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Inside This Issue

The Economic Challenge of Funding Transportation Improvements to Support Urban Redevelopment in the City of Pittsburgh

By Mark J. Magalotti, PhD, PE

Transportation funding for new roadway capacity in urban areas has traditionally been created through the use of fuel taxes on both the federal and state levels. As land development occurs within an urban or suburban area, additional fuel taxes are generated through increased fuel consumption. Nonetheless, there is no direct relationship between land development promoting additional highway capacity and the revenues collected from fuel taxes.

Traditional Transportation Funding Mechanisms for Urban Areas

As transportation infrastructure ages, additional fuel tax revenues are needed to maintain and replace existing infrastructure rather than build new roads and highways. Ultimately, when traffic capacity expansion isn't built, congestion increases and system performance diminishes.

Providing the necessary elements for the urban transportation system includes addressing nonautomobile needs—what are known as alternative modes. Typically, new development in suburban or rural areas means expanding highway capacity, but in urban areas, new land development creates demand for all modes of transportation, including auto, public transit, bicycle, and pedestrian.

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Resident Workplace Location, Commuting Flows, and the City of Pittsburgh

By Christopher Briem

Over the last half century, the City of Pittsburgh has maintained its role as the employment center for the Pittsburgh metropolitan region.

While the resident population of the City of Pittsburgh fell from 604,332 in 1960 to 305,704 in 2010, the number of jobs located in the city's limits remained relatively stable. By one estimate, the 2006–10 American Community Survey, just under 300,000 jobs were located in the City of Pittsburgh in that period, a figure consistent with previous estimates. *The Economic Study of the Pittsburgh Region*, a project of the Pittsburgh Regional Planning Association, estimated that 304,000 jobs were located in the City of Pittsburgh between 1958 and 1960.

Over half a century, the number of jobs in the City of Pittsburgh has been remarkably consistent in spite of the city's population loss. The differing trends between employment by place of residence and employment by place of work reflect the growing flow of workers commuting into the city.

In order to understand these commuting patterns and the effects they have on the number of total jobs in the city, the University Center for Social and Urban research (UCSUR) has compiled commuting data made available by the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program. LEHD data are primarily compiled from administrative records of state Unemployment Insurance (UI) programs across the nation. Most, but not all jobs, are covered by the UI system. Employment generally excluded from the UI program includes self-employed, such as independent

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The Economic Challenge of Funding Transportation Improvements to Support Urban Redevelopment in the City of Pittsburgh

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As urban areas in many older cities undergo redevelopment, the impacts on the transportation system must be examined, including the impacts on alternative modes.

As new land development increases in these older urban areas, expanding highway capacity is limited by space and land uses. Today, transportation planning must examine increasing capacity for all modes of transportation to maintain or improve system performance. Unfortunately, though many older urban areas once had substantial transit and pedestrian networks, much of that infrastructure deteriorated or was eliminated.

To accommodate urban growth, more emphasis must be placed on increasing the capacity of nonautomobile systems, including public transit, bicycles, and pedestrian walkways. Enhancing alternative travel modes may also create other benefits, such as reduced congestion, as some commuters shift from auto travel to alternative transportation modes.

Traffic Impact Fees and the Impact on Land Use in Urban Areas

One potential source of funding for alternative modes of transportation can come from traffic impact fees. Traffic impact fees are charges that local governments assess on new development projects to fund the transportation improvements needed when the new development creates new impacts.

A potential change in the current traffic impact fee structure would allow traffic impact fees to fund alternative modes of transportation and not solely road and highway expansion.

A secondary benefit of using traffic impact fees to fund alternative modes of transportation is that it may encourage redevelopment of existing properties, including greater reuse of greyfield and brownfield sites. Traffic impact fees are paid based on the net increase in trips generated by the development project. Redevelopment projects typically pay a lower fee because impact fee credits are given for current land uses that are already generating trips from the site. This means that only the net increase in trips needs to be mitigated. This is a major contrast in land use impacts of suburban or rural development, which typically occurs on greenfield sites and results in greater impacts on the transportation system.

