Appendix I: Scenario Reports

September 2023

Forces of Change
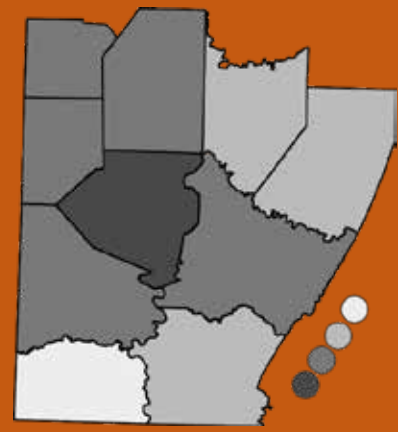
Demographics

Exploratory Scenario Report

MOBILITY • SERVICE •
MANUFACTURING •
BROADBAND • ARTIF
REGIONAL • IMPACT •
HOUSING • GROWTH •
AFFORDABILITY • SHA

SPC
SOUTHWESTERN PENNSYLVANIA COMMISSION

PULATION • IMMIGRATION
• DEVELOPMENT • PA
• SIZE • DIVERSITY • ED
• AUTONOMOUS • V
ERVICE • AUTOMATION •
RING • MODAL IM
• ARTIFICIAL • INTE
IMPACT • EMERGING IN
GROWTH • INCOME • EMP
TY • SHARED • ONLINE
TURE • ENERGY • SUPPLY •
EWABLE • BALANCE •
RESILIENCE • WATER •
PUBLIC • PRIVATE •

Table of Contents

What Are Forces of Change?

Forces of Change are a wide range of global and national trends that could affect Southwestern Pennsylvania now and in the future.

What Are Forces of Change?

Every four years, the Southwestern Pennsylvania Commission (SPC) is required by Federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019 **as both the region's long range transportation plan and comprehensive economic development strategy**. SPC is creating a new regional plan in which it will consider major Forces of Change and how we can best take advantage of opportunities they may create and mitigate the disruptions they may cause. Forces of Change are high level external forces (global, national, regional) that could have significant regional impacts (both positive and/or negative) now and in the future.

A Force of Change Scenario Report for each category has been developed by SPC. The reports will be used, along with input from the public, to establish a range of potential strategies related to each Force of Change. These strategies were reviewed and discussed at a Regional Plan Workshop held in September 2018. The resulting list of strategies will be used to gather further public input and ultimately to update the long range plan for the Southwestern Pennsylvania region.

SPC has identified forces that have effects on transportation and development in five broad categories: Demographics, Technology, Economy, Environment, and Funding.

Why and How Were Forces of Change Identified?

Every four years, SPC is required by federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019.

In 2017, SPC staff began working with the region's planning directors to develop a Task Force to help develop a process for the new long range plan.

SPC began by reviewing publications from the National Cooperative Highway Research Program on "Dynamic Forces of Change." Next, peer Metropolitan Planning Organizations (MPOs) along with national and regional thought leaders were interviewed to get different perspectives. Common themes emerged, which drove the formation of Expert Resource Panels for each of the five categories to identify the Forces of Change that will impact them.

Expert Resource Panels and Exploratory Scenarios

Expert Resource Panels were formed to provide expertise on the potential effects of Forces of Change on the region. The Expert Resource Panels identified the Forces of Change within each category that are likely to impact the region. Panelists discussed potential opportunities and challenges, the relative probability of occurrence, and whether the impacts will be positive or negative.

The panel activities were designed to help answer the following questions:

What significant trends or disruptions are occurring now, or are foreseen to occur, with potential impact for the region?

Will the impacts be positive or negative for the region?

What specific challenges and opportunities for the region are generated by these occurrences?

What is the anticipated magnitude of the identified challenges and opportunities?

Participants were asked to focus on events, trends, and factors within each category and to identify possible impacts, potential challenges, and opportunities for each Force of Change.

Based on that discussion, exploratory scenarios were developed. Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in discussions related to impacts and strategies for moving forward successfully.

Below are some of the topics that were explored by the Expert Resource Panels. Panelists considered the regional impacts of the topics and identified additional avenues for investigation.

Demographics
Aging Population and Labor Force; Immigration (regional); Urban and Suburban Development Patterns; National/Regional Shifts; Household Size; Diversity; Education; and, Opioid Addiction.

Technology
Connected & Autonomous Vehicles; Mobility as a Service; Automation; Additive Manufacturing; Modal Impacts; Broadband; and, Artificial Intelligence.

Economy
Emerging Industries; Housing Affordability; Economic Growth; Household Income; Employment Types; Shared Economy; On-line Economy vs. Brick and Mortar Retail; and, Decaying Infrastructure.

Environment
Energy Supply and Demand; Fossil Fuel/Renewable Balance; Security; Environmental Attitudes; Climate Change and Resilience; and, Water Quality.

Funding
Role of Public & Private Sectors; Investment Levels; National/State/Local Government Roles; and, Finance (how to pay).

What Are The Demographic Forces of Change?

# Demographic Forces of Change

Population Trends

As a major metro area, the SPC region is home to approximately 2.5 million people. While the region's population is generally older, there are areas of youth centered around colleges, universities and urban centers such as Downtown Pittsburgh, Oakland and Cranberry Township.

Welcoming a more diverse population serves as an opportunity for growth and entrepreneurship. For example, *CNN* reports that immigrants are twice as likely to start a business as U.S.-born citizens and *Fortune* magazine reports that black females are the fastest growing group of entrepreneurs.

NOTEWORTHY:

According to LendingTree, Pittsburgh was named as one of the top eleven cities in the country for millennial homebuyers.

Population Change by County (2010 to 2021)

Source: U.S. Census

■ July 1, 2010 ■ July 1, 2020 ■ July 1, 2021
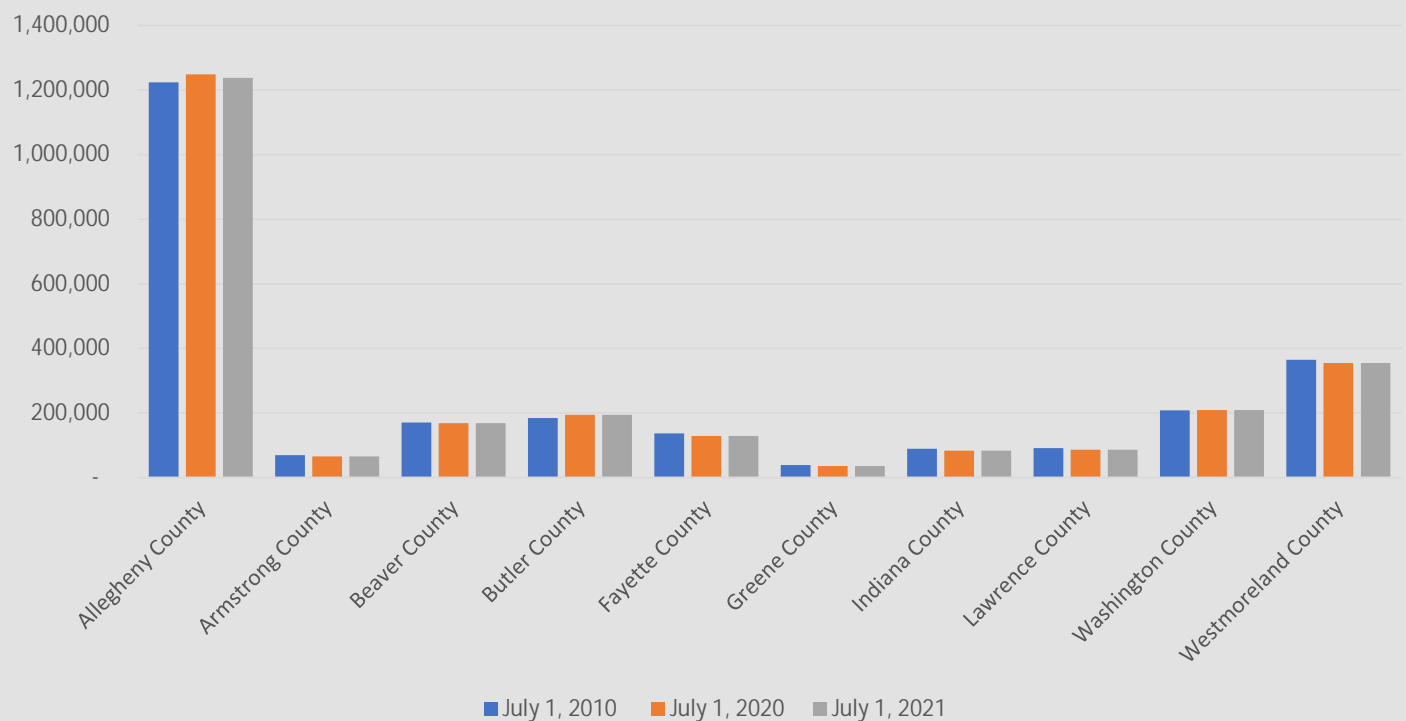
Jobs

As job opportunities increase in the tech fields, the Southwestern Pennsylvania region may need another 80,000 workers by 2025. Across the region's 61 institutions of higher education, 50% of the 40,000 annual graduates leave the region, with the number one reason for departure being that they cannot find a job here.

The Southwestern Pennsylvania region, when compared to 15 other benchmark regions, has the lowest percentage of residents under 18, the second lowest percentage of residents 18-64 and the highest percentage of residents 65 and over.

Pittsburgh is home to the Carnegie Mellon University, which holds the highest-ranked graduate program for artificial intelligence in the U.S., according to *U.S. News & World Report (2022)*. Also, Pittsburgh was named one of four tech hubs in the U.S. to watch in 2018 via *VentureBeat* and one of the 11 Best U.S. Cities for Young Professionals in 2023 by *Spacewise*.

Projected Workforce Shortage by 2025	
Workforce Openings during 2015-2025	
Baby Boomer Retirements (29,000 per year)	290,000
Job Growth (5,000 per year)	50,000
Total Projected Workforce Openings	340,000
Expected Number of Workers (26,000 per year)	260,000
Potential Shortfall by 2025	80,000

SOURCE: *Inflection Point 2016, Allegheny Conference on Community Development*

NOTEWORTHY:

Pittsburgh is home to the Carnegie Mellon University, which holds the No. 1 graduate program for artificial intelligence in the U.S.
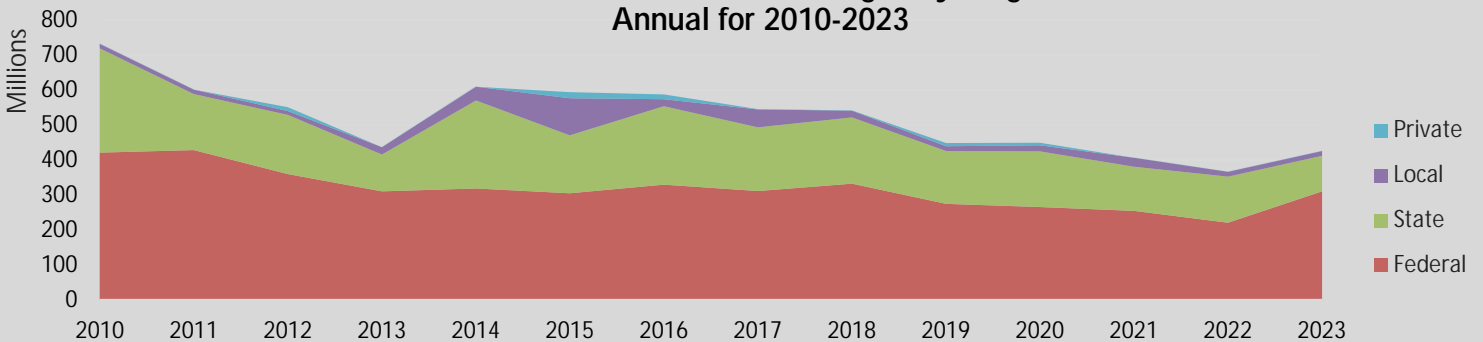
Transportation

The region's aging infrastructure and equitable access to transportation services have the potential to affect the population, development patterns and workforce. Keeping the region's aging transportation system in a state of good repair is critical to support growth in the region.
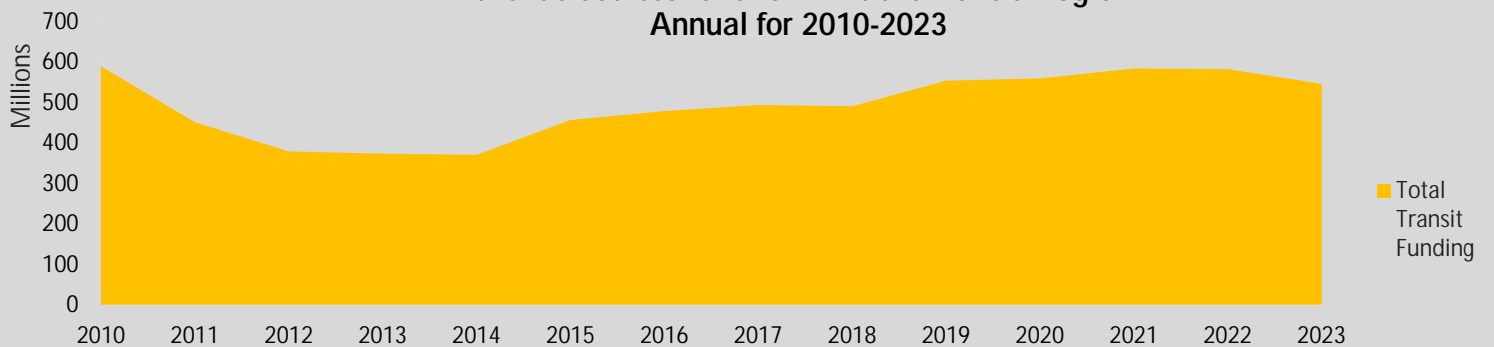
The region not only needs to smartly invest in maintaining the system, but it also needs to find ways to invest in additional projects that strengthen our communities; make the transportation system safer, more efficient, and more reliable; and, grow our economy.

NOTEWORTHY:
Transportation and land use that supports and enhances the regional economy and the communities within it is vital to the future of our region.

**Revenue Sources for SPC TIP Highway Program**
Annual for 2010-2023

Millions

Legend:
- Private
- Local
- State
- Federal

Revenue Sources for SPC TIP Public Transit Program
Annual for 2010-2023

Millions

Legend:
- Total Transit Funding

Demographic Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*
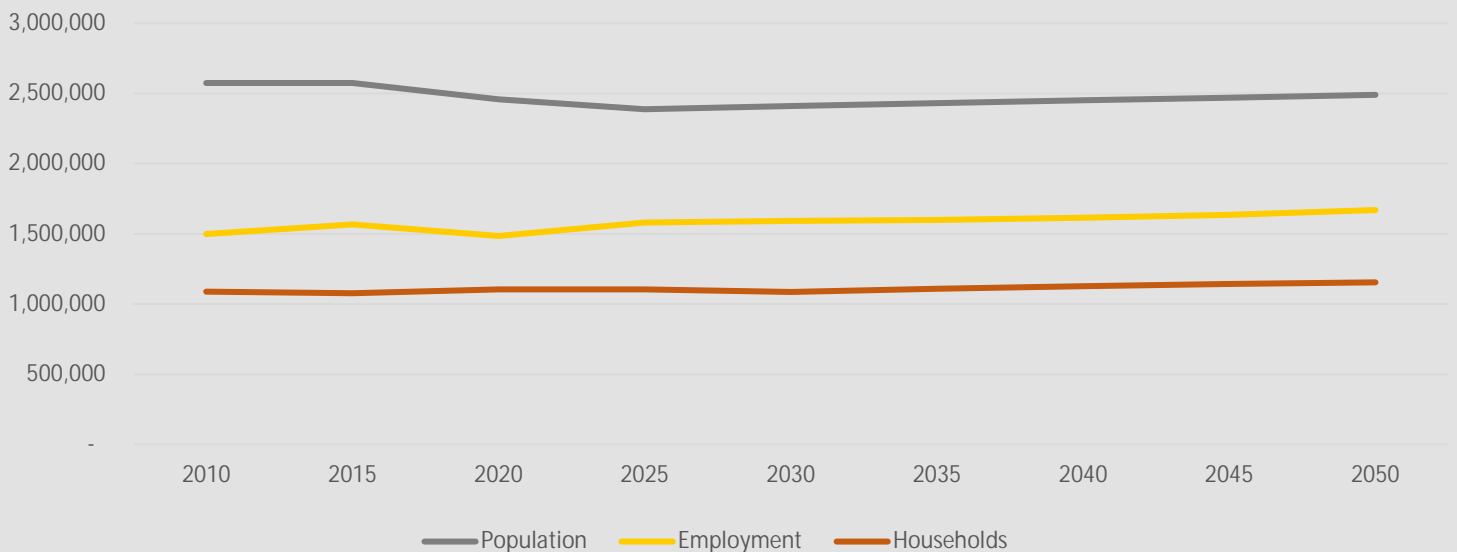
Land Use

Changing demographics have the ability to affect development patterns and the provision of services in existing communities throughout the region. While population is steady to slightly decreasing in the region, the average household size is also decreasing. Decreasing household size can create continued demand for housing units even in the face of overall population decline as the composition of households change. An increase in the number of households in lower density areas may strain the ability to provide services and infrastructure to support growth in those areas. Development should be focused in existing urbanized areas with infrastructure improvements targeted at the corridors that connect them.

Nearly 79% of the region's population lives in the 16% of the land area that is classified as urban.

Census 2020 Urbanized Area
SPC Area Transit Routes
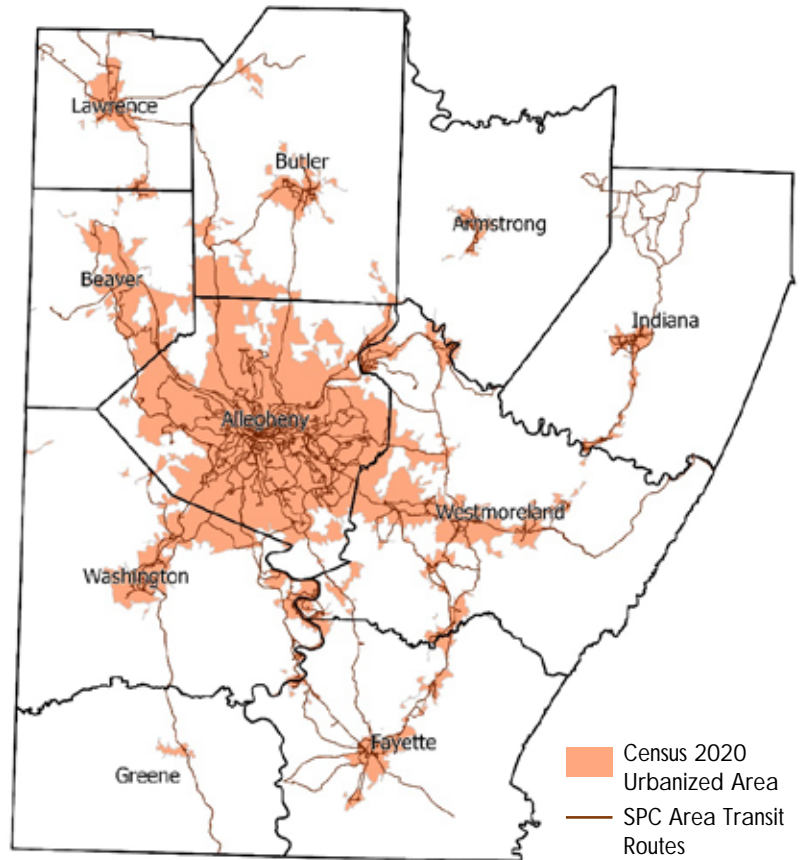
Source: SPC Regional Data Center

Regional Population, Employment and Households (2010-2050)

Population — Employment — Households

Demographic Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

*How can we adapt to the Forces of Change
underway and take full advantage of the
opportunities they create?*

Population Trends

*Southwestern PA has one of the oldest populations in the country and
most areas have slightly declining/stable population.*

Jobs

*Southwestern Pennsylvania may face a potential shortage of 80,000
workers by 2025 and 50% of the region's 40,000 annual college
graduates leave the region.*

Transportation

*The region's aging infrastructure & equitable access to transportation
services have the potential to affect the population, development
patterns and workforce.*

Land Use

*Changing demographics have the ability to affect development
patterns and the provision of services in existing communities
throughout the region.*

Creating Strategies
To Address Demographic Forces of Change

The Demographic Expert Resource Panel identified strategies for each Force of Change to address potential impacts and mitigate risks. Panelists discussed the need to better align people with available jobs and explored various ways to make that happen:

- *Develop better transportation connections to underserved employment areas.*

- *Guide land use policies to encourage new housing and employment development in areas with existing transportation and access.*

- *Increase training and awareness to match local people with the jobs that are available.*

Regional cooperation was also a common theme: collaborating, communicating, and sharing of public resources and facilities to better direct resources and priorities around the region.

Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in developing strategies to address impacts and mitigate risks.

• DEMOGRAPHICS • TECHNOLOGY • ECONOMY • AGING • POPULATION • IMMIGRATION • URBAN • SUBURBAN • DEVELOPMENT • PATTERNS • HOUSEHOLD • SIZE • DIVERSITY • EDUCATION • CONNECTED • AUTONOMOUS • VEHICLES • MOBILITY • SERVICE • AUTOMATION • ADDITIVE • MANUFACTURING • MODAL IMAPACTS • BROADBAND • ARTIFICIAL • INTELLIGENCE • REGIONAL • IMPACT • EMERGING INDUSTRIES • HOUSING • GROWTH • INCOME • EMPLOYMENT • AFFORDABILITY • SHARED • INCOME • RETAIL • INFRASTRUCTURE • ENERGY • SUPPLY • DEMAND • FUEL • RENEWABLE • BALANCE • SECURITY • ATTITUDES • RESOURCES • WATER • QUALITY • FUNDING • PUBLIC • PRIVATE SECTORS • LOCAL • INVESTMENT LEVEL

Note: Draft strategies in this report are presented for discussion and consideration purposes only. They are not final or official policy unless adopted by the Commission in its official plan.

Population Trends Strategies

That Impact Demographics
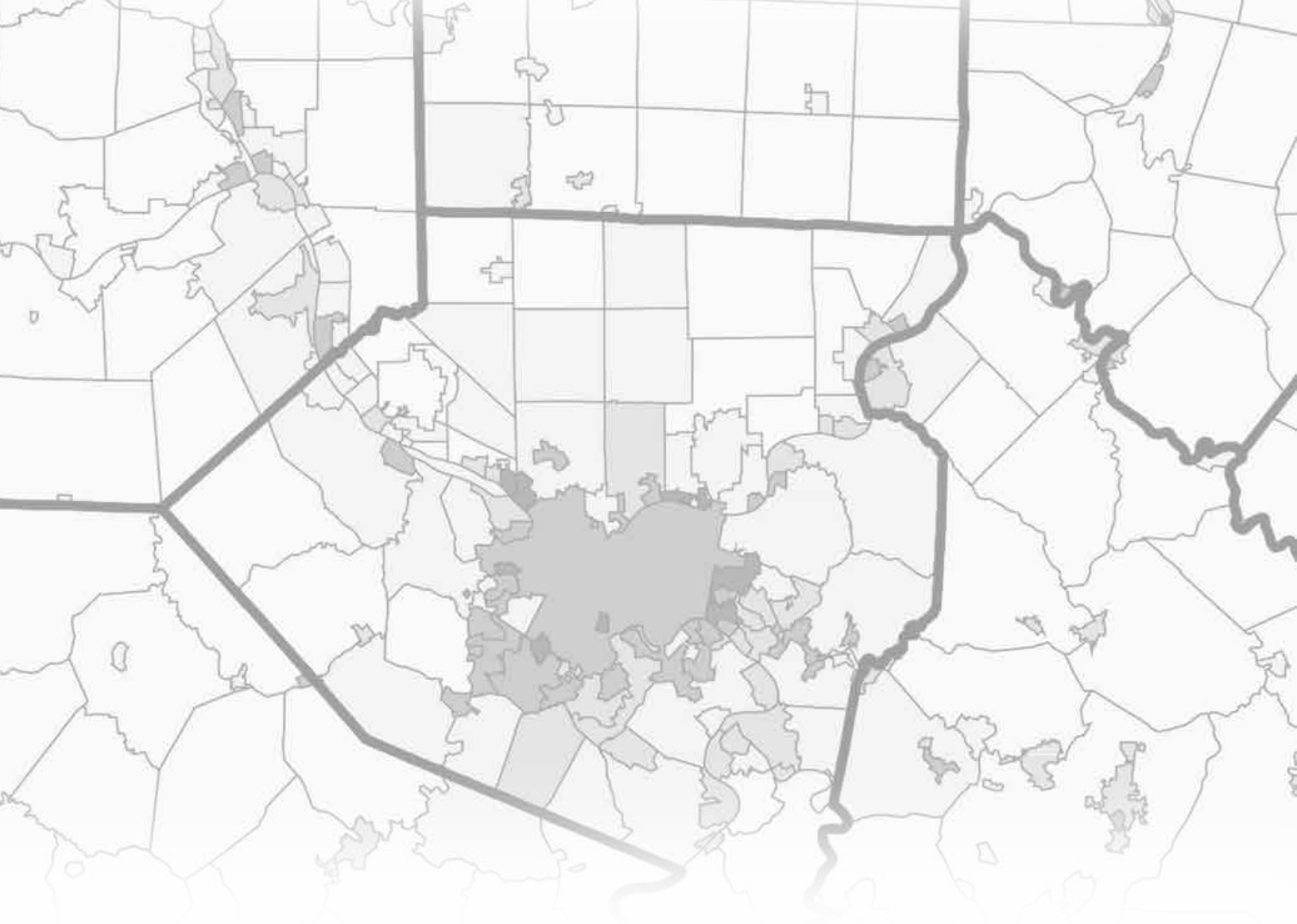
Exploratory Scenario*

What if population trends such as low birth rates and low immigration rates are impeding the region's population growth. Population shifts are impacting public investments at the local level, such as schools, services and infrastructure. The region's lack of diversity makes it more difficult to attract a diverse workforce.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Attract New Residents and Retain More University Graduates

Encourage migration to the region to mitigate population decline. Promote quality of life to attract new residents including great schools, health care facilities, and services. This effort will be most successful if it has a regional focus. Business communities and chambers of commerce often do a great job of attracting residents, but workforce investment boards and college / university alumni organizations can also help. Understanding the role of employment opportunities and overall employment rates will also help to guide action steps for attracting new residents.

