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Broadening Perspectives

Current Issues in Preservation

Forum
NATIONAL TRUST FOR HISTORIC PRESERVATION

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ForumJournal

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It's challenging for a small museum to add collections conservation to its other pressing responsibilities, but the Indian Pueblo Conservation Center in Albuquerque, N.Mex., is now taking some critical steps to protect its artwork and artifacts.

PHOTO COURTESY INDIAN PUEBLO CULTURAL CENTER, © 2006

Quantifying the Environmental Benefits of the Maryland Historic Tax Credit Program

EVANS PAULL

Baltimore's historic downtown center of commercial activity at Howard and Lexington streets is now at the center of the city's economic and green resurgence. The Hecht's and Stewart's department store shoppers have long since departed, now replaced by the luxury Atrium Apartments residents and world headquarters Catholic Relief Services (CRS) office workers.

The transformation of that intersection into an emerging vibrant West Side mixed-use community is due in great part to the Maryland Heritage Structure Rehabilitation Tax Credit Program (here after referred to as the Maryland Historic Tax Credit Program). But the intersection can also be dubbed "climate change central," exemplifying the types of changes needed to set Maryland on a sustainable path for future growth.

Most Atrium residents and CRS office workers are probably unaware that their choice of a place to live and work is about as close to "climate neutral" as you can get on a developed piece of real estate in the state of Maryland. The occupants of these buildings drive at least 40 percent less than regional norms, since residents and workers can walk or take public transit to everything from baseball games to movies. Both buildings have been renovated to LEED or LEED equivalent standards, saving about 30 percent of energy use within the building. In addition, the area is also served by Baltimore's district heating and cooling system (an energy-efficient way to capture waste heat from Baltimore's waste-to-energy plant) so the energy that is required is delivered with low-carbon efficiency.

While these two projects are in the forefront of the nexus between preservation and sustainability, a recent analysis of Maryland's tax credit program also indicates that historic tax credit projects, in general, even though they may not feature green design, can legitimately claim substantial climate benefits that are attributable to reduced vehicle miles traveled (VMTs). The analysis finds that tax credit projects reduce VMTs by 30 to 40 percent relative to suburban norms, at the high end of the 20 to 40 percent range for VMT reduction generally attributed to "compact development" and smart growth locations. These VMT reductions have been converted into a finding that the state historic rehab tax credit projects (counting all projects since program inception) are now reducing CO_2 emissions by between 15,900 and 21,200 metric tons annually, which is the equivalent of taking 2,900 to 3,800 cars off the road for one year.

BACKGROUND

The Maryland Historic Tax Credit Program is intended to encourage the redevelopment of historic properties in the state by offering developers tax incentives equal to up to 20 percent of eligible rehabilitation costs for rehabs that meet the Secretary of

Catholic Relief's $18 million rehab of the former Stewart's building in downtown Baltimore (leveraged by $4.5 million in Maryland Historic Tax Credits) has gained LEED certification for energy efficiency and other sustainability elements. With 47 percent of employees accessing work via non-automobile means, the project can be estimated to reduce vehicle miles traveled (VMTs) by about 50 percent relative to regional norms. Further, the project is also served by Baltimore's carbon-saving district heating and cooling services. Data provide by Ron Kreitner, Westside Renaissance.

PHOTO COURTESY OF DESIGN COLLECTIVE © ANNE GUMMERSON PHOTOGRAPHY

the Interior's Standards. In the 1996–2002 period, the Maryland program was a leader nationally in the number and scale of commercial projects which it enabled. The success of the program, however, led to concerns about the unpredictability of annual tax credit outlays. Over the 2002–2004 period, the commercial program was progressively cut back: capping total program expenditures and expenditures per property, apportioning awards geographically, instituting competitive ranking for scarce credits—all of which limited its desirability for developers.

Because the program needed to be reauthorized by the Maryland General Assembly, there was an opportunity to make the case for program improvements. With funding from the Abell Foundation (www.abell.org), Lipman Frizzell &

Mitchell, LLC, and the Northeast-Midwest Institute collaborated to produce a report on the economic and environmental impacts: *Heritage Tax Credits: Maryland's Own Stimulus to Renovate Buildings for Productive Use and Create Jobs, an $8.53 Return on Every State Dollar Invested*, available at www.abell.org/pubsitems/arn309.pdf. The analysis went beyond conventional economic impact reports, and quantified the smart growth–related environmental and energy conservation benefits of the tax credit program.

