¹⁸⁶ Jason Adelman and Krista Long.

Map 9. Housing and Transportation Costs in Lorain County



Looking beyond city boundaries, Map 9 shows the relative affordability of housing and transportation in downtown Oberlin as compared to surrounding areas in Lorain County. Elyria and Grafton have neighborhoods with affordability similar to that of Oberlin, but the average household in the surrounding areas can spend 60% or more of their income on housing and transportation combined.

Map 10. Transportation Costs in Lorain County



In the broader Lorain County area, Map 10 shows that transportation costs increase the further out an average household is from the town centers in the county. This implies that despite the recent public transit challenges in the area, the historic towns still have land use patterns that reduce transportation needs as compared to the more newly developed parts of the region. Focusing new housing into these more affordable areas could curb transportation demand and transportation costs going forward.

Greenhouse Gas Emissions and Energy Use

Oberlin has completed GHG inventories for the city, government operations, and the College. This transportation profile focuses in on the transportation-related emissions in those inventories, as it is crucial to understand the scale of GHGs and energy use associated with travel in and around Oberlin if one is to develop low-carbon solutions for the area.

The methods for calculating the GHG impacts of transportation vary slightly from source to source, but the big picture is the same—the largest source of GHG emissions in the transportation sector is the use of fossil fuels. The less fossil fuel used—whether through less driving, more efficient cars, or the use of lower-carbon alternative fuels—the lower GHG emissions will be.

Beyond the emissions from vehicle fuel, transportation has climate change impacts through the GHGs used in vehicle air conditioners, the lifecycle GHG impacts of vehicles, and the carbon footprint of transportation infrastructure. Vehicles, roads, streets, and sidewalks all contain imbedded carbon and have a significant lifecycle carbon footprint that includes their manufacturing, transport, repair, and disposal. Similarly, fuels have additional GHG impacts when one considers the extraction, refining, and transportation required to get the fuel to the gas pump. An analysis of these lifecycle impacts have not been done for Oberlin, but it is worth keeping in mind that the emissions values presented here are just a part of Oberlin’s global transportation GHG impact.

Community Transportation Emissions: 23,887 mtCO₂e

With a few exceptions that will be discussed elsewhere, Oberlin’s motor vehicle transportation is primarily fueled by petroleum that emits GHGs when combusted. Transportation accounted for 15% of the community-wide GHG emissions in Oberlin in 2007, emitting 23,887 metric tons of carbon dioxide equivalent (mtCO₂e). This was a slight 2% decrease in emissions from the 2001 inventory, which showed 24,441 mtCO₂e in emissions from the transportation sector. Emissions decreased in that period, even though VMT increased, because average on-road vehicle fuel economy was estimated to have improved over that time period.¹⁸⁷

As a share of its total GHG footprint of 158,213 mtCO₂e, Oberlin’s transportation emissions are low relative to many other communities. This is caused, in part, by the carbon intensity of Oberlin’s electricity, which causes electricity consumption to make up a greater share of the emissions profile than the same amount of electricity use would in other places. In 2007, Oberlin Municipal Light and Power System (OMLPS) had an average GHG intensity of 0.87 kilograms CO₂e per kilowatt hour (kg CO₂e/kWh).¹⁸⁸ This is 48% higher than the national average that year (0.59 kg CO₂e/kWh); and 23% higher than the average for the regional electrical grid (0.71 kg CO₂e/kWh).¹⁸⁹

¹⁸⁷ Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin.”

¹⁸⁸ Meyer, “A Baseline Greenhouse Gas Inventory for Oberlin.”

¹⁸⁹ U.S. Environmental Protection Agency, “eGRID2010 Version 1.1 Year 2007 GHG Annual Output Emission Rates,” May 9, 2011, http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2010V1_1_year07_GHGOutputrates.pdf

The higher carbon intensity of Oberlin's electricity use was mainly due to the large share of coal in the electricity generation mix. Coal, one of the most carbon-intensive fuels, was the generation source for 76% of the electricity used in Oberlin in 2007. Comparatively, coal generated 48% of electricity nationally in 2007. If Oberlin's electricity mix had looked like the national average in 2007, transportation would have been 20% of the community's emissions instead of 15%.¹⁹⁰

As a result of Oberlin's electricity resource mix, emissions from electricity consumption were 55% of the community-wide GHG inventory in Oberlin in 2007, while making up only 26% of the end-use energy consumed in the community in terms of British thermal units (BTUs). Comparatively, transportation was 15% of the emissions profile but 23% of the energy use.¹⁹¹ This shows that if the electricity generation mix were to stay the same, electrification would not be a sound carbon reduction strategy for transportation, as switching a given vehicle from gasoline and diesel fuel to coal-based electricity could increase its emissions. However, as Oberlin works to decarbonize its electricity generation, electricity will become much more competitive on a carbon-per-useful-energy basis, to the point where electricity may become the cleaner choice as a transportation fuel. The wind, landfill gas, and hydropower electricity that will be a larger share of Oberlin's electricity in coming years may enable the use of low-carbon electricity for transportation.

Oberlin will receive 85% of its electricity from renewable sources by 2015, however, that electricity will only help the community be carbon neutral to the extent that the carbon credits associated with the electricity are retained. For purposes of modeling emissions from electric transportation in this report it is assumed that half the renewables are purchased with carbon credits in 2015, which increases to 85% carbon neutral electricity in 2030, and 100% in 2050. Acceleration of the process of making electricity carbon neutral in Oberlin will increase the effectiveness of electric vehicles as a low-carbon transportation strategy.

Fugitive Emissions: 738 mtCO₂e

The refrigerant used in most vehicle air conditioners, known as HFC-134a, is a potent GHG with a global warming impact 1,300 times greater than CO₂. Oberlin's 2007 community-wide GHG inventory estimates that the leakage of this gas from vehicles emitted 738 mtCO₂e that year, based on an estimate of average emissions rates and vehicle registrations in the city. This source is a small share of Oberlin's overall global warming impact—less than 1%—but is a

¹⁹⁰ Calculated based on U.S. Environmental Protection Agency, "eGRID2010 Version 1.1." and Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

¹⁹¹ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

source that should be considered when designing sustainable transportation strategies for the area.¹⁹²

Community Petroleum Use: 2.5 Million Gallons

Oberlin's GHG inventory shows that vehicles driving in Oberlin consumed 254,178 million BTUs of gasoline and 53,038 million BTUs of diesel fuel in 2007, which is approximately 2 million gallons of gasoline and over 400,000 gallons of diesel. At 2011 retail fuel prices, this represents about \$8.5 million of expenditures, most of which are leaving the community, making the value of reducing transportation fuel use in Oberlin clearly evident; that level of expenditure equates to approximately \$1,000 per capita.

Biofuel

Biofuels, such as biodiesel and straight vegetable oil (SVO) can offer low-carbon alternatives to petroleum powered travel, though much debate has occurred in recent years over the total climate change impact of biofuels, as fuels derived from non-sustainably grown sources, or fuels that require large amounts of energy for processing, can have very large lifecycle GHG footprints. Biofuel use is not accounted for in Oberlin's GHG inventory, but the direct CO₂ emissions from burning biofuels are often excluded from GHG calculations anyway as sustainably grown biofuels will allow the carbon that is emitted during combustion to be reabsorbed when the plants are regrown.

Some vehicles in Oberlin have been converted to alternative fuels. Oberlin College grounds vehicles use 20% biodiesel¹⁹³ and a few tractors can use SVO. A small number of residents of Oberlin and farmers in surrounding townships have also converted their vehicles and tractors to utilize SVO. However, barriers to wider adoption of biofuels remain, including cost, availability, and vehicle choice.

Since 2004, Full Circle Fuels has converted over 300 cars, trucks, big rigs, and tractors to run on SVO.¹⁹⁴ Many of these conversions were for vehicles owned by residents outside Lorain County and Full Circle Fuels draws customers from as far away as Kentucky and Maryland. In addition to performing conversions themselves, Full Circle Fuels also educates vehicle owners about the process to encourage adoption of the practice beyond Oberlin.¹⁹⁵

Full Circle Fuels also operates two gas pumps for biodiesel and for SVO. Customers at the biodiesel pump can choose between 100% biodiesel, 100% conventional diesel, or nine

¹⁹² Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

¹⁹³ Colin Koffel, Rob Lamma, and Madeline Marvar, interviewed by Kyle Smith, Oberlin OH., May 16 2011

¹⁹⁴ "Full Circle Fuels," accessed May 26 2011, <http://www.fullcirclefuels.com/>.

¹⁹⁵ Sam Merritt.

combinations of the two.¹⁹⁶ About half of the roughly one dozen restaurants in town that produce vegetable oil export it to Full Circle for use as SVO.¹⁹⁷ The City purchased the tanks for Full Circle Fuels through the sale of renewable energy credits.¹⁹⁸

However, Full Circle Fuels only operates between 9 AM and 5 PM, and biofuel sales are a secondary focus of its business. Most residential customers who purchase biofuel at Full Circle use it for longer trips to Cleveland and Pittsburgh rather than for trips around town. A biofuel station that operates longer hours and accepts credit cards would make biofuel a more convenient option on a day-to-day basis.¹⁹⁹

Electric Vehicles

Hybrid electric vehicles are becoming common on the road in the U.S. and while data are not available on the number of hybrid-electric vehicles in Oberlin, the College has hybrids in its fleet.²⁰⁰ However, the College may have begun phasing them out of service.²⁰¹

The City of Oberlin has begun switching its fleet to more fuel efficient vehicles and purchased two hybrids in 2010. The Oberlin Police Department resisted purchasing hybrid vehicles out of concern that the engines are too weak for public safety needs. Purchasing hybrid pick-up trucks has been mentioned as an option for other city maintenance vehicles.²⁰²

While plug-in electric vehicles are not commonly used in Oberlin today, the College has electric charging capacity in one parking lot and the city is investigating installing electric vehicle charging stations downtown. The City has installed capacity for one or two charging stations in the lot behind College Street and Main Street in the western section of downtown.²⁰³ Also, Oberlin College mail service has a plug-in electric cargo van.²⁰⁴

Municipal Operations Transportation Emissions: 801 mtCO₂e

In addition to a community-wide GHG inventory, Oberlin has prepared an inventory of emissions associated with its municipal operations. Municipal operations emitted 10,355 mtCO₂e in 2007 or 6.5% of the community emissions (though some municipal emissions

¹⁹⁶ "Full Circle Fuels."

¹⁹⁷ Sam Merritt.

¹⁹⁸ Bryan Burgess and Ken Sloane, interviewed by Kyle Smith, Oberlin OH, May 16 2011.

¹⁹⁹ Sam Merritt.

²⁰⁰ Oberlin College, "Environmental Sustainability: Transportation." Accessed May 19, 2011. <http://new.oberlin.edu/office/environmental-sustainability/progress/transportation.dot>

²⁰¹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁰² Bryan Burgess and Ken Sloane.

²⁰³ Bryan Burgess and Ken Sloane.

²⁰⁴ The College Sustainability Report Card, "Report Card 2011: Oberlin College," accessed May 2011, <http://www.greenreportcard.org/report-card-2011/schools/oberlin-college/surveys/campus-survey>.

occurred outside community boundaries).²⁰⁵ Within municipal operations, transportation emissions were calculated based on gasoline and diesel usage for city-owned vehicles. A survey of employee commute patterns was also administered to estimate emissions associated with employee commute travel.

The total government transportation emissions were 801 mtCO₂e or 8% of the total government inventory. Fleet vehicles emitted 485 mtCO₂e from fuel use, while employee commuting emitted 316 mtCO₂e. Fugitive emissions from vehicle air conditioners were estimated to be 14 mtCO₂e in 2007. Each fleet vehicle emitted an average of 5 mtCO₂e in 2007 and each employee commute emitted an average of 2 mtCO₂e.²⁰⁶

Municipal fleet vehicles consumed 32,874 gallons of gasoline and 17,315 gallons of diesel in 2007, which cost \$135,751. City employee commuting consumed about the same amount of gasoline—32,144 gallons—but significantly less diesel—279 gallons.²⁰⁷

Air Travel

Oberlin's GHG inventory does not account for air travel emissions. While Oberlin does not have an airport within its boundaries, Oberlin is a community that both attracts visitors from around the world and has a very highly connected population of residents and scholars. Therefore, it is likely that the emissions profiles of residents and organizations in Oberlin and visitors to Oberlin include a substantial amount of air travel. There is no international consensus on how to account for air travel emissions in communities that do not have an airport, but when the average round trip flight from Cleveland to New York can produce nearly a half ton of GHG emissions per person, plus the potential increased impacts of emissions emitted at higher altitudes, it is not an emissions source that should be ignored for a fully sustainable transportation system.²⁰⁸

While the College has periodically discussed energy-efficient solutions for student travel during academic breaks and the end of semesters, the College has not identified a solution for the energy use of faculty trips to academic conferences and other professional endeavors. The College has installed teleconferencing technology, but it has not been not heavily adopted. Restrictions or regulations on air travel are not seen as an acceptable strategy for College business. Similarly, a large number of parents, former students, and other visitors come to

²⁰⁵ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

²⁰⁶ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

²⁰⁷ Meyer, "A Baseline Greenhouse Gas Inventory for Oberlin."