Local college graduates are another potential population of permanent residents. Efforts to retain graduates should align with efforts to attract new residents. Understanding the impacts of employment rates and opportunities will also help to retain graduates. Further, working with colleges and universities to prepare students for local industries can create a path from graduation to a local job. Additional measures for retaining graduates could include programs for housing assistance or student loan assistance.

Partners for Implementation
SPC, regional organizations, business community/chambers of commerce, workforce investment boards, university alumni outreach groups, colleges and universities, Pittsburgh Regional Alliance, realtors associations, economic development board, tourism/visitors bureaus

Strategy 2: Help Employers Attract Workers

Work with regional employers to attract job candidates. This effort can align with overall efforts to attract new residents by promoting the region and the benefits of relocating here.

Encourage employers to align their requirements with national standards to ensure that they are competitive and able to attract workers. Employers can offer competitive benefits and perks such as moving expenses. Realistic job requirements that align with the job (i.e. discourage the trend of requiring experience but offering entry-level pay) can also help bring new employees to businesses and new residents to the area.

Partners for Implementation
Employers, with support from local chambers of commerce, Pittsburgh Regional Alliance, realtors associations, economic development board, tourism boards, workforce development boards

Job Strategies

That Impact Demographics

<u>Exploratory Scenario*</u>

What if the region's workforce continues to age, and a majority of the potential workforce does not have the skills for today's jobs, let alone the skills for evolving jobs. This negatively impacts the region's ability to compete.

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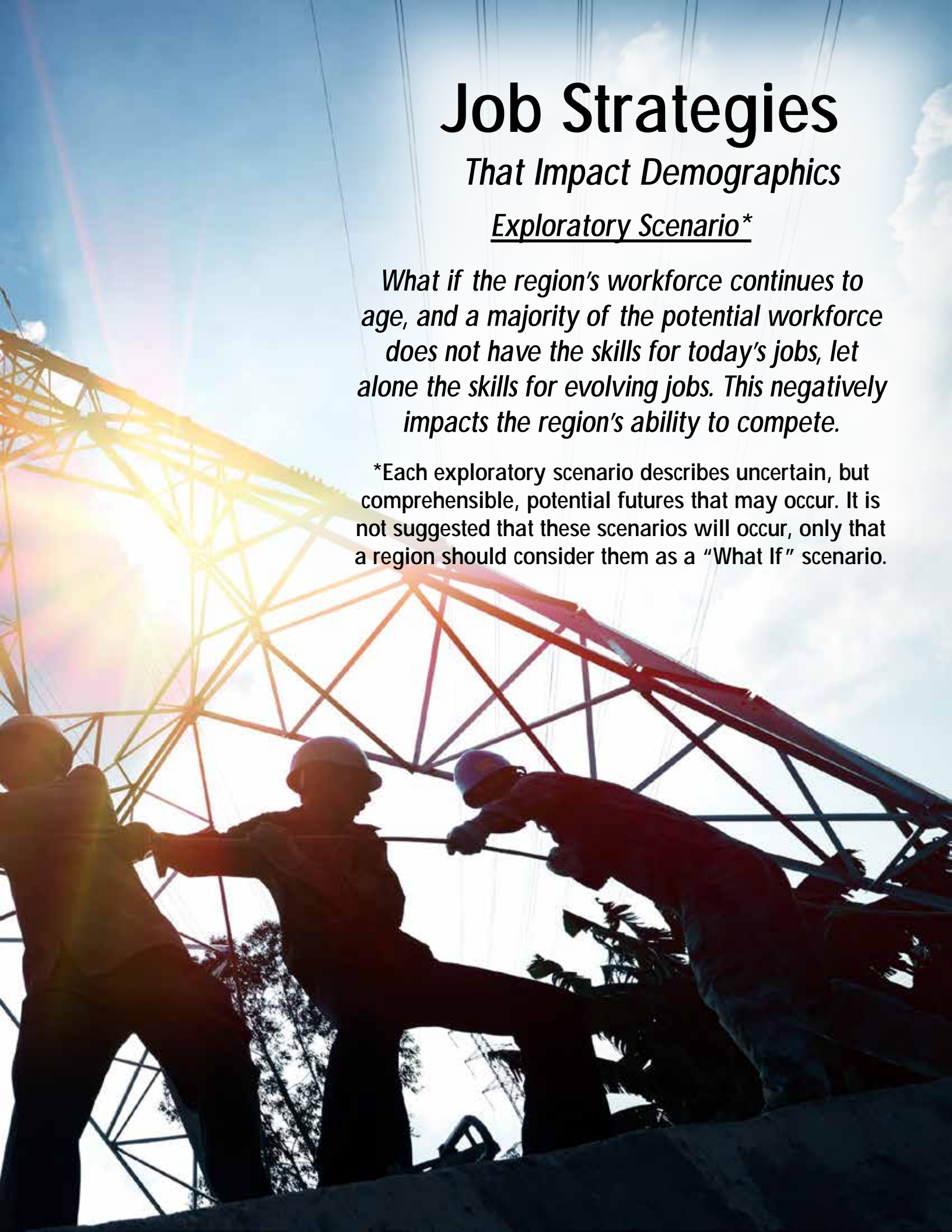
Strategy 1: Grow and Attract a Variety of Industries

Over the next decade our workforce will be characterized by large scale retirements, slow population growth, and increasing skill demand across all occupations. At the same time, many of our traditional industries will continue to be disrupted by technological advances, requiring that employers and talent keep pace with this change to remain competitive. According to Inflection Point 2017-18, prepared by the Allegheny Conference on Community Development, far reaching business investment decisions have been made in the past year that have strong, positive workforce implications, whether it be a multi-billion dollar investment in an ethane cracker, billion dollar investments in our unique technology assets such as autonomous vehicles, or those active investments of time and energy being made by our region's educators and businesses to grow a more nimble and strong talent pipeline.

Continuing this trend and working to attract a variety of industries to diversity the region will help the economy grow stronger, attract new residents, and retain the residents that we have.

Partners for Implementation

Chambers of commerce, industry groups, Allegheny Conference on Community Development

Strategy 2: Focus on Workforce Reintegration

Expand the workforce by reintegrating individuals into the workforce with minor criminal records or previous drug use. Educate employers on the value and potential of these workers, help with job placement, and consider legislation to ease the way to clear records of past use (in reference to opioid use). Changes to legislation can help to keep those with minor criminal offenses in touch with the workforce and help to create a path for reintegration.

Partners for Implementation

Nonprofit agencies for employment help, chamber of commerce, local and state government, employers, school superintendents/boards, alumni associations, workforce boards, and professional groups

Strategy 3: Match Graduates to Jobs

Match college graduates to available jobs. Bus college students to local job fairs. The Allegheny Conference on Community Development recently held a regional bus tour with students from high-demand occupations to showcase employment opportunities and quality of life assets in the region. Working with colleges and universities to make attendance at these job fairs mandatory, and/or require internships will help students connect to the local workforce and region – raising the odds that they will remain on as long-term residents.

Partners for Implementation
Young professionals groups, universities, employers, school superintendents, workforce boards, career services at universities, Allegheny Conference on Community Development, trade associations

Strategy 4: Train Workers for Jobs

Train and match workers to existing regional jobs. Encourage training in schools from earlier ages in a two-pronged approach of increasing awareness and encouraging hands-on work experience such as apprenticeships.

Expose students to a greater range of jobs to increase their awareness of career opportunities. Conduct an awareness campaign in schools to guide students to the many available jobs (such as skilled trades). Partner with project management training programs to emphasize problem solving and leadership skills. This will help to demonstrate that these jobs have opportunities for advancement. Incorporate transition plans with employment goals into graduation requirements.

Network with universities to secure funding support and ongoing education for leadership. This can include upskill training to move employees up the ladder. Promote these opportunities to local residents. Invest in transportation that connects people to jobs so that the available jobs are also desirable long term and people can afford to stay.

Partners for Implementation
Philanthropy organizations, K-12 schools, universities, and employers, with support from industries, local chambers of commerce, and local and regional governments

Transportation Strategies
That Impact Demographics

*Exploratory Scenario**

What if increasing expenses are incurred to maintain and rebuild the region's old infrastructure despite varying population shifts. A focus on transportation access and options becomes more important in both urban and rural areas. Available financial resources place a strain on how and when transportation investments are made, and changing demographics dictate the location and type of investment.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Focus in the Right Places

Although different projects suit different locations, some places were "left behind" when transit options expanded elsewhere. Prioritize investment based on performance criteria. This will help prioritize impacts across the region while respecting and preserving local quality of life. Subsidies offered by private development must be evaluated carefully because they don't always subsidize development that is sustainable in the long term. For example, locations near transit access are less likely to experience long term transportation failures and are more likely to be successful well into the future.

Partners for Implementation

All regional transportation authorities, including PennDOT, public transit providers, Federal Transit Administration, county and municipal officials, and all local authorities

Strategy 2: Develop a Regional Comprehensive Public Transit Plan

A regional public transit plan can drive cooperation and linkages across the region. Improving collaboration between providers, utilizing PennDOT Connects, sharing resources, and allowing service across jurisdictions could all be addressed at a regional scale. A method known as "finding dancing partners" works to pair neighboring Authorities or relevant resources to enhance resource sharing. Moving forward from PennDOT Connects, an online database would enable access to shared resources including past and existing studies.

Another related regional effort could be collaborating on the location of Park and Ride facilities across all counties to support their varying needs and providing bus access in areas with greater need but less demand.

Partners for Implementation

All regional transportation authorities, including PennDOT, transit providers, Federal Transit Administration, county and municipal officials, and all local authorities. Housing and finance authorities may be valuable partners as well.

Land Use Strategies
That Impact Demographics

*Exploratory Scenario**

What if there is a mismatch between affordable available housing in proximity to jobs and services. This degrades access, especially for the low income and the physically challenged.

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Strategy 1: Consider Transportation When Making Land Use Decisions and Simplify Regulations for Developers

The impact of transportation funding and projects must be considered when making land use decisions. Land use regulations should support connectivity between the transportation network and new development. Regulations and codes should also set requirements for developers. Local municipalities value independence, but consistent zoning and land use regulations at the municipal level can help to create a more level laying field across the region and guide development to high-impact locations.

Beyond land use regulations, options to make land "friendly" to developers should be considered. Guiding developers to high-impact properties that will support transportation projects will help to meet multiple goals. Regulatory and tax burdens for new businesses can also be reviewed to identify opportunities to guide development.

Partners for Implementation
Municipalities, municipal steering committees, counties, and councils of government

Strategy 2: Promote the Benefits of Best Practices in Land Use

Educate local government about good land use practices and their benefits, including how to prepare land use regulations that support transportation networks and encourage development that is linked to, or drives, transportation access.

Target chambers of commerce and state leadership for education efforts to raise awareness about best practices, ways to create great places that improve quality of life, and strategies to achieve consistent and user-friendly regulations that support an affordable transportation system and provide housing closer to jobs and services.

SPC and related organizations, including housing and finance authorities, should assist counties with education about successful land use practices and their benefits. State level support is also important because the state is well-positioned to follow through on strengthening land use plans and practices.

Partners for Implementation
SPC and related regional organizations, housing and finance authorities, state agencies, chambers of commerce

Investing in our Future
Demographic Strategies for Investment

During the Regional Plan Workshop, participants were asked to discuss potential draft strategies for the Forces of Change and identify investment levels for each of the draft strategies. This exercise helped to create a framework that could be used to evaluate and drive future evaluation of projects and investments.

Below are the investment strategy results for the Demographic Forces of Change.

Demographic Forces of Change	Percent Investment
Transportation Strategies	**19.3%**
Focus in the right places. (Not all projects suit all locations. Some places were "left behind" when transit options expanded elsewhere.)	5.7%
Develop a comprehensive regional plan for public transit to drive cooperation and linkage across the region.	13.6%
Land Use Strategies	**25.0%**
Consider the impact of transportation funding and projects when making land use decisions.	8.6%
Make affordable housing land development regulations user-friendly for developers.	7.1%
Educate local government and councils about best land use practices and their benefits.	9.3%
Population Trends Strategies	**15.0%**
Encourage domestic migration to stop the decline or slow population growth in the region.	5.7%
Retain university students after graduation.	5.7%
Encourage employers to better align their requirements with national standards to be more competitive and attract workers.	3.6%
Jobs Strategies	**40.7%**
Grow and attract a variety of industries to diversify jobs across the region.	15.7%
Reintegrate individuals into the workforce with minor criminal records or previous drug use.	8.6%
Encourage employers to offer better employment benefit packages.	4.3%
Match college graduates to available jobs.	3.2%
Train and match workers to the jobs we have in the region.	8.9%

Demographic Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Building the Vision

Demographics

Building the Vision

As discussed in this report, in developing Smart Moves for a Changing Region, SPC convened a series of Expert Resource Panel meetings to identify Forces of Change, weigh their potential impacts, and develop strategies to mitigate and/or optimize the forces. This information, coupled with public and partner input and feedback from SPC leadership, was organized into a set of three emerging themes that capture the most positive aspects of each strategy and focus them in a way that will result in a holistic long range plan for the region.

SPC is developing a plan that both provides a framework and makes significant investment to advance the most critical issues and projects facing the region. The emerging themes will be used in conjunction with performance metrics and other public input to evaluate the program of proposed projects and programs to be contained in the plan. This will ensure the projects and programs contained in the plan will work in concert to assist the Southwestern Pennsylvania region achieve its desired vision for the future.

The emerging regional vision is a world-class, well maintained, integrated transportation system that provides connected mobility for all, enables resilient communities and supports a globally competitive economy.

This vision means taking advantage of our considerable existing assets and developing, supporting and implementing projects that advance our progress. It means investing in regionally connected seamless public transportation that includes new transit investments in key corridors and networks. It means developing modern support infrastructure that prepares the region not just for current technological advances, but also strives to put the region years and decades ahead, by developing the next technology here in this region because we have the expertise in the region to make this happen. It means tackling climate change and taking care of our air and our water. This will allow us to work with many partners and dovetail this plan with other related plans and regional efforts of both public and private sector to advance the region.

The vision means working with partners in identifying and using the types of proven funding and financing arrangements that we will need to make that happen.

The vision will focus on the workforce needs of the region. It means attracting and growing our population by making the region a place where people want to come and stay. It means training our population not just for the jobs that exist but for the jobs we create through innovation and entrepreneurship, and making this region a leader in technology and innovation.

Technology and innovation can be much more than self-driving cars and artificial intelligence and it can work in rural as well as urban parts of the region. It will include innovative new farming techniques and technology deployment that will connect our entire region with high speed access to the internet to afford all our residents the opportunity to work from anywhere and connecting them to the global economic opportunities. The vision will recognize our assets and putting them to the best use for this region, and our residents.

The vision also means taking stewardship and care of the communities that are the foundation of this region, and environment that sustains us. This plan will focus community investment that both sustains our past and protects our future, while elevating the status of our communities throughout the region as desirable places to live and work.

Acknowledgements

Expert Panel Resource Members

Acknowledgements (continued)

Acknowledgements (continued)

Forces of Change

Demographics

Exploratory Scenario Report

Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*
September 2023

Michael Baker INTERNATIONAL

Forces of Change

Economy

Exploratory Scenario Report

Southwestern Pennsylvania Commission
Forces of Change Exploratory Scenario Reports
September 2023

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Every four years, the Southwestern Pennsylvania Commission (SPC) is required by Federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019 **as both the region's long range transportation plan and comprehensive economic development strategy.** SPC is creat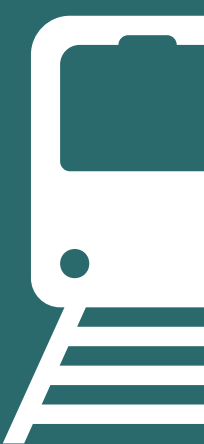ing a new regional plan in which it will consider major Forces of Change and how we can best take advantage of opportunities they may create and mitigate the disruptions they may cause. Forces of Change are high level external forces (global, national, regional) that could have significant regional impacts (both positive and/or negative) now and in the future.

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What is the anticipated magnitude of the identified challenges and opportunities?

Participants were asked to focus on events, trends, and factors within each category and to identify possible impacts, potential challenges, and opportunities for each Force of Change.

Based on that discussion, exploratory scenarios were developed. Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in discussions related to impacts and strategies for moving forward successfully.

Below are some of the topics that were explored by the Expert Resource Panels. Panelists considered the regional impacts of the topics and identified additional avenues for investigation.

Demographics
Aging Population and Labor Force; Immigration (regional); Urban and Suburban Development Patterns; National/Regional Shifts; Household Size; Diversity; Education; and, Opioid Addiction.

Technology
Connected & Autonomous Vehicles; Mobility as a Service; Automation; Additive Manufacturing; Modal Impacts; Broadband; and, Artificial Intelligence.

Economy
Emerging Industries; Housing Affordability; Economic Growth; Household Income; Employment Types; Shared Economy; On-line Economy vs. Brick and Mortar Retail; and, Decaying Infrastructure.

Environment
Energy Supply and Demand; Fossil Fuel/Renewable Balance; Security; Environmental Attitudes; Climate Change and Resilience; and, Water Quality.

Funding
Role of Public & Private Sectors; Investment Levels; National/State/Local Government Roles; and, Finance (how to pay).

What Are The Economy Forces of Change?
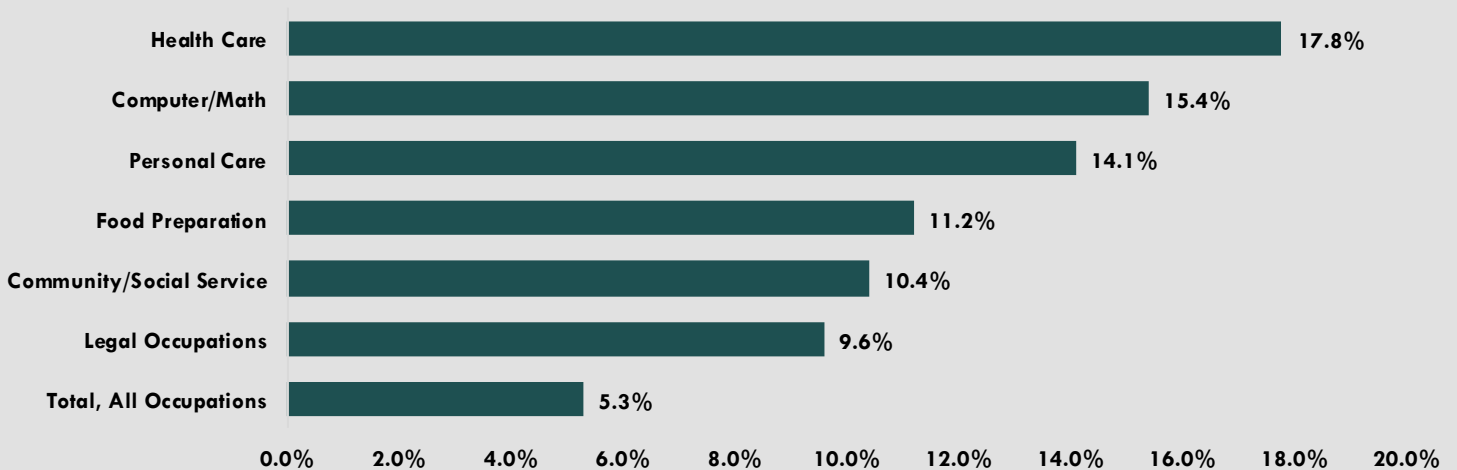
Economy Forces of Change

Workforce

As occupations change, there is a need to match skills with expected job demand. While technology is impacting every sector of the regional economy, its rapid development is also leading to new jobs in emerging fields. The demand for technical workers is expected to grow 2.6 times faster than the market overall. This increased need for technical skills across all industries will impact the type of education and skills required in the future.

Pittsburgh is home to the Carnegie Mellon University, which holds the highest-ranked graduate program for artificial intelligence in the U.S., according to *U.S. News & World Report (2022)*. Also, Pittsburgh was named one of four tech hubs in the U.S. to watch in 2018 via *VentureBeat* and one of the 11 Best U.S. Cities for Young Professionals in 2023 by *Spacewise*.

Investment in building a local, diverse workforce to meet this demand for highly skilled talent across sectors is critical. Employers must invest in training and career pathways so that all employees can keep pace with skill demand. Collaboration between employers and local and regional educators to develop a workforce with the knowledge and skills needed to support future jobs is vital to the future of the region.

NOTEWORTHY:

Pittsburgh was named one of the 11 best U.S. cities for young professionals in 2023 via Spacewise.

Employment by Occupation, Projected Growth Rate, 2021-2031

Occupation	Growth Rate
Health Care	17.8%
Computer/Math	15.4%
Personal Care	14.1%
Food Preparation	11.2%
Community/Social Service	10.4%
Legal Occupations	9.6%
Total, All Occupations	5.3%

SOURCE: Bureau of Labor Statistics

Economy Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*
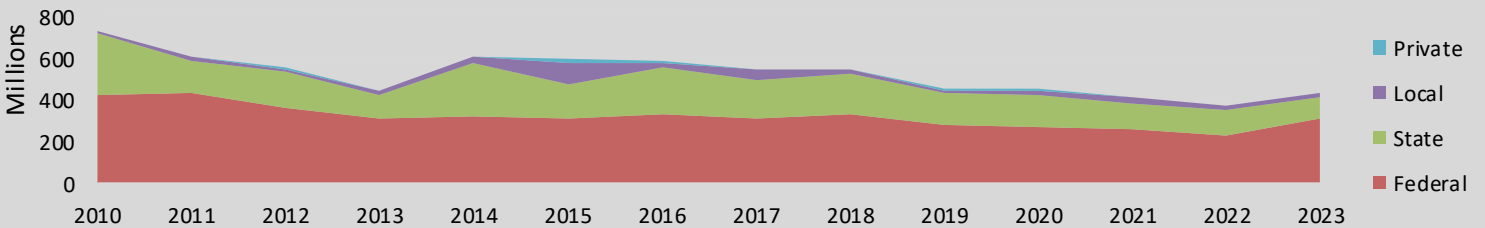
Infrastructure

If neglected, the region's aging public infrastructure could affect the region's ability to retain existing and attract new businesses and people. Investments during Pittsburgh's industrial peak created a large base of roadways and bridges, rail lines, waterways, locks and dams, building stock and housing across the region, but much of it requires substantial reinvestment.