PRESERVATION PROJECTS SAVE between 50 and 80 percent in infrastructure investments relative to suburban greenfields development.

This paper concentrates on the energy conservation and climate benefits. The other environmental impact findings are summarized below and are available in greater detail at www.nemw.org/images/EnvEnergyImpactsMDHistTaxCredit.pdf.

SUMMARY OF THE ECONOMIC AND ENVIRONMENTAL IMPACTS, OTHER THAN ENERGY

Preservation projects contribute to numerous public benefit objectives, from creating jobs in distressed areas to saving landfill space and lowering the infrastructure investments required to accommodate growth. The Maryland study attempted to quantify the full range of public benefits.

All program impacts estimated in this report correspond to 404 completed commercial projects receiving the Maryland Historic Tax Credit between 1996 and 2008, representing $1.02 billion in total eligible rehabilitation expenditures. This level of rehabilitation expenditures has been calculated to correspond to 10.2 million square feet of renovated space (assuming an average of $100 per square foot in rehab expenditures). The non–energy-related economic and environmental benefits of the Maryland Historic Tax Credit projects are summarized below:

- **Economic Development.** Over 12 years, completed commercial projects have generated a total economic impact on the Maryland economy of more than $1.74 billion (in 2009 dollars) in total economic activity, employing an estimated 15,120 persons earning $673.1 million (2009 dollars). Construction labor on the job sites totaled an estimated 9,248 workers earning $443.4 million (2009 dollars)—over three-fifths of the total economic impact.
- **Fiscal Impact.** During their construction periods alone, the 404 projects generated an estimated $83.7 million (2009 dollars) in state and local taxes—effectively paying down more than one-third of the state's total $213.9 million tax credit investment. The greatest return on the state's investment, however, comes from the long-term increase in employment and property taxes at the historic properties and their neighbors.
- **Saving Infrastructure Investment.** Preservation projects save between 50 and 80 percent in infrastructure investments relative to suburban greenfields development. The historic tax credit program, in effect, counterbalances the public subsidies that continue to exacerbate sprawl by virtue of publicly funded infrastructure and flat rate charges for utilities.
- **Landfill Space Saved.** Rehabilitation of tax credit properties has "saved" 387,000 tons of material from landfills. This amount of landfill material is the equivalent of filling a football stadium to a depth of 50 to 60 feet.

- **Lowered Run-off.** Run-off from preservation projects is estimated to be 30 to 40 percent less than alternative low-density sprawl, with resulting benefits for water quality.
- **Natural Resources Conserved.** Because preservation projects use less building materials than new construction, historic tax credit projects have conserved an estimated $100 million in natural resources (relative to new construction).
- **Saving Greenfields.** Preservation projects, due to their urban locations and densities, have preserved an estimated 1,053 acres of greenfields that otherwise may have been developed for sprawl.

The discussion below concentrates on the energy and climate impacts.

ARE OLD BUILDINGS ENERGY HOGS?

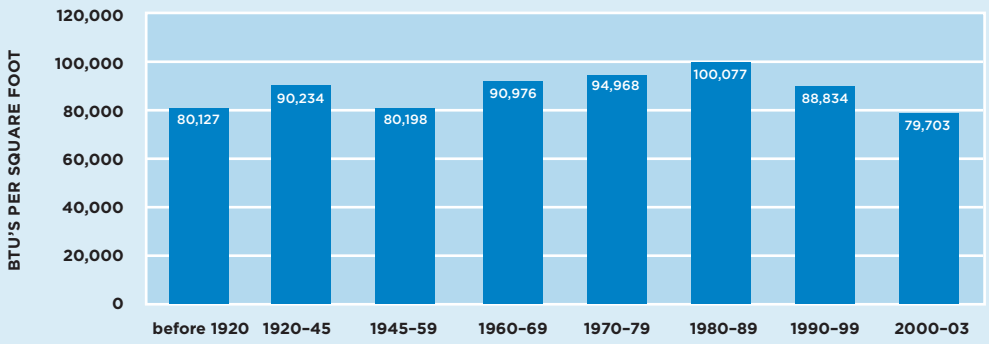
The first point in a discussion of preservation and energy is to dispel a basic myth: There is a common misperception that older buildings are less energy efficient than buildings built in more recent times. Data from the U.S. Energy Information Administration indicate that buildings built before 1920 are approximately equivalent to buildings built from 2000 to 2003, and the worst energy offenders are actually those built in the 1970s and 1980s.