²⁰⁸ Travel Analytics, "Airline Carbon Emissions Calculator," accessed May 2011, <http://carbon.trx.com/Home.asp>.

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Oberlin for Commencement weekend, but no feasible energy-efficient mode of transportation has been identified.²⁰⁹

College Transportation Emissions: 2,891 mtCO₂e

Oberlin College has made a commitment to climate neutrality by 2025 relative to its 2007 baseline emissions inventory of 51,049 mtCO₂e by signing the American College and University Presidents Climate Commitment (ACUPCC).²¹⁰ As shown in

²⁰⁹ Colin Koffel, Rob Lamma, and Madeline Marvar.

²¹⁰ Oberlin College, "Oberlin College: A Plan to be Carbon Neutral," October 2009.

Table 34. Oberlin College Transportation GHG Emissions

, transportation emissions accounted for 6% of the total emissions from the College in 2007, which includes emissions from fleet vehicles commuting and air travel for College events.

An updated emissions inventory was reported for 2009 and found transportation accounted for 2,891 mtCO₂e, or 7% of that year's total. Emissions from all types of transportation were lower in 2009 than in 2007; however, caution should be taken in extrapolating those trends as the report for 2009 notes, "Travel and commuting data are estimates carried over from the previous inventory."²¹¹

²¹¹ American College & University Presidents Climate Commitment, "GHG Report for Oberlin College," Last modified February 15, 2011, <http://rs.acupcc.org/ghg/1707>.

Table 34. Oberlin College Transportation GHG Emissions

Category	2000 GHG Emissions (metric CO ₂ e) ^{212*}	2007 GHG Emissions (metric tons CO ₂ e) ^{213**}	2009 GHG Emissions (metric tons CO ₂ e) ²¹⁴
Total Oberlin College Emissions	45,738	51,049	42,609
Total Transportation Emissions	2,648 (6% of total)	3,217 (6% of total)	2,891 (7% of total)
Fleet Vehicles	371	238	220
Commuting	1,521	1,814	1,792
Air Travel	424	1,165	879
Ground Travel for College Events	136	Not reported, possibly in another category	Not reported, possibly in another category
Transport of Coal to College	196	Not reported	Not reported
*Note the 2000 inventory used a different methodology and published emissions values in short tons, they have been recalculated here to metric tons, but care should be made when making comparisons with the 2007 and 2009 inventories.			

The report *Oberlin College: Climate Neutral by 2020*, which was published in 2002, was one of the first of its kind, and in it the Rocky Mountain Institute prepared a GHG inventory for the College for the year 2000.²¹⁵ These emissions are included in Table 34, but as different methodologies and boundaries were used to develop that inventory the transportation numbers are not directly comparable to the 2007 and 2009 inventories. It is interesting to note, however, that even with the differences between the reports, transportation is a similar share of emissions for the College at 6%.

²¹² Rocky Mountain Institute, *Oberlin College: Climate Neutral by 2020*, January 2002.

²¹³ American College & University Presidents Climate Commitment, "GHG Report for Oberlin College," Last modified November 26, 2008, <http://rs.acupcc.org/ghg/367>.

²¹⁴ American College & University Presidents Climate Commitment, "GHG Report for Oberlin College," Last modified February 15, 2011, <http://rs.acupcc.org/ghg/1707>.

²¹⁵ Rocky Mountain Institute, *Oberlin College: Climate Neutral by 2020*.

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As part of its climate neutral commitment, Oberlin College published a climate action plan in 2009, *Oberlin College: A Plan to Be Carbon Neutral*. The emissions reduction strategies identified in the plan did not focus on transportation aside from discussing the purchase of a limited number of carbon offsets for activities like transportation. Stationary combustion emissions and electricity consumption were such a large share of the College's GHG impact that focusing emissions reduction on those areas is understandable. However, as the College's other types of energy use get cleaner, the transportation emissions will become greater share of its footprint if not addressed as well. That said, the College has developed many transportation alternatives as part of its environmental policy and sustainability initiatives that are documented elsewhere in this report.²¹⁶

A 2010 Campus Survey completed by Oberlin for the *College Sustainability Report Card* shows that Oberlin College's fleet of 74 vehicles includes 2 electric vehicles, 3 hybrids, and 22 club cars. The survey response also states, "Newer, more efficient vehicles are being phased in to replace older, less efficient vehicles. Additionally a Kubota tractor was converted to run on waste vegetable oil used for lawn mowing and snow plowing."²¹⁷

The Campus Survey response for Oberlin also estimates that 99% of students and 60% of employees commute to campus, "via transportation methods other than single-occupancy vehicles (e.g., bicycle, walking, public transportation, carpool/vanpool)."²¹⁸ The 2009 version of the same survey showed a breakdown estimate of 99 % of students, 48% faculty and 27% staff commuting via non-single occupancy vehicles.²¹⁹ The almost universal use of non-single occupant vehicles for commute by Oberlin students is greatly facilitated by the estimated 90% of full-time students that live on campus.²²⁰

Oberlin College's Environmental Policy, which was published May 2004, is comprehensive in scope and sets an ambitious agenda for sustainable transportation. The Environmental Policy states,

"Over the years, Oberlin students, faculty, and staff have become increasingly reliant on cars for their day-to-day activities. This development has reduced the quality of life on and around Oberlin's campus through the attendant growth of centrally located parking lots and increased traffic. More importantly, it has also reinforced an increasingly troublesome culture of environmental disregard.

²¹⁶ Oberlin College, "Oberlin College: A Plan to be Carbon Neutral," October 2009.

²¹⁷ The College Sustainability Report Card, "Report Card 2011: Oberlin College."

²¹⁸ The College Sustainability Report Card, "Report Card 2011: Oberlin College."

²¹⁹ The College Sustainability Report Card, "Report Card 2010: Oberlin College," accessed May 2011, <http://www.greenreportcard.org/report-card-2010/schools/oberlin-college/surveys/campus-survey>

²²⁰ The College Sustainability Report Card, "Report Card 2011: Oberlin College."

College transportation policy should therefore be formulated to reverse this trend by encouraging alternative modes of transportation, such as bicycles, and increasing the efficiency of the vehicles that continue to be used. The strong link between transportation use and environmental quality provides an ideal opportunity to educate Oberlin students, faculty, and staff about environmental responsibility.”²²¹

The Environmental Policy goes on to prioritize low-carbon transportation modes, but states a need for vehicles, “when they carry visitors, persons with disabilities, or are engaged in emergencies, deliveries, or maintenance.” The Environmental Policy sets the goal of incentivizing sustainable transportation by both students and employees, but calls for consideration for those students, employees, and visitors traveling from outlying areas. The transportation strategies discussed in detail in the Environmental Policy are: “Parking and Enforcement,” “Encouraging the use of efficient vehicles and alternative modes of transportation,” “Measurement,” “Consultation with the City of Oberlin,” and “Education.”²²²

In-town Alternatives and Regional Travel

Those traveling within Oberlin and the region have different transportation needs than those going on long-distance trips. Accordingly, the transportation alternatives for those types of trips need to be considered in different ways. This transportation profile therefore looks at the transportation choices for short and longer-distance trips separately.

Bike

The town enjoys a robust set of services and infrastructure for a place of its size. Aside from OH-58 and OH-511, the lightly trafficked streets make them suitable for bicycling.²²³ Although no bike lanes exist in the city, streets such as Professor Street see regular activity. The town has installed bicycle racks in key locations around downtown Oberlin.²²⁴

Significant gaps remain in the citywide bicycle infrastructure. Students lock so many bikes on the fences in front of Slow Train Café that it has become difficult to walk past them on the sidewalks some days.²²⁵ Disrepair of some Oberlin roads discourages widespread cycling, especially during harsh Ohio winters.²²⁶

²²¹ Oberlin College, “Oberlin College Environmental Policy,” May 2004, <http://oberlin.edu/sustainability/about/OCEnvironmentalPolicyMay2004.pdf>.

²²² Oberlin College, “Oberlin College Environmental Policy.”

²²³ City of Oberlin, Ohio, *Comprehensive Plan*, January 3, 2005.

²²⁴ Jason Adelman and Krista Long.

²²⁵ Bryan Burgess and Ken Sloane.

²²⁶ Jason Adelman and Krista Long.

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Oberlin College has experimented with numerous bicycle policies with mixed results. The College recently installed covered bike canopies that cost \$15,000 outside of Mudd Library in the center of campus designed to handle heavy snow. Students are currently designing a new bike canopy that would be cheaper to construct, but additional locations have not been identified. The College considered a bicycle giveaway program for new students, but determined that it would not reduce the number of vehicles on campus. The College once developed a bicycle sharing program but discontinued it after many bicycles were stolen.²²⁷

Three bicycle shops and stores operate around Oberlin. The Oberlin Bike Co-Op is located at 154 North Main Street and offers bicycle repair, rental, and education services to students at the College and residents of the town.²²⁸ Dale's Bike Shop is located near US-20 at 43239 Oberlin-Elyria Road.²²⁹ In 2011, Swerve opened at 23 S. Main Street in Downtown.²³⁰

The North Coast Inland Trail connects the city of Oberlin to the city of Elyria to the northeast and the town of Kipton to the southwest. Lorain County Metro Parks is extending the trail northward to downtown Lorain, with an on-road connection through Elyria.²³¹ The completed trail will connect Oberlin with the two largest cities in Lorain County.

Lorain County lacks the infrastructure to allow bicycling to be a realistic alternative to regional car trips. Only one street that intersects with the Kipton-Elyria trail has a marked lane.²³² Before LCT cut its service, it removed bike racks from its fleet due to poor maintenance.²³³ Due to a lack of coordination between county park systems, bicycle trails in Lorain County do not connect to trails in Cuyahoga County.²³⁴

Within Oberlin, the lack of a designated lane connecting the Kipton-Elyria trail and to the rest of the city has discouraged recreational riders from visiting Downtown. The city is installing its first bicycle lane along North Professor Street, which will connect downtown Oberlin to the trail. There are a few additional bike/walking paths in the downtown area connecting it to surrounding neighborhoods including the recently completed bike trail along Park St, the path through Martin Luther King park, and the path from W Vine St along Plum Creek to S Professor.

²²⁷ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²²⁸ Oberlin College Student Organizations, "Oberlin Bike Coop," accessed May 2011, <http://www.oberlin.edu/stuorg/bikecoop/bchome/bchome.html>.

²²⁹ "Dale's Bike Shop," accessed May 2011, <http://dalesbikeshop.com/>.

²³⁰ "New Bike Shop, Swerve in Oberlin Now Open," *Back Roads and Beaches*, May 6, 2011, <http://backroadsandbeaches.blogspot.com/2011/05/new-bike-shop-swerve-in-oberlin-now.html>.

²³¹ Lorain County Metro Parks, "North Coast Inland Trail," accessed May 2011, <http://www.metroparks.cc/reservation-north-coast-inland-trail.php>.

²³² Google Maps, accessed May 2011.

²³³ Richard Enty, interviewed by Kyle Smith, Oberlin OH, May 17 2011.

²³⁴ Hunter Morrison, interviewed by Kyle Smith, May 26 2011.

These paths are linked together via sidewalks. Downtown Oberlin’s unique mix of amenities make it a regional entertainment destination, so some visitors might ride on weekends once the lane is complete. However, the majority of outside visitors will continue to drive.²³⁵

Walk

The city’s comprehensive plan recognizes a need to preserve walkability and connect new developments with the existing street grid. The city encourages sidewalks and discourages cul-de-sacs and dead end streets in all new developments.²³⁶

Because the College campus is located across Tappan Square from downtown, it is easy to walk between the two.²³⁷ Numerous pedestrian paths connect the buildings of the campus across attractive open spaces and regularly intersect with sidewalks in the remainder of the town.

Oberlin’s low crime rate—approximately half that of the national average—makes it a particularly attractive walking city.²³⁸ Oberlin College offers a “Walking Safety Escort Service” for students that do not feel comfortable walking alone.²³⁹

In downtown Oberlin, sidewalks include brick pavers, trees, and other amenities. Most of these amenities were installed in the 1980s and need replacement. Over the last decade, the City has invested in new curb cuts at intersections, pedestrian crossing signals at Main and Vine and Main and College, and new crosswalk markings at intersections without traffic lights.²⁴⁰

Significant gaps in sidewalk coverage limit mobility in newer neighborhoods. The degraded state of some sidewalks makes them dangerous for seniors during icy winters.²⁴¹ Many neighborhoods built between 1950 and 1980 lack sidewalks altogether. Sections of OH-511 and OH-58 maintained by the Ohio Department of Transportation (ODOT) also lack sidewalks. ODOT has opposed lower speed limits and additional stop signs along both roads.²⁴²

In 2011, ODOT awarded the City of Oberlin a \$610,000 Safe Routes to School grant to improve area sidewalks to three neighborhood schools. The grant includes traffic signal flashers at three intersections, School Zone flashers on Prospect Street, and ADA-compliant sidewalk and

²³⁵ Jason Adelman and Krista Long.