Pittsburgh has enough physical infrastructure to support a population twice its current size. Strategic coordination and planning can help transform the aging infrastructure into an asset rather than a risk is critical. The region not only needs to smartly invest in maintaining its infrastructure, it also needs to find ways to invest in additional projects that strengthen our communities.
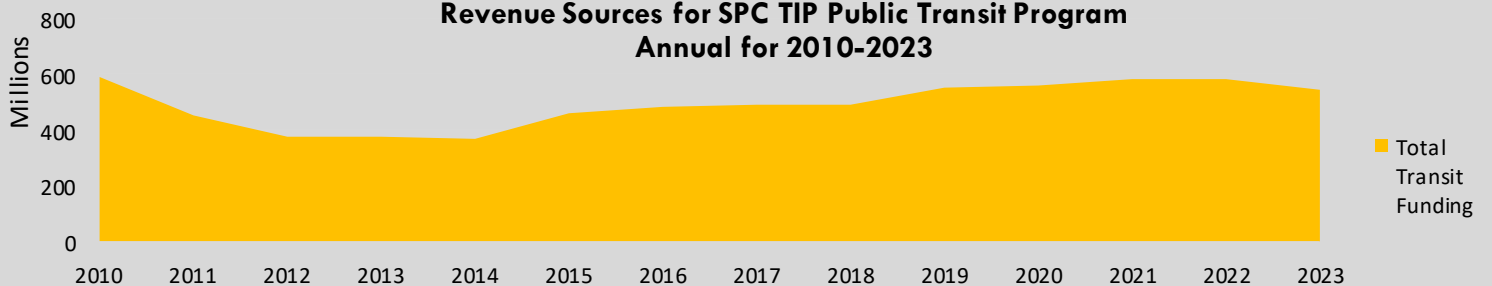
Keeping the region's aging public infrastructure in a state of good repair is necessary to support growth in the region. By making infrastructure improvements a top priority in the face of declining funding, public infrastructure will be more reliable, safer, and more efficient, and can support growth in the region.

NOTEWORTHY:
Public infrastructure that enhances the regional economy and the communities within it is vital to the future of our region.

Revenue Sources for SPC TIP Highway Program
Annual for 2010-2023

Private, Local, State, Federal

Revenue Sources for SPC TIP Public Transit Program
Annual for 2010-2023

Total Transit Funding

Economy Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Technology

Rapidly advancing technologies are affecting all aspects of the economy, from infrastructure and mobility to healthcare, retail and the service industry. Technology is reshaping virtually every occupation at a rapid rate, changing the skills future employees must be equipped with and driving the need for continuous up-skilling of the incumbent workforce.

There is fast paced technology adoption in all facets of the economy that may impact business models in the areas of manufacturing, services and retail. Institutions could struggle to keep up with the education and training needs associated with these industry changes.

With these changes, there will be an increased need in the region for digital infrastructure investments. Without greater investment, rural areas may continue to fall further behind as technology advances.

An Allegheny Conference on Community Development study examined the risk automation poses to various fields, and is illustrated in the chart to the right. Positions such as registered nurses, nursing assistants, and software developers face little risk of automation, while occupations such as retail salespersons and pharmacy technicians, among others, are at the greatest risk of automation.

Job Risk of Automation

Occupation	Risk of Automation	Total Employment in Pittsburgh MSA
Registered Nurses	Low	30,810
Nursing Assistants	Low	13,590
Software Developers, Applications	Low	7,920
Medical Assistants	Low	6,130
Computer Systems Analysts	Low	5,790
Management Analysts	Low	4,880
First-Line Supervisors of Construction Trades and Extraction Workers	Low	4,380
Electricians	Low	4,060
Mechanical Engineers	Low	3,420
First-Line Supervisors of Mechanics, Installers, and Repairers	Low	3,310
Customer Service Representatives	Medium	23,310
Heavy and Tractor-Trailer Truck Drivers	Medium	13,360
Maintenance and Repair Workers, General	Medium	10,810
Carpenters	Medium	7,340
Automotive Service Technicians and Mechanics	Medium	6,220
Computer User Support Specialists	Medium	5,950
Market Research Analysts and Marketing Specialists	Medium	4,990
Machinists	Medium	3,920
Industrial Machinery Mechanics	Medium	2,340
Dental Hygienists	Medium	2,130
Retail Salespersons	High	35,970
Laborers and Freight, Stock, and Material Movers, Hand	High	18,100
Construction Laborers	High	9,460
Operating Engineers and Other Construction Equipment Operators	High	5,220
Team Assemblers	High	4,380
Loan Officers	High	3,670
Pharmacy Technicians	High	3,250
Welders, Cutters, Solderers, and Brazers	High	3,160
Electrical and Electronic Equipment Assemblers	High	2,950
Inspectors, Testers, Sorters, Samplers, and Weighers	High	2,760

SOURCE: Inflection Point 2016, Allegheny Conference on Community Development

Energy

The region's abundance of natural gas reserves could affect the economy, business attraction, the environment, infrastructure, and jobs. The energy sector, buoyed by the shale gas investment, can become a driving force in the regional economy. This exacerbates an already tight labor market. Investment could be increased in sites and infrastructure needed to attract and grow related industries and businesses that could be drawn by ever decreasing energy costs.

While the region should continue promoting the energy sector, it must also work to minimize the environmental impacts of the industry and its associated development. Thus, while shale gas drilling and processing could affect business attraction, infrastructure, and jobs, efforts must be made to reduce the impact on the environment.

In order to educate and expand the available workforce, the National Science Foundation, the U.S. Department of Labor, and the U.S. Department of Energy provide funding for workforce training opportunities. An example of this workforce training in Southwestern Pennsylvania is the Solar Training Network, which is funded by the U.S. Department of Energy SunShot Initiative. Led by The Solar Foundation, the Solar Training Network seeks to meet the needs of the growing solar industry by providing solar training and strategic employment partnerships to build the network of solar training providers, job seekers, and employers.

NOTEWORTHY:
The energy sector, buoyed by the growing shale gas industry, may become a driving force in the regional economy.

SOLAR TRAINING NETWORK
POSITIVE CONNECTIONS. POWERFUL CAREERS.
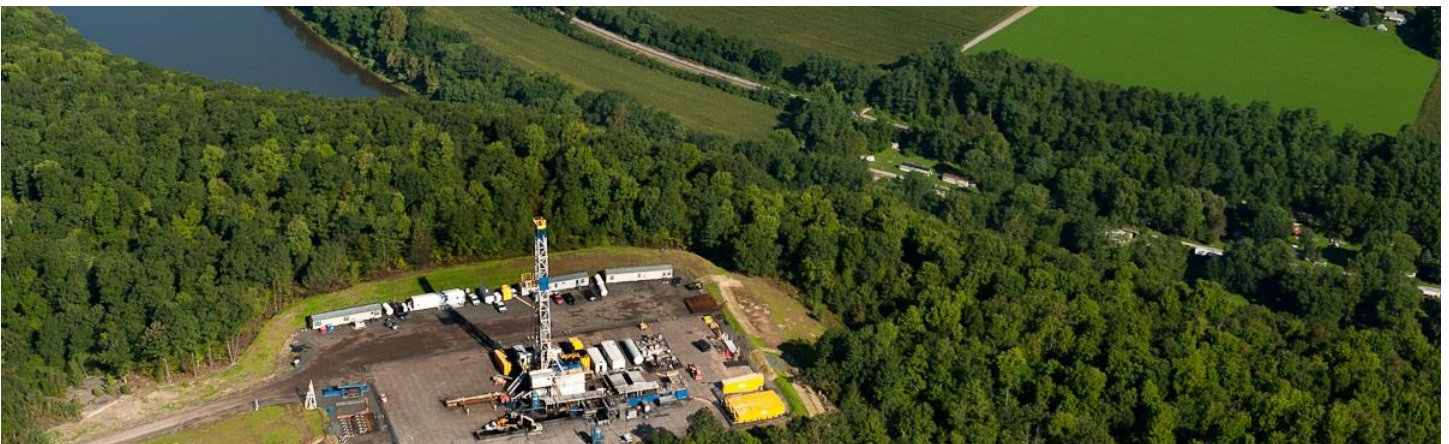
Vacant Properties

Vacant properties can affect crime, the tax base, and population loss. They can also be used to spur community revitalization. While vacant properties have plagued many industrial cities, they pose a unique opportunity for local government officials, community organizations, and residents to become assets in the community.

Local governments should work to return the property to its previous use (i.e. an owner-occupied residence or a business), but a number of factors can limit these options. Weak markets and population loss can limit the ability to return these uses, which require new strategies to stabilize and revitalize neighborhoods.

Vacant land plots in neighborhoods can be reimagined into urban farms, community gardens, and playgrounds, which can all prevent increases in crime and raise or maintain nearby property values. Local municipalities can take more control of this process through land trusts, land banks, municipal ordinances, and local beautification and stabilization programs.

Furthermore, the redevelopment of vacant brown field locations can increase available sites for business and industry, such as the growing natural gas field. Communities should identify new challenges and emerging opportunities in the future, while also being able to develop a system that can adapt to future changes.

NOTEWORTHY:

Pittsburgh markets its vacant lots through an online searchable database that was introduced in 2017.

Screenshot of Pittsburgh's online vacant property database (2023)
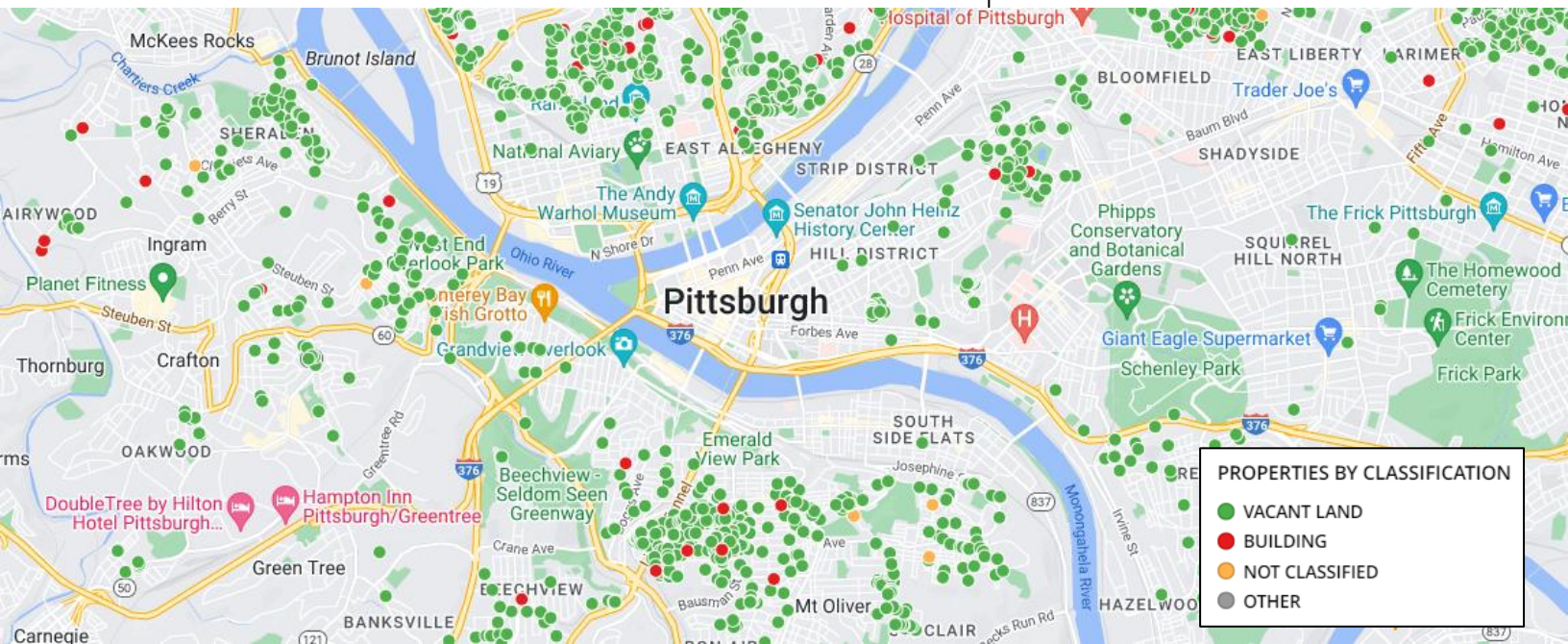
PROPERTIES BY CLASSIFICATION

- VACANT LAND
- BUILDING
- NOT CLASSIFIED
- OTHER

How can we adapt to the Forces of Change underway and take full advantage of the opportunities they create?

Workforce

As occupations change, there is a need to match skills with expected job demand.

Infrastructure

Aging infrastructure could affect the region's ability to retain and attract new businesses and people.

Technology

Advancing technologies are affecting all aspects of the economy.

Energy

Shale gas drilling and processing could affect business attraction, the environment, infrastructure and jobs.

Vacant Properties

Vacant properties can affect crime, tax base loss, and population loss, but can also be redeveloped.

Creating Strategies
To Address Economy Forces of Change

The Economic Resource Expert Panel identified strategies for each Force of Change to address potential impacts and mitigate risks. Panelists discussed the need to retain, attract, and train employees to maintain a competitive workforce and identified a number of ways to better prepare for growth in future economic sectors:

- *By increasing training and awareness to match local workers with the jobs that are available and retain a strong regional workforce.*
- *By prioritizing funding for critical infrastructure and improving efficiency in the development, design, construction, operation, and maintenance of infrastructure.*
- *By promoting investment and training in the growing technology and energy fields.*
- *By encouraging the repurposing of vacant and underutilized properties to maintain and/or increase property values.*

Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in developing strategies to address impacts and mitigate risks.

• DEMOGRAPHICS • TECHNOLOGY • ECONOMY • AGING • POPULATION • IMMIGRATION • URBAN • SUBURBAN • DEVELOPMENT • PATTERNS • HOUSEHOLD • SIZE • DIVERSITY • EDUCATION • CONNECTED • AUTONOMOUS • VEHICLES • MOBILITY • SERVICE • AUTOMATION • ADDITIVE • MANUFACTURING • MODAL IMAPACTS • BROADBAND • ARTIFICIAL • INTELLIGENCE • REGIONAL • IMPACT • EMERGING INDUSTRIES • HOUSING • GROWTH • INCOME • EMPLOYMENT • AFFORDABILITY • SHARED • ONLINE • RETAIL • INFRASTRUCTURE • ENERGY • SUPPLY • DEMAND • FUEL • RENEWABLE • BALANCE • SECURITY • ATTITUDES • LAND USE • WATER • QUALITY • FUNDING • PUBLIC • PRIVATE SECTORS • LOCAL • INVESTMENT LEVEL

Note: Draft strategies in this report are presented for discussion and consideration purposes only. They are not final or official policy unless adopted by the Commission in its official plan.

Economy Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Workforce Strategies
That Impact the Economy

Exploratory Scenario*

What if it is a tight labor market, where workforce demands exceed the available workforce. This leads to increased employee compensation and company cost to retain, attract, and train employees. An increased need for tech skills across all industries will impact the type of education and skills required, along with necessary retraining of existing workforce. Additional productivity investments will be needed as well. All things considered, business attraction efforts become more difficult.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Raise the Profile of Skilled Labor Blue Collar Careers

In order to fill the increasing number of jobs in skilled trade industries, efforts must be made to break the stigma attached to available jobs in blue collar jobs (such as heavy machinery, etc.). Partner with local workforce boards to implement training that emphasizes problem solving and leadership skills to show that these jobs have opportunities for advancement.

Implement a public education strategy showing that skilled labor is a viable path to success. Encourage training in schools from early ages to both increase awareness of these trades and encourage hands-on work experience such as apprenticeships. Build partnerships with educators and employers to understand employer needs and post-secondary employment options. Place as much emphasis on skilled labor tracks as academic tracks.

Partners for Implementation
Employers, workforce investment boards, trade associations, universities, K-12 schools, chambers of commerce, trade schools

Strategy 2: Focus on Soft Skill Training

Encourage training programs to focus on soft skills. Local schools and universities can develop programs that focus on soft skills and industry specific training. Schools and training programs can incorporate transition plans with employment goals into graduation requirements.

Regional partners can help expose students to a greater range of jobs to increase their awareness of career opportunities. Network with universities to secure funding to support education and leadership training to help move employees up the ladder. Provide or arrange for flexible and easy to use on-the-job training funds for companies to train employees and promote awareness of existing resources to aid with these goals.

Partners for Implementation
Employers, workforce investment boards, trade associations, universities, K-12 schools, chambers of commerce, local governments

Strategy 3: Increase the Candidate Market

Increase the candidate market or "end size" to meet future workforce demands. Encourage universities to train and match workers with the jobs currently available. Employers must better align their requirements with national standards to be more competitive and attract workers. Discourage employers to require experience for entry-level positions.

Retain local talent by encouraging businesses to offer better employment packages, pay rates, and other benefits (relocation assistance, child care support, etc.). Invest in public transit to connect people to jobs to make them both more desirable and affordable. Develop programs that change the perspective on once "undesirable" candidates such as workers with minor criminal records or previous drug use.

Partners for Implementation

Allegheny Conference on Community Development, chambers of commerce, young professional groups, universities, school superintendents, employers, alumni associations, workforce investment boards, career services at universities, trade associations

Strategy
3

NOTEWORTHY:

Organizations like SPC and the Allegheny Conference on Community Development have an ongoing focus on workforce development in the region. They will be a key partner in implementing these strategies.

Infrastructure Strategies

That Impact the Economy

<u>*Exploratory Scenario*</u>*

What if after struggling for years to maintain aging infrastructure and build new to meet technology demands, the region is at a tipping point of an infrastructure crisis. Intermittent stoppages in water and sewer service, limited availability of locks and dams, and difficulty connecting people to jobs and services are exacerbating the population decline and hurting the region's economy.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Increase Funding for Critical Infrastructure

Funding streams and buying power for infrastructure improvements and maintenance have declined and general public understanding of the costs of critical infrastructure are often understated. Support strategies that increase funding and educate the public on the true cost of infrastructure.

Partners for Implementation
SPC, PennDOT, counties, municipalities, nonprofit organizations

Strategy 2: Improve Efficiency in Infrastructure Development, Design, Construction, Operation, and Maintenance

More efficient use of funding will be needed as revenue streams are reduced in the coming years. Work to build public/private partnerships between infrastructure owners through collaboration and cooperation to develop cost savings. Work with local and county governments to establish requirements for developers to pay for public infrastructure improvements associated with private sector projects. For example, the costs to provide sewer line access to a new housing development could be the responsibility of the private developer.

Identify private sector opportunities. Promote a public education campaign to educate the public and local businesses on the importance of infrastructure for business attraction, quality of life, tourism economy, and competitive advantages for both public and private sectors. Embrace emerging technologies, including new materials and processes to improve efficiency.

Partners for Implementation
SPC, PennDOT, counties, municipalities

Strategy 3: Prioritize Projects With Economic Impact

Consider the economic impact of infrastructure investment on land use patterns and tax revenues from potential commercial or industrial development, residential investment, and other types of land development. Coordinated investments often yield the greatest impact and should be prioritized. Focusing on these types of projects can also help to support the kind of public/private partnerships that could lead to efficiencies and reduced overall cost for infrastructure.

Partners for Implementation
SPC, chambers of commerce, counties, municipalities

Strategy 4: Develop and Provide Tools That Allow for Local Funding of Projects

Promote collaboration of planning efforts and bundling of projects and programs to reduce costs and develop cohesive communities/local governments. SPC could serve as a conduit and clearinghouse for plans and information about projects – connecting potential partners and helping to ensure that connections are made while projects are in the planning and design phases.

Expand the leverage of state and federal funds with local funds in bundling programs. Use available tools and provide flexibility through legislation to local governments to create new revenue opportunities.

Possible programs/funding include regionalization (multi-municipal purchasing), TIF, LERTA, Enterprise Zones (state and federal), LSA – Technical and educational assistance to communities and business community (regional).

Conversations with other public and private sector entities with public-private partnership experience could expand this list or generate innovative ideas. Surveys, national legislation, and planning efforts to identify regional initiatives could help to move this effort forward. Incentivize public sector participation with tax credits, funding, etc.

Partners for Implementation
SPC, PennDOT, counties, municipalities

Technology Strategies

That Impact the Economy

Exploratory Scenario*

What if there is fast-paced technology adoption in all facets of the economy that will cause business model shifts in areas of manufacturing, services, and retail. Institutions struggle to keep up with the education and training needs associated with these changes. There is an increased need in the region for digital infrastructure investment however it is apparent that rural areas of the region continue to fall further behind as technology advances.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.
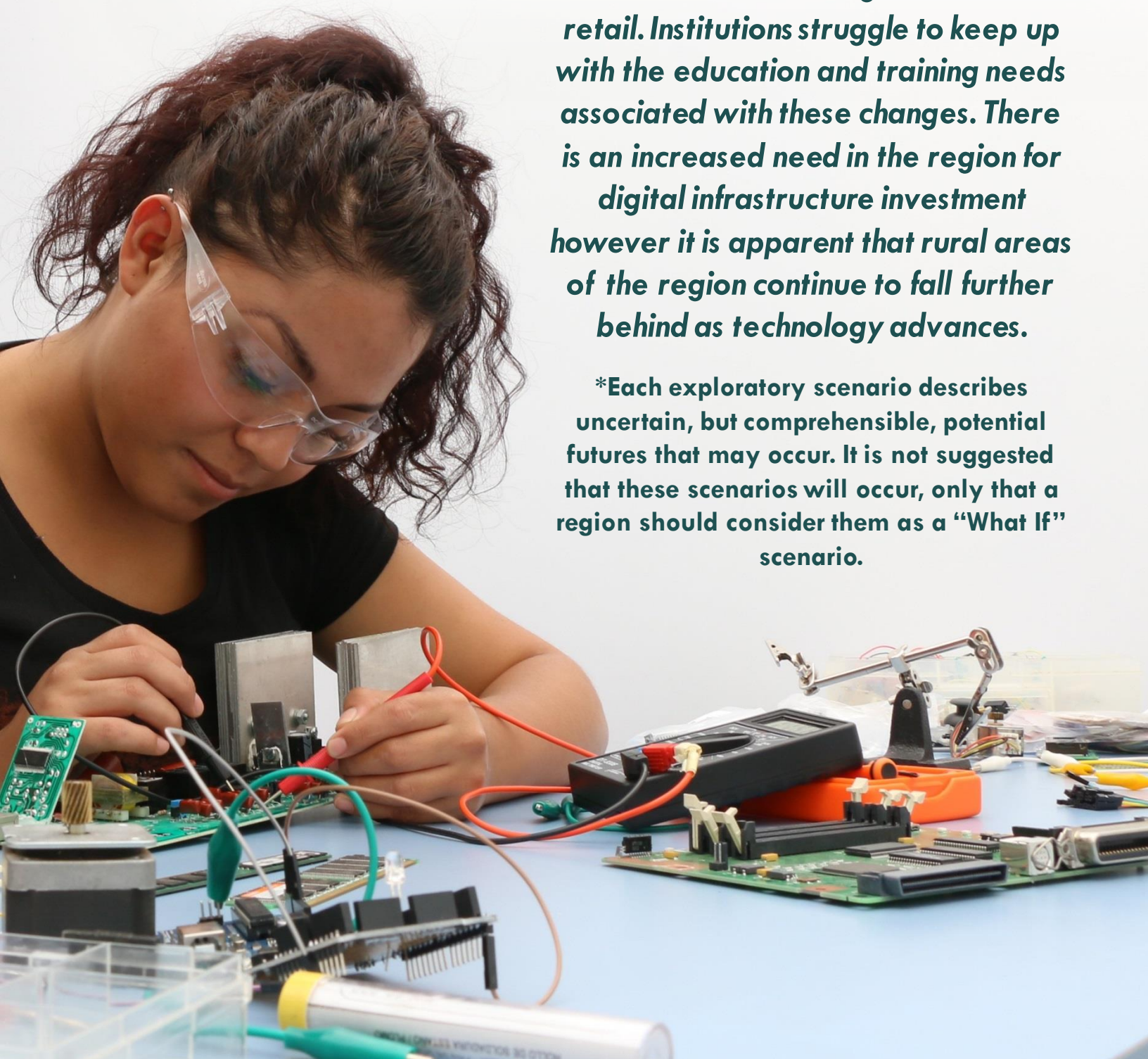
Strategy 1: Promote Access to High Speed Internet Connectivity and Availability Everywhere

Push high speed deployment either through funding or incentives (the carrot) and/or regulatory (the stick). As private sector development typically focuses on areas of high demand, public entities may need to step in to ensure areas outside of urban centers are not left behind.