The reasons that historic structures are relatively energy-efficient have to do with the use of materials that are superior insulators, use of natural ventilation, and siting/orientation for efficient heating and, especially, cooling in the pre-air conditioning era.

VMTS AND SMART GROWTH—NEW URBANISM WITHOUT THE "NEW"

Climate change experts are drawing attention to the salient facts: Americans have been increasing their driving rates at a pace that will likely nullify gains in fuel efficiency, making greenhouse gas reduction an elusive objective. Without a strategy to also lower vehicle miles traveled, mandated fuel efficiency standards will only succeed in lowering the projected *increase* in greenhouse gases, not lower them.[1] The primary public policy mechanisms that can reduce VMTs are those that relate to smart growth—encouraging

FIGURE 1. Commercial Buildings—Average Energy Use per Square Foot by Time Period



development patterns that make driving less necessary.

A comprehensive review of the literature by the Urban Land Institute concluded that "compact development" saves in the range of 20 to 40 percent of VMTs relative to sprawl.[2] Backing this finding, a study in Atlanta found that the travel patterns of residents of the area's "most walkable neighborhoods" accounted for 30 percent lower VMTs relative to the least walkable communities.[3] A King County, Wash., study concluded that urban "interconnected neighborhoods," defined by density, frequency of intersections, and grid street patterns, reduced VMTs by 26 percent relative to a suburban spread development model.[4]

DENSITY DATA WOULD TEND to indicate that tax credit projects are reducing VMTs at rate of between 30 and 40 percent.

At the high end of the VMT reduction spectrum, an analysis of the highly urbanized, dense, and historic North Beach area in San Francisco (100 households per residential acre)[5] found VMTs per household were 75 percent lower than the low-density suburb of San Ramon (three households per residential acre). Studies of the dense, mixed-use Atlantic Station project in Atlanta, Ga., found that residents average 73 percent lower VMTs per day relative to Atlanta region norms.[6]

The factor that has proven to be most highly correlated with VMT reduction is density. Several studies found that doubling density corresponds to a 25 to 30 percent reduction in VMTs.[7] One model for predicting VMT reduction and greenhouse gas impacts employs density as a sole input variable, because density is also highly correlated with all of the other VMT determinants listed below.[8] The factors that are positively correlated with VMT reduction are, generally in rank order:[9]

- Density
- Mixing uses
- Proximity to public transit
- Proximity to city center or job centers
- Connectivity of the streets and the pedestrian friendliness of the public thoroughfare (grid streets)

These data are leading environmental and city planning experts and advocates to support "new urbanist" mixed-use, walkable communities. One of the questions posed by this analysis is: Do we need the "new" in "new urbanist"? Can efforts to revitalize older communities meet the same criteria and function to lower greenhouse gases, while having the additional benefits of preserving the historic fabric of our cities?

HISTORIC PRESERVATION VMT CASE STUDY

There is one case study of a historic preservation project that was modeled for VMT reduction: the "Lamar on South Side" redevelopment of the former Sears catalogue center, one mile south of downtown Dallas. The development includes 455 loft apartments that occupy 900,000 square feet, 120,000 square feet of office space, and 34,000 square feet for retail and other arts-related uses in a ground-floor retail arcade running the length of the building along a former railroad tunnel. Federal and state historic rehabilitation tax credits were the key financing source. The U.S. Environmental Protection Agency (EPA) examined the project in 2001 and compared it to a greenfields site in the outer suburbs. The findings projected a 23

to 38 percent reduction in VMTs due to the infill/historic preservation project. EPA projected parallel reductions in air pollutants such as nitrous oxide (NOx) and volatile organic compounds (VOCs).[10]

MARYLAND PRESERVATION PROJECT CHARACTERISTICS

Preservation projects tend to be located in smart growth and energy-efficient locations. This simply reflects the urban form of the pre-suburban era: Density, mixing uses, access to public transit, grid streets, and proximity to the city center all reflected the historic/economic need for proximity to jobs and services at a time when car ownership was a luxury.