²³⁶ City of Oberlin, Ohio, *Comprehensive Plan*.

²³⁷ City of Oberlin, Ohio, *Comprehensive Plan*.

²³⁸ City-data.com, “Oberlin, Ohio.” Accessed May 20, 2011.<http://www.city-data.com/city/Oberlin-Ohio.html>

²³⁹ Oberlin College, “Get Around Campus.” Accessed May 19, 2011.<http://new.oberlin.edu/transportation/get-around-campus.dot>

²⁴⁰ City of Oberlin, Ohio, *Downtown Revitalization and Development Plan: Update 2010*, May 13 2010.

²⁴¹ Oberlin Resident Focus Groups.

²⁴² Bryan Burgess and Ken Sloane.

crosswalk improvements at twelve locations.²⁴³ The grant will make it easier for all residents to walk around sections of town where the installation of sidewalks lapsed after the 1950s.²⁴⁴

Lorain County Transit

Due to budget difficulties, Lorain County Transit (LCT) reduced its 12 transit routes to 2 and ended regular bus connection from Oberlin to other destinations in the County. The cuts were the result of a combination of state and federal budget cuts and a decision by the County Board of Commissioners to reduce funding by \$500,000 when a sales tax levy failed. According to *The Chronicle-Telegram*, “U.S. Rep. Betty Sutton, D-Copley Township, was able to arrange for \$295,000 in transit funding, but county officials said many routes still must be eliminated because the federal money does not bring in matching money like county money does.”²⁴⁵

Oberlin Connector

After LCT eliminated transit service, the town and College evaluated several mobility alternatives and eventually settled on a Connector service. The city originally sought an allocation of Congestion Mitigation and Air Quality (CMAQ) dollars through NOACA but could not secure a large enough local match to adequately fund a service that would meet all of the transportation demands of students and residents. The city then scaled back its plans.²⁴⁶

In 2010, the city launched a three-month pilot for the Oberlin Connector and chose to continue the service after it proved successful.²⁴⁷ The bus runs on Monday to pre-arranged destinations within Oberlin and alternates between destinations in Elyria and Lorain from 9:00 AM and 3:00 PM. Fares cost \$2.35 for adults, \$1.15 for senior citizens and low-income residents, and \$5.00 for a one-day pass. The city contracts with Lorain County to provide the service. It costs \$40 to operate the vehicle per hour with an additional federal \$40 per hour match provided through Lorain County.²⁴⁸

This limited service does not fully address mobility issues for most residents, especially those with medical appointments, but the city cannot afford to expand it. Anticipating general

²⁴³ City of Oberlin, Ohio, “Safe Routes to School Countermeasure Application,” application to the Ohio Department of Transportation, November 5 2010.

²⁴⁴ Bryan Burgess and Ken Sloane.

²⁴⁵ Cindy Leise, “County’s transit plan reduces LCT to two routes.” *The Chronicle-Telegram*, December 31, 2009. <http://chronicle.northcoastnow.com/2009/12/31/countys-transit-plan-reduces-lct-to-two-routes/>

²⁴⁶ Gary Boyle and Eric Norenberg, interviewed by Kyle Smith, May 25 2011.

²⁴⁷ Gary Boyle and Eric Norenberg.

²⁴⁸ City of Oberlin, “Oberlin Connector Transit Service,” Accessed May 2001.

<http://www.cityofoberlin.com/files/city%20manager/oberlin%20connector%2012-16-10.pdf>.

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revenue losses in 2012, the city has asked the Wal-Mart Foundation for a \$25,000 grant, but that grant application was not successful.²⁴⁹

RideLine

Oberlin College operates a stop-to-stop vehicle escort service called RideLine that runs along a fixed route around the campus.²⁵⁰ It operates between 9 PM and 2 AM daily and it provides Oberlin College students a safe mode of transportation from one destination to another. It is primarily used as a “drunk bus” for students consuming alcohol.²⁵¹

Student Union

The Oberlin College student union occasionally offers shuttles to certain parts of Cleveland, including West Side Market and Crocker Park.²⁵²

Cleveland RTA at Airport

While the RTA does not offer direct service to Oberlin, the RTA Red Line is about 25 miles away and serves Tower City, University Circle, and West Side Market. The closest station is at Cleveland-Hopkins Airport and the closest Park-and-Ride is at Brookpark Station.

Airport Oberlin Shuttle

The Airport Oberlin Shuttle (AOS) can also be used as a method of regional transportation because it connects Oberlin residents with the RTA at the Cleveland airport. The LCT was used for this purpose before service was cut and there are still Oberlin residents who use the AOS to get to and from Cleveland.

Hertz Connect

Since October Oberlin College has partnered with Connect by Hertz for three shared vehicles in the town. Membership for students is free. Cars include the cost of gasoline and insurance and are priced by the mile.²⁵³ Oberlin College has considered auto-enrolling first year students into the program at no cost.²⁵⁴

Each of the three cars is located along the edge of the campus within walking distance to surrounding residential neighborhoods:²⁵⁵

- A Mazda 3 behind Keep Cottage at 154 N. Main Street.

²⁴⁹ Gary Boyle and Eric Norenberg.

²⁵⁰ Oberlin College. “Transportation Options for Students: Get Around Campus,” Accessed May 2011. <http://new.oberlin.edu/transportation/get-around-campus.dot>.

²⁵¹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁵² Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁵³ Oberlin College Office of Sustainability, May 2011.

²⁵⁴ Colin Koffel, Rob Lamppa, and Madeline Marvar.

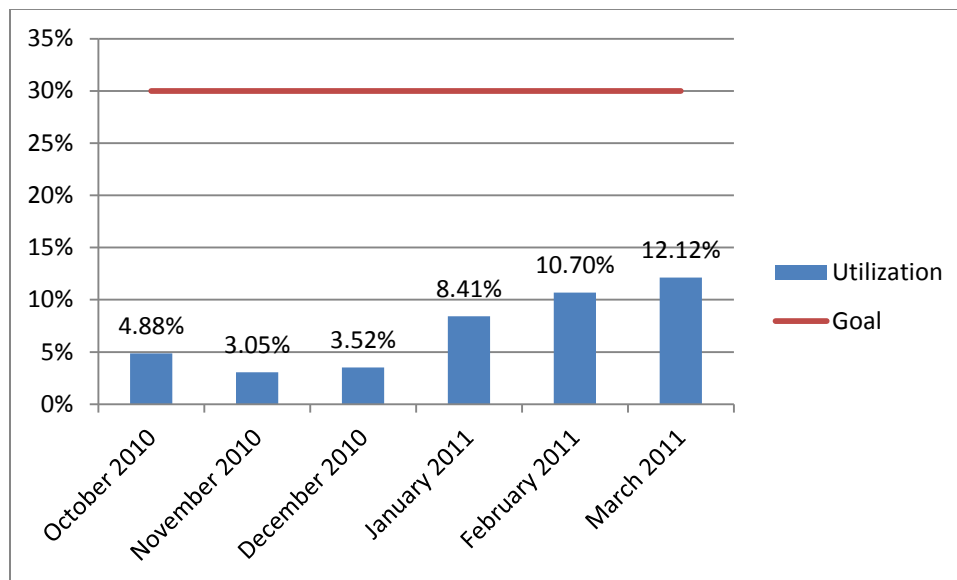
²⁵⁵ Hertz, “Connect by Hertz,” Accessed May 2011, <http://www.connectbyhertz.com/>.

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- A Toyota Prius behind the Adam Joseph Lewis Center for Environmental Studies on Elm Street.
- A Ford Escape behind the Oberlin Inn at 7 N. Main Street.

In the six months of Hertz service, the number of members has increased from 17 to 91. Utilization of the vehicles steadily increased from October to March 2011 (Figure 17),²⁵⁶ and the city is optimistic that car sharing will eventually reduce the number of student vehicles in Oberlin.²⁵⁷

Figure 17. Hertz Connect Utilization in Oberlin



Hertz is rolling out charging stations nationally and the College installed wiring behind Kahn Hall during its construction. However, Hertz will not consider electric vehicles to be an effective investment until the ridership for the cars increase.²⁵⁸

The city of Oberlin also attempted to coordinate a volunteer car sharing program among local residents, but it failed due to legal concerns about insurance in the event of an accident.²⁵⁹ The growth of peer to peer car sharing programs in other areas and the development of policies to overcome insurance, liability, and other barriers may make this more of an option in the future.

²⁵⁶ Connect by Hertz, Monthly Reports, accessed May 2011.

²⁵⁷ Gary Boyle and Eric Norenberg.

²⁵⁸ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁵⁹ Bryan Burgess and Ken Sloane.

Shared Rides through Oberlin Classifieds

Students at the College and residents of the town both find shared rides through the Oberlin classifieds.²⁶⁰ In the spring of 2011, the “Seeking Sides” section sought transportation for an array of regional destinations including the Cleveland Clinic, concert venues, connections to bus stops, rail stations, and both airports.²⁶¹ Nearly two thirds of the postings were for long-distance intercity trips on weekends and after commencement to all parts of the country.

The “Rides Offered” section in spring 2011 featured long-distance travelers for the summer looking to share gas costs as well as several different ad hoc paid ride services. Sample prices included \$10 within Oberlin, \$15 to Elyria, \$20 to the Cleveland Airport, and \$30 to other transport hubs in Cleveland. At least one driver charged a \$10 premium for late night or early morning rides.

Rideshare

NOACA, along with two other regional planning agencies, operates *OhioRideShare*, which allows users to identify potential carpool partners to destinations. While NOACA does not track rideshare activity, 11 vehicles in Oberlin’s zip code 44074 were registered in 2011; 8 vehicles registered in other zip codes listed 44074 as a destination.²⁶²

One of the concerns of carpool participants is a lack of flexibility and the potential to get stuck at work when an issue arises. NOACA addresses this by providing a “Guaranteed Ride Home.” The program reimburses 80% of bus or taxi fare up to \$60 as often as 4 times per year.²⁶³

Travel Options for Long Distance Travel

Oberlin College’s students and faculty come from all over the globe and are part of a worldwide scholarly community, so long-distance travel is more a part of Oberlin’s travel profile than many towns its size. There are several long-distance travel options available in the region, but accessing them other than by car can be a challenge. Cleveland-Hopkins International Airport is about 25 minutes from Oberlin and provides direct and connecting service to cities around the world.

Air Travel

Cleveland-Hopkins International Airport is about 25 minutes from Oberlin. It is the largest airport in Ohio. As a Continental Airlines hub, it offers direct flights to several metropolitan

²⁶⁰ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁶¹ Oberlin Classifieds, “Rides Offered,” and “Seeking Rides,” Accessed May 19, 2011, <https://oncampus.oberlin.edu/classifieds>

²⁶² Colleen Donnelly, “OhioRideShare service request,” Email to Kyle Smith, May 9 2011.

²⁶³ Northeast Ohio Areawide Coordinating Agency, “Guaranteed Ride Home (GRH) Program,” Accessed May 6, 2011. <http://www.noaca.org/grh.html>

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areas throughout the country, although this could change after the airline completes its merger with United Airlines.²⁶⁴

Two carriers offer shuttle service between Oberlin and Cleveland-Hopkins International Airport. The Airport Oberlin Shuttle (AOS) operates three shared vans from Oberlin to Cleveland-Hopkins and five vans from Cleveland-Hopkins to Oberlin on Monday through Friday during the fall and spring semesters. It costs \$15 each way.²⁶⁵ Service costs \$15 for a shared shuttle or \$49 for an arranged car service. Around major holidays and breaks, the College contracts with Brecksville Road Transit to offer a much larger charter bus.²⁶⁶ The bus runs as many as sixteen trips a day, seats 47 passengers, and costs \$5 for a pre-ordered ticket and \$6 for a walk on.

Oberlin College has determined that an increasing number of students fly out of Akron-Canton Regional Airport, which is 75 miles away by car. Several low cost carriers provide direct service from this airport to major cities in the Northeast and Midwest.²⁶⁷ The College does not provide any shuttle service to this airport for students.²⁶⁸

Amtrak

Oberlin College students and residents can use one of Elyria's two Amtrak lines to directly reach Chicago, Buffalo, New York City, Boston, Pittsburgh, and Washington, DC, but it is inconvenient to access and it arrives in the middle of the night. The *Capitol Limited* connects Chicago and Washington, DC the *Lake Shore Limited* connects Chicago to Boston and New York City through Ohio. All of these trains arrive and depart between midnight and 5 AM.²⁶⁹

The station is 12.5 miles away from Oberlin by car and LCT does not provide service to the station. Oberlin College estimates that ten students use Amtrak for breaks.²⁷⁰

Intercity Bus

There is a Greyhound station in Elyria that is about 20 minutes away from Oberlin.²⁷¹ Megabus offers low cost direct service from Tower City in Cleveland to Chicago, Pittsburgh, and Toledo

²⁶⁴ Jay Miller, "United Airlines CEO Smisek says Cleveland must 'earn its hub status every day,'" *Crains Cleveland*, November 10 2010.