Partners for Implementation
SPC, PennDOT (including Design and Permit Divisions), telecommunication companies, municipalities
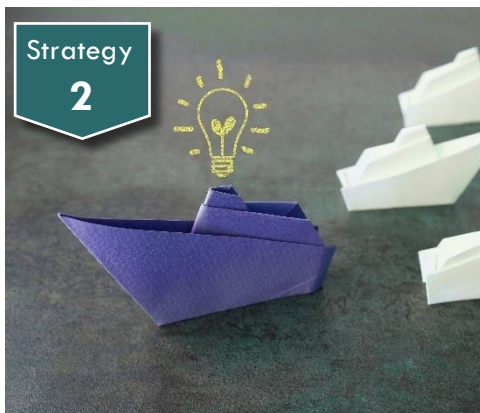
Strategy 2: Track and Promote New Technology and Train or Retrain Employees for Emerging Technologies

Organized and coordinated efforts to stay informed on developing technologies and options for technology deployment are needed keep pace with changing technology.

Work with schools and other partners to provide flexible and easy to use funding for an on-the-job training geared to emerging and new technologies. Teach/promote new computer skills to help aging populations enhance productivity and relativity in the job market.

Expose students to a greater range of jobs to increase their awareness of career opportunities. Conduct an awareness campaign in schools to guide students to the many available jobs (such as skilled trades). Partner with project management training programs to emphasize problem solving and leadership training. This will help to demonstrate that these jobs have opportunities for advancement. Incorporate transition plans with employment goals into graduation requirements.

Partners for Implementation
Employers, workforce investment boards, trade associations, universities, K-12 schools, chambers of commerce, local and regional government

Energy Strategies
That Impact the Economy

*Exploratory Scenario**

What if the energy sector, buoyed by the shale gas investment, becomes a driving force in the regional economy. This exacerbates an already tight labor market. There is inadequate investment in sites and infrastructure needed to attract and grow related industries and businesses that could be drawn by ever-decreasing energy costs. At the same time, the region continues to struggle to minimize the environmental impacts of the industry and the associated development.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Support Development of an "Appalachian Storage Hub"

According to the American Chemistry Council (ACC), the Appalachian region has the potential to become a major petrochemical and plastic resin-producing region. The Appalachian region is an ideal location for the emergence of a second major petrochemical manufacturing hub in the country, with close proximity to abundant natural gas liquid (NGL) resources and manufacturing markets.

Support growth of the energy sector through the identification and development of a storage hub for NGLs and petrochemical products as well as supporting a pipeline distribution network and other petrochemical, plastics, and other energy infrastructure and manufacturing throughout the quad-state area (Pennsylvania, Ohio, Kentucky, West Virginia).

Reduce the uncertainty of future energy infrastructure needs by encouraging its partners to apply existing private-public financing programs to Appalachian energy infrastructure projects and continuing to promote investment in the energy sector.

Partners for Implementation
U.S. Department of Energy, Pennsylvania Department of Environmental Projection's Energy Programs Office (EPO), chambers of commerce, industry groups, Allegheny Conference on Community Development

Strategy 2: Promote Common Sense Regulations

Promote common sense regulations that protect the environment but allow the energy industry to prosper. Ensure basic steps are taken to protect the environment from obvious point sources of pollution. The region's natural resource assets must be protected to both preserve a sustainable ecosystem and maintain the economic and environmental value they pose.

Partners for Implementation
Pennsylvania Department of Environmental Protection

Strategy 3: Provide Flexible Funding for "On the Job Training"

Over the next decade our workforce will be characterized by large scale retirements, slow population growth, and increasing skill demand across all occupations. At the same time, many of our traditional industries will continue to be disrupted by technological advances, requiring that employers and talent keep pace with this change to remain competitive.

Provide or arrange for flexible and easy to use on-the-job training funds for companies to train employees and promote awareness of existing resources to aid with these goals (opportunities to lobby the government for funding to train, grants, etc.). Funding for on-the-job training and development will assist workers retool their skills and reestablish themselves in viable career paths.

Partners for Implementation
Employers, workforce investment boards, trade associations, universities, K-12 schools, chambers of commerce, local and regional governments

Strategy 3

Strategy 4: Promote Local Utilization of Energy and Industry Output

The region can promote or undertake public education efforts to better inform the public of the local impacts of being an energy exporter. The region should focus on NGL and downstream users, while developing information on basic site requirements. Quasi-public development organizations will need to take the lead in site development. Focus on the attraction of high energy users, as well as point of source users.

Partners for Implementation
Pennsylvania Department of Environmental Protection

Strategy 4

Vacant Properties Strategies

That Impact the Economy

<u>Exploratory Scenario*</u>

What if there are blighted homes, along with brick and mortar retail locations throughout the region becoming vacant and abandoned. This lowers the tax base and increases crime rates.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Prioritize: Repurposing Rather Than Demolition

While vacant properties offer communities opportunities to repurpose land for community benefit, such as community gardens, playgrounds, and open space, efforts should be expended to repurpose the building(s) in question. Maintaining a neighborhood's character and preventing too much demolition from occurring should be a priority when dealing with vacant dilapidated structures.

Partners for Implementation
SPC, land banks, counties, municipalities, nonprofits, economic development agencies

Strategy 2: Promote Institutional Investment in Older Communities

Older communities tend to lose population, employment, and a tax base to support needed public services and infrastructure improvements. Promoting investment in older, underserved communities helps counteract these forces and encourage stability in the region's existing older communities. Weak markets and population loss can limit private investment in these markets.

Partners for Implementation
Economic development organizations, colleges, universities, hospitals

Strategy 3: Use Regulation and Incentives to Promote Property Maintenance

Public policy incentives and/or regulations can help to ensure private property owners maintain their homes/buildings. Incentives may include zoning variances, tax abatements, and fee waivers among others. Regulations can also ensure properties are maintained, either through zoning requirements and/or local laws.

Partners for Implementation
Municipalities, planning commissions, zoning hearing boards

Strategy 4: Develop, Promote, and Duplicate Best Practice Models

Communities should share best practices in the handling of vacant land. Options include land trusts (nonprofits that hold land in trust to provide affordable housing and other community assets), land banks (public entity that converts vacant, abandoned, and foreclosed properties into productive uses), municipal ordinances, beautification programs, and local stabilization programs.

The best practices for addressing vacant land will vary based on the community's desires, land values, incentive programs, preservation efforts, and the local economy. Understanding best practices and how to apply them in each unique situation will ensure that the region can take advantage of the opportunities presented by the region's vacant properties.

Partners for Implementation
Allegheny County Vacant Property Program, land trusts, land banks, municipal ordinances, local beautification and stabilization programs

Investing in our Future

Economy Strategies for Investment

During the Regional Plan Workshop, participants were asked to discuss potential draft strategies for the Forces of Change and identify investment levels for each of the draft strategies. This exercise helped to create a framework that could be used to evaluate and drive future evaluation of projects and investments.

Below are the investment strategy results for the Economy Forces of Change.

Economy Forces of Change	Percent Invesment
Workforce Strategies	**13.1%**
Break the negative stigma of skilled labor "blue collar" versus college.	3.8%
Change training curriculum and delivery paradigm to focus on soft skills, while also providing industry specific training funding to the employers.	7.5%
Increase the candidate market or "end size."	1.9%
Infrastructure Strategies	**33.8%**
Increase funding for critical infrastructure.	13.8%
Improve efficiency in development, design, construction, operation and maintenance.	7.5%
Prioritize projects with economic impact.	7.5%
Develop and provide tools that allow for local funding of projects.	5.0%
Technology Strategies	**18.8%**
Provide high speed internet connectivity and availability everywhere.	8.8%
Push high speed deployment through public policy, either funding or incentives (the carrot) and/or regulatory (the stick).	5.0%
Track and promote new technology development and deployment through Public-Private Partnerships.	2.5%
Train and/or retrain employees for emerging technologies.	2.5%
Energy Strategies	**11.9%**
Support the identification and development of an "Appalachian Storage Hub".	1.9%
Promote common sense regulations that protect the environment but allow the energy industry to prosper.	5.0%
Provide flexible and easy to use funding for "on the job training" approach geared to emerging and new technologies.	3.8%
Retain the region's economic value by promoting local utilization of energy and industry output.	1.3%
Vacant Properties Strategies	**22.5%**
Prioritize: Repurpose versus Demolition.	6.3%
Promote institutional investment in older communities.	3.8%
Entice property owner action through public policy, either funding or incentives (the carrot) and/or regulatory (the stick).	3.8%
Develop, promote and duplicate best practice models (such as: land trusts, land banks, municipal ordinances, beautification and stabilization programs, etc).	8.8%

Building the Vision

Economy

Building the Vision

As discussed in this report, in developing Smart Moves for a Changing Region, SPC convened a series of Expert Resource Panel meetings to identify Forces of Change, weigh their potential impacts, and develop strategies to mitigate and/or optimize the forces. This information, coupled with public and partner input and feedback from SPC leadership, was organized into a set of three emerging themes that capture the most positive aspects of each strategy and focus them in a way that will result in a holistic long range plan for the region.

SPC is developing a plan that both provides a framework and makes significant investment to advance the most critical issues and projects facing the region. The emerging themes will be used in conjunction with performance metrics and other public input to evaluate the program of proposed projects and programs to be contained in the plan. This will ensure the projects and programs contained in the plan will work in concert to assist the Southwestern Pennsylvania region achieve its desired vision for the future.

The emerging regional vision is a world-class, well maintained, integrated transportation system that provides connected mobility for all, enables resilient communities and supports a globally competitive economy.

This vision means taking advantage of our considerable existing assets and developing, supporting and implementing projects that advance our progress. It means investing in regionally connected seamless public transportation that includes new transit investments in key corridors and networks. It means developing modern support infrastructure that prepares the region not just for current technological advances, but also strives to put the region years and decades ahead, by developing the next technology here in this region because we have the expertise in the region to make this happen. It means tackling climate change and taking care of our air and our water. This will allow us to work with many partners and dovetail this plan with other related plans and regional efforts of both public and private sector to advance the region.

The vision means working with partners in identifying and using the types of proven funding and financing arrangements that we will need to make that happen.

The vision will focus on the workforce needs of the region. It means attracting and growing our population by making the region a place where people want to come and stay. It means training our population not just for the jobs that exist but for the jobs we create through innovation and entrepreneurship, and making this region a leader in technology and innovation.

Technology and innovation can be much more than self-driving cars and artificial intelligence and it can work in rural as well as urban parts of the region. It will include innovative new farming techniques and technology deployment that will connect our entire region with high speed access to the internet to afford all our residents the opportunity to work from anywhere and connecting them to the global economic opportunities. The vision will recognize our assets and putting them to the best use for this region, and our residents.

The vision also means taking stewardship and care of the communities that are the foundation of this region, and environment that sustains us. This plan will focus community investment that both sustains our past and protects our future, while elevating the status of our communities throughout the region as desirable places to live and work.

Acknowledgements

Expert Panel Resource Members

Acknowledgements (continued)

Acknowledgements (continued)

Forces of Change

Economy
Exploratory Scenario Report

Michael Baker
INTERNATIONAL

Forces of Change

Environment

Exploratory Scenario Report

MOBILITY • SERVICE • A
MANUFACTURING •
BROADBAND • ARTIFIC
REGIONAL • IMPACT •
HOUSING • GROWTH • I
AFFORDABILITY • SHARE

SOUTHWESTERN PENNSYLVANIA
SPC
COMMISSION
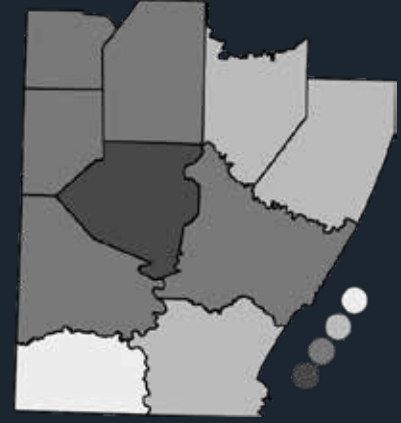
PULATION • IMMIGRATION
• DEVELOPMENT • P
• SIZE • DIVERSITY • ED
• AUTONOMOUS
SERVICE • AUTOMATION •
RING • MODAL IM
• ARTIFICIAL • INTE
IMPACT • EMERGING IN
GROWTH • INCOME • EMI
TY • SHARED • ONLINE
TURE • ENERGY • SUPPLY
IEWABLE • BALANCE •
RESILIENCE • WATER •
PUBLIC • PRIVATE •

Table of Contents

What Are Forces of Change?

Forces of Change are a wide range of global and national trends that could affect Southwestern Pennsylvania now and in the future.

What Are Forces of Change?

Every four years, the Southwestern Pennsylvania Commission (SPC) is required by Federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019 **as both the region's long range transportation plan and comprehensive economic development strategy**. SPC is creating a new regional plan in which it will consider major Forces of Change and how we can best take advantage of opportunities they may create and mitigate the disruptions they may cause. Forces of Change are high level external forces (global, national, regional) that could have significant regional impacts (both positive and/or negative) now and in the future.

A Force of Change Scenario Report for each category has been developed by SPC. The reports will be used, along with input from the public, to establish a range of potential strategies related to each Force of Change. These strategies were reviewed and discussed at a Regional Plan Workshop held in September 2018. The resulting list of strategies will be used to gather further public input and ultimately to update the long range plan for the Southwestern Pennsylvania region.

SPC has identified forces that have effects on transportation and development in five broad categories: Demographics, Technology, Economy, Environment, and Funding.

Why and How Were Forces of Change Identified?

Every four years, SPC is required by federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019.

In 2017, SPC staff began working with the region's planning directors to develop a Task Force to help develop a process for the new long range plan.

SPC began by reviewing publications from the National Cooperative Highway Research Program on "Dynamic Forces of Change." Next, peer Metropolitan Planning Organizations (MPOs) along with national and regional thought leaders were interviewed to get different perspectives. Common themes emerged, which drove the formation of Expert Resource Panels for each of the five categories to identify the Forces of Change that will impact them.

Expert Resource Panels and Exploratory Scenarios

Expert Resource Panels were formed to provide expertise on the potential effects of Forces of Change on the region. The Expert Resource Panels identified the Forces of Change within each category that are likely to impact the region. Panelists discussed potential opportunities and challenges, the relative probability of occurrence, and whether the impacts will be positive or negative.

The panel activities were designed to help answer the following questions:

What significant trends or disruptions are occurring now, or are foreseen to occur, with potential impact for the region?

Will the impacts be positive or negative for the region?

What specific challenges and opportunities for the region are generated by these occurrences?

What is the anticipated magnitude of the identified challenges and opportunities?

Participants were asked to focus on events, trends, and factors within each category and to identify possible impacts, potential challenges, and opportunities for each Force of Change.

Based on that discussion, exploratory scenarios were developed. Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in discussions related to impacts and strategies for moving forward successfully.

Below are some of the topics that were explored by the Expert Resource Panels. Panelists considered the regional impacts of the topics and identified additional avenues for investigation.

Demographics
Aging Population and Labor Force; Immigration (regional); Urban and Suburban Development Patterns; National/Regional Shifts; Household Size; Diversity; Education; and, Opioid Addiction.

Technology
Connected & Autonomous Vehicles; Mobility as a Service; Automation; Additive Manufacturing; Modal Impacts; Broadband; and, Artificial Intelligence.

Economy
Emerging Industries; Housing Affordability; Economic Growth; Household Income; Employment Types; Shared Economy; On-line Economy vs. Brick and Mortar Retail; and, Decaying Infrastructure.

Environment
Energy Supply and Demand; Fossil Fuel/Renewable Balance; Security; Environmental Attitudes; Climate Change and Resilience; and, Water Quality.

Funding
Role of Public & Private Sectors; Investment Levels; National/State/Local Government Roles; and, Finance (how to pay).

What Are The Environmental Forces of Change?
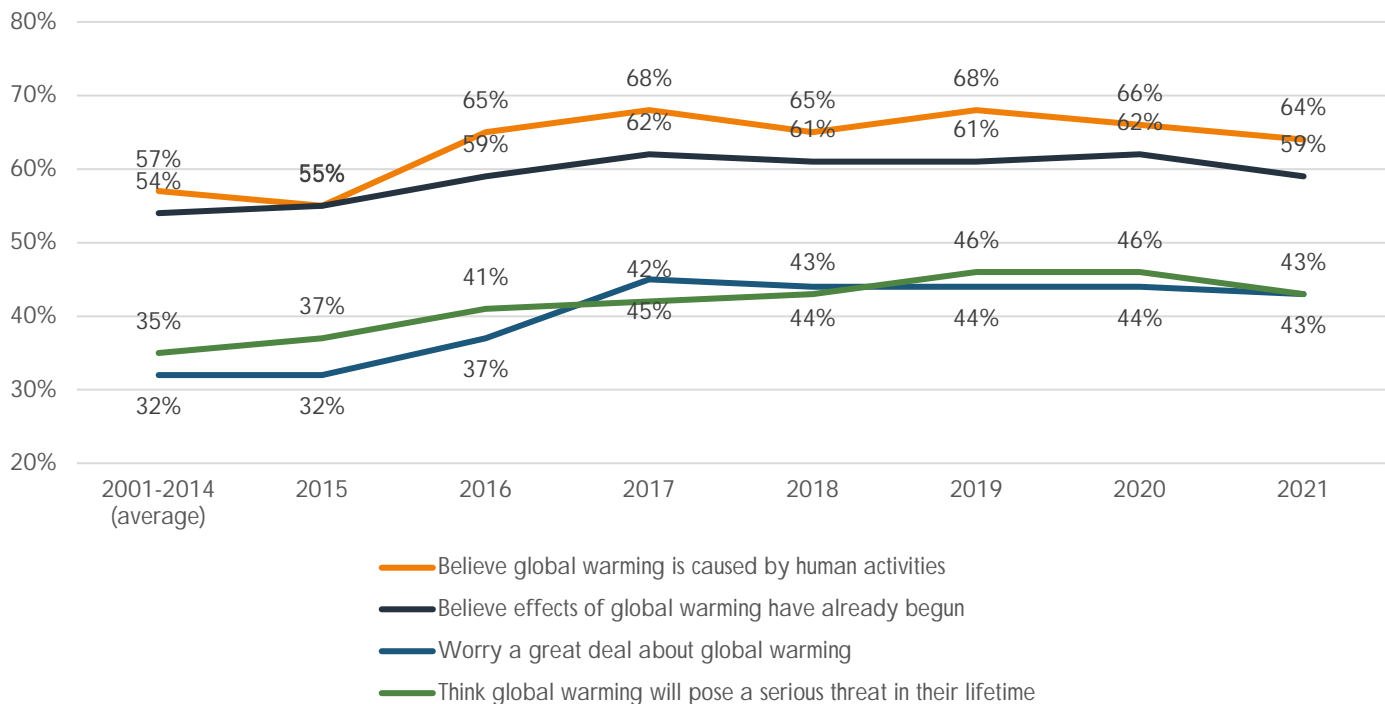
Environmental Forces of Change

Climate Change

Volume II of the *Fourth National Climate Assessment* says that in 2050, the average global warming since preindustrial levels could be about twice what it is in 2018 (U.S. Global Change Research Program); which can lead to increased precipitation, landslides, flooding, and water quality concerns. The region and world are less resilient as human and natural systems continue to be negatively impacted. Climate change can lead to increased precipitation, landslides, flooding, and water quality concerns.

While this is a global problem, there are steps that the region can take to help mitigate future problems as a result of climate change. These actions include adopting a regional energy policy, investing in strategies to be better prepared for extreme weather patterns and natural disasters, and raising the general public's knowledge of the issue.

NOTEWORTHY:
Climate change can lead to increased precipitation, landslides, flooding, and water quality concerns.

Summary of Americans' Views on Global Warming

Legend:
- Believe global warming is caused by human activities
- Believe effects of global warming have already begun
- Worry a great deal about global warming
- Think global warming will pose a serious threat in their lifetime

SOURCE: GALLUP, June 2021

Land Use

The way land is used and developed could impact open space, active transportation, and natural resources. Southwestern Pennsylvania's natural resources are the region's most important asset.

As land development and land use changes are directly impacted by transportation patterns, SPC's "Livability Through Smart Transportation Program" encourages sponsors to plan and implement strategies consistent with the policies of the region's adopted Long Range Transportation and Development Plan as well as municipal and county comprehensive plans. A "Smart Transportation" project links transportation investments and land use planning to decision-making, creating transportation facilities that are safe, sustainable, responsive of the needs of all users, and support community planning goals.

NOTEWORTHY:

Southwestern Pennsylvania's natural resources are the region's most important asset.

COUNTY	MUNICIPAL COMPREHENSIVE PLANS	
	Yes	% Yes
Allegheny	111	85
Armstrong	21	46
Beaver	38	69
Butler	33	57
Fayette	31	72
Greene	18	67
Indiana	10	26
Lawrence	16	57
Washington	59	88
Westmoreland	37	56
Region	374	67

SOURCE: PA Department of Community & Economic Development (2023)

Environmental Forces of Change
Southwestern Pennsylvania Commission Exploratory *Forces of Change Scenario Reports*
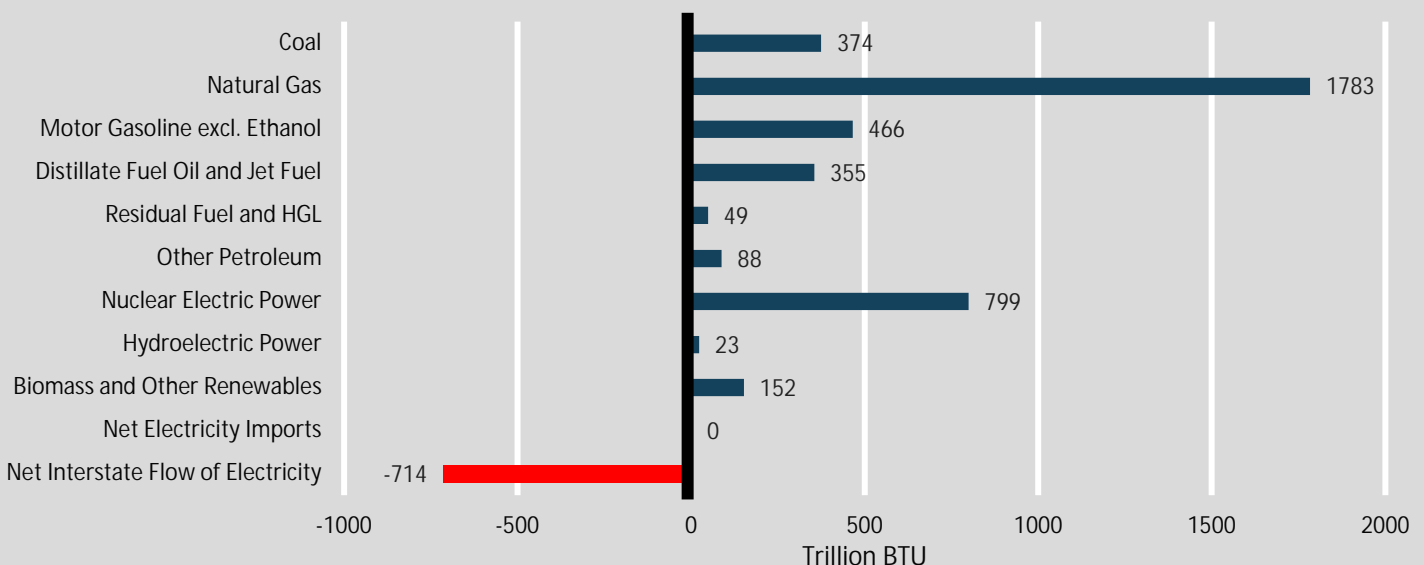
Energy

Electric vehicles, renewable energy, and natural gas are playing a growing role in the energy sector. The Southwestern Pennsylvania region continues to be a net exporter of energy assets, which makes it subject to outside markets and boom/bust cycles. A focus on renewable energy sources could provide a sustainable energy source and have a positive impact on the environment. Additionally, a Regional Energy Plan could be developed to promote cleaner electricity generation. Incentives could be a strategy in which to promote the research and development of sustainable forms of energy. Local educational institutions could provide support in developing ways to produce "cleaner" electricity, such as wind turbines, solar panels, and hydroelectric systems.

The U.S. Energy Information Administration (EIA) provides annual electricity generating capacity over the past ten years as well as projections through 2050. The projections show a large increase in solar power. Additionally, the EIA and State Energy Data System provide information on how different states are generating non-carbon electric power; while California has transitioned to a balanced mix of energy sources and Washington produces large quantities of hydropower, Pennsylvania is still very reliant on nuclear power as its chief non-carbon source of energy.