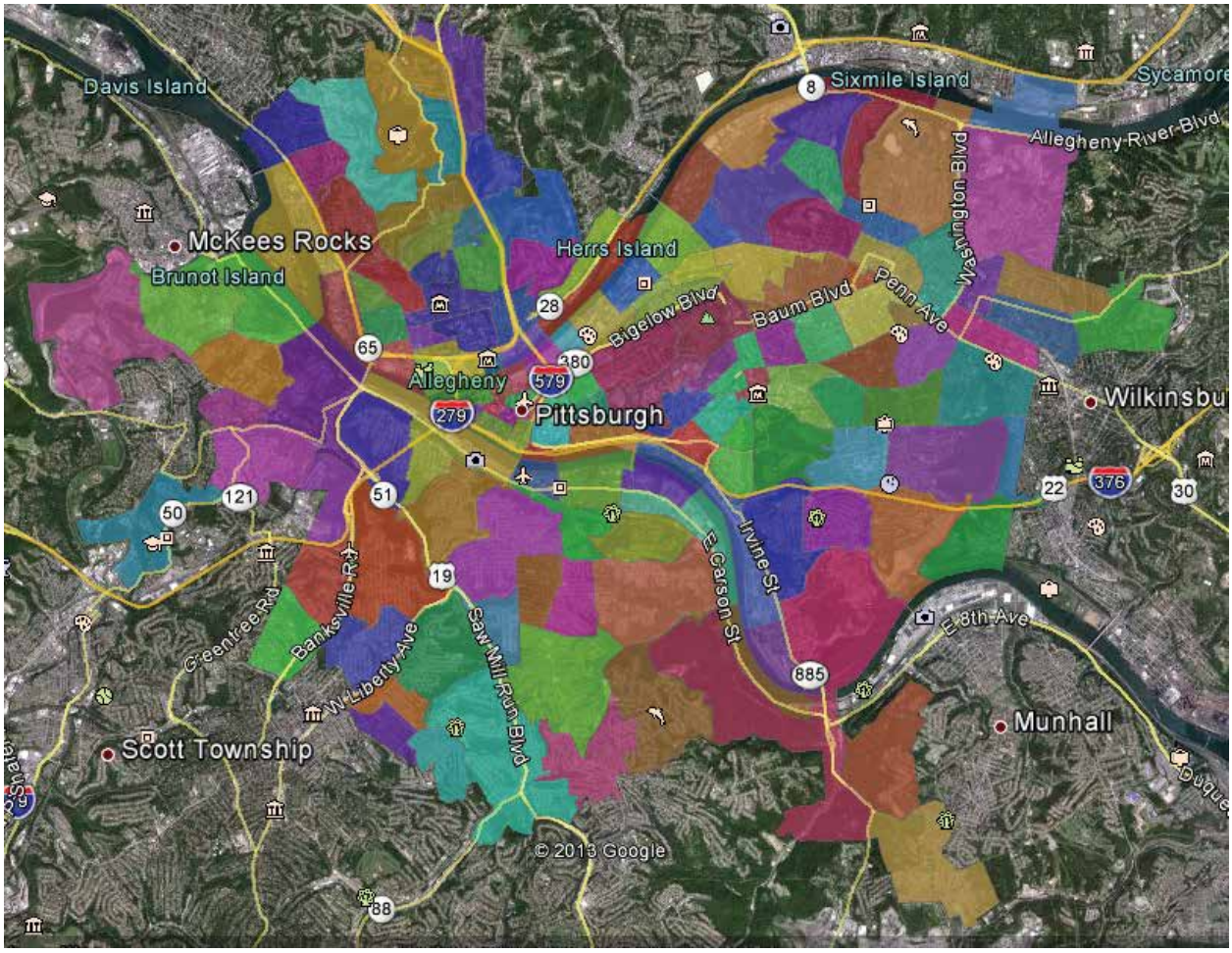
Consideration of Impact Fees in the City of Pittsburgh

Research was conducted to evaluate the effectiveness of using traffic impact fees in Pittsburgh. As additional capacity is created for transit, biking, and walking, will travelers shift to alternative modes and thus reduce traffic congestion? The work included an

Table 1. Contact Base and Interview Summary

Contact	Impact fees used for alternative transportation projects?	Specific method used to develop program?	Legislation permits funding alternative transportation projects?	Type of projects funded with fees	Used studies to determine effectiveness?	Measures of effectiveness?	Alternative methods of funding?
Broward County, Fla.	Yes	No	Yes	Bus stops, shelters, lighting, buses, sidewalks, ADA ramps, bike facilities	No	None	None
Hillsborough County, Fla.	Yes	No	Yes	Bus pull-off lanes, widening intersections that have high volumes of bus traffic	No	None	None
San Francisco, Calif. Municipal Transportation Agency	Yes	No	Unsure	Transit headway improvements; service expansions; transit reliability improvements; regional transit improvements; bicycle, pedestrian, and pricing programs to shift mode share	Yes	Transit travel time, transit crowding	Parking revenues, sales tax
Portland, Ore. Bureau of Transportation	Yes	No	Yes	Intersection improvements, development of a light rail expansion, bikeways, sidewalks	No	None	Parking revenues

Figure 1. City of Pittsburgh Southwestern Planning Commission Zone Structure



evaluation of other urban areas that have explored this approach and forecast the effectiveness for the City of Pittsburgh.