²⁶⁵ "Airport Oberlin Shuttle Service," Accessed May 2011, <http://airportoberlinshuttle.com/>.

²⁶⁶ Oberlin College, "Airport Shuttle Service – Oberlin College," Accessed May 2011. <http://new.oberlin.edu/transportation/shuttles.dot>.

²⁶⁷ Akron-Canton Regional Airport, "Akron-Canton Airport: A Better Way to Go," Accessed May 2011, <http://www.akroncantonairport.com/>.

²⁶⁸ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁶⁹ Amtrak, "Amtrak – Timetables," Accessed May 2011,

<http://www.amtrak.com/servlet/ContentServer/Page/1237405732505/1237405732505>.

²⁷⁰ Colin Koffel, Rob Lamppa, and Madeline Marvar.

²⁷¹ Oberlin College, "Visiting Oberlin – Transportation," Accessed May 2011, <http://new.oberlin.edu/visitor/transportation.dot>.

several times per day.²⁷² In 2010, two entrepreneurial graduates began service called Wilder Lines that charters a bus between New York City and Oberlin around major breaks. The service costs \$100 one way or \$150 for a round trip.²⁷³

Land Use

The design of Oberlin and its location and mix of homes, businesses, and institutions affects where residents go and how they get choose to get there. Much research continues to be done on the complex interplay of travel demand and land use, but the basic concepts are simple to understand. When it is easy to walk a few blocks for an errand, more people will do so. If the library, post office, or destination of any other errand is far away, difficult to access, or unsafe, fewer people will walk there. Every day, these individual decisions are shaped in part by the land use of a place and added together they determine the travel patterns for the region.

Oberlin remains small and compact, with a land area of 4.4 square miles.²⁷⁴ The central configuration of the town includes interconnected streets and a concentration of amenities around downtown Oberlin and the Oberlin College campus. This makes it an inherently very walkable and bikeable place, even with growing commercial areas at the edge of town. Automobile trips within Oberlin are likely to be short, which can make alternative vehicles and fuels an especially good fit. However, Oberlin's small size means that it is a small market for any transportation alternative. Solutions that require a larger scale of users to become economically viable will require creativity to implement in Oberlin.

From a land use perspective, Oberlin's location in the larger region determines transportation patterns as well. The nearest major city, Cleveland, is 35 miles away and difficult to access by means other than an automobile, yet is a destination for students and residents. Oberlin's relative remoteness also means that it does not benefit from some of the transportation alternatives available in the region; the Greater Cleveland RTA's rail lines do not extend as far as Oberlin.

Oberlin College

The configuration of the Oberlin College campus makes it easy and convenient for students to access all of their destinations without an automobile. Many classrooms, a student union, and Mudd Library all overlook the central quad of Wilder Bowl with two clusters of student housing to the north and the south.²⁷⁵ Additional housing options include co-operative housing, program housing, and off-campus rentals, some of which are located further from Wilder Bowl.

²⁷² "Megabus US," Accessed May 2011, <http://us.megabus.com/>.

²⁷³ "Wilder Lines," Accessed May 2011, <http://www.wilderlines.com/>.

²⁷⁴ U.S. Census Bureau, Census 2000.

²⁷⁵ Oberlin College, "Campus Map/Directions," Accessed May 27 2011, <http://new.oberlin.edu/visitor/index.dot>.

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A few student services are located just outside the heart of the campus. Student Health Services and Allen Memorial Hospital on West Lorain Street provide health services west of Wilder Bowl. Indoor and outdoor athletic facilities are located at the northwestern edge of campus near the intersection of Union and Woodland Streets. The distance between these facilities and South Campus just exceeds ten minutes or one half mile, a commonly accepted standard for reasonable walking distance.²⁷⁶

Downtown Oberlin

Downtown Oberlin sits across Tappan Square from Wilder Bowl and spans the south side of College Street and both sides of S. Main Street. Most buildings along both streets are relatively dense, compact and occupied, which make it an easy and enjoyable place to walk.²⁷⁷ Surface parking lots, vacant lots, and open space create some small gaps in retail frontage further south along Main Street towards Vine Street. Many buildings downtown date from the 19th century, are in fair to good condition, and create a unique sense of place and shopping experience.

The most recent survey by Main Street Oberlin found 46 commercial enterprises downtown.²⁷⁸ Downtown Oberlin shoppers can access goods and services including, groceries, books, hardware, banking, and household items,. Entertainment options include a movie theater and live music. Oberlin City Hall, the public library, and a post office are also downtown.

The growing residential population in Downtown Oberlin has been led by the recent development of Sustainable Communities Associates' East College Street Project, a green building with retail space and 33 residential units, which represents the type of downtown development that enables trip reductions and the use of transportation alternatives. The site's tenants include a bank, a cafe, an Asian market, and offices, with plans for a restaurant, art gallery, and studios. A diversity of destinations like this within walking distance of each other enable trip chaining—combining many trips into one—and can cut down on travel time and vehicle use with its related fuel consumption and emissions.²⁷⁹

Eleven other buildings in the downtown district have apartments on the second floor and third floors of multistory buildings. Other upstairs uses include professional offices and service space.²⁸⁰ The entire downtown is zoned C-1, which permits residential uses on the second story of buildings.²⁸¹ There are no parking requirements. Vacant spaces in five downtown buildings

²⁷⁶ Google Maps.

²⁷⁷ City of Oberlin, Ohio, *Downtown Revitalization and Development Plan*.

²⁷⁸ Geoffrey Comings and Gregory Tisher, *Downtown Market Study*, 2010.

²⁷⁹ Sustainable Communities Associates, *Home Page and Tenants*, Accessed May 23, 2011,

<http://sustainableca.com/retail/new-tenants/>

²⁸⁰ Geoffrey Comings and Gregory Tisher.

²⁸¹ City of Oberlin, Ohio, *Comprehensive Plan*.

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could accommodate additional downtown residential units in the existing building stock.²⁸² There will probably be demand for additional units as the housing market recovers.²⁸³

Other commercial districts

Oberlin has annexed property on the outskirts of town to accommodate development, which has resulted in the creation of non-downtown shopping destinations in Oberlin that are most easily accessed by automobile, as transportation infrastructure for other modes has not kept pace with development.

The largest and most recent commercial development in Oberlin is anchored by a Wal-Mart at the intersection of OH-58 and US-20.²⁸⁴ The annexation of this land was a contentious issue, but the town ultimately decided to proceed to gain control of the design of the development.²⁸⁵ Wal-Mart installed sidewalks and bicycle parking as part of that agreement.²⁸⁶ However, these sidewalks do not connect the development to the center of town.

Smaller automobile oriented districts exist elsewhere around the periphery of town:

A small commercial district at the intersection of OH-511 and Pyle-Amherst Road that includes a Dollar General to the west of town.²⁸⁷

A Discount Drug Mart at the intersection of Butternut Ridge Road and Leavitt Road to the north of town.²⁸⁸

An IGA at 331 E Lorain Street that is within a walkable park of town but set back behind a large parking lot.²⁸⁹

A McDonald's, CVS, and vacant grocery store at 297 South Main Street south of downtown.²⁹⁰

As will be discussed later in this report, focus groups suggested that permanent residents of Oberlin rely on these developments for groceries and other basic household needs. They sit along state roads where the Ohio Department of Transportation has resisted sidewalk installation and traffic calming measures on them in the past.²⁹¹

²⁸² City of Oberlin, Ohio, *Downtown Revitalization and Development Plan*.

²⁸³ Gary Boyle and Eric Norenberg.

²⁸⁴ Google Maps.

²⁸⁵ Bryan Burgess and Ken Sloane.

²⁸⁶ Gary Boyle and Eric Norenberg.

²⁸⁷ Google Maps.

²⁸⁸ Google Maps.

²⁸⁹ Oberlin Resident Focus Groups.

²⁹⁰ Oberlin Resident Focus Groups.

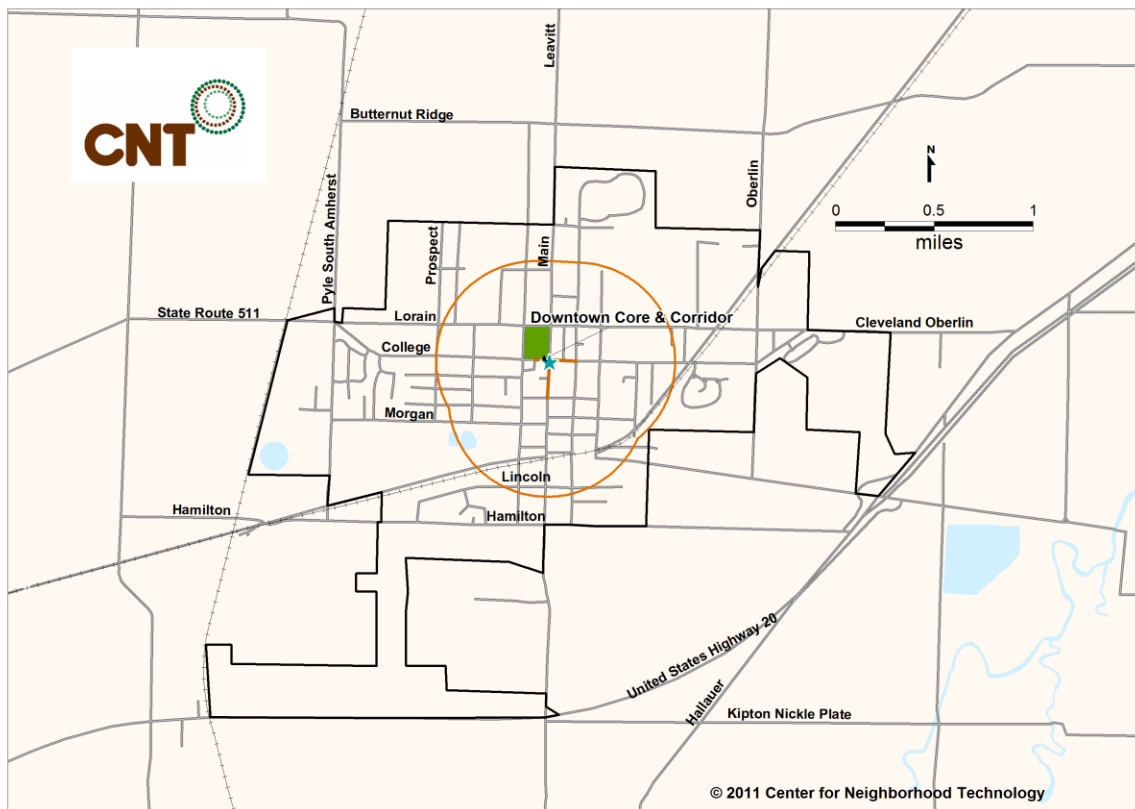
²⁹¹ Bryan Burgess and Ken Sloane.

Residential neighborhoods

As a result of the city’s historical pattern of development, many residential neighborhoods in Oberlin are clustered around the urban core²⁹² and more than half of Oberlin’s population lives within an easy walk of downtown. As

Map 11 shows, a majority of Oberlin neighborhoods in Oberlin are one half mile from downtown or closer. A total of 4,857 out of 8,761 people or 55% lived within a ten minute walk of downtown in 2010.²⁹³

Map 11. One Half Mile Radius around Downtown Oberlin



The number of Oberlin residents within walking distance declined over the last decade. Since 2000, this half-mile radius has lost 188 residents and 122 occupied housing units (a close proxy

²⁹² City of Oberlin, Ohio, *Comprehensive Plan*.

²⁹³ U.S. Census Bureau, Census 2010.

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for households).²⁹⁴ The city has demolished several derelict properties in these neighborhoods and believes they can be redeveloped as the housing market improves.²⁹⁵ Infill development on these sites would put more Oberlin households within walking distance of downtown.

South of the core of town, the Oberlin Plan Commission encouraged higher density development in some undeveloped land immediately surrounding the Wal-Mart in the hope that it can build an interconnected residential neighborhood here as the housing market recovers.²⁹⁶

Industrial Areas

Located along Artino Street in the northeast quadrant of the city, the Oberlin Industrial Park includes a facility for the Federal Aviation Administration that employs 700 workers and several smaller manufacturers.²⁹⁷ While the FAA facility has been a stable tenant, the Park has lost other, smaller manufacturers over the course of the last decade.²⁹⁸

The park generates significant truck and commuter traffic along OH-511 from US-20, which needs to be considered in any transportation plan for Oberlin.