NOTEWORTHY:
A focus on renewable energy sources could provide a sustainable energy source and have a positive impact on the environment.

Pennsylvania 2020 Energy Consumption

Source	Trillion BTU
Coal	374
Natural Gas	1783
Motor Gasoline excl. Ethanol	466
Distillate Fuel Oil and Jet Fuel	355
Residual Fuel and HGL	49
Other Petroleum	88
Nuclear Electric Power	799
Hydroelectric Power	23
Biomass and Other Renewables	152
Net Electricity Imports	0
Net Interstate Flow of Electricity	-714

SOURCE: EIA & State Energy Data System

Water

The region continues to see increased stormwater, flooding, water quality, and water quantity impacts. Within the Southwestern Pennsylvania region, there are 15,091 miles of streams, of which 150.3 miles are designated as Exceptional Value streams and 3,913 miles designated as High Quality by Pennsylvania Code Chapter 93: Water Quality Standards. These major river systems and their tributaries provide aquatic habitat, ecological benefits, recreational opportunities, drinking water supply, transportation, and economic benefits to the region. SPC and its regional partners must support the integration of better stormwater management decisions into local planning, municipal operations and budgeting decisions, data and information sharing, and transportation planning and programming in the region.

Local municipalities and regional COGs should prepare a Regional Integrated Water Plan to address floodplain restoration, stormwater management, and flooding mitigation and prevention. These plans can promote the use of best practices, identify previous lessons learned, and stress the importance of upstream responsibilities. Watershed Plans should be prepared within the context of that Regional Integrated Water Plan.

Local municipalities can take a step further and incentivize individuals and business property owners to minimize and manage stormwater management. A standalone Stormwater Tax or a property tax increase can be used, as well as discounts for green infrastructure, etc. SPC and its partners should look into developing a regional flood susceptibility index (FSI) to help prioritize areas susceptible to flooding for planning and mitigation investments.

NOTEWORTHY:

Within the Southwestern Pennsylvania region, there are 15,091 miles of streams, of which 150.3 miles are designated as Exceptional Value streams and 3,913 miles designated as High Quality.

Southwestern Pennsylvania Municipalities With Separate Storm Sewer Systems (MS4s)
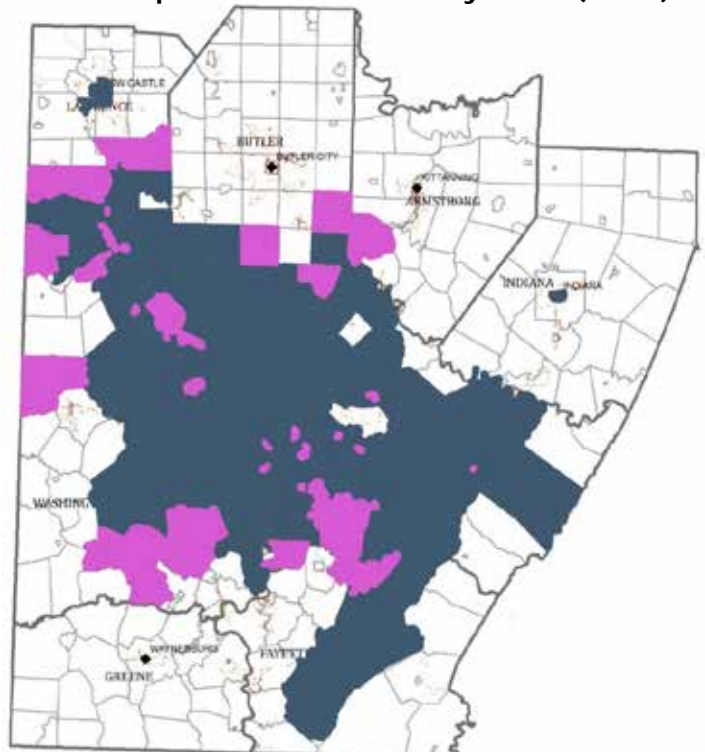
Municipalities With No MS4
Municipalities With MS4 Permit
Municipalities With MS4 Waiver
SOURCE: Mapping the Future, SPC
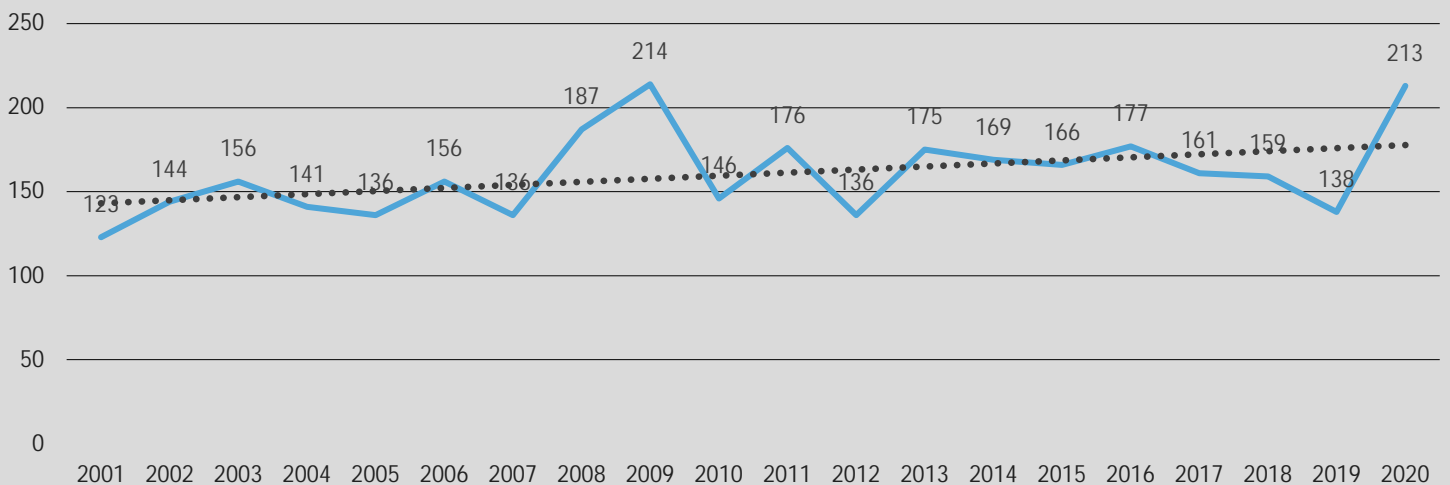
Natural Resources and Air Quality

Southwestern Pennsylvania's natural resources are the region's most important asset, but the region has a long history of air quality issues with health and pollution at the forefront.

Our forests are a critical natural resource that is essential to the overall ecological functions and environmental health of the region. These areas are home to an abundance of wildlife, some of which are threatened and endangered. They provide goods such as timber and food, ecological functions such as carbon storage, nutrient cycling, water and air purification, and also serve as recreational areas.

While air quality has been an issue in the past, the region's partners have made substantial progress in setting and enforcing air quality standards. According to the Allegheny County Health Department, the number of "good days" in Allegheny County is trending upwards, increasing from 123 "good days" in 2001 to 213 in 2020. In contrast, the number of "unhealthy days" has decreased, with five unhealthy days in 2001 and zero in 2020.

NOTEWORTHY:
The number of "good days" in Allegheny County is trending upwards, increasing from 123 "good days" in 2001 to 213 in 2020.

Number of Air Quality "Good Days"

Year	Value
2001	123
2002	144
2003	156
2004	141
2005	136
2006	156
2007	136
2008	187
2009	214
2010	146
2011	176
2012	136
2013	175
2014	169
2015	166
2016	177
2017	161
2018	159
2019	138
2020	213

SOURCE: Allegheny County Health Department

Environmental Forces of Change
Southwestern Pennsylvania Commission Exploratory *Forces of Change Scenario Reports*

How can we adapt to the Forces of Change underway and take full advantage of the opportunities they create?

Climate Change

Climate change can lead to increased precipitation, landslides, flooding and water quality concerns.

Land Use

The way land is used and developed could impact open space, active transportation, and natural resources.

Energy

Electric vehicles, renewable energy, and natural gas are playing a growing role in the energy sector.

Water

The region continues to see increased stormwater, flooding, water quality, and water quantity impacts.

Natural Resources / Air

Southwestern Pennsylvania's natural resources are the region's most important asset.

Creating Strategies
To Address Environmental Forces of Change

The Environmental Expert Resource Panel identified strategies for each Force of Change to address potential impacts and mitigate risks. Panelists identified the importance of stemming climate change and better preparing for severe weather events and natural disasters. Central strategies include:

- *Support local planning efforts to support sustainable growth and walkable communities.*

- *Prioritize efficient and sustainable energy sources.*

- *Plan for increases in stormwater runoff and take a collaborative approach with regional partners when taking steps to address water issues.*

- *Support existing recreational opportunities and develop strategies to mitigate emissions and other pollutants.*

Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in developing strategies to address impacts and mitigate risks.

• DEMOGRAPHICS • TECHNOLOGY • ECONOMY • AGING • POPULATION • IMMIGRATION • URBAN • SUBURBAN • DEVELOPMENT • PATTERNS • HOUSEHOLD • SIZE • DIVERSITY • EDUCATION • CONNECTED • AUTONOMOUS • VEHICLES • MOBILITY • SERVICE • AUTOMATION • ADDITIVE • MANUFACTURING • MODAL IMAPACTS • OADBAND • ARTIFICIAL • INTELLIGENCE • REGIONAL • CT • EMERGING INDUSTRIES • HOUSING • GROWTH • ME • EMPLOYME FFORDABILITY • SHARED • NE • RETAIL • I CTURE • ENERGY • SUPPLY • AND • FUEL BLE • BALANCE • SECURITY • ATTITUDES • P WATER • QUALITY • FUNDING • PUBLIC • PR TORS • LOCAL • INVESTMENT LEVEL

Note: Draft strategies in this report are presented for discussion and consideration purposes only. They are not final or official policy unless adopted by the Commission in its official plan.

Climate Change Strategies

That Impact the Environment

Exploratory Scenario*

What if the effects of climate change worsen. The region experiences extreme temperatures and high-intensity precipitation that leads to flooding, erosion, landslides, mine subsidence, and disease. The region and world are less resilient as human and natural systems continue to be negatively impacted.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Invest in Strategies That Help the Region Adapt to the Impacts of Climate Change

Since 2006, over $140 million of emergency funds have been obligated on the federal aid system in Pennsylvania. Communities must invest in strategies to better prepare for the impacts of climate change. Local municipalities and/or county governments should coordinate to actively pursue SPC's Congestion Management and Air Quality Improvement Program funding.

Partners for Implementation
PennDOT, local municipalities, SPC

Strategy 2: Increase the Capacity of Storm Water Collection and Retention Systems

Increase the capacity of storm water collection and retention systems to accommodate future projected increases in extreme precipitation events. Encourage a long-term focus on activities that impact waterways. According to a downscaled climate model produced by the National Oceanic and atmospheric Administration and U.S. Army Corps of Engineers, Institute for Water Resources, the SPC region is forecasted to experience a 15-20 percent increase in annual mean streamflow between 2040 and 2070. Further, according to the National Climate Assessment and the Great Lakes Integrated Sciences + Assessments at the University of Michigan, between 1958 and 2016 there was a 55 percent increase in the frequency of the heaviest 1-percent precipitation events in the Northeast United States, including Pennsylvania

Counties and municipalities need to identify ways that they can prioritize areas for flood response and infrastructure management. It is predicted that the region will be handling more water in the future and it is crucial that stormwater systems be expanded in order to prevent flooding during extreme participation events.

Partners for Implementation
Municipalities, floodplain managers, U.S. Army Corps of Engineers, counties, federal and state agencies, SPC

Strategy 3: Invest in Disaster Preparedness, Response, and Recovery

According to the National Oceanic and Atmosphere Administration (NOAA), which is under the U.S. Department of Commerce, the number of billion-dollar disaster event types have grown over the past thirty-plus years. The frequency of such disasters has risen from one in 1980 to five in 2003 to 18 in 2022. Because greater frequency of environmental disasters and greater severity of storms are a result of climate change, we must continue to invest in disaster preparedness, response, and recovery.

Plans should be created at the county and/or watershed level to state processes to follow in the event of severe weather and to better facilitate rapid communication among municipalities.

Partners for Implementation
SPC, municipalities, floodplain managers, U.S. Army Corps of Engineers, counties

Strategy 3

Strategy 4: Invest in Strategies That Help to Decelerate the Rate of Climate Change

Encouraging investment in renewable energy sources that produce less emissions can help to slow the rate of climate change. According to the Intergovernmental Panel on Climate Change (IPCC), despite a growing number of climate change mitigation policies, annual greenhouse gases (GHG) emissions grew 2.2% per year from 2000 to 2010 compared to 1.3% per year from 1970 to 2000. However, emissions increased at a decreased rate of 0.8% between 2010 and 2021, largely due to increases in efficiency and the growing use of natural gas and renewables to generate electricity in place of more carbon-intensive fuels (EPA, Scientific Data). Decarbonizing (i.e. reducing the carbon intensity of) electricity generation is a key component of cost effective mitigation strategies in achieving low-stabilization levels. Decarbonization happens more rapidly in electricity generation than in other sectors.

Partners for Implementation
SPC, PennDOT, local municipalities, state legislature, private industry, chambers of commerce, nonprofits, foundations, general public

Strategy 4

Strategy 5

Strategy 5: Raise Awareness and Educate the Public, Government Officials, and Businesses About Climate Change

Undertake strategies that raise awareness and educate the public, government officials, and businesses about climate change, its projected impacts, and region's strategies in response.

The nation-wide belief in global warming is increasing at a steady pace as more information is found and shared. However, a Gallup poll shows a significant percentage of Americans remain skeptical of climate change science. The percentage of Americans who worry a great deal about global warming increased from 32% (2001-2014 average) to 43% in 2021.

Partners for Implementation
SPC, local municipalities, counties, educational institutions

Land Use Strategies

That Impact the Environment

Exploratory Scenario*

What if land use and development regulations and control are fragmented. Where there are efforts to establish sustainable development requirements, multimodal improvements, and redevelopment, they are unevenly distributed and non-contiguous.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Create Livable Communities at the Local and Neighborhood Level

Local planning efforts should establish sustainable development requirements and multimodal improvements. Comprehensive plans, zoning, and subdivision ordinances can ensure that best practices are followed at the local and neighborhood levels.

Smart growth principles and traditional neighborhood development concepts that encourage mixed-use, walkable communities can create a more livable environment and reduce energy consumption. Policies should be adopted that encourage and/or mandate best practices.

An example of a successful program is SPC's Livability Through Smart Transportation Program. The program encourages project sponsors to plan and implement strategies consistent with the policies of the region's adopted Long Range Transportation and Development Plan as well as municipal and county comprehensive plans. A participating transportation project links transportation investments and land use planning to decision-making, creating transportation facilities that are safe, sustainable, responsive to the needs of all users, and support community planning goals. The program is designed to provide multimodal connections and community livability enhancements beyond traditional asset management-focused projects.

Partners for Implementation
SPC, county planning agencies, municipalities, private developers

Strategy 2: Promote Land Use Best Practices, Community Development, and Transportation Planning

Provide municipal education on land use best practices, community development, and transportation planning. Provide information on best practices to all SPC members and encourage collaboration on local and regional transportation planning. Information on best practices and the sharing of successful development and conservation tools among SPC members will yield both more successful localities and a stronger region as a whole.

SPC has partnered with PennDOT to conduct workshops throughout the region to educate local governments on the value of community planning and its importance as it relates to future transportation projects.

Partners for Implementation
SPC, counties, municipalities, PennDOT

Energy Strategies
That Impact the Environment

<u>*Exploratory Scenario**</u>

What if the region continues to be a net exporter of energy assets and is subject to outside markets and boom/bust cycles. There is little to no development or adoption of renewable energy resources, and there continues to be a reliance on fossil fuels. This has a negative impact on the environment.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Pursue Strategies to Diversity the Region's Energy Sources and Promote Cleaner Electricity Generation

The region should develop a Regional Energy Plan to promote cleaner electricity generation. Focus research, development and transportation projects, and educational institutions on electrical energy and ways to produce cleaner electricity. Such sources may include wind turbines, solar panels, and hydroelectric systems.

Partners for Implementation

Local municipalities, coalition of public and private entities

Strategy 2: Incentivize the Development and Deployment of Alternative Fuels and Renewable Sources of Energy

Based on 2020 data from the U.S. Energy Information Administration Pennsylvania ranks 42nd among the states for renewable energy consumption as a share of the state consumption. Renewable energy represents only 6.4% of Pennsylvania's energy consumption.

Encourage the development of alternative sources of energy, in particular local water and sewer authorities, as well as transit authorities. The SPC region continues to be a net exporter of energy assets, which makes it subject to outside markets and boom/bust cycles. A focus on renewable energy sources could provide a sustainable energy source and have a positive impact on the environment.

Partners for Implementation

Water authorities, sewer authorities, transit authorities

Strategy 3: Improve Efficiency in the Energy Sector (Generating, Transmission, and End User)

Promote alternative and renewable energy sources in the Southwestern Pennsylvania region. Across the region, the age of the building stock presents a challenge to energy efficiency. For example, within the City of Pittsburgh, over 76% of homes were built prior to 1960, with 53% constructed before 1940. Eleven of the current energy efficiency standards were not integrated into national building codes until the 1970s, and therefore only a quarter of homes within the city meet the newer codes. Similar challenges exist throughout the Southwestern Pennsylvania region. To date, energy efficiency has proven beneficial for Pennsylvania's overall energy portfolio while saving money for end uses. For example, between 2009 and 2012 electricity savings and demand reduction produced an annual savings of approximately $278 million for electric ratepayers. Further, in a national survey, only 4% of respondents had awareness of energy audits. Of the rest, 29% had "never heard of it."

Partners for Implementation
SPC, utilities, nonprofits, foundations, municipalities, counties

Water Strategies
That Impact the Environment

<u>*Exploratory Scenario**</u>

What if utility legacy problems worsen, exacerbating stormwater, flooding, property loss and water quality issues throughout the region. Water availability continues to be good and the region's rivers and riverfronts remain a source of economic opportunity. This results in disinvestment and reduced livability in older urban areas and a continuing demographic shift as the region's more affluent populations relocate.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Promote Sustainable Regional Water Resource Management and Planning

Prepare a Regional Integrated Water Plan to address floodplain restoration, stormwater management, and flooding mitigation and prevention. In this plan, promote the use of best practices, lessons learned, and upstream responsibilities. Watershed Plans should be prepared within the context of the Regional Integrated Water Plan.

Water issues such as sewage, water quality, water quantity, stormwater drainage, flooding, and watershed protection are closely interrelated and should be examined holistically. Support the integration of better stormwater management decisions into local planning, municipal operations and budgeting decisions, data and information sharing, and transportation planning and programming in the region.

Partners for Implementation
Local municipalities, counties, watershed associations, municipal planning agencies, ALCOSAN

Strategy 2: Collaborate on Regional Water Topics

Local and regional municipalities must be aware of how local decisions can affect access for other users and ensure the region's water remains a vital environmental, economic, and recreational asset.

Develop a study for a Regional Stormwater Utility/Authority. Representatives from each member county can ensure representation and a coordinated approach. The SPC region should take an Integrated Water Resources Management (IWRM) approach, which has been defined by the Technical Committee of the Global Water Partnership (GWP) as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."

Partners for Implementation
SPC, counties

Strategy 3: Support Efforts to Manage Water Quantity and Storm Water/Flooding

Incentivize individuals and business owners to minimize and manage stormwater. A standalone stormwater tax or a property tax increase could be used, while implementing discounts for green infrastructure. SPC and its partners should consider developing a regional flood susceptibility index (FSI) to help prioritize areas susceptible to flooding for planning and mitigation investments.

The Stormwater Management Act (Act 167) of 1978 requires that each county prepare and adopt a watershed stormwater management plan (SWMP) for each watershed located in the county as designated by the Pennsylvania Department of Environmental Protection. After adoption of a watershed stormwater plan, all design and construction of stormwater management systems, as well as subdivisions, highway projects, and subdivisions/major land developments, must be conducted in a manner consistent with the watershed stormwater plan.

The status of SWMPs within the 10-county SPC region varies. One county has minimal to no Phase I or Phase II SWMP work completed (Greene County); four counties that have a completed Phase I SWMP (Beaver, Indiana, Armstrong, and Westmoreland Counties); five counties have an adopted SWMP (Allegheny, Butler, Fayette, Lawrence, Washington Counties). Encourage and support the completion of SWMPs throughout the region.

Partners for Implementation
SPC, counties, municipalities

Strategy 3

Strategy 4: Fund Sustainable Infrastructure Systems

Encourage and/or incentivize the greater use of sustainable infrastructure systems. Such incentives can be the implementation of a stormwater fee, either administered through an authority or by a municipality.

A stormwater fee is one example of how local municipalities can take a proactive stance on protecting communities from flooding and harmful pollution. Although green infrastructure techniques are more cost-effective than their alternatives in the long-term, they can require larger up-front investment (*Funding Stormwater Management in Pennsylvania Municipalities*, PennFuture). A stormwater fee, instead of relying on general tax revenue, ensures that all members of the community who contribute to stormwater runoff will contribute to paying for the solution. As the funding will not be diverted to other uses, the fee will be used solely for stormwater management every year.

Partners for Implementation
Local planning organizations, local taxing bodies

Strategy 4

Environmental Forces of Change
Southwestern Pennsylvania Commission Exploratory *Forces of Change Scenario Reports*

Strategy 5

Strategy 5: Develop and Provide Tools for Regional Water Quality Improvement

The region should ensure best practices for stormwater management are followed whether through ordinances or permitting processes. Within the SPC region, there are 15,091 miles of streams, of which 150.3 miles are designated as Exceptional Value streams and 3,913 miles designated as High Quality by Pennsylvania Code Chapter 93: Water Quality Standards.

Pollution from stormwater runoff, acid mine drainage, brownfields, combined sewer overflows, and frequent localized flooding are the primary water-related concerns in the region. Chapter 1 of the Pennsylvania Stormwater Best Management Practice (BMP) Manual "Describes a stormwater management approach to the land development process that strives to prevent or minimize stormwater problems through comprehensive planning and development techniques."

However, the Pennsylvania Stormwater BMP Manual has no independent regulatory authority. Therefore, the strategies, practices, recommendations, and control guidelines presented in the manual can become binding requirements only through ordinances and rules established by local municipalities, or permits and other authorizations issued by local, state, and federal agencies.

Partners for Implementation
Local municipalities, local stormwater management agencies, local water authorities

Natural Resources and Air Quality Strategies

That Impact the Environment

<u>*Exploratory Scenario*</u>*

What if the region takes advantage of its abundant natural resources by conserving/preserving critical open space and biological diversity areas. The beauty of the region is maintained, recreational opportunities increase, and public health and competitiveness is improved.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Conserve and Preserve Existing Natural Resources

Encourage counties to continue planning and management efforts to conserve and preserve existing natural resources and sensitive ecosystems. With 2.2 million acres of state forest land, the planning and management by the PA Bureau of Forestry benefits Pennsylvania's extensive forest habitat and aquatic ecosystem resources, including nearly 5,000 miles of streams located within state forest land.

Since 2014, all counties in the SPC region have adopted an open space greenway plan. These plans include the consideration of sensitive ecological areas in the development of future greenways.

Partners for Implementation
County governments

Strategy 2: Support Conservation of Key Tracts of Land

Local and county governments should continue to support conservation efforts to enhance environmental quality, natural lands connectivity, habitat corridors, and agricultural lands preservation. The conservation of key tracts of land could be completed through acquisitions and easements. According to the 2018 National Conservation Easement Database, there are 34,790 reported acres within some type of a conservation easement in the SPC region.

Partners for Implementation
Local and county governments

Strategy 3: Support, Promote, Develop, and Adapt Recreational Opportunities

Support, promote, develop, and adapt recreational opportunities for residents and tourists that are based on the region's non-ski/snow-related natural resource assets. The Pittsburgh region reported the third highest share of traveler dollars spent on recreation among Pennsylvania's tourism regions in 2021 (Tourism Economic/Visit PA). The region's natural resource assets must be protected to maintain their economic and environmental value. However, Pennsylvania's downhill ski and snowboard resorts are not expected to remain economically viable past mid-century. Snow cover to support cross country skiing and snowmobiling has been declining in Pennsylvania, and is expected to further decline in the near future.