Of the five VMT reduction characteristics outlined above, researchers for the Maryland study were able to definitively quantify three: density, proximity to job centers, and mixing uses. Because access to public transit is highly correlated with density, and connectivity is strongly associated with the historic urban form, the lack of data in these two areas is not a fatal flaw. Nevertheless the VMT reduction estimates should be characterized as "order of magnitude" estimates.

Population Density. A methodology was developed for this study (using Maryland Department of Planning demographic data) to compare typical suburban densities to the densities of the historic rehab tax credit project areas. For the suburban norm, the methodology isolated the developed (non-rural) parts of Baltimore County, an area that includes both older (somewhat dense) and newer low-density tract development. These densities were compared to the densities of the areas within one-half mile of the historic tax credit projects. Note that tax credit projects include some rural and suburban projects, but the vast majority are urban and some of the more suburban and rural projects actually have urban densities.

Three population density measures were calculated for the tax credit project areas—mean, median, and weighted average (weighted for eligible rehabilitation expenditures). Tax credit project area densities were approximately three times the Baltimore County developed area densities: 2.7 (median), 3.0 (weighted average), and 3.2 (mean).[11] See Figure 2, page 18.

As discussed above, research indicates that a doubling of density corresponds to a 25 to 30 percent reduction in VMTs. These density data would tend to indicate that tax credit projects are reducing VMTs at rate of between 30 and 40 percent.

Job Density. Researchers used employment per acre data (also from the Maryland Department of Planning) comparing the tax credit project areas to the developed area in suburban Baltimore County, using a similar methodology to the population density analysis. In this instance the differences between tax credit areas and the suburban Baltimore County area are more pronounced, with wider variations between mean, median, and weighted average. Tax credit area median job densities were 3.7 times the Baltimore county job densities; tax credit area mean job densities were 13 times Baltimore County's job densities; and the weighted average (weighted for eligible rehabilitation expenditures) tax credit project job densities were 19

PRESERVATION PROJECTS tend to be located in smart growth and energy-efficient locations.

times the Baltimore County developed area densities.[12] See Figure 2, below.

Mixing Uses and Walkable Communities. The best measure for mixing uses is Walk Score. The website www.walkscore.com explains the measuring and scoring as follows: "Walk Score calculates the walkability of an address by locating nearby stores, restaurants, schools, parks, etc. Walk Score measures how easy it is to live a car-lite lifestyle—not how pretty the area is for walking." The Walk Score for an address "is a number between 0 and 100:

- **90–100 = Walkers' Paradise:** Most errands can be accomplished on foot and many people get by without owning a car.
- **70–89 = Very Walkable:** It's possible to get by without owning a car.
- **50–69 = Somewhat Walkable:** Some stores and amenities are within walking distance, but many everyday trips still require a bike, public transportation, or car.
- **25–49 = Car-Dependent:** Only a few destinations are within easy walking range. For most errands, driving or public transportation is a must.
- **0–24 = Car-Dependent (Driving Only):** Virtually no neighborhood destinations within walking range. You can walk from your house to your car!

Project researchers ran Walk Score on 397 of the 404 tax credit commercial projects (the other six did not have geocodable addresses). The results were:

- Median Walk Score – 91
- Mean Walk Score – 82.2
- Weighted average Walk Score (weighted for eligible rehabilitation expenditures) – 86.9
- 85 percent of tax credit projects ranked in the top "walker's paradise" category or the "very walkable" category

Thus, almost all tax credit projects are in highly walkable communities; i.e. where there are alternatives to using automobiles to access services.