Parking

Although the College campus and downtown are compact and walkable, a significant amount of land is devoted to parking. Most designated parking lots for Oberlin College are located around the edge of campus behind major buildings rather than in its core areas.²⁹⁹ Major parking lots are separated from pedestrian and open spaces of the campus and do not discourage walking from one part of the campus to another. The College has designated seven LEED parking spaces for fuel efficient vehicles outside the Kohl Building, Kahn Hall, and the Allen Art Museum.³⁰⁰

Students at Oberlin College must purchase a parking permit to use a College lot. Safety and Security has successfully raised permit prices \$75 to \$100 to dissuade students from bringing vehicles to Oberlin.³⁰¹ In Kahn Hall, which opened in 2010, students pledge to live without a car for their first year in Oberlin. To build the residence hall, the College requested and was granted

²⁹⁴ U.S. Census Bureau, Census 2010.

²⁹⁵ Gary Boyle and Eric Norenberg.

²⁹⁶ Gary Boyle and Eric Norenberg.

²⁹⁷ Moody's Investor Service, "Moody's Assigns MIG 1 Rating to City of Oberlin's (OH) \$1.2 million GoltBod Anticipation Notes, Series 2009." September 9, 2009,

<http://www.cityofoberlin.com/Files/Finance/TIF%20E%20College%20St%20Note%209-9-09.pdf>

²⁹⁸ City of Oberlin, Ohio, *Comprehensive Plan*.

²⁹⁹ Oberlin College, "Visiting Oberlin – Parking" Accessed May 2011, <http://new.oberlin.edu/visitor/parking.dot>.

³⁰⁰ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁰¹ Oberlin College Office of Sustainability, "Bicycles and Transportation Survey," Winter 2009.

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a variance by the City to reduce the number of mandated spaces from 180 to 20. The Hertz Connect car behind Kahn Hall sees heavy utilization.³⁰²

College employees receive two free parking permits. The College does not offer incentives for carpooling or a condensed work week for staff.³⁰³ Visitors to Oberlin College campus require a temporary parking permit in order to park in visitor-designated spaces.³⁰⁴

In Downtown, two privately-owned lots sit behind the streetscape along College and Main Streets.³⁰⁵ Additionally, there is some land now dedicated to free on-street parking that could be converted to sidewalk space and accommodate more outdoor dining like existing options at Agave Burrito and Lorenzo's. Because most downtown parking is free, the student body of Oberlin uses many spots to park vehicles that were not intended for them. Students park in the free diagonal spots along College and Main Streets rather than the permitted lots near campus. It can also be difficult to find parking when events are held at the Oberlin Conservatory. The city of Oberlin has stepped up its enforcement policies of downtown parking spaces over the last year.³⁰⁶

The status of Oberlin as a shopping destination and the lack of regional transit connections create demand for visitor parking. As one example, Slow Train Café has increased the strain on available parking because it draws customers from other communities. Oberlin also experiences peak parking needs during commencement and special events.³⁰⁷

Travel Destinations

Overview

As a college town and regional destination for shopping and entertainment, many different kinds of people come to and from Oberlin for different reasons, and at different times of the day and week. Energy-efficient solutions for transportation mobility in Oberlin should consider the needs of all three of these groups:

- **Residents of Oberlin.** Many residents of Oberlin work in surrounding parts of Lorain County and need a car to get to work every day. Residents of Oberlin are much more likely to drive a car for groceries or shopping than Oberlin College students.
- **Students at Oberlin College.** All College facilities are accessible by foot and students appear to be the core market for downtown.

³⁰² Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁰³ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁰⁴ Oberlin College.

³⁰⁵ Jason Adelman and Krista Long.

³⁰⁶ Gary Boyle and Eric Norenberg.

³⁰⁷ Bryan Burgess and Ken Sloane.

- **Visitors to Oberlin.** People travel to Oberlin for work, downtown shopping and eating, and special events. Few options exist for them to reach Oberlin other than by car.

Wide variation in transportation behavior across these groups has made it difficult to find equitable and cost-effective transportation alternatives. When the city and College considered a more robust Connector service than the one eventually implemented, they found they could not afford to operate at the hours and locations these constituencies demanded.³⁰⁸

After a travel survey suggested a significant split in travel behavior between College students and permanent residents of the town, CNT conducted two focus groups that emphasized seniors, lower income residents, and those with special needs. This section emphasizes findings from those focus groups and previous surveys.

Residents of Oberlin

Although Oberlin is a compact place, permanent residents often go elsewhere to work, shop, and access services. Not everybody who lives in Oberlin works there and many of the amenities downtown serve students with a different set of tastes and needs. Residents without access to a car face severely limited choices in daily needs and may be unable to find a job altogether.

Work

Although it now accounts for less than one quarter of all trips, the journey to work is the primary trip that a household makes and significantly affects other travel behavior.³⁰⁹ While the city of Oberlin has two “recession-proof” employers in the College and the Federal Aviation Administration,³¹⁰ more than half of Oberlin workers travel elsewhere to earn their paycheck.³¹¹ The severe cutbacks in LCT service have eliminated transit access to these jobs.³¹²

³⁰⁸ Gary Boyle and Eric Norenberg.

³⁰⁹ Nancy McGuckin and Nandu Srinivasan, “The Journey-to-Work in the Context of Daily Travel,” *Census Data for Transportation Planning Conference*, 2001.

³¹⁰ Moody’s Investor Service.

³¹¹ U.S. Census Bureau, *Locational Employment Dynamics*, 2008.

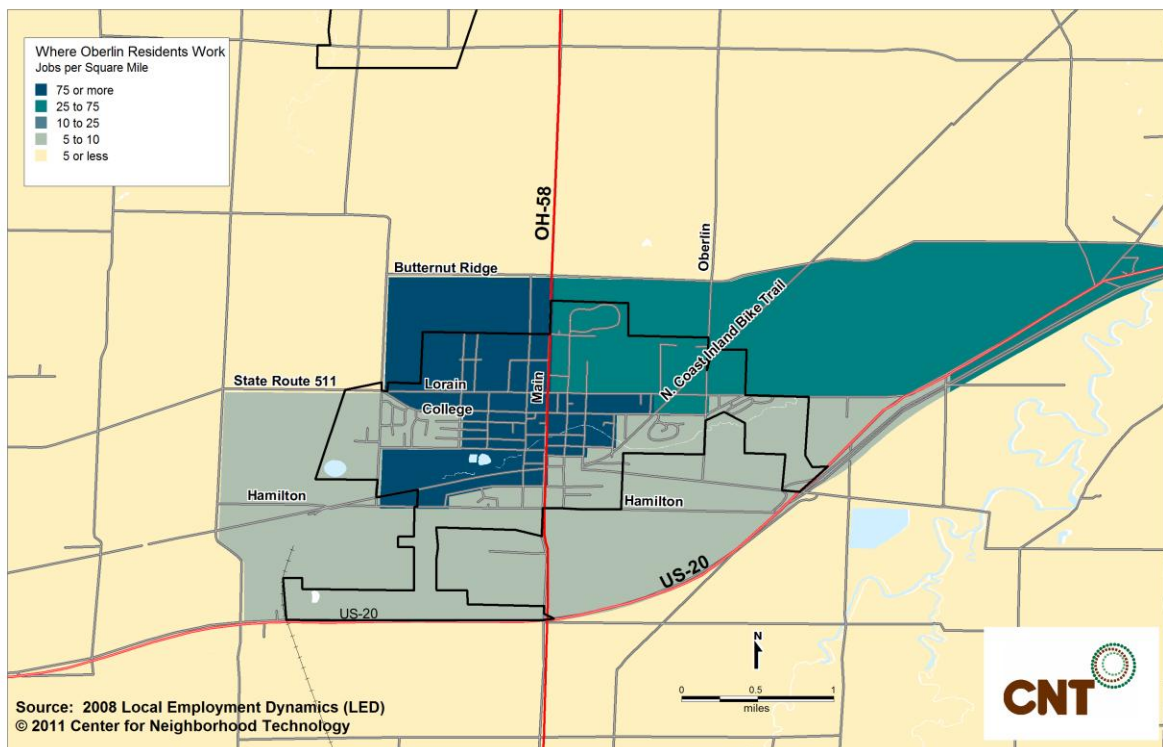
³¹² Oberlin Resident Focus Groups.

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A significant number of Oberlin residents work within the city. Out of the 1,793 jobs in Lorain County staffed by Oberlin residents in 2008, 1,043 of them, or 58%, were located in and around the city.³¹³ As

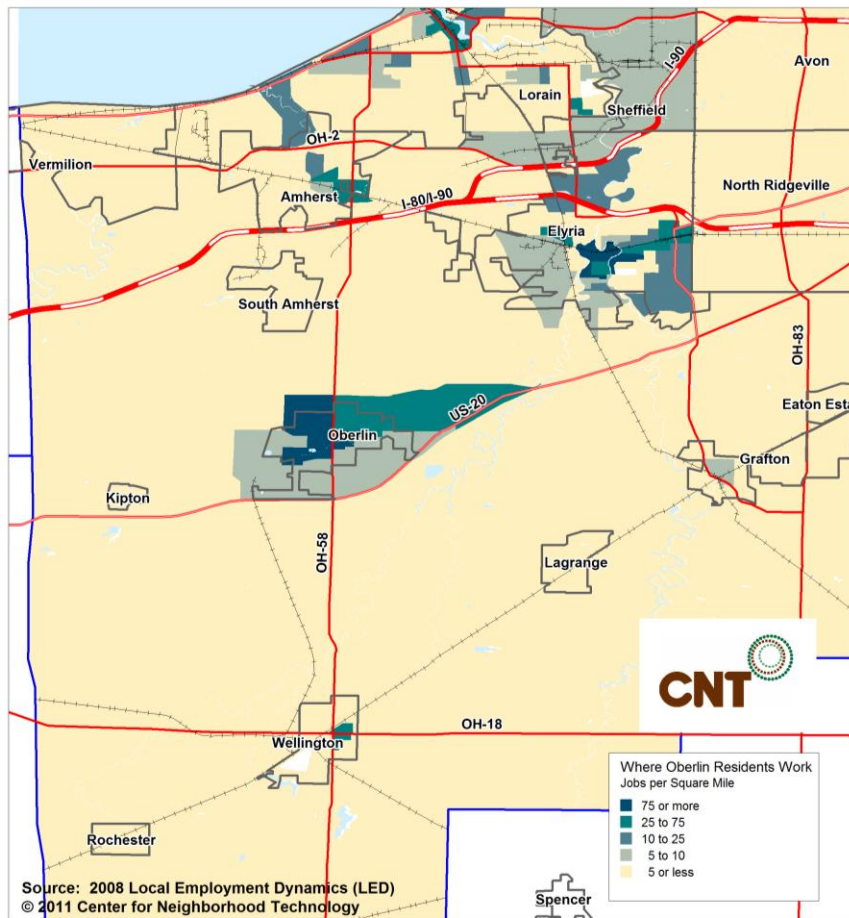
Map 12 shows, the most significant work destination for residents of the city of Oberlin is the northwest quadrant, which contains the core of Oberlin College and the neighborhoods in and around downtown.

Map 12. Local Employment Destinations for Residents of the City of Oberlin



³¹³ As defined by the six U.S. Census Block Groups that contain sections of the town of Oberlin.

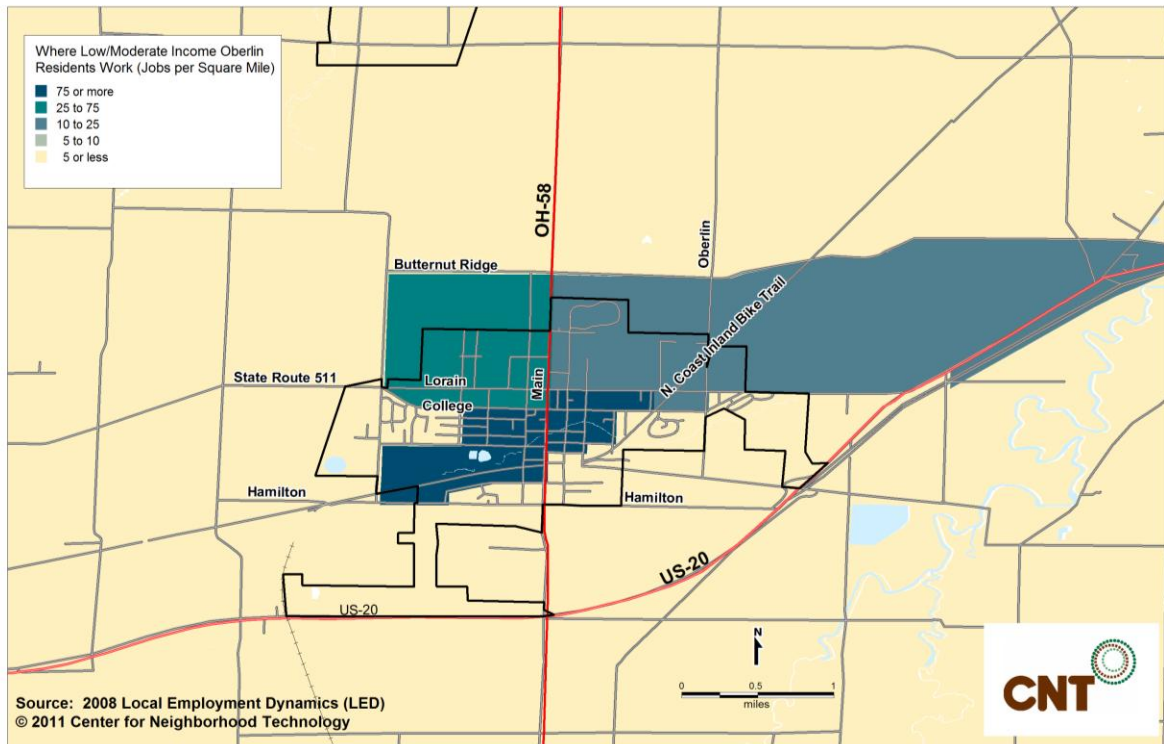
Map 13. Local Employment Destinations for Oberlin Residents in Lorain County



Map 13 shows that significant numbers of Oberlin residents work elsewhere in Lorain County, but they do not commute to any single destination. Oberlin residents staff 222 jobs in Elyria and 139 jobs in Lorain, but not very many of them work near each other. Another 389 jobs are located elsewhere in Lorain County. This job decentralization will make a fixed-route transit solution extremely challenging to implement.³¹⁴

³¹⁴ U.S. Census Bureau, Locational Employment Dynamics, 2008.