Partners for Implementation
Local tourism boards, local and county governments

Strategy 4: Support and Develop Coordinated Mitigation Planning Efforts

Support and develop mitigation planning efforts that identify the highest quality mitigation projects for natural and cultural resources in the region. The importance of mitigation projects for natural and cultural resources will be of paramount importance in the future. Coordination and the sharing of best practices among local and regional municipalities should be encouraged to ensure the most efficient mitigation planning efforts are undertaken.

Partners for Implementation
SPC, counties, municipalities

Strategy 5: Support and Encourage Transportation Projects or Programs That Enhance Air Quality

Support and encourage transportation projects or programs that will contribute to attainment and maintenance of the national ambient air quality standards (NAAQS) for ozone, carbon monoxide, and particulate matter.

Southwestern Pennsylvania's natural resources are the region's most important asset, but the region has a long history of air quality issues with health and pollution at the forefront.

While air quality has been an issue in the past, SPC's partners have made substantial progress in setting and enforcing air quality standards. According to the Allegheny County Health Department, the number of "good days" in Allegheny County is trending upwards, increasing from 123 "good days" in 2001 to 213 in 2020. In contrast, the number of "unhealthy days" has decreased, with five unhealthy days in 2001 and zero in 2020.

Partners for Implementation
Local municipalities, energy producers, county health departments

Investing in our Future
Environment Strategies for Investment

During the Regional Plan Workshop, participants were asked to discuss potential draft strategies for the Forces of Change and identify investment levels for each of the draft strategies. This exercise helped to create a framework that could be used to evaluate and drive future evaluation of projects and investments.

Below are the investment strategy results for the Environment Forces of Change.

Environment Forces of Change	Percent Investment
Climate Change Strategies	**25.0%**
Invest in strategies that help the region adapt to the impacts of climate change.	3.6%
Increase capacity of storm water collection and retention systems to accommodate future projected increases in extreme precipitation events.	7.1%
Invest in disaster preparedness, response, and recovery.	3.6%
Invest in strategies that help to decelerate the rate of climate change.	5.7%
Strategies that raise awareness and educate the public, government officials, and business about climate change, its projected impacts, and region's strategies in response.	5.0%
Land Use/Development Density Strategies	**17.1%**
"Smart Growth" principles and "traditional neighborhood development" concepts to create "livable" communities on the local and neighborhood level.	8.6%
Provide municipal education on land use best practices, community development, and transportation planning.	8.6%
Energy Strategies	**13.6%**
Pursue strategies to diversify the region's energy sources and promote cleaner electricity generation.	4.3%
Incentivize the development and deployment of alternative fuels and renewable sources of energy.	5.7%
Strategies to improve the efficiency in the energy sector (generating, transmission, and end user).	3.6%
Water Strategies	**13.6%**
Promote sustainable regional water resource management and planning.	5.7%
Regional collaboration for water topics.	0.7%
Support efforts to manage water quantity and storm water/flooding.	3.6%
Sustainable Infrastructure systems (funding).	2.1%
Develop and provide tools for regional water quality improvement.	1.4%
Natural Resources Strategies	**15.7%**
Comprehensive planning and management of sensitive ecosystems to conserve and preserve existing natural resources.	3.6%
Support conservation of key tracts of land through acquisitions and easements that enhance environmental quality, natural lands connectivity, habitat corridors, and agricultural lands preservation.	3.6%
Support, promote, develop, and adapt recreational opportunities for residents and tourists that are based on the region's natural resource assets.	5.0%
Support and develop mitigation planning efforts that identify where to get the highest quality mitigation projects for natural and cultural resources in the region.	3.6%
Air Quality Strategies	**7.1%**
Support and encourage transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards (NAAQS) for ozone, carbon monoxide (CO), and particulate matter (PM).	7.1%
Other	**7.9%**
Not allocated or reserved for other	7.9%

Environmental Forces of Change
Southwestern Pennsylvania Commission Exploratory *Forces of Change Scenario Reports*

Building the Vision

Environment

Building the Vision

As discussed in this report, in developing Smart Moves for a Changing Region, SPC convened a series of Expert Resource Panel meetings to identify Forces of Change, weigh their potential impacts, and develop strategies to mitigate and/or optimize the forces. This information, coupled with public and partner input and feedback from SPC leadership, was organized into a set of three emerging themes that capture the most positive aspects of each strategy and focus them in a way that will result in a holistic long range plan for the region.

SPC is developing a plan that both provides a framework and makes significant investment to advance the most critical issues and projects facing the region. The emerging themes will be used in conjunction with performance metrics and other public input to evaluate the program of proposed projects and programs to be contained in the plan. This will ensure the projects and programs contained in the plan will work in concert to assist the Southwestern Pennsylvania region achieve its desired vision for the future.

The emerging regional vision is a world-class, well maintained, integrated transportation system that provides connected mobility for all, enables resilient communities and supports a globally competitive economy.

This vision means taking advantage of our considerable existing assets and developing, supporting and implementing projects that advance our progress. It means investing in regionally connected seamless public transportation that includes new transit investments in key corridors and networks. It means developing modern support infrastructure that prepares the region not just for current technological advances, but also strives to put the region years and decades ahead, by developing the next technology here in this region because we have the expertise in the region to make this happen. It means tackling climate change and taking care of our air and our water. This will allow us to work with many partners and dovetail this plan with other related plans and regional efforts of both public and private sector to advance the region.

The vision means working with partners in identifying and using the types of proven funding and financing arrangements that we will need to make that happen.

The vision will focus on the workforce needs of the region. It means attracting and growing our population by making the region a place where people want to come and stay. It means training our population not just for the jobs that exist but for the jobs we create through innovation and entrepreneurship, and making this region a leader in technology and innovation.

Technology and innovation can be much more than self-driving cars and artificial intelligence and it can work in rural as well as urban parts of the region. It will include innovative new farming techniques and technology deployment that will connect our entire region with high speed access to the internet to afford all our residents the opportunity to work from anywhere and connecting them to the global economic opportunities. The vision will recognize our assets and putting them to the best use for this region, and our residents.

The vision also means taking stewardship and care of the communities that are the foundation of this region, and environment that sustains us. This plan will focus community investment that both sustains our past and protects our future, while elevating the status of our communities throughout the region as desirable places to live and work.

Acknowledgements

Expert Panel Resource Members

Acknowledgements (continued)

Acknowledgements (continued)

Forces of Change

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Exploratory Scenario Report

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Funding

Exploratory Scenario Report

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What Are Forces of Change?

Forces of Change are a wide range of global and national trends that could affect Southwestern Pennsylvania now and in the future.

What Are Forces of Change?

Every four years, the Southwestern Pennsylvania Commission (SPC) is required by Federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019 **as both the region's long range transportation plan and comprehensive economic development strategy**. SPC is creating a new regional plan in which it will consider major Forces of Change and how we can best take advantage of opportunities they may create and mitigate the disruptions they may cause. Forces of Change are high level external forces (global, national, regional) that could have significant regional impacts (both positive and/or negative) now and in the future.

A Force of Change Scenario Report for each category has been developed by SPC. The reports will be used, along with input from the public, to establish a range of potential strategies related to each Force of Change. These strategies were reviewed and discussed at a Regional Plan Workshop held in September 2018. The resulting list of strategies will be used to gather further public input and ultimately to update the long range plan for the Southwestern Pennsylvania region.

SPC has identified forces that have effects on transportation and development in five broad categories: Demographics, Technology, Economy, Environment, and Funding.

Why and How Were Forces of Change Identified?

Every four years, SPC is required by federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019.

In 2017, SPC staff began working with the region's planning directors to develop a Task Force to help develop a process for the new long range plan.

SPC began by reviewing publications from the National Cooperative Highway Research Program on "Dynamic Forces of Change." Next, peer Metropolitan Planning Organizations (MPOs) along with national and regional thought leaders were interviewed to get different perspectives. Common themes emerged, which drove the formation of Expert Resource Panels for each of the five categories to identify the Forces of Change that will impact them.

Expert Resource Panels and Exploratory Scenarios

Expert Resource Panels were formed to provide expertise on the potential effects of Forces of Change on the region. The Expert Resource Panels identified the Forces of Change within each category that are likely to impact the region. Panelists discussed potential opportunities and challenges, the relative probability of occurrence, and whether the impacts will be positive or negative.

The panel activities were designed to help answer the following questions:

What significant trends or disruptions are occurring now, or are foreseen to occur, with potential impact for the region?

Will the impacts be positive or negative for the region?

What specific challenges and opportunities for the region are generated by these occurrences?

What is the anticipated magnitude of the identified challenges and opportunities?

Participants were asked to focus on events, trends, and factors within each category and to identify possible impacts, potential challenges, and opportunities for each Force of Change.

Based on that discussion, exploratory scenarios were developed. Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in discussions related to impacts and strategies for moving forward successfully.

Below are some of the topics that were explored by the Expert Resource Panels. Panelists considered the regional impacts of the topics and identified additional avenues for investigation.

Demographics
Aging Population and Labor Force; Immigration (regional); Urban and Suburban Development Patterns; National/Regional Shifts; Household Size; Diversity; Education; and, Opioid Addiction.

Technology
Connected & Autonomous Vehicles; Mobility as a Service; Automation; Additive Manufacturing; Modal Impacts; Broadband; and, Artificial Intelligence.

Economy
Emerging Industries; Housing Affordability; Economic Growth; Household Income; Employment Types; Shared Economy; Online Economy vs. Brick and Mortar Retail; and, Decaying Infrastructure.

Environment
Energy Supply and Demand; Fossil Fuel/Renewable Balance; Security; Environmental Attitudes; Climate Change and Resilience; and, Water Quality.

Funding
Role of Public & Private Sectors; Investment Levels; National/State/Local Government Roles; and, Finance (how to pay).

What Are The Funding Forces of Change?

Funding Forces of Change

Public Awareness

Infrastructure costs are not always well understood by the general public. The region has made significant strides in adequately maintaining the existing transportation system, but investing in maintenance alone is not enough to achieve the transportation system the region desires. The region needs to find ways to smartly invest in additional projects that will strengthen our communities; make the transportation system safer, more efficient, and more reliable; and grow our economy.

We must garner greater private sector, nonprofit, and general public understanding of public infrastructure needs and subsequent support for increased infrastructure revenues. Local municipalities, SPC, PennDOT and others can implement public education campaigns to increase awareness of the benefits of sustainable funding for infrastructure improvements and how it will benefit the economy and local communities.

NOTEWORTHY:

Making smart investments that positively impact the communities and economy of the region is important.

Role of Private Sector

Increased private sector financing of infrastructure could play a future role in investments, particularly with decreases in available public financing. To ensure best practices are followed in the use of public-private partnerships (P3s), conversations should be held between public and private sector entities. Along with tax increment financing (TIF) and transit revitalization investment districts (TRID), P3s offer a way to raise additional financing for transportation or infrastructure projects.

Existing state and federal mechanisms exist that can leverage private sector development in providing infrastructure improvements, such as multi-municipal purchasing, TIF, local economic stimulus tax assistance (LERTA), and Enterprise Zones. Public sector participation can also be incentivized with tax credits and other funding mechanisms. In order to gain the most public support possible, municipalities should undertake public education campaigns to highlight the needs, costs, and benefits of greater transportation funding.

Revenue Sources for SPC TIP Highway Program
Annual for 2010-2023
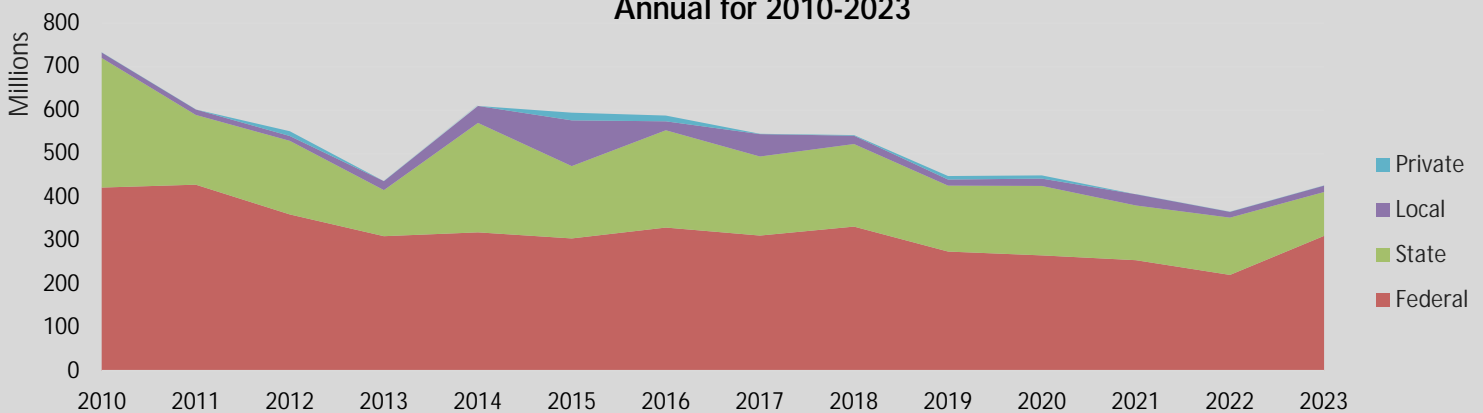
Revenue Sources for SPC TIP Public Transit Program
**Annual for 2010-2023**
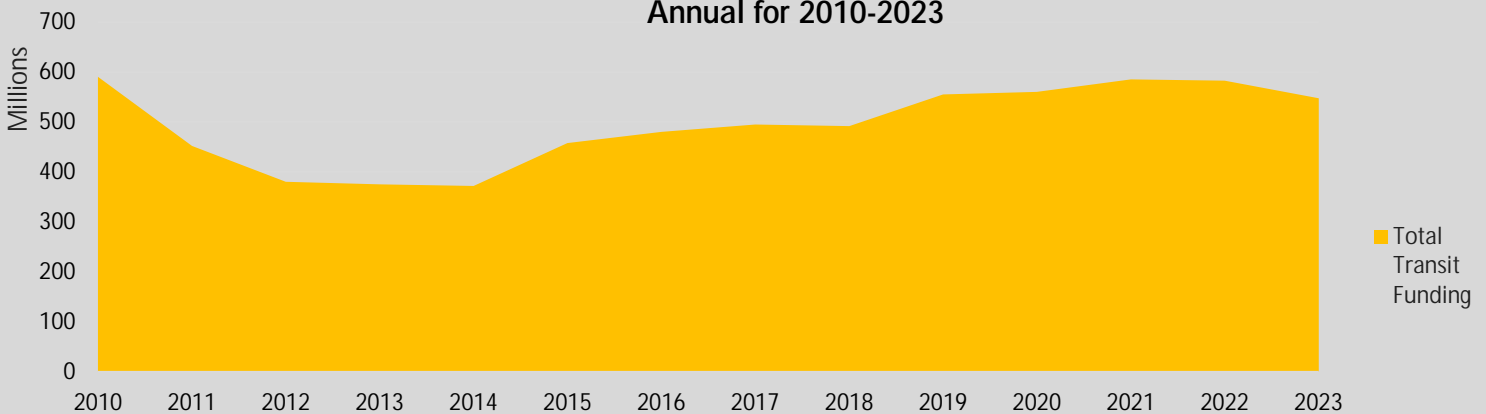
Changing Roles

Changing roles in federal, state, and local government could affect our ability to fund infrastructure. According to the Congressional Budget Office, by 2030, outlays from the Highway Trust Fund will exceed trust fund reserves by a cumulative $134 billion for the highway account and by $54 billion for the mass transit account, even if expiring trust funds taxes are extended (Congressional Budget Office 2020). This is due, in part, to reliance on the gas tax because vehicles, including hybrid and electric vehicles, are becoming increasingly fuel efficient. The current mechanism is not providing the revenues necessary to adequately maintain or enhance our current transportation infrastructure.

State and local governments are being forced to play an increased role in funding transportation infrastructure. The Pennsylvania state government helped fill some of the gap by passing Act 89 in 2013. However, it is uncertain how local governments will come up with the matching funds necessary to maintain and sustain locally owned systems. Stable, reliable funding for infrastructure is critical to the quality of life and economic vitality of Southwestern Pennsylvania. Without predictable funding commitments at all levels, it will be more difficult to invest in new projects such as new transit services, further development of our regional trail networks, and projects that increase capacity and improve the reliability and safety of our roadway and transit systems.

Highway Trust Fund Account Projections
Fiscal years 2019 – 2030
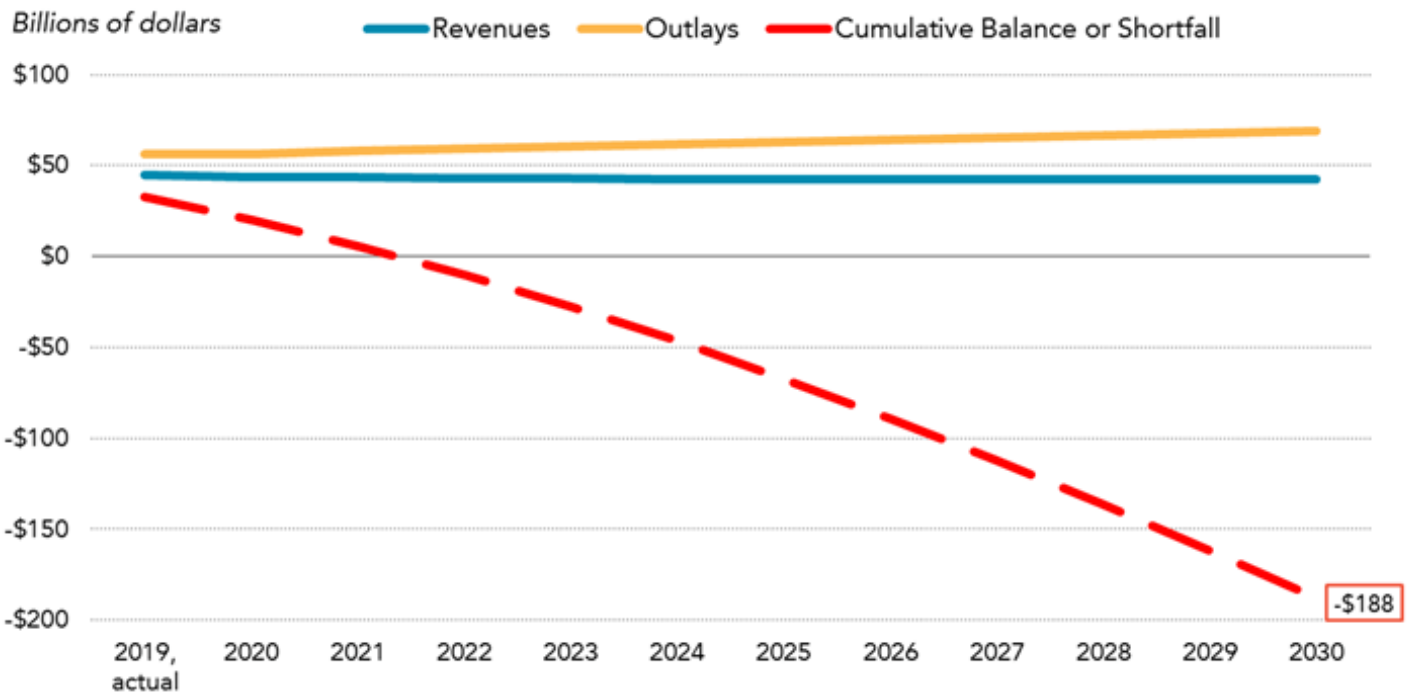
Source: Congressional Budget Office. *Highway Trust Fund Accounts - CBO's January 2020 Baseline*, January 2020.
Notes: Revenues include interest on trust fund reserves, while cumulative balance includes general revenue transfers. Under current law, the trust fund cannot incur negative balances. Some of the taxes that are credited to the Highway Trust Fund are scheduled to expire on September 30, 2022, including the taxes on tires and all but 4.3 cents of the federal tax on motor fuels. However, these estimates reflect the assumption that all of the expiring taxes credited to the fund will continue to be collected after fiscal year 2022.
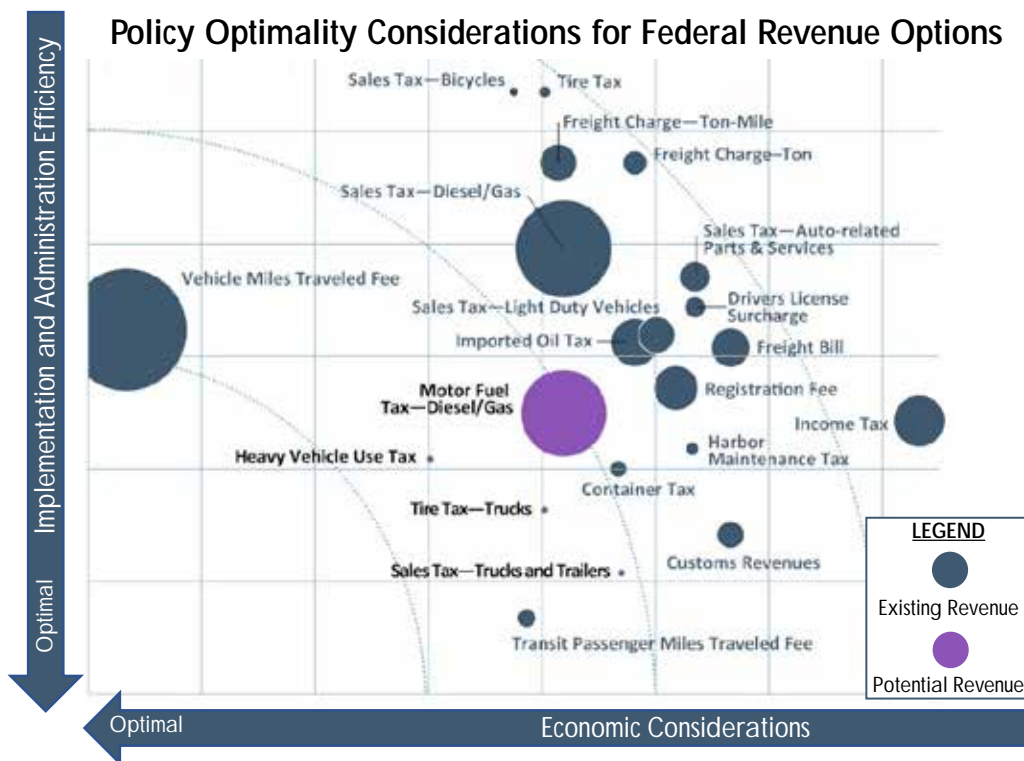
How to Pay

The need for sustainable and flexible revenue sources to fund infrastructure is critical to the future of the region. Declining revenue from the Federal Highway Trust Fund related to reduced fuel consumption (fuels tax) means that new revenue tools may be necessary to fund infrastructure improvements. Further decreases in Federal Highway Trust Fund allocations mean that maintaining current infrastructure and advancing transit projects will require sustainable funding sources. Some new funding sources that have been used in other regions include alternative uses of general tax funds such as: property or income taxes, dedicated funding assessments or assessments such as sales tax allocations or improvement district fees, tax increment financing (TIF), Transit Oriented Development (TOD), TRID, Infrastructure Investment and Jobs Act (IIJA) grants, private financing and bonding, public-private partnerships, tolling and millage-based user fees, High Occupancy Toll (HOT) lanes, congestion pricing, corridor and bridge tolling, etc. To both increase revenue and reduce emissions, user fees can be used or adjusted to address high efficiency/low emission vehicles. While many of these alternative funding sources are not always well understood by the general public, robust public education campaigns could help to enhance public knowledge.

An additional revenue stream that may significantly improve infrastructure in the region is the Infrastructure Investment and Jobs Act (IIJA), which was signed into law on November 15, 2021. The legislation includes approximately $550 billion in new federal investment in America's roads and bridges, water infrastructure, resilience, internet, and more. Based on formula-funding alone, Pennsylvania may expect to receive the following over a five-year period: $11.3 billion for federal-aid highway apportioned programs, $2.8 billion to improve public transportation options, $1.6 billion for bridge replacement and repairs, $1.4 billion to improve water infrastructure, $171 million to support the expansion of an EV charging network in the state, and $100 million to help provide broadband coverage.

The American Association of State Highway and Transportation Officials (AASHTO) has researched the Federal Highway Trust Fund issue. The adjacent diagram from AASHTO shows a national-level assessment of the existing Federal Highway Trust Fund mechanisms in blue and proposed revenue mechanisms in purple. The size of the circle corresponds to the order of magnitude of the revenue generation potential.