MODEL FOR VMT REDUCTION DUE TO TAX CREDIT PROJECTS

Researchers for this project used the above data to set up a VMT reduction model, designed to define, within a range, the likely VMT reduction attributed to each

FIGURE 2. Maryland Historic Tax Credit (MHTC) Project Area Densities Compared to Baltimore County Developed Areas

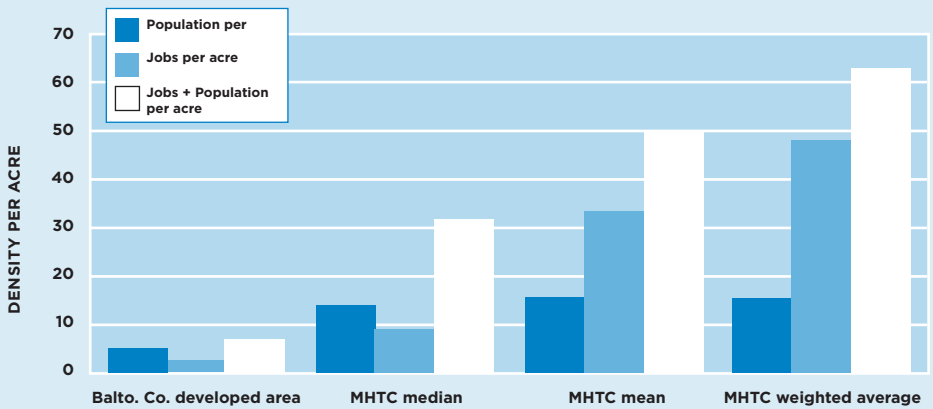


TABLE 1. Weighting and Ranking to Predict VMT Reduction

	Tax credit project area as a multiple of suburban Baltimore County			
	>6 X Balto Co	4 to 6 X Balto Co	2–4 X Balto Co	1.25 to 2 X Balto Co
Population density	4	3	2	1
Concentration of jobs	4	3	2	1
Job and population combined density	4	3	2	1
	Walkscore			
Walk Score	90–100	80–89	70–79	60–69
Walk Score ranking	4	3	2	1

TABLE 2. Historic Tax Credit Projects and VMT Reduction

	Percentage reduction—historic tax credit projects relative to suburban norms				
	EXCEEDING 40%	BETWEEN 20 AND 40%	BETWEEN 0 AND 20%	NEUTRAL	TOTAL
% of all eligible rehab expenditures	47%	23%	26%	4%	100%
% of all projects	36%	39%	11%	14%	100%
Number of sites meeting criteria	138	150	43	56	387
Expenditures represented by these sites	$393,936,947	$92,446,142	$216,365,947	$30,886,529	$733,635,565

tax credit project. Projects were ranked according to the four variables and the weighting system outlined in Table 1.

The total score is the sum of each project's ranking on each of the four factors. Because the research indicates that doubling density corresponds to a 25 to 30 percent VMT reduction, projects that have densities that are a multiple of Baltimore County density by a factor of four or more are candidates for VMT reduction greater than the 20 to 40 percent attributed to compact development. Projects that are 2 to 4 times the Baltimore County densities are generally within the 20 to 40 percent reduction range. Projects that are 1.25 to 2 times the Baltimore County densities are likely reducing VMTs by less than 20 percent, but greater than zero.

The point system, then, is as follows:

- Total score of 13 to 16 – reduce VMT by more than 40 percent
- Total score of 8–12 – reduce VMT by between 20 and 40 percent
- Total score of 4–7 – reduce VMT by between 0 and 20 percent
- Total score less than 4 – no effect on VMT

The result of this ranking system is shown in Table 2 above.

Almost half (47 percent) of eligible rehabilitation expenditures have taken place in projects that have been esti-

mated to reduce VMTs by more than 40 percent. When the measuring rod is number of projects, instead of expenditures, the results are not as strong—a plurality (39 percent) of projects are in the 20 to 40 percent reduction category, followed closely by those (36 percent) in the higher over-40-percent reduction category. From these data the project researchers conclude that historic tax credit projects are, on average, in the high end of the 20 to 40 percent VMT reduction generally attributed to compact development; that is, in the 30 to 40 percent part of the range.

VMT REDUCTION AND CO_2

This 30 to 40 percent VMT reduction can be translated into carbon dioxide reduction as follows:[13]

- There have been $1.02 billion (2009 dollars) in eligible rehabilitation expenditures that have been leveraged by the tax credit over the period of 1996 to 2008. These expenditures are assumed to be producing reuse projects that are 50 percent commercial and 50 percent residential. Using rules of thumb, this represents:
  - 2,548 dwelling units, and
  - 20,382 employees.
- Using the 30 to 40 percent reduction range (conclusion from above) these households and employees have reduced their travel by between 34.3 million and 45.8 million VMTs annually, relative to regional norms.
- CO_2 emissions have been reduced by between 15,900 and 21,200 metric tons annually.
- These VMT and CO_2 reductions represent:
  - 1.7 million and 2.3 million gallons of gasoline, or
  - 2,500 and 3,800 cars from the road for a year.