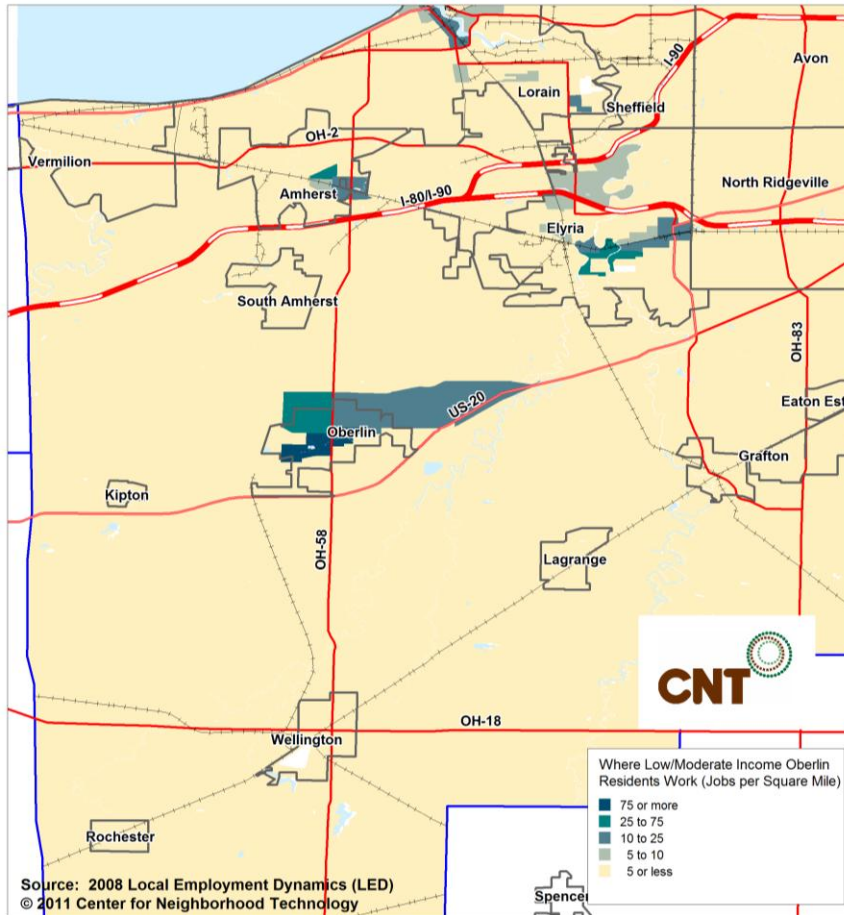
Map 14. Local Employment Destinations for Lower Income Oberlin Residents in Oberlin



Over half of the residents that earn less than \$1,250 per month work in and around the city. As Map 14 shows, lower income workers are less likely to hold jobs at Oberlin College but more likely to hold them in downtown Oberlin and the Oberlin Industrial Park in the northeast quadrant of town. Out of 507 low income jobs staffed by Oberlin residents, 287 of them were located in town.³¹⁵

³¹⁵ U.S. Census Bureau, Locational Employment Dynamics, 2008.

Map 15. Local Employment Destinations for Lower Income Oberlin Residents in Lorain County



As indicated in Map 15, lower income residents travel all over Lorain County for work, just like residents of all income levels, although retail centers in Elyria and Amherst are significant destinations for lower income workers.³¹⁶

These numbers date to 2008 and do not reflect the recent elimination of LCT and the loss of blue collar jobs. Focus groups suggested that the end of transit service to jobs around Midway Mall in Elyria and along County Line Road has forced Oberlin residents with special needs for mobility into unemployment.³¹⁷ Additionally, several manufacturers vacated the Oberlin

³¹⁶ U.S. Census Bureau, Locational Employment Dynamics, 2008.

³¹⁷ Oberlin Resident Focus Groups.

Industrial Park as the national economic climate worsened in 2008 and 2009.³¹⁸ These events have made it even harder to find work within the city of Oberlin or access jobs outside of it.

Food

After work, the grocery store is the most significant in-town destination for Oberlin residents and it often requires a car.³¹⁹ Six businesses offer groceries in the town:

- Gibson's Food Mart and Bakery at 23 W. College Street offers baked goods, specialty products, and groceries, although some residents find that their inventory caters to the College and is more expensive than other stores.³²⁰
- Oberlin Market at 22 Carpenter Court is a small natural foods store, bakery, and deli downtown.
- Oberlin IGA Foodliner at 331 E. Lorain Street offers produce and a full inventory but older residents see it as an inconvenient destination by foot.³²¹
- Wal-Mart Super Center at 46440 US Route 20 offers cheaper prices and better produce than Gibson's or IGA, but there is no obvious way to walk or bike there.³²²
- Discount Drug Mart and Food Fair at 12289 Leavitt Road. The Drug Mart offers some grocery inventory but is not accessible by foot.
- Kim's Market at 23 Eric Nord Way opened in 2011 and offers a mix of Korean groceries and prepared goods. It appears to be a specialty store.³²³

Missler's Super Valu, another full service grocery store, closed in 2007. Residents and students reported walking and biking to it.³²⁴ Its closing significantly reduced the variety, price, and quality of groceries available to pedestrians in Oberlin.³²⁵

Most of the food shopping options are not an easy walk from residential neighborhoods. Map 16 displays the location of full-service grocers in Oberlin and a half mile walking distance around them.

³¹⁸ Gary Boyle and Eric Norenberg.

³¹⁹ Oberlin Resident Focus Groups.

³²⁰ Oberlin Resident Focus Groups.

³²¹ Oberlin Resident Focus Groups.

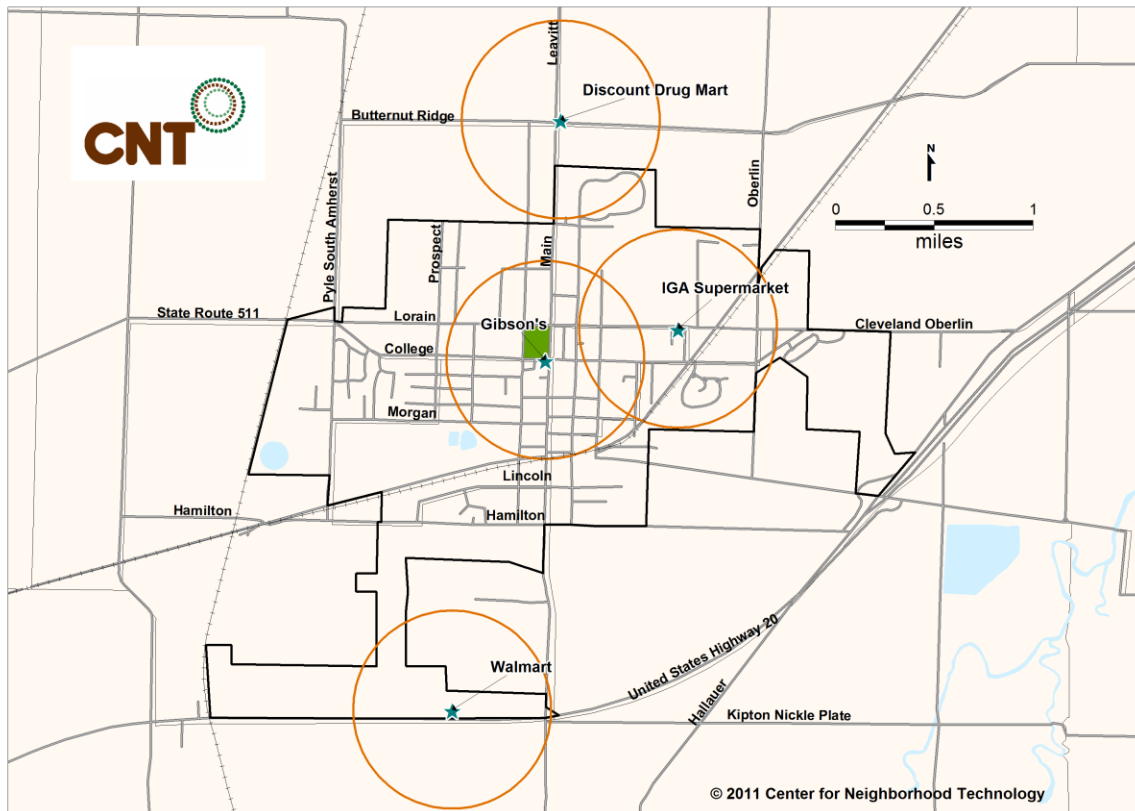
³²² Oberlin Resident Focus Groups.

³²³ Alex la Ferla, "Food Review: Korean Market Brings Kimchee to Huddled Oberlin Masses," *Oberlin Review*, February 17 2011.

³²⁴ Cindy Leise, "Oberlin grocery closing its doors," *The Chronicle-Telegram*, September 17 2007, <http://chronicle.northcoastnow.com/2007/09/17/oberlin-grocery-closing-its-doors/>

³²⁵ Oberlin Resident Focus Groups.

Map 16. Blocks within a Half Mile Walking Distance of Major Grocery Stores in Oberlin



Wal-Mart is the city’s most commonly cited destination for groceries, but it is very far from the center of town. Discount Drug Mart is also outside of walking distance. IGA is somewhat more accessible, but a high volume of truck traffic along OH-511 and uneven sidewalks make it a difficult walk for seniors. And while much of the town is about a half mile walk from Gibson’s, older residents see the store as too specialized and expensive for all of their needs.³²⁶

The automobile-orientation of Oberlin’s grocers proves especially challenging for seniors and residents with special needs. Wal-Mart is the most common destination for the Oberlin Connector,³²⁷ but since it only operates twice a week, it is not always an option. Some residents arrange rides or taxis that cost as much as \$10 one way.³²⁸

³²⁶ Oberlin Resident Focus Groups.

³²⁷ “OBERLIN.xls,” Data for the Oberlin Connector provided by Colin Koffel, May 23 2011.

³²⁸ Oberlin Resident Focus Groups.

Shopping

As with groceries, residents cannot always walk to the amenities they want or need. Businesses estimate that permanent residents only spend about 11% of their retail purchases downtown.³²⁹

As with groceries, focus groups and travel surveys identified Wal-Mart the single biggest shopping destination, followed by Dollar General and Drug Mart. All three of these stores sit along highly trafficked state routes and lack consistent sidewalk coverage.³³⁰

The remaining shopping options are outside of Oberlin. LCT once served retail destinations in Elyria and Lorain via the 11 and 21 buses. The Oberlin Connector does provide transportation on demand to these cities on alternating weeks, but a wait for a return trip takes hours. Residents find rides or hail cabs to reach the lifestyle center in Crocker Park.³³¹

Medical services

While there are a few medical offices and a hospital in Oberlin, fewer doctors are holding weekly office hours there³³² and most medical specialists in Lorain County are located in Elyria, Sheffield, and Avon. The Oberlin Connector does not always operate on the days of appointments and many residents take cabs or hire a local driver for medical appointments. These trips can cost more than \$30 for a round trip.³³³

Social services

Oberlin Community Services (OCS) is a not-for-profit social services organization at 285 S. Professor Street. OCS provides direct assistance to low income residents for utilities, housing, transportation, and food.³³⁴ It can be challenging for residents to reach some services outside of Oberlin. The nearest license bureau is in Wellington, which means that residents cannot easily acquire identification for subsidized transportation.³³⁵ Oberlin residents seeking subsidized housing must apply at the Lorain Metropolitan Housing Authority administration offices in Lorain.