Policy Optimality Considerations for Federal Revenue Options

Source: Matrix of Illustrative Surface Transportation Revenue Options, AASHTO

Funding Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Social Equity

The provision of equitable, accessible infrastructure and transportation services should be considered for all investment decisions. Equity and accessibility are growing concerns for transportation services. Additional mobility options such as public transit, walking and biking are needed to promote quality of life and healthy communities for the area's residents. These options can also help ease the burden on the roadway system.

Transportation services must include the most disadvantaged population groups, in particular seniors, persons with disabilities, and low-income individuals. Redundancies in available services across the region should be identified and addressed between agencies.

NOTEWORTHY:

Additional mobility options such as public transit, walking and biking are needed to promote quality of life and healthy communities for the area's residents.

Funding Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

How can we adapt to the Forces of Change underway and take full advantage of the opportunities they create?

Public Awareness

Infrastructure costs are not always well understood by the general public.

Role of Private Sector

Increased private sector financing of infrastructure could play a future role in investments.

Changing Roles

Changing roles in federal, state and local government could affect our ability to fund infrastructure.

Social Equity

Equity and accessibility are growing concerns for infrastructure and transportation services.

How to Pay

New revenue tools may be necessary to fund infrastructure for the future of the region.

Creating Strategies
To Address Funding Forces of Change

The Funding Expert Resource Panel identified strategies for each Force of Change to address potential impacts and mitigate risks. Panelists discussed the need to raise public awareness about the true cost of infrastructure and the lack of a sustainable revenue stream. Panelists identified a number of ways to move forward:

- *Provide information to local governments and the business community on the existing mechanisms to leverage private sector development in providing infrastructure improvements.*

- *Broaden taxes available to local governments through legislature, amending local codes, etc.*

- *Ensure the provision of public transportation and affordable housing in rural areas.*

- *Consider funding transportation with user fees.*

Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in developing strategies to address impacts and mitigate risks.

• DEMOGRAPHICS • TECHNOLOGY • ECONOMY • AGING • POPULATION • IMMIGRATION • URBAN • SUBURBAN • DEVELOPMENT • PATTERNS • HOUSEHOLD • SIZE • DIVERSITY • EDUCATION • CONNECTED • AUTONOMOUS • VEHICLES • MOBILITY • SERVICE • AUTOMATION • ADDITIVE • MANUFACTURING • MODAL IMAPACTS • BROADBAND • ARTIFICIAL • INTELLIGENCE • REGIONAL • CT • EMERGING INDUSTRIES • HOUSING • GROWTH ME • EMPLOYME AFFORDABILITY • SHARED NE • RETAIL • I CTURE • ENERGY • SUPPLY AND • FUEL BLE • BALANCE • SECURITY ATTITUDES • B WATER • QUALITY • FUNDING • PUBLIC • PR TORS • LOCAL • INVESTMENT LEVEL

Note: Draft strategies in this report are presented for discussion and consideration purposes only. They are not final or official policy unless adopted by the Commission in its official plan.

Public Awareness Strategies

That Impact Funding

Exploratory Scenario*

What if there is no sustainable revenue stream to adequately fund public infrastructure and the general public is not aware of what it takes to do it.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1

Strategy 1: Build Support for Increased Infrastructure Revenues

The general public is not always aware of the revenue stream that is required to adequately fund public infrastructure. In order to broaden support for increased infrastructure revenues, the region should work to raise awareness in the business community, nonprofit sector, and other areas. Past successes and accomplishments should be highlighted through public education campaigns to make the general public more aware of the benefits of increased infrastructure funding and how it has been used in local communities.

Partners for Implementation

SPC, nonprofits, chambers of commerce, rotaries, local champions, local transportation related industries, Construction Legislative Council, American Society of Civil Engineers (ASCE), County Commissioners Association of Pennsylvania

Role of Private Sector Strategies

That Impact Funding

Exploratory Scenario*

What if the application of Public-Private Partnerships is only being used for large scale projects and is inherently complicated and unreliable. There is increasing stress on public infrastructure due to private development that negatively affects livability and mobility in the region.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Share Existing Mechanisms with Local Government and the Business Community to Leverage Private Sector Development

Provide information to local governments and the business community on the existing state and federal mechanisms to leverage private sector development in providing infrastructure improvements. Regional cooperation (multi-municipal purchasing), TIF, LERTA, Enterprise Zones (state and federal), LSA-technical and educational assistance to communities are options that are currently available. Encourage innovative thinking and new legislative solutions to further promote this effort.

Partners for Implementation

SPC, economic development and redevelopment authorities, PennDOT, counties, municipalities, councils of government, educational institutions, private transportation companies

Strategy 2: Identify the Best Path for Private Sector Participation

Learn from with other public and private sector entities with public-private partnership experience. Public sector participation can be incentivized via tax credits and other methods of financing. Existing state and federal mechanisms exist that can leverage private sector development in providing infrastructure improvements, such as multi-municipal purchasing, TIF, LERTA, and Enterprise Zones. Public sector participation can also be incentivized with tax credits and other funding mechanisms.

Partners for Implementation

PennDOT P3 office, counties, trade organizations, financial organizations, chambers of commerce, economic development agencies

Strategy 3: Privatize Infrastructure and Charge Users What it Costs

Privatization of infrastructure and charging users "what it costs" to operate and maintain the facility to increase the role of the private sector in funding infrastructure projects. Work with local government and private developers to charge users "what it costs" to operate and maintain the facility.

Partners for Implementation

Councils of government, private developers, PennDOT, financial organizations, Pennsylvania Turnpike Commission

Strategy 4: Protect State and Local Infrastructure From Damage Caused by Natural Gas Extraction Activities

Local governments and PennDOT should ensure those companies provide adequate protection and/or fees to offset damages to the local transportation system.

Partners for Implementation
Private sector, PennDOT, municipalities, counties, SPC, developers

Strategy 5: Require Private Sector Projects to Complete Required Public Infrastructure Improvements

Work with local and county governments to establish requirements for developers to pay for public infrastructure improvements associated with private sector projects. For example, the costs to provide sewer line access to a new housing development may be the responsibility of the private developer.

Identify private sector opportunities. Promote a public education campaign to educate the general public and local businesses on the importance of infrastructure for business attraction, quality of life, tourism economy, and competitive advantages for both public and private sectors.

Partners for Implementation
Counties, municipalities, PennDOT, councils of government, private transportation companies, developers

Changing Roles Strategies
That Impact Funding

Exploratory Scenario*

What if a decline in the long-term role of the federal government in funding for transportation infrastructure is having a strong negative impact to the region. State and local governments are being forced to play an increased role in funding transportation infrastructure. It is uncertain how local governments will come up with the matching funds necessary to maintain and sustain locally owned system.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Broaden Revenue Tools Available to Local Governments

Municipalities must anticipate future decreases in the revenue they receive from fuel taxes. Broaden revenue opportunities available to local governments, which would include revenue neutrality across different funding streams. Encourage legislature to amend local codes that permit local governments to broaden available tax base(s).

Partners for Implementation
Counties, municipalities, state government

Strategy 2: Create Bundling Programs for Funding

Expand the leverage of state and federal funds with local funds in successful bundling programs. Use available tools and provide flexibility through legislation to local governments to create new revenue opportunities.

Possible programs/funding include regionalization (multi-municipal purchasing), TIF, LERTA, Enterprise Zones (state and federal), LSA – Technical and educational assistance to communities and business community (regional).

Conversations with other public and private sector entities with public-private partnership experience could expand this list or generate innovative ideas. Surveys, national legislation, and planning efforts to identify regional initiatives can help to move this effort forward. Incentivize public sector participation with tax credits, funding, etc.

Partners for Implementation
Legislators, business community, advocacy groups, local officials, local champions, SPC, PennDOT P3 office, trade organizations

Strategy 3: Identify Sustainable Public Transit Funding

Identify a possible sustainable source for dedicated public transit funding. Due to reductions in federal funding for transportation systems, additional revenue will be needed. Encourage the public and local organizations to advocate for increased federal funding.

Partners for Implementation

PennDOT, county, public transit agencies, public, municipalities, nonprofits

Strategy
3

Strategy 4: Identify Sustainable State Revenues for Transportation Needs

Work consistently with the state legislature to recognize that the need for revenue increases are a continuing process, not a "one and done" endeavor. Develop an ongoing, cooperative process with the state legislature to work toward matching revenues to transportation needs. Garner private sector, nonprofit and general public understanding of public infrastructure needs and subsequent support for increased infrastructure revenues by highlighting past successes and accomplishments (i.e. Act 13, 89).

Undertake a public education campaign to make the general public aware of the benefits of increased transportation funding and how it has been used in local communities.

Partners for Implementation

Chambers of commerce, rotaries, local champions, local transportation related industries, Construction Legislative Council, American Society of Civil Engineers (ASCE), County Commissioners Association of Pennsylvania

Strategy
4

Social Equity Strategies

That Impact Funding

Exploratory Scenario*

What if the region's elderly and disabled populations have difficulty in accessing transportation services and infrastructure. Property tax structures are a burden on fixed income retirees.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy
1

Strategy 1: Encourage Philanthropic Activity Throughout the Region

Encourage philanthropic sources to expand giving into the region's rural areas. Engage in conversations with regional foundations to discuss larger regional issues and highlight how funds can benefit rural areas.

Partners for Implementation

Grantmakers of WPA, nonprofits, community foundations

Strategy
2

Strategy 2: Provide Relief for Disadvantaged Populations

Examine current the tax structure and provide tax relief for disadvantaged populations where needed. Work with school districts, county governments and municipalities to implement tax structures to attract fixed income retirees.

Partners for Implementation

School districts, municipalities, counties

Strategy 3: Ensure the Provision of Affordable Housing

Ensure that the provision of affordable housing is retained in areas that are experiencing redevelopment and increased investment. Require mixed income housing and green/open space in new or redeveloping blighted areas. Expand the requirement and/or replicate it in areas of redevelopment. Agreements should be tied to public investment to ensure equitable options.

Partners for Implementation
Banking industry, developers, local governments, housing authorities

Strategy 4: Ensure the Provision of Transportation Options for Rural Areas and Disadvantaged Populations

Ensure that rural areas and disadvantaged populations have access to public transportation and other transportation options. Work with rural providers to examine services to optimize funding and leverage services. Form partnerships with the private sector and health services/nonprofits. Address flexibility in transportation funding, mobility as a service, and technology.

Partners for Implementation
Nonprofits, ridesharing companies, health care industry, transit providers, PennDOT, local governments

How to Pay Strategies
That Impact Funding

<u>*Exploratory Scenario*</u>*

What if higher costs and lower revenues are having negative impacts on the regional transportation system. Funding needs across all modes of transportation continue to grow.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Enhance Efficiency in Public Transit Systems

Work toward greater efficiency in public transit systems through regional cooperation and/or privatization. As the private sector plays an increasing role in transit, municipalities must be able to adapt to future changes in transit and ensure equity in providing access is maintained.

Partners for Implementation

Transit agencies, county governments, PennDOT, SPC educational institutions, private transportation companies

Strategy 2: Fund Transportation With New Revenues

Fund transportation with a user-fee-based transportation revenue system or other new revenues. A robust public education campaign is needed to educate the general public on the need for sustainable funding sources. Some examples of revenue options that have been used in other regions include, but are not limited to the following:

- Tolling (corridor, bridge, etc.)
- VMT tax (mileage-based user fees are not always well understood by the general public and would require a robust public education campaign)
- Mileage-Based User Fee/Road-User Fee
- State and/or local taxes
- Bicycle registration fees
- Transportation Network Company (TNC) fees
- Ridesharing/pooled vehicle fees
- Electric vehicle charging fees
- Carbon taxes
- Congestion pricing
- State income tax - dedicated to infrastructure
- Regional asset districts

Partners for Implementation

Legislators, business community, SPC, advocacy groups, local officials, local champions

Investing in our Future
Funding Strategies for Investment

During the Regional Plan Workshop, participants were asked to discuss potential draft strategies for the Forces of Change and identify investment levels for each of the draft strategies. This exercise helped to create a framework that could be used to evaluate and drive future evaluation of projects and investments.

Below are the investment strategy results for the Funding Forces of Change.

Funding Forces of Change	Percent Investment
Public Awareness Strategies	**10.8%**
Garner private sector, nonprofit and public understanding of public infrastructure needs and subsequent support for increased infrastructure revenues.	10.8%
Role of the Private Sector Strategies	**19.2%**
Provide information to local governments and the business community on the existing (state and federal) mechanisms to leverage private sector development in providing infrastructure improvements.	7.5%
Identify what the public sector does not do well and leverage private sector in their participation to assist.	1.7%
Ensure private companies involved in natural gas extraction provide adequate protection for possible damages to state and local roads and bridges.	2.5%
Privatization of infrastructure and the ability to charge "what it costs" to operate and maintain the facility.	0.0%
Private sector pays cost of public improvements associated with private development projects.	7.5%
Changing Roles Strategies	**30.8%**
Broaden taxes available to local governments, which would include revenue neutrality across different funding streams	2.5%
Expand the leverage of state and federal funds with local funds in bundling programs	3.3%
Identify a possible regional source for dedicated public transit funding.	12.5%
Work consistently with the state legislature to recognize that the need for revenue increases are a continuing process, not a "one and done" endeavor. Develop an ongoing, cooperative process with the state legislature to work toward matching revenues with appropriately measured overall transportation needs.	12.5%
Social Equity Strategies	**22.5%**
Encourage philanthropic sources to expand giving in the region's rural areas.	0.8%
Examine current tax structure; provide tax relief for disadvantaged populations.	3.3%
Ensure the provision of affordable housing is retained in areas that are experiencing redevelopment and increased investment	8.3%
Ensure the provision of public transportation and transportation options to rural areas and disadvantaged populations	10.0%
How to Pay Strategies	**14.2%**
Regionalization and/or privatization of public transit systems (efficiency).	7.5%
Fund transportation with user fee based transportation revenue system/new revenues.	6.7%
Other	**2.5%**
Not allocated or reserved for other	2.5%

Funding Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Building the Vision
Funding

Building the Vision

As discussed in this report, in developing Smart Moves for a Changing Region, SPC convened a series of Expert Resource Panel meetings to identify Forces of Change, weigh their potential impacts, and develop strategies to mitigate and/or optimize the forces. This information, coupled with public and partner input and feedback from SPC leadership, was organized into a set of three emerging themes that capture the most positive aspects of each strategy and focus them in a way that will result in a holistic long range plan for the region.

SPC is developing a plan that both provides a framework and makes significant investment to advance the most critical issues and projects facing the region. The emerging themes will be used in conjunction with performance metrics and other public input to evaluate the program of proposed projects and programs to be contained in the plan. This will ensure the projects and programs contained in the plan will work in concert to assist the Southwestern Pennsylvania region achieve its desired vision for the future.

The emerging regional vision is a world-class, well maintained, integrated transportation system that provides connected mobility for all, enables resilient communities and supports a globally competitive economy.

This vision means taking advantage of our considerable existing assets and developing, supporting and implementing projects that advance our progress. It means investing in regionally connected seamless public transportation that includes new transit investments in key corridors and networks. It means developing modern support infrastructure that prepares the region not just for current technological advances, but also strives to put the region years and decades ahead, by developing the next technology here in this region because we have the expertise in the region to make this happen. It means tackling climate change and taking care of our air and our water. This will allow us to work with many partners and dovetail this plan with other related plans and regional efforts of both public and private sector to advance the region.

The vision means working with partners in identifying and using the types of proven funding and financing arrangements that we will need to make that happen.

The vision will focus on the workforce needs of the region. It means attracting and growing our population by making the region a place where people want to come and stay. It means training our population not just for the jobs that exist but for the jobs we create through innovation and entrepreneurship, and making this region a leader in technology and innovation.

Technology and innovation can be much more than self-driving cars and artificial intelligence and it can work in rural as well as urban parts of the region. It will include innovative new farming techniques and technology deployment that will connect our entire region with high speed access to the internet to afford all our residents the opportunity to work from anywhere and connecting them to the global economic opportunities. The vision will recognize our assets and putting them to the best use for this region, and our residents.

The vision also means taking stewardship and care of the communities that are the foundation of this region, and environment that sustains us. This plan will focus community investment that both sustains our past and protects our future, while elevating the status of our communities throughout the region as desirable places to live and work.

Acknowledgements
Expert Panel Resource Members

Acknowledgements (continued)

Acknowledgements (continued)

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Forces of Change

Funding
Exploratory Scenario Report

Forces of Change

Technology
Exploratory Scenario Report

Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*
September 2023

MOBILITY • SERVICE • A
MANUFACTURING •
BROADBAND • ARTIFI
REGIONAL • IMPACT •
HOUSING • GROWTH •
AFFORDABILITY • SHAR

SPC
SOUTHWESTERN PENNSYLVANIA COMMISSION

PULATION • IMMIGRATION
• DEVELOPMENT • PA
• SIZE • DIVERSITY • ED
• AUTONOMOUS • V
ERVICE • AUTOMATION •
RING • MODAL IM
• ARTIFICIAL • INTEL
IMPACT • EMERGING IN
GROWTH • INCOME • EMF
TY • SHARED • ONLINE
TURE • ENERGY • SUPPLY •
EWABLE • BALANCE •
RESILIENCE • WATER •
PUBLIC • PRIVATE •

Table of Contents

What Are Forces of Change?

Forces of Change are a wide range of global and national trends that could affect Southwestern Pennsylvania now and in the future.

What Are Forces of Change?

Every four years, the Southwestern Pennsylvania Commission (SPC) is required by Federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019 **as both the region's long range transportation plan and comprehensive economic development strategy**. SPC is creating a new regional plan in which it will consider major Forces of Change and how we can best take advantage of opportunities they may create and mitigate the disruptions they may cause. Forces of Change are high level external forces (global, national, regional) that could have significant regional impacts (both positive and/or negative) now and in the future.

A Force of Change Scenario Report for each category has been developed by SPC. The reports will be used, along with input from the public, to establish a range of potential strategies related to each Force of Change. These strategies were reviewed and discussed at a Regional Plan Workshop held in September 2018. The resulting list of strategies will be used to gather further public input and ultimately to update the long range plan for the Southwestern Pennsylvania region.

SPC has identified forces that have effects on transportation and development in five broad categories: Demographics, Technology, Economy, Environment, and Funding.

Why and How Were Forces of Change Identified?

Every four years, SPC is required by federal law to update the region's long range transportation plan. This plan lays out the vision and strategies for transportation investments in the Southwestern Pennsylvania region over the next 25 years. The current plan was adopted in June 2019.

In 2017, SPC staff began working with the region's planning directors to develop a Task Force to help develop a process for the new long range plan.

SPC began by reviewing publications from the National Cooperative Highway Research Program on "Dynamic Forces of Change." Next, peer Metropolitan Planning Organizations (MPOs) along with national and regional thought leaders were interviewed to get different perspectives. Common themes emerged, which drove the formation of Expert Resource Panels for each of the five categories to identify the Forces of Change that will impact them.

Expert Resource Panels and Exploratory Scenarios

Expert Resource Panels were formed to provide expertise on the potential effects of Forces of Change on the region. The Expert Resource Panels identified the Forces of Change within each category that are likely to impact the region. Panelists discussed potential opportunities and challenges, the relative probability of occurrence, and whether the impacts will be positive or negative.

The panel activities were designed to help answer the following questions:

What significant trends or disruptions are occurring now, or are foreseen to occur, with potential impact for the region?

Will the impacts be positive or negative for the region?

What specific challenges and opportunities for the region are generated by these occurrences?

What is the anticipated magnitude of the identified challenges and opportunities?

Participants were asked to focus on events, trends, and factors within each category and to identify possible impacts, potential challenges, and opportunities for each Force of Change.

Based on that discussion, exploratory scenarios were developed. Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in discussions related to impacts and strategies for moving forward successfully.

Below are some of the topics that were explored by the Expert Resource Panels. Panelists considered the regional impacts of the topics and identified additional avenues for investigation.

Demographics
Aging Population and Labor Force; Immigration (regional); Urban and Suburban Development Patterns; National/Regional Shifts; Household Size; Diversity; Education; and, Opioid Addiction.

Technology
Connected & Autonomous Vehicles; Mobility as a Service; Automation; Additive Manufacturing; Modal Impacts; Broadband; and, Artificial Intelligence.
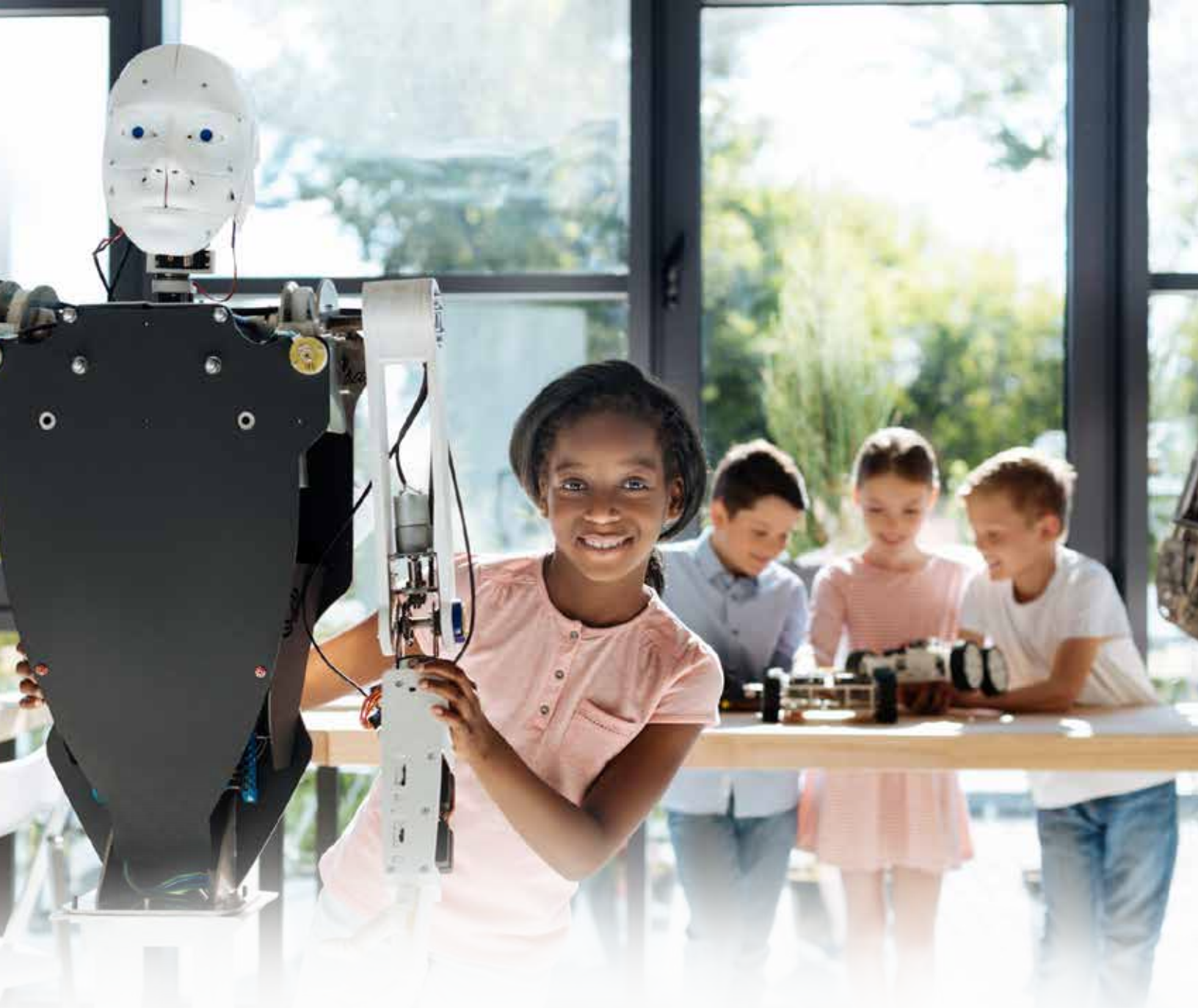
Economy
Emerging Industries; Housing Affordability; Economic Growth; Household Income; Employment Types; Shared Economy; Online Economy vs. Brick and Mortar Retail; and, Decaying Infrastructure.

Environment
Energy Supply and Demand; Fossil Fuel/Renewable Balance; Security; Environmental Attitudes; Climate Change and Resilience; and, Water Quality.

Funding
Role of Public & Private Sectors; Investment Levels; National/State/Local Government Roles; and, Finance (how to pay).

What Are The Technology Forces of Change?