A national survey of transportation planners and engineers who work with government agencies and administer traffic impact fees was conducted to determine if impact fees are used to fund alternative mode projects and how they are implemented. This survey identified alternative mode enhancements, such as pedestrian and transit facilities that are funded by impact fees and the methods of project selection and measuring effectiveness that are used.

The research also focused on a limited contact base of government agencies that have advanced this funding mechanism. This contact base, along with interviews with experts in the field, showed the current limited use of these fees (see Table 1). As shown, while impact fees are being used to fund alternative modes of transportation, measuring the effectiveness of these to reduce urban congestion has not been explored.

To examine whether impact fees could be effective in reducing congestion in the City of Pittsburgh, a travel demand model was used to forecast future conditions of travel system performance and financial feasibility. The model comes from the City of Pittsburgh, which is currently developing its first-ever long-range transportation plan, MOVEPGH, and has built a travel demand model in it to forecast long-range transportation needs of all transportation modes. The model, based on traffic analysis zones, includes forecasts of land use changes that impact travel demand (see Figure 1).

The model results revealed positive and negative impacts on future travel conditions due to implementation of alternative mode projects (see Table 2). These were forecast to reduce total distance traveled on the roadway network by 7 percent, but with an increase in average travel distance.

The model projected the limited relative transportation benefits for the alternative mode enhancements selected for testing. This conclusion was based on comparing two different scenarios for 2035: 1) "no build"—conditions without alternative mode projects implemented; and 2) "build"—with alternative mode enhancements.

This conclusion is supported by results that revealed that four of the five measures of effectiveness (MOEs) showed negative results. Negative results were defined as degradation in travel conditions as described by the MOEs.

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Table 2. Model Results Analysis Summary

Measure of Effectiveness		Existing to Future Comparison		Future Scenario Comparison	
	Units for Total Network	Year 2035 Build	Year 2035 No Build	2035 No Build and Build	Analysis Summary
Total Distance (vehicle*miles)	Vehicle miles of travel	6.6%	13.5%	-7.3%	Reduction is a positive and significant MOE
Average Travel Time (minutes)	Average trip travel time (minutes)	9.6%	8.4%	1.4%	The increase in average travel time is unexpected, with a reduction in total vehicle miles of travel
Average Travel Distance (miles)	Average trip travel distance (miles)	2.2%	1.8%	0.4%	Similar results to average travel time; negative impact unexpected
Average Speed (miles per hour)	Average trip speed (miles per hour)	-8.2%	-7.1%	-1.0%	Negative MOE reflects increase in congestion
Number of Congested Links (vc>=1)	Number of roadway segments in failure	11.5%	11.3%	0.2%	Very slight negative impact but not significant

However, when comparing the 2035 forecast no-build travel conditions to existing conditions in 2011 (the year of the model development), it was concluded that the increase in traffic congestion could have been significantly worse. The researchers concluded that by implementing the alternative mode projects travel conditions by the year 2035, transportation conditions will remain static or be slighted degraded. This was a positive impact projection, given the growth in the city and region that must be accommodated by the transportation system, with little or no increase in the highway capacity.

Potential impact fee revenues were estimated based upon the long-range projected land use changes in the City of Pittsburgh. The projected revenues were compared to the cost of the alternative mode projects to determine the financial feasibility of using impact fees for this purpose. Even under different scenarios of costs and travel, it was projected that there would be insufficient revenues to completely fund a program of alternative mode projects in Pittsburgh. This result was expected because traffic impact fees are rarely sufficient for fully funding major transportation investments and typically fall short of even the required 20 percent local funding levels.

The conclusion was that the revenues from traffic impact fees were projected to be in the range of 1.7– 2.0 percent of the total program costs. The level of capital cost investment in the alternative mode projects, the type of alternative projects selected, and the traffic impact fee structure are all variables that could be evaluated further to determine what combination of these could deliver a more positive result relative to funding alternative mode projects.