College students

The travel behavior of Oberlin College students has not been as well studied as the transportation needs of residents of the town. However, recent travel surveys suggest that

³²⁹ Geoffrey Comings and Gregory Tisher.

³³⁰ Oberlin Resident Focus Groups.

³³¹ Oberlin Resident Focus Groups.

³³² Gary Boyle and Eric Norenberg.

³³³ Oberlin Resident Focus Groups.

³³⁴ "Oberlin Community Services," Accessed May 2011, http://www.oberlincommunityservices.org/client_food.html.

³³⁵ Oberlin Resident Focus Groups.

students generally meet their needs in-town more often than permanent residents and that many, but not all, of their trips occur by foot or by bike.³³⁶

Oberlin College

The most frequent destination for Oberlin College students is, of course, the classroom and other College facilities. As noted earlier, the vast majority of trips to class occur by foot. A survey conducted by the Oberlin College Office of Sustainability finds that students that own a bike use it to get to class more frequently than any other need.³³⁷

Food

Oberlin College provides dining meal plans for its students.³³⁸ Students also provide a core market for the fifteen restaurants in downtown.³³⁹ A travel survey conducted by the Transportation Working Group identified a handful of students that drive to IGA and Drugmart for groceries.³⁴⁰ The Oberlin College Office of Sustainability finds that an equal number of students travel to Drug Mart, IGA, and Wal-Mart to meet their needs.³⁴¹

Shopping & Services

In contrast to town residents, downtown Oberlin serves many if not all shopping needs for students at Oberlin. Oberlin College students are in many ways a captive market for local businesses, who stock their inventory accordingly. It has been estimated that Oberlin College students make one third of their yearly retail purchases in downtown.³⁴² The single largest alternative to downtown Oberlin for retail sales is Crocker Park, which includes an Urban Outfitters and a Dick's Sporting Goods.³⁴³

Visitors to Oberlin

Visitors to Oberlin form the third constituency for travel and transportation in Oberlin. While data exist for people who work in Oberlin but live in other locations in Lorain County, the travel behavior of visitors to downtown and special events is largely anecdotal. Nonetheless, there are very few options for people who travel to Oberlin for work or events.

³³⁶ Oberlin College Office of Sustainability.

³³⁷ Oberlin College Office of Sustainability.

³³⁸ Oberlin College, "Oberlin Online: Meal Plans," Accessed May 2011, <http://www.oberlin.edu/cds/mealplans/>.

³³⁹ Geoffrey Comings and Gregory Tisher.

³⁴⁰ City of Oberlin and local agencies, "2010 City of Oberlin Transportation Needs Survey."

³⁴¹ Oberlin College Office of Sustainability.

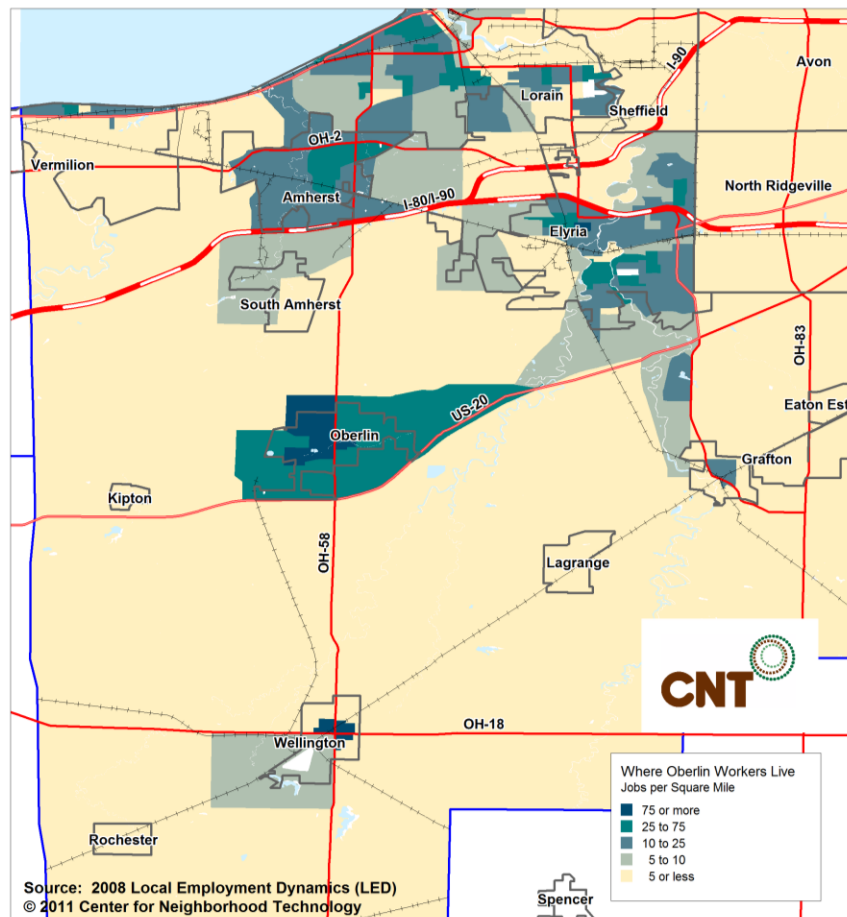
³⁴² Geoffrey Comings and Gregory Tisher.

³⁴³ Jason Adelman and Krista Long.

Visitors that work in Oberlin

Over the last decade, Lorain County and the whole of Northeast Ohio have witnessed a decline in blue collar jobs as domestic automobile manufacturing and steel production lagged.³⁴⁴ By contrast, Oberlin College and the Federal Aviation Administration building, the town’s two largest employers are more “recession proof” and make the town a valuable source of jobs as the county economy restructures. And as Map 17 shows, a significant number of people who work in and around Oberlin live elsewhere.

Map 17. Oberlin Workers Who Lived in Lorain County in 2008



Out of the 3,765 jobs located in and around Oberlin, only 1,043, or 28%, of the workers live in the city. Another 821 live in unincorporated Lorain County. And while 267 workers live in Lorain

³⁴⁴ Stephen Koff, “President Obama’s upcoming Lorain County visit puts spotlight on Ohio’s economy, jobs.” *The Cleveland-Plain Dealer*, January 5, 2010.

and 270 workers live in Elyria, they are not concentrated in any single neighborhood.³⁴⁵ The existing distribution of jobs and employees will make a fixed-route solution like transit service difficult to serve everybody even if LCT service were to be increased.

Due to limitations in the data, this analysis does not consider the Federal Aviation Administration facility on Lorain Street. That facility employs many out-of-town workers who use a combination of OH-511 and US-20 to access their shifts.³⁴⁶ Some workers at the FAA facility drive as long as thirty minutes or even two hours.³⁴⁷

In the past, Oberlin College has discussed creating more opportunities for College staff to live in town through an employer assisted housing program modeled after the Greater Circle Living Program in Cleveland. While the program was never implemented, it could also stimulate the market for some infill residential parcels around town.³⁴⁸

Visitors to Downtown Oberlin

The businesses and restaurants of downtown Oberlin make it a unique destination in Lorain County. Downtown merchants estimate that almost half of their business comes from Cleveland or destinations that are even further away. Almost all of these visitors will choose to drive because no good alternatives exist from one point of Northeast Ohio to another. Although the Elyria-Kipton trail connects Oberlin with some other destinations in Lorain County, shoppers prefer to drive to carry things home.³⁴⁹

Visitors for Special Events

Cultural events at the Oberlin College Conservatory, the Jazz Center, and other venues draw significant numbers of visitors from a large regional area. Downtown and College parking lots struggle to accommodate the vehicles from out-of-town visitors during these events.³⁵⁰

Trends and Plans Shaping Oberlin's Future

Introduction

Most of this transportation profile has looked at Oberlin historically and today. However, transportation planning decisions require a forward looking perspective as well. There are several important trends that will influence Oberlin's transportation picture in the coming years.

³⁴⁵ U.S. Census Bureau, Locational Employment Dynamics, 2008.

³⁴⁶ Oberlin Resident Focus Groups.

³⁴⁷ Gary Boyle and Eric Norenberg.

³⁴⁸ Gary Boyle and Eric Norenberg.

³⁴⁹ Jason Adelman and Krista Long.

³⁵⁰ Jason Adelman and Krista Long.

Transportation Trends Affecting Emissions

Emissions reductions in Oberlin will be influenced by national, local, and regional trends in transportation energy intensity and travel demand. Overall, vehicles in the U.S. are slated to become more efficient in coming years, which Oberlin can benefit from, but this change is not going to be enough to overcome trends in VMT growth, which Oberlin will have to work to change.

National VMT Growth

Nationally, VMT has been on the rise for decades, though with slight downticks in recent years due to the economic downturn and high gas prices. Growth in VMT is expected to continue through 2035 nationally, though at slower rates than in the past.³⁵¹ Though Oberlin's population has been relatively steady, population growth is just one cause of increasing VMT, and Oberlin will face many of the same VMT pressures as the rest of the country if it does not proactively counteract the trend.

Fuel Economy Improvements

On the other hand, Oberlin will see the GHG benefit of federal regulations requiring increased fuel economy of light duty and heavy duty vehicles. 2016 model year vehicles are required to achieve 34.1 miles per gallon (mpg) on average, and rules are being set for even more stringent fuel economy and emissions rates beyond that year.³⁵² It will take time for those new vehicles to make their way onto Oberlin's roads in any significant number, so actual on-road fuel economy will lag the standards, but the trend is toward reducing emissions per VMT. The U.S. Department of Energy estimates that the average light-duty vehicle on the road in 2030 will get 28 miles per gallon (mpg), as compared to 22.6 mpg today.^{353,354} This could result in as much as a 35% drop in GHG emissions per passenger mile over that time. But nationally these expected improvements in vehicle efficiency are not large enough to overcome travel growth, so transportation emissions are expected to continue to rise.³⁵⁵

National Emissions Growth

While Oberlin has created strong GHG reduction targets, this local action is taking place in the context of a national trend of emissions growth. Emissions in the U.S. have grown 0.4% per year

³⁵¹ U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2011*, April 26, 2011, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2011\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2011).pdf)

³⁵² U.S. Department of Transportation, National Highway Traffic Safety Administration, *CAFE and GHG Emission Fact Sheet*, April 1, 2010, http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cale/CAFE-GHG_Fact_Sheet.pdf

³⁵³ U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2010*, Report #:DOE/EIA-0383(2010), May 11, 2010, <http://www.eia.doe.gov/oiaf/aeo/index.html>

³⁵⁴ U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2008*. Table VM-1, December 2009, <http://www.fhwa.dot.gov/policyinformation/statistics/2008/vm1.cfm>

³⁵⁵ U.S. DOE, EIA, *Annual Energy Outlook 2011*.

since 1990 on average. The growth rate was even stronger before the economic downturn, and can be expected to increase as the economy improves, barring other major interventions. This emissions growth is correlated with fossil fuel consumption, which has also been on the rise.³⁵⁶

Transit Ridership Struggles

The loss of most public transit service in Oberlin in recent years means that transit ridership has dropped. While data do not exist as to how many former LCT customers are now using private vehicles for their trips, it can be presumed that some shift to private vehicle travel has occurred to fill the mobility gap created by the loss of LCT buses. Returning transit ridership to the levels of just a few years ago will take a major initiative to restore service.

The People of Oberlin

Any transportation plan needs to address the travel needs of the people in the community. Oberlin's residents, students, employees, and visitors are a vibrant constituency of travelers that bring both high expectations for sustainable outcomes and great enthusiasm for, and expertise in, new and innovative transportation options.

Aging Population

The U.S. population is aging, and as the number of senior citizens increases around the country, including in Oberlin, transportation needs will change. Older residents may face mobility challenges, may no longer be able to drive, and have different travel patterns than students and workers.

Enthusiasm and Experience

Oberlin's expertise in global warming and sustainability issues is extremely strong and can be expected to continue to grow, which is a major asset to any sustainability plan. Carbon neutrality is a big deal for Oberlin residents, so they would be likely to support town transportation policies aimed at combating climate change. Most residents will buy into town investments that produce energy efficiency without affecting day-to-day consumer behavior, such as hybrid vehicles, compact bulbs, and weatherization of older homes. However, residents are more hesitant to change their consumer behavior, especially concerning car ownership.³⁵⁷

Activism around Local Food

One of the challenges for reducing the energy use of goods movement in Oberlin is that little is produced in town, so residents and businesses are reliant on truck deliveries. However, there is significant interest by students, residents, and businesses for a food access solution that

³⁵⁶ U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2009*, April 15, 2011.