Technology Forces of Change

Broadband

The provision of broadband internet service throughout the Southwestern Pennsylvania region is critical to our economy and our children's education. According to the Federal Communications Commission's 2021 Broadband Progress Report, Armstrong, Fayette, Greene, Indiana, and Washington Counties are five of forty-two counties across the state that have less broadband access than the national average.

Increased access to broadband could impact rural development, telecommuting, and infrastructure. Next generation 5G broadband services require small cell installations that are more closely spaced than the current tower installations, which creates a potential land use dilemma as well as implementation challenges.
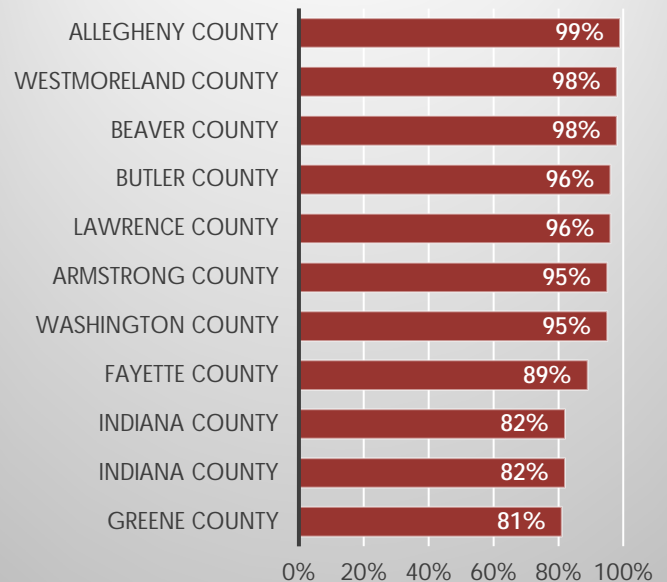
Standards are still emerging and will continue to evolve as technology advances. Regional assessments will be required in order to determine the threshold of service needed by public and private uses. Public/private partnerships will be crucial in the development and implementation of broadband installation.

The recently-launched Pennsylvania Broadband Initiative is a dedicated effort to provide high speed internet access to every household and business in the state. Pennsylvania was awarded $279 million for broadband expansion through the American Rescue Plan Act (ARPA). These funds will assist municipalities across the Commonwealth in building high-speed broadband infrastructure where access is currently lacking. By the end of 2023, additional Investment in Infrastructure and Jobs Act (IIJA) funds will be allocated to invest statewide in transforming the landscape of broadband internet in Pennsylvania and bringing reliable connectivity to all.

NOTEWORTHY:

The recently-launched Pennsylvania Broadband Initiative is a dedicated effort to provide high speed internet access to every household and business in the state.

% Population with Broadband by County

County	%
ALLEGHENY COUNTY	99%
WESTMORELAND COUNTY	98%
BEAVER COUNTY	98%
BUTLER COUNTY	96%
LAWRENCE COUNTY	96%
ARMSTRONG COUNTY	95%
WASHINGTON COUNTY	95%
FAYETTE COUNTY	89%
INDIANA COUNTY	82%
INDIANA COUNTY	82%
GREENE COUNTY	81%

SOURCE: Federal Communications Commission's 2021 Broadband Progress Report, SPC Equitable Broadband Access

Autonomous/Connected Vehicles

Self-driving vehicles could impact safety, infrastructure, traffic, land use, and workforce. Furthermore, self-driving cars have to potential to change everything from the need to own a private vehicle, to the way we move freight, the way we pay for infrastructure, and the way we plan for development.

The private sector will most likely drive this technology and create user demand and expectations. The public sector will need to keep pace with technology advancements, which may drive funding and investment priorities. For example, if these vehicles result in more congestion and maintenance of our current infrastructure, then revenue based on vehicles miles traveled and congestion pricing measures could be considered.

Autonomous/connected vehicles (AV/CV) will rely on public sector coordination, including policy setting, infrastructure development, and land use controls (drop off zones, curb management, etc.). Coordination between the private sector and local and regional public entities will be crucial in ushering widespread use of AV/CV while ensuring the safety of all road users.

Local municipalities must also ensure current and future investment is adaptable to changes in transportation and land use regulations. For example, the region must plan for adaptable reuse of existing and future parking structures if they become obsolete due to AV/CV technology.

The Pittsburgh region is already a leader in the autonomous vehicle field, in large part due to the region's large number of engineering graduates, many of whom come from the robotics and engineering programs at Carnegie Mellon University and the University of Pittsburgh. Per the Allegheny Conference's Inflection Point 2017-2018, the year-over-year growth of the autonomous vehicle field was 324%, which topped all other regions.

NOTEWORTHY:

The Pittsburgh region is already a leader in the autonomous vehicle field with a 324% growth in job openings

Year Over Year Growth in Job Openings Related to Autonomous Vehicles

Location	Growth in Autonomous Vehicles-Related Job Openings
Pittsburgh	324%
San Francisco	228%
San Jose	70%
Detroit	61%
US Overall	54%

SOURCE: Inflection Point 2017-2018, Allegheny Conference on Community Development

Mobility as a Service

Uber, Lyft, etc. (mobility as a service) may change the way we travel and may reduce individual vehicle ownership. These services have the potential to reduce congestion, improve the region's air quality, connect people with jobs throughout the region and provide equitable access to transportation to all communities in the region.

Uber recently launched Uber Movement in Pittsburgh, which provides anonymized traffic data from information collected on Uber trips in the region. The aggregate data collected by Uber Movement can help cities make informed decisions about how to adapt existing infrastructure and invest in future solutions to make a region more efficient.

Funding for mobility remains an issue for both private and public entities. Cost is the largest deterrent to creating a sustainable system. Credit vouchers for ride-sharing services could be implemented to expand current public transit routes and incentivize riders to consider other forms of public/private transportation.

All service providers should be working and coordinating with transit agencies and local municipalities to potential address service gaps in the system.

NOTEWORTHY:
Mobility as a service has the potential to lessen congestion, improve air quality, and create more equitable access.

Uber Coverage in the Southwestern PA Region
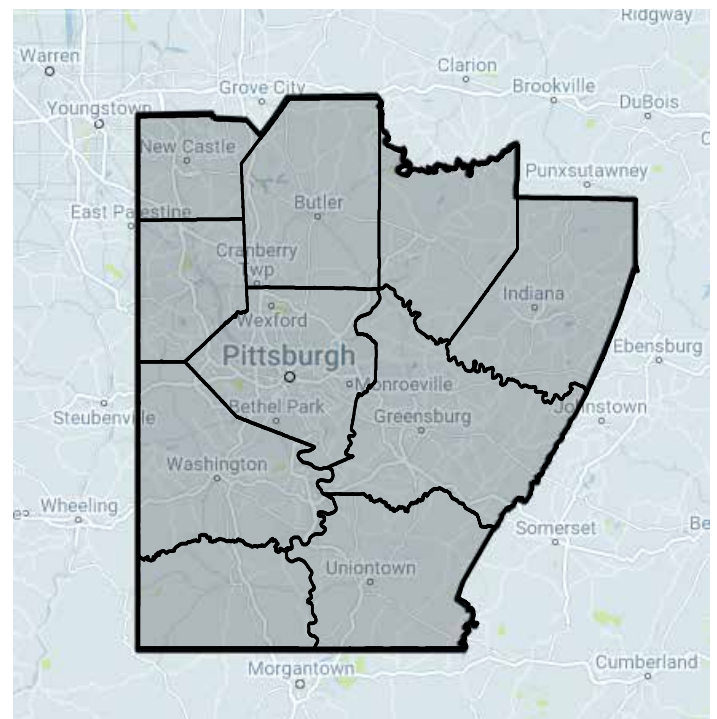
SOURCE: Uber, Pittsburgh City Page, 2023

Additive Manufacturing

Additive manufacturing, also known as "3D printing," can lead to efficiency, competitiveness, workforce development, and supply chain impacts. Additive manufacturing has the potential to reshape the industry through rapid prototyping, faster time-to-market, and distributed manufacturing capabilities.

The City of Pittsburgh and its surrounding areas have emerged as a leader in this field, which is shown in the year-over-year growth in additive manufacturing job demand. With 128% year-over-year growth, Pittsburgh is the nation's fastest-growing major metropolitan area for job openings related to additive manufacturing.

As additive manufacturing grows in the region, it will require training. Employers and universities should work together to ensure workers receive the training they need so that the region remains competitive in this fast-growing field.

NOTEWORTHY:

The Southwestern Pennsylvania region is the nation's fastest-growing metro area for job openings related to additive manufacturing.

2017-2018 Year-Over-Year Growth in Job Openings Related to Additive Manufacturing

Location	Growth in Additive Manufacturing-Related Job Openings
Pittsburgh	128%
US Overall	9%

SOURCE: Inflection Point 2017-2018, Allegheny Conference on Community Development

Artificial Intelligence

Use of robotics has the potential to increase efficiency, impact jobs, and shift the local culture. Due to technological advancements over the past 20 years, the way we communicate with one another, and shop for goods and services are all changing rapidly.

As technology advances so will the skills employees will need, thus calling for continuous upskilling of the incumbent workforce. Even as demand for these skills increases, there are new concerns about the impacts of automation. However, some believe workers may actually have greater employment opportunities as routine tasks become automated, as long as they are able to learn how to use these new technology-based tools.

An Allegheny Conference report examined the risk automation poses to various fields, and is illustrated in the chart to the right. Positions such as registered nurses, nursing assistants, and software developers face little risk of automation, while occupations such as retail salespersons and pharmacy technicians among others are at the greatest risk of automation.

Job Risk of Automation

Occupation	Risk of Automation	Total Employment in Pittsburgh MSA
Registered Nurses	Low	30,810
Nursing Assistants	Low	13,590
Software Developers, Applications	Low	7,920
Medical Assistants	Low	6,130
Computer Systems Analysts	Low	5,790
Management Analysts	Low	4,880
First-Line Supervisors of Construction Trades and Extraction Workers	Low	4,380
Electricians	Low	4,060
Mechanical Engineers	Low	3,420
First-Line Supervisors of Mechanics, Installers, and Repairers	Low	3,310
Customer Service Representatives	Medium	23,310
Heavy and Tractor-Trailer Truck Drivers	Medium	13,360
Maintenance and Repair Workers, General	Medium	10,810
Carpenters	Medium	7,340
Automotive Service Technicians and Mechanics	Medium	6,220
Computer User Support Specialists	Medium	5,950
Market Research Analysts and Marketing Specialists	Medium	4,990
Machinists	Medium	3,920
Industrial Machinery Mechanics	Medium	2,340
Dental Hygienists	Medium	2,130
Retail Salespersons	High	35,970
Laborers and Freight, Stock, and Material Movers, Hand	High	18,100
Construction Laborers	High	9,460
Operating Engineers and Other Construction Equipment Operators	High	5,220
Team Assemblers	High	4,380
Loan Officers	High	3,670
Pharmacy Technicians	High	3,250
Welders, Cutters, Solderers, and Brazers	High	3,160
Electrical and Electronic Equipment Assemblers	High	2,950
Inspectors, Testers, Sorters, Samplers, and Weighers	High	2,760

SOURCE: Inflection Point 2016, Allegheny Conference on Community Development

How can we adapt to the Forces of Change underway and take full advantage of the opportunities they create?

Broadband
Increased access to broadband could impact rural development, telecommuting, and infrastructure.

Autonomous/Connected Vehicles
Self-driving vehicles could impact safety, infrastructure, traffic, land use, and workforce.

Mobility as a Service
Uber, Lyft, etc. may change the way we travel and may reduce individual vehicle ownership.

Additive Manufacturing
3D printing can lead to efficiency, competitiveness, workforce development, and supply chain impacts.

Artificial Intelligence
Use of robotics has the potential to increase efficiency, impact jobs, and shift the local culture.

Creating Strategies
To Address Technology Forces of Change

The Technology Expert Resource Panel identified strategies for each Force of Change to address potential impacts and mitigate risks. Panelists discussed the need to adapt to ever-changing and evolving technology to stay competitive in the regional and national economy. Panelists identified a number of technology strategies:

- *Expand the availability of broadband throughout the region and ensure rural areas do not get left behind.*

- *Assist in the deployment of connected/autonomous vehicles and offset negative impacts.*

- *Work with private ridesharing services to equitably provide increased mobility for all users.*

- *Prepare our current workforce for a future with greater integration of additive manufacturing and artificial intelligence.*

Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. These were developed to aid in developing strategies to address impacts and mitigate risks.

• DEMOGRAPHICS • TECHNOLOGY • ECONOMY • AGING • POPULATION • IMMIGRATION • URBAN • SUBURBAN • DEVELOPMENT • PATTERNS • HOUSEHOLD • SIZE • DIVERSITY • EDUCATION • CONNECTED • AUTONOMOUS • VEHICLES • MOBILITY • SERVICE • AUTOMATION • ADDITIVE • MANUFACTURING • MODAL IMAPACTS • OADBAND • ARTIFICIAL • INTELLIGENCE • REGIONAL • CT • EMERGING INDUSTRIES • HOUSING • GROWTH • ME • EMPLOYME   FFORDABILITY • SHARED • NE • RETAIL • IN   CTURE • ENERGY • SUPPLY • AND • FUEL   BLE • BALANCE • SECURITY • ATTITUDES • R   WATER • QUALITY • FUNDING • PUBLIC • PRI   TORS • LOCAL • INVESTMENT LEVEL

Note: Draft strategies in this report are presented for discussion and consideration purposes only. They are not final or official policy unless adopted by the Commission in its official plan.

Broadband Strategies

That Impact Technology

<u>*Exploratory Scenario*</u>*

What if there is unprecedented investment to bring next generation 5G Broadband Technology to the entire region.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1

Strategy 1: Use Existing Transportation Corridors to Facilitate Delivery of Broadband Throughout the Region

Counties and municipalities should help promote reliable broadband access in rural communities and educate users on capabilities. New technology follows the highest demand and rural areas may be left behind without public intervention. This will help to address equitable access concerns in rural areas and allow rural residents to access work-from-home and remote positions. Furthermore, they should help integrate systems to include people who are not independently mobile. This network can also act as a backbone for a fiberoptic network in rural areas for autonomous vehicles to communicate.

Local and regional transportation agencies and local systems of government should include fiberoptic cable on highway construction/reconstruction projects to better adapt for the future and expand network capacity. Standards are still emerging and will continue to evolve as technology advances.

Regional assessments will be required in order to determine the threshold of service needed for public and private uses. Public/private partnerships will be crucial in the development and implementation of broadband installation. As 5G broadband services require small cell installations that are more closely spaced than the current tower installations, local municipalities should prepare for accommodating small cell locations through zoning, municipal actions, review processes, etc.

Partners for Implementation
PennDOT (including Design and Permit Divisions), telecommunications companies, municipalities

Autonomous/Connected Vehicle Strategies

That Impact Technology

Exploratory Scenario*

What if connected and autonomous vehicles are the norm. The region's roadways are more congested, requiring more maintenance of infrastructure, and impacting available revenues. Parking structures located near destinations become vacant as new parking storage areas are built away from activity centers.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Deploy Appropriate Infrastructure to Facilitate Autonomous and Connected Vehicles

Appropriate infrastructure is required to facilitate autonomous and connected vehicles (AV/CV) technology. The region must work with PennDOT, local municipalities, and vehicle manufacturers to determine the infrastructure needs for AV/CV and identify and eliminate any technical barriers to the safe use of such vehicles. Projects and corridors should be prioritized based on safety, connectivity, and efficiency. Encourage partnerships between regional partners and local municipalities to develop associated land use design requirements/standards, such as curb space, drop-off points, etc. Coordinate public policy with funding, incentives and/or regulations, to advance deployment. Work with regional partners to develop a phasing process, which will be needed due to AV/CVs and non-AV/CVs sharing the roads for the foreseeable future.

Collaborate with PennDOT, research organizations, and local educational institutions to research best practices and educate the public on the implementation of AV/ACs.

Partners for Implementation
PennDOT, municipalities, universities, research organizations, vehicle manufacturers

Strategy 2: Offset Impacts of Autonomous and Connected Vehicles

AV/CV have many advantages. However, concerns exist regarding impacts to safety, land use, and other factors. When drive time matters less because of AV/CV use, decentralized development and sprawl can result. AV/CV may also unleash demand for vehicle trips by those who can't drive. Longer commutes and increased number of trips would also increase the costs of providing and maintaining existing infrastructure and would increase fuel consumption.

AV/CV may reduce local congestion, in particular bottleneck and merging areas on and off highways. However, less vehicles leads to less taxes/revenue for projects. Congestion pricing should be considered, as well as permitting/fees to discourage inappropriate automated routing (i.e. diverting off of arterials into residential streets). Tax revenues could shift away from gas taxes towards other fees. Local municipalities may convert parking garages and curb parking spaces to other revenue-generating uses.

Partners for Implementation
Public sector, private sector, local, state and federal governments

Mobility as a Service Strategies

That Impact Technology

Exploratory Scenario*

What if the region, its residents, and its business community fully embrace mobility as a service with the private sector playing a vital role. This lessens congestion, helps improve the region's air quality and equitable access to all communities. It also connects people with job opportunities throughout the region, thereby alleviating tight local labor markets.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Integrate Multiple Forms of Public/Private Transportation to Equitably Provide Increased Mobility For All Users

Increase mobility in the region by integrating multiple forms of public/private transportation which can result in increased mobility for all users. It also connects people with job opportunities throughout the region, thereby helping to alleviate tight local labor markets.

Encourage local municipalities and transit agencies to work to coordinate private services, such as Uber and Lyft, with traditional public transit to provide first and last mile services. Different types of services can be integrated and incentivized. The region must be able to adapt to future changes and work towards equitable solutions.

As public transit, AV/CV, ridesharing, and other technologies change our developed landscape. Local municipalities should be proactive in setting regulatory standards and ensuring that safety and best practices are being followed.

Partners for Implementation
Municipalities, counties, public transit agencies, private transportation providers

Additive Manufacturing Strategies

That Impact Technology

*Exploratory Scenario**

What if additive manufacturing continues to grow in the region. This increases the region's competitiveness in the manufacturing sector, requiring retraining of incumbent workers for additive manufacturing jobs.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1: Retrain Workers to Accommodate Additive Manufacturing

While greater automation of manufacturing may lead to cost savings, it may also lead to employment loss and change in the educational requirements of the workforce. Encourage local public and trade schools to better prepare students for this changing field.

Partners for Implementation
Unions, employers, universities, public and trade schools, research organizations/foundations

Strategy 2: Address Impacts of Supply Chain Restructuring

New and innovative 3D printing/additive manufacturing can impact the supply chain. While this technology would enable manufacturing to occur in small towns and underdeveloped areas, it may also lead to greater truck traffic and further incentivize sprawl. Furthermore, materials and products will need to be transported from different locations for manufacturing. It must be determined that if additive manufacturing would be more likely to occur in denser areas, what regulations would need to be developed, and how much it would impact current workforce numbers and ability.

Partners for Implementation
Municipalities, regional organizations, research organizations, existing manufacturers

Artificial Intelligence Strategies

That Impact Technology

Exploratory Scenario*

What if there is a substantial increase in the use of automation and artificial intelligence, increasing efficiency, but negatively impacting many sectors of the workforce.

*Each exploratory scenario describes uncertain, but comprehensible, potential futures that may occur. It is not suggested that these scenarios will occur, only that a region should consider them as a "What If" scenario.

Strategy 1

Strategy 1: Retrain and Develop the Regional Workforce

As technology advances there may be a reduction in white collar jobs. Local unions, employers, and schools should partner to prepare for this potential industry shift. It will be important to build workforce expectations over time as industries evolve and mature. As a region, we can work to identify and address skills and geographic mismatches while considering tradeoffs (some jobs will be created while others are eliminated).

Providing flexible and easy to use funding for on the job training and teaching new computer skills will be important.

Partners for Implementation
Unions, employers, education institutions

Strategy 2

Strategy 2: Identify how Transportation Agencies can Better Use Artificial Intelligence

Advances in artificial intelligence will enable local and regional transportation agencies to make intersections and routes more efficient and improve traffic flow for all users. Local, regional, and federal transportation agencies can better plan for the future and better prioritize resources. SPC, local municipalities, and transit agencies should coordinate with PennDOT and collaborate with local universities to help.

Artificial intelligence has the potential to help local transit/infrastructure authorities with potholes and sidewalk problems. Artificial intelligence in local infrastructure may be able to identify "who" is at the intersection (pedestrians, bicyclists, cars, other) and adjust timing of traffic lights to better improve traffic flow.

Additionally, facial recognition could be used for payment, transit preferences, and marketing/advertising for transit authorities. Artificial intelligence has the potential to transform our transportation system through improvements in access and efficiency.

Partners for Implementation
SPC, PennDOT, Federal Highway Administration, municipalities, counties, universities, public transit providers

Investing in our Future
Technology Strategies for Investment

During the Regional Plan Workshop, participants were asked to discuss potential draft strategies for the Forces of Change and identify investment levels for each of the draft strategies. This exercise helped to create a framework that could be used to evaluate and drive future evaluation of projects and investments.

Below are the investment strategy results for the Technology Forces of Change.

Technology Forces of Change	Percent Investment
Broadband Strategies	**31.9%**
Use existing transportation corridors to facilitate delivery of broadband throughout the region.	31.9%
Automated / Connected Vehicles Strategies	**11.3%**
Deploy appropriate infrastructure to facilitate Automated and Connected Vehicles.	6.9%
Offset impacts of AV/CV on public sector revenue, congestion and local quality of life.	4.4%
Mobility as a Service Strategies	**16.3%**
Integrate multiple forms of public/private transportation to equitably provide increased mobility for all users.	16.3%
Additive Manufacturing Strategies	**14.4%**
Retrain workers as needed to accommodate Additive Manufacturing.	10.0%
Address impacts of supply chain restructuring.	4.4%
Artificial Intelligence Strategies	**18.8%**
Retrain/develop new workers as needed.	12.5%
Identify how transportation agencies can better use Artificial Intelligence.	6.3%
Other	**7.5%**
Not allocated or reserved for other	7.5%

Technology Forces of Change
Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*

Building the Vision

Technology

Building the Vision

As discussed in this report, in developing Smart Moves for a Changing Region, SPC convened a series of Expert Resource Panel meetings to identify Forces of Change, weigh their potential impacts, and develop strategies to mitigate and/or optimize the forces. This information, coupled with public and partner input and feedback from SPC leadership, was organized into a set of three emerging themes that capture the most positive aspects of each strategy and focus them in a way that will result in a holistic long range plan for the region.

SPC is developing a plan that both provides a framework and makes significant investment to advance the most critical issues and projects facing the region. The emerging themes will be used in conjunction with performance metrics and other public input to evaluate the program of proposed projects and programs to be contained in the plan. This will ensure the projects and programs contained in the plan will work in concert to assist the Southwestern Pennsylvania region achieve its desired vision for the future.

The emerging regional vision is a world-class, well maintained, integrated transportation system that provides connected mobility for all, enables resilient communities and supports a globally competitive economy.

This vision means taking advantage of our considerable existing assets and developing, supporting and implementing projects that advance our progress. It means investing in regionally connected seamless public transportation that includes new transit investments in key corridors and networks. It means developing modern support infrastructure that prepares the region not just for current technological advances, but also strives to put the region years and decades ahead, by developing the next technology here in this region because we have the expertise in the region to make this happen. It means tackling climate change and taking care of our air and our water. This will allow us to work with many partners and dovetail this plan with other related plans and regional efforts of both public and private sector to advance the region.

The vision means working with partners in identifying and using the types of proven funding and financing arrangements that we will need to make that happen.

The vision will focus on the workforce needs of the region. It means attracting and growing our population by making the region a place where people want to come and stay. It means training our population not just for the jobs that exist but for the jobs we create through innovation and entrepreneurship, and making this region a leader in technology and innovation.

Technology and innovation can be much more than self-driving cars and artificial intelligence and it can work in rural as well as urban parts of the region. It will include innovative new farming techniques and technology deployment that will connect our entire region with high speed access to the internet to afford all our residents the opportunity to work from anywhere and connecting them to the global economic opportunities. The vision will recognize our assets and putting them to the best use for this region, and our residents.

The vision also means taking stewardship and care of the communities that are the foundation of this region, and environment that sustains us. This plan will focus community investment that both sustains our past and protects our future, while elevating the status of our communities throughout the region as desirable places to live and work.

Acknowledgements

Expert Panel Resource Members

Acknowledgements (continued)

Forces of Change

Technology

Exploratory Scenario Report

Southwestern Pennsylvania Commission *Forces of Change Exploratory Scenario Reports*
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