Summary

The results of this research revealed that projected traffic impact fees in the City of Pittsburgh to 2035 would have a limited positive impact on overall congestion, maintenance of expected travel characteristics, and net revenue benefits over transportation project costs.

Nonetheless, with limitations of this research, studying impact fees as a revenue source for alternative mode enhancements is worth exploring further. This research found that focusing traffic impact fees within a small area of a city may result in more success. This ensures that the traffic impact fees generated by a development project benefit the transportation network close to the development. What is known as the "rational nexus" approach is used by many states, including Pennsylvania.

Pittsburgh's transportation planning model also revealed that when an urban area is a major regional employment and commerce hub, the impact of travel originating outside the city limits can outweigh the benefits gained from enacting the traffic impact fees for alternative modes of transportation. While mitigation of traffic impacts is the goal of the alternative transportation project funding, growth originating outside the city's boundaries may be too significant to overcome. Expansion of the impact area is an option to address this issue. Because regions experience economic development across municipal borders, traffic impact fee revenues could be enacted on a regional basis. Florida uses such a regional approach by enacting impact fees on a countywide level, and this may be an approach worth considering.

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Resident Workplace Location, Commuting Flows, and the City of Pittsburgh

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contractors, certain workers at places of religious worship, children of sole proprietorships, and other limited categories of workers.

One data product made available via the LEHD program is the Origin-Destination Employment Statistics (LODES) data set. LEHD-LODES data provide detailed information on the geographic pattern of commuting flows. UCSUR has recompiled the LEHD-LODES data for a detailed look at the commuting flows affecting the City of Pittsburgh.

In 2011, 282,841 jobs were identified in the LEHD-LODES data set as having workplaces located within the City of Pittsburgh (see Figure 1), an increase of 8.9 percent from 2002. Of these positions, Pittsburgh residents filled 71,656 jobs, or 25 percent of total number of jobs in the city in 2011, while 211,185 positions were filled by workers residing outside the city and commuting into Pittsburgh for work.

In many nearby suburbs, more than half of the employed residents commute into the City of Pittsburgh for their jobs, including Edgewood, Wilkinsburg, Mount Oliver, Fox Chapel, and Swissvale (see Table 1). In 14 additional suburban communities, the concentration of employed residents working in the City of Pittsburgh exceeds 40 percent.

Another way to cut the same data set is to examine the total number of City of Pittsburgh resident workers and their workplace locations. In 2011, a total of 124,544 jobs were held by City of Pittsburgh residents, and, as shown at right, 57.5 percent of these jobs were located in the City of Pittsburgh.

The LEHD-LODES data can be used to measure what is characterized as "reverse commuting," or the flow of workers living in the City of Pittsburgh but working at jobs located elsewhere (see Figure 2). City residents "reverse commuted" to 53,554 jobs

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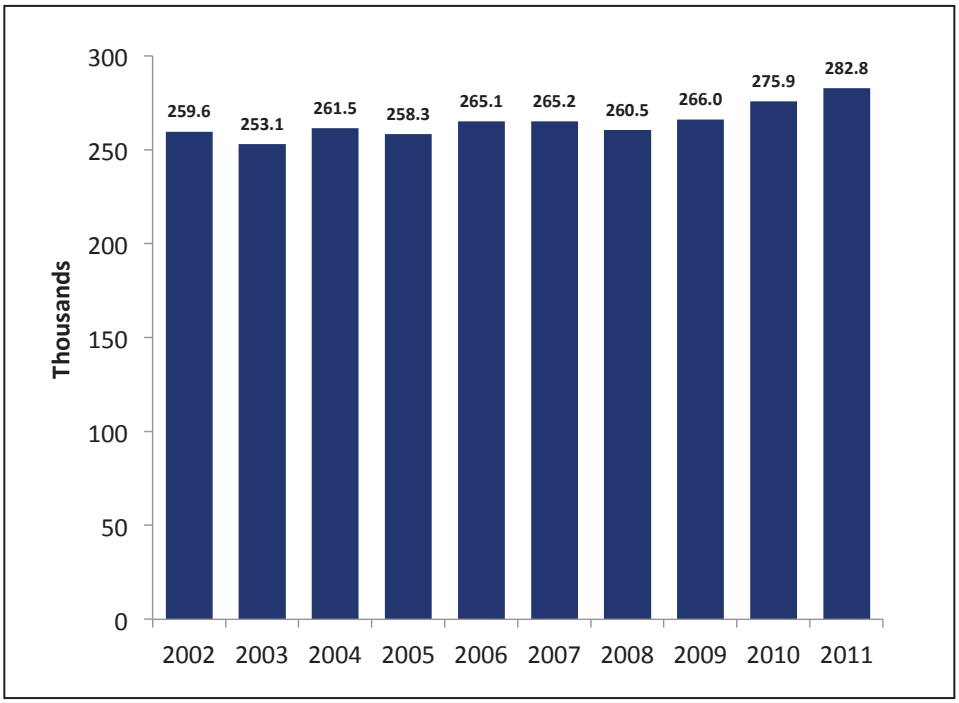
Figure 1. Total Jobs with Workplace Locations in the City of Pittsburgh, 2002–2011