³⁵⁷ Bryan Burgess and Ken Sloane.

increases the number of items produced at local farms. Oberlin College launched a Farm to Fork program and partners with 23 local farms to provide local produce, meat, honey, and other items in campus dining halls.³⁵⁸ The popularity of entrees with seasonal mushrooms at the Feve implies that downtown patrons would support dishes made from local ingredients.³⁵⁹

Joe Waltzer, a former student of Oberlin College, has proposed an organic food store that would locate at the site of the former Missler's in the southeast quadrant. It would include a retail component for residents of the town as well as a bulk sales, processing, and distribution facility for the regional customers.³⁶⁰ Students would be likely to support it, but it is unclear whether they represent a large enough customer base.³⁶¹ The focus group of seniors also supported the idea of this store.³⁶²

Similarly, stakeholders interviewed for this project expressed an interest in food delivery solutions. Not every downtown restaurant offers delivery service due to the overhead costs and each business uses its own vehicle to make trips.³⁶³

Local and Regional Plans

There are a number of local and regional projects underway which will impact transportation in Oberlin. From downtown Oberlin redevelopment to regional sustainability and transit planning, there are important efforts happening in and around the community that a sustainable transportation plan should seek to leverage.

City Climate Action Plan

The City of Oberlin is developing a climate action plan to help it meet its GHG reduction targets. As members of ICLEI-Local Governments for Sustainability, the plan is the next step in a 5-milestone process of climate action which started with the GHG inventory and will include implementation of GHG reduction measures and ongoing measurement and tracking. The transportation elements of the climate action plan are still in development, but the sustainable transportation plan will both be informed by, and seek to build on, the climate action plan as it is finalized.

Oberlin 2025 Strategic Plan

Oberlin is currently undertaking a strategic planning process with visioning and goals for Oberlin in 2025. The Public Services Institute of Lorain County Community College and Management

³⁵⁸ Oberlin College, "Dining – Local Foods," Accessed May 2011, <http://www.oberlin.edu/cds/social/vendors.html>.

³⁵⁹ Jason Adelman and Krista Long.

³⁶⁰ David Orr, interviewed by Kyle Smith, May 16 2011.

³⁶¹ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁶² Oberlin Resident Focus Groups.

³⁶³ Jason Adelman and Krista Long.

Assistance for Nonprofit Agencies of Kendal are assisting the city with this process. Public involvement for the plan includes an online forum and a series of “community conversations” hosted at locations around town.³⁶⁴

Oberlin Project

The Oberlin Project is a collaborative venture between the College, City, School District and private sector with support from the Clinton Climate Initiative. It has three components. A block of Main Street fronting Tappan Square will be redeveloped into a Green Arts District that includes improvements to the Allen Memorial Art Museum and Hall Auditorium as well as a new four star hotel, student housing, retail space, a conference center, and an ecological design center. The city and College will work together to achieve carbon neutrality through alternative energy supply. Finally, public partners will acquire 35 surrounding farms, resuscitate them back into productive re-use, and establish a greenbelt around Oberlin for forestry, biofuels, agriculture, and carbon sequestration.³⁶⁵

Transportation planning did not play a major role in the Oberlin Project, although parking policies for the new Green Arts District have been discussed.³⁶⁶ However, several components of the Oberlin project do address transportation challenges and needs addressed elsewhere in this document. Additional amenities and retail space in the Green Arts District would augment a relatively walkable and accessible downtown. New student housing will increase downtown’s residential population and could support more businesses, although that could also make downtown more of a destination for drivers too. The Greenbelt around Oberlin could supply some food and wood products that currently arrive into town by tractor trailer.³⁶⁷

NOACA Sustainable Communities Grant

Although the Northeast corner of Ohio has evolved into a sixteen county megaregion anchored by Cleveland, Akron, Youngstown, Canton, and surrounding cities and suburbs, they have not coordinated well on transportation and land use planning. Four Metropolitan Planning Organizations (MPO) plan for federal transportation investments independently and many of them use incompatible forecasting models. This lack of coordinated planning has helped spur a pattern of “job sprawl” that makes transportation solutions regional rather than local, especially for a town the size of Oberlin.³⁶⁸

³⁶⁴ City of Oberlin, “Oberlin 2025: Community Conversation Guide,” Winter 2011,

http://www.cityofoberlin.com/files/city%20manager/city_of_oberlin_conversation_guide.pdf.

³⁶⁵ David Orr, “The Oberlin Project: A Clinton Climate Initiative Climate Positive Project,” May 2010.

³⁶⁶ David Orr.

³⁶⁷ Jason Adelman and Krista Long.

³⁶⁸ Hunter Morrison.

In October 2010, the U.S. Department of Housing and Urban Development awarded a \$4.25 million Sustainable Communities grant to a consortium of 21 metropolitan planning organizations, county and municipal governments, housing authorities, and non-profit advocates. Five outcomes of the grant align with the transportation challenges facing Oberlin:³⁶⁹

- Creation of regional transportation, housing, water & air quality plans that are deeply aligned with and tied to local comp land use & capital investment plans
- Reduced social and economic disparities for low-income, minority communities, and other disadvantaged populations in the target region.
- Decrease in per capita VMT and per-capita emissions for the region.
- Decrease in housing and transportation costs per household.
- An increased proportion of low and very low households within a thirty minute transit commute of employment centers.

The grant will regularly convene conversations between regional stakeholders about land use, housing, transit, and service delivery. Some communities will discuss the concepts of sustainability and coordinated investments for the first time. A highly engaged community like Oberlin that already “gets it” may not see the impact of the grant as much as other communities in Northeast Ohio will.³⁷⁰

Westshore Corridor Transportation Project

A consortium of transit providers and MPOs are overseeing an alternatives analysis for a regional transportation service that would connect the downtowns of Cleveland and Sandusky through the city of Lorain. Lorain County is the only county that borders Cuyahoga County but lacks an express connection to downtown Cleveland.³⁷¹ Three express bus corridors, one rail corridor, and a no-build scenario are currently under consideration in the study. The rail corridor would utilize a lightly trafficked Norfolk Southern freight line with a station in downtown Lorain at Black River landing.³⁷²

The service is unlikely to be an attractive alternative for Oberlin residents. Without regular LCT bus service, residents will still need to drive 23 minutes and almost 13 miles to reach it.³⁷³ While the Brookpark Park-and-Ride station for the RTA Red Line is 23 miles from Oberlin, the drive

³⁶⁹ Northeast Ohio Areawide Coordinating Agency, “Northeast Ohio Application for Sustainable Communities Regional Planning Grant,” Application to U.S. Department of Housing and Urban Development, August 23 2010.

³⁷⁰ Hunter Morrison.

³⁷¹ Richard Enty.

³⁷² Parsons Brinkerhoff, *Westshore Corridor Transportation Project: Alternatives Analysis Study*, April 2011.

³⁷³ Google Maps.

takes an equivalent amount of time. The Rapid already provides more frequent service and serves some additional destinations like West Side Market and University Circle.

Passenger Rail Service

Students and the College have shown support for passenger rail, but state investment will be needed for it to be a better transportation option. In 2004 the Ohio Rail Development Corporation released the *Ohio & Lake Erie Regional Rail Ohio Hub Study*, which envisioned connections to every major Ohio city as well as Detroit, Toronto, Buffalo, and Pittsburgh through a passenger rail hub in Cleveland.³⁷⁴ In 2010, the Federal Rail Administration awarded the state \$400 million to establish “quick start” service between Cleveland, Columbus and Cincinnati.³⁷⁵ The service would have stopped at Puritas Avenue, about 26 miles from Oberlin. It would have operated at a conventional 79 MPH speed and advocates believed it would build a ridership base and political constituency for additional improvements. The Oberlin College Student Senate passed a referendum in support of the 3C service.³⁷⁶

The federal grant became a political issue in the race for Governor in 2010. Critics of the “quick start” service argued that the service was too slow, that Ohioans would not ride it, and that the state would be “stuck” with the operating subsidy.³⁷⁷ The politicization of the issue demonstrated that passenger rail service struggles to find a constituency in Ohio, in part because decades of declining service has left residents unfamiliar with its benefits. But, unless the state becomes an active partner again in planning and financing new passenger rail improvements, the level of Amtrak service in Lorain County is unlikely to change.

Nonetheless, three members of Congress recently met with the U.S. Department of Transportation and Amtrak to discuss improvements that would reduce delays to existing services through station re-design.³⁷⁸ Sometime in 2011, Amtrak will also offer a direct ride between Philadelphia and Elyria by picking up two passenger cars from the *Pennsylvanian* to the *Capitol Limited*.³⁷⁹ While these improvements are expected to increase ridership, they will not change the number of trains or times or arrival in Elyria.

³⁷⁴ Transportation Economics and Management Systems, Inc., *Ohio Hub 2004 Full Draft Technical Memorandum and Business Plan*, October 2004.

³⁷⁵ Mark Dodosh, “Ohio’s planned 3C rail corridor awarded \$400 million in federal money,” *Crain’s Cleveland Business*, January 28, 2010.

³⁷⁶ Colin Koffel, Rob Lamppa, and Madeline Marvar.

³⁷⁷ All Aboard Ohio “3C Corridor Mythbusters!,” 2010.

³⁷⁸ All Aboard Ohio, *Passenger Rail News*, Issue 175, Spring 2011.

³⁷⁹ Amtrak, *PIIRA Section 210 Report: Capitol Limited Performance Improvement Plan*, September 2010.

Finances

A sustainable transportation plan must take into consideration the financial issues that are affecting a community and its residents and businesses. In Oberlin this has been particularly important as financial constraints have led to major cuts in transit services. Even as the national economy enters a period of recovery from the recent downturn, cities like Oberlin face financial challenges that will affect the feasibility of investment in transportation alternatives.

City of Oberlin Fiscal Outlook

The City of Oberlin faces a significant budget shortfall in 2012 that will make implementing new transportation solutions a challenge. Residents in Oberlin have been willing to raise local taxes in exchange for increased services, but the municipal income tax now meets the 2% maximum allowed by state law. The City also increased the registration fee for vehicles to the maximum level mandated by state law. Future increases in taxes and fees would be applied to meet general obligations, although special assessments may be allocated for specific projects.³⁸⁰

Developments at the state and federal level further threaten the stability of the city budget. Revenues from the state estate tax currently allocate at least \$250,000 to the city each year, but the General Assembly has proposed legislation that would eliminate the tax and end these distributions.³⁸¹ The General Assembly also recently reduced the local government fund by 25% in 2011 and 50% in 2012, which will provide a double punch to the city's operating budget. The recession has reduced the returns on local bond investments. These reductions will represent an aggregate loss of one million dollars of revenue in 2012.³⁸²

The fiscal situation threatens several transportation programs and improvements, most notably the Oberlin Connector. The City Council has not yet prioritized its cuts, but there is a chance that it will tap its capital improvement fund and begin deferring maintenance on sidewalks and roads if the shortfall cannot be met elsewhere.³⁸³

Lack of Dedicated Funding for LCT

LCT is the only transit agency in Ohio that lacks a dedicated revenue source.³⁸⁴ Voters in Lorain County have consistently opposed a dedicated revenue mechanism for LCT and this held true during a sales tax levy in 2010. Urban areas in Lorain County have been too fragmented to overcome opposition from voters in predominantly rural areas to the south.³⁸⁵

³⁸⁰ Bryan Burgess and Ken Sloane.

³⁸¹ Gary Boyle and Eric Norenberg.

³⁸² Bryan Burgess and Ken Sloane.

³⁸³ Gary Boyle and Eric Norenberg.

³⁸⁴ Gary Boyle and Eric Norenberg.

³⁸⁵ Richard Enty.

APPENDICES

The lack of local support for transit is compounded by scant investment by the state. The state Motor Fuel Tax is restricted to highway funding.³⁸⁶ Because no dedicated revenue stream for transit exists, it competes with other services like education and health care. Since his inauguration in January, Governor Kasich has rescinded prior awards for transit services and does not support increased state investment.³⁸⁷

Oberlin's best option for robust transit service may be the consolidation of regional transit services under the RTA. Such a consolidation would create a better economy of scale for operations and capital purchases, allow for more convenient bus trips that do not stop at county lines, and create the capacity to plan specifications for vehicles that run on clean burning fuels and natural gas. However, stakeholders and voters still have a negative memory of the consolidation of smaller systems into the RTA over the last thirty years. Lorain County leaders would want assurances of local control and RTA faced its own funding crisis in 2010.³⁸⁸

While regional transit service is largely outside of the city's control, Oberlin enjoys a high level of engagement about transit issues that could be utilized to advocate for greater transit funding or consolidation in the future. Participants at both CNT focus groups energetically communicated about their transportation needs and a Transportation Working Group meets regularly. There is a belief that with persistent advocacy about the economic development benefits of transit a new sales tax levy could pass countywide.³⁸⁹

³⁸⁶ Greater Ohio Policy Center, "Transit Retreat," Presented in Columbus, OH, January 27 2010.

³⁸⁷ Angie Schmitt, "John Kasich's Sad War on Transit (and Cities), *DCStreetsBlog*, April 15 2011.

<http://dc.streetsblog.org/2011/04/15/john-kasichs-sad-war-on-transit-and-cities/>

³⁸⁸ Richard Enty.

³⁸⁹ Gary Boyle and Eric Norenberg.