Source: UCSUR/compiled from LEHD-LODES data. Job counts represent jobs covered under Unemployment Insurance programs only.

Table 1. Municipalities with the Highest Concentrations of Employed Residents Working in the City of Pittsburgh, 2011

Municipality	Total	Employed Residents Workplace in the City of Pittsburgh	
Edgewood	1,719	1,008	58.6%
City of Pittsburgh	124,544	71,656	57.5%
Wilkinsburg	6,368	3,479	54.6%
Fox Chapel	1,956	1,034	52.9%
Mount Oliver	1,326	689	52.0%
Swissvale	4,020	2,015	50.1%
Churchill	1,595	737	46.2%
O'Hara	3,734	1,693	45.3%
Forest Hills	3,661	1,646	45.0%
Thornburg	493	220	44.6%
Brentwood	4,703	2,046	43.5%
Green Tree	2,243	972	43.3%
Sharpsburg	2,868	1,240	43.2%
Baldwin Township	1,051	452	43.0%
Homestead	990	424	42.8%
Braddock Hills	789	334	42.3%
Munhall	5,105	2,127	41.7%
Rankin	650	270	41.5%
Baldwin Borough	9,226	3,764	40.8%
Whitehall	6,421	2,594	40.4%

Source: UCSUR/compiled from LEHD-LODES data

Resident Workplace Location, Commuting Flows, and the of Pittsburgh

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located outside the city, representing an increase of 1.9 percent from 2002.

The most common destinations of Pittsburgh residents working outside the city were large suburban employment centers, led by the communities of Green Tree, Robinson, Ross, Monroeville, and Moon. Overall, the City of Pittsburgh continues to provide a concentration of jobs for communities throughout the region.

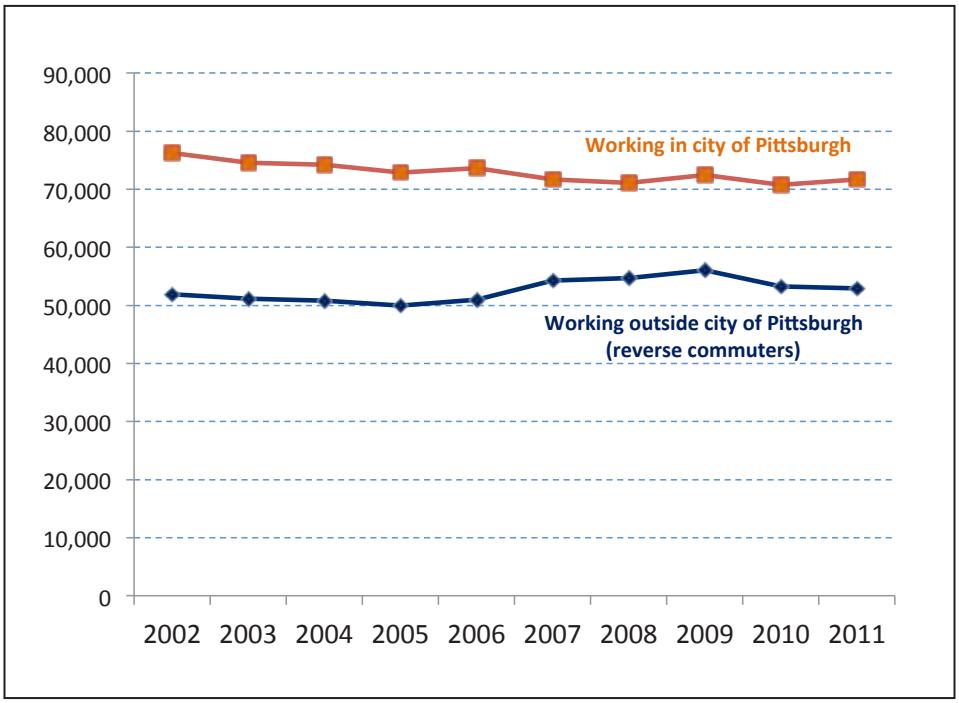
Commuting data made available through the LEHD-LODES analysis provide a number of ways to examine employment trends in the Pittsburgh region.

Table 2. Top Workplace Locations of Reverse Commuters Residing in the City of Pittsburgh, 2011

Location	Workers
Green Tree	2,417
Robinson	1,857
Ross	1,848
Monroeville	1,686
Moon	1,417
O'Hara	1,274
West Mifflin	1,212
Bethel Park	1,193
Mt. Lebanon	1,178
Scott	1,107

Source: UCSUR/compiled from LEHD-LODES data

Figure 2. Workplace Location of Employed Residents of the City of Pittsburgh, 2002–2011



Source: UCSUR/compiled from LEHD-LODES data

Additional data on commuting patterns are available on UCSUR's Pittsburgh Urban Blog online at www.ucsur.pitt.edu/thepub.php. Robert M. Gradeck of UCSUR's Urban and Regional Analysis program and consultant Lee Bash worked on compiling the LEHD data used in this report.

Steel City Codefest

By Sabina Deitrick and Robert Gradeck

Community organizations and more than 100 civic-minded software developers and designers converged on the weekend of February 22-23, 2014, for the second annual Steel City Codefest. Building on the energy and experience of the first Steel City Codefest (see *PEQ*, March 2013), organizers sought to create more extensive partnerships between event participants and civic organizations devoted to improving quality of life in city neighborhoods. The event was held at American Eagle Outfitters' corporate headquarters in the SouthSide Works.

Steel City Codefest is one of hundreds of civic apps competitions—or "hackathons"—held in cities around the world. Emerging from the long thread of "democratizing data" and promoting greater access to government data, many civic apps competitions were established to bring the tech community, with its programming skills, together with open government data to build creative and useful applications that benefit local communities. Along the way, civic apps competitions were featured in the promotion of open government data with their focus on greater government transparency and accountability.

While the 2013 Steel City Codefest generated useful apps, organizers of the 2014 Steel City Codefest sought to improve the level of engagement of community and grassroots organizations in the event. More than 50 local nonprofit and government organizations presented "challenges" directly to teams of Codefest participants at a pitch session in early February.

Codefest organizers then selected challenges from eight organizations for the February event. Software teams worked with challenges from the Three Rivers Workforce Investment Board, Bike Pittsburgh, Checkpoint, the City of Pittsburgh, Pittsburgh Cares, Planned Parenthood of Western Pennsylvania, Northern Area Multi Service Center, and the Salvation Army over the 24-hour period, with the winning teams working with the City of Pittsburgh, Planned Parenthood, and Pittsburgh Cares. UCSUR was represented in the Codefest effort, with Robert Gradeck serving on the planning committee and Robert Keene as a judge.

Pittsburgh Mayor Bill Peduto with Codefest participants.

To promote Codefest designs moving to useful applications, the Forbes Funds and BNY Mellon Foundation provided a grant pool of $35,000 for organizations and their teams to apply for small grants to support the completion of the apps.

Hackathons face two major critiques: that tech participants don't engage more disadvantaged communities or residents in building their applications and, even when events are held with a more grassroots focus, that few of the tools built are ever completed or used. The Steel City Codefest organizers purposively addressed both of those concerns in this year's event.

UCSUR has been involved in events such as the Steel City Codefest as part of its data agenda for community revitalization. As the City of Pittsburgh has just passed its open data legislation and other units seek to "open" their data delivery, UCSUR looks forward to continued involvement as an "information intermediary" by making more data available and accessible; promoting ease of use; fostering the use of data in research, evaluation, and decision making; and enhancing civic engagement through data use and understanding.

Groups meet the challenge.

The Steel City Codefest is a partnership of the Urban Redevelopment Authority of Pittsburgh and PowerUp Pittsburgh, a collaboration of government, business, universities, and entrepreneurs to accelerate the commercialization of technology innovation activities in Pittsburgh. More information about the event can be found at steelcitycodefest.com.

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