From a future investment point of view, using the same assumptions, but calculating the savings for $1 million in new historic tax credits, results in:

- 198,000 to 264,000 VMTs "saved;"
- 92 to 123 metric tons of CO_2 "saved."

AVOIDED ENERGY USE—EMBODIED ENERGY AND OTHER SOURCES OF ENERGY SAVINGS

Aside from VMT reductions, there are several additional ways that preservation projects conserve energy. Two have been quantified for the Maryland analysis and four others have not—a follow-up analysis that would be more like a "carbon footprinting" study is recommended.

The calculations below are based on a conversion of the total rehab dollars to renovated space as follows: $10.2 billion in eligible rehabilitation expenditures corresponds to 10.2 million square feet of renovated space, based on an average of $100 per square foot.

HISTORIC PRESERVATION SAVES energy by avoiding demolition.

First, the Maryland analysis includes a calculation of embodied energy—energy already expended and therefore "not wasted" by virtue of retaining rather than demolishing historic structures. This is an impressively large number—11.2 MBTUs (Millions of British Thermal Units) or a little more than one MBTU per square foot of renovated space.[14] However, because consideration of embodied energy is backward looking, some contend that embodied energy has less legitimacy in

the energy-climate debate. Without taking sides in this debate, this analysis gives greater attention to the other energy and climate benefits claimed (but never quantified) by preservationists.

Second, historic preservation saves energy by avoiding demolition. If we make the simplifying assumption that every tax credit project is one that, absent the tax credit, would have been a demolished building, we can also calculate energy "saved" by avoiding demolition. There are two internet calculators for the energy conservation impacts of avoided demolition. One, www.thegreenestbuilding.org, calculates the energy saved for 10.2 million square feet of space to be 107,005 MBTU. This can be roughly calculated to represent 5,000 metric tons of CO_2. An alternative EPA calculator for energy lost in landfilling material (see www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html) calculates the MBTUs at 205,000 MBTU, or 10,900 metric tons of CO_2.

It should be noted that there are four additional potential sources of energy conservation attributable to preservation. These were all beyond the scope of the Maryland study and could not be easily quantified, but a full accounting of preservation projects would need to address these additional factors.

1. Because rehabilitation is less "materials-intensive" (and more labor intensive) than new construction, preservation projects save energy expended in the construction phase.

2. Similarly, because preservation projects need between 50 and 80 percent less infrastructure investment relative to greenfields development, there are energy savings because new infrastructure does not need to be built and maintained.

3. Residential preservation projects are usually multifamily dwellings, and multifamily dwellings are associated with energy efficiencies in heating and air conditioning due to fewer exposed walls.

BECAUSE REHABILITATION IS LESS "materials-intensive" (and more labor intensive) than new construction, preservation projects save energy expended in the construction phase.

4. Many preservation projects are served by Baltimore's downtown district heating and cooling systems. Nationally these facilities—known as Combined Heat and Power—are associated with 30 to 60 percent lower carbon emissions, relative to centralized fossil-fuel–burning power plants.

HISTORIC AND GREEN—THE DUAL BENEFIT OF ENERGY-EFFICIENT BUILDINGS IN ENERGY-EFFICIENT LOCATIONS

The preservation community is increasingly embracing sustainability principles, including energy efficiency. The question then becomes, if you have energy efficiencies within the building structure, as well as VMT reduction, what is the total climate benefit? The analysis below projects a total greenhouse gas reduction from one project that exhibits this dual benefit: the H. F. Miller Tin Can and Box Company.[15]

With $4 million in state and federal historic tax credits providing the key financing, developers Donald and Thibault Manekin (Seawall Development) are undertaking a $19 million redevelopment of the former H. F. Miller & Sons Tin Box and Can Manufacturing Com-

Rehabilitation of the H. F. Miller Tin Can and Box Company in Baltimore demonstrates the dual benefits of an energy-efficient building in an energy-efficient location. Planned as a LEED Gold facility, it will provide office space and apartments in easy walking distance of public transit and urban amenities.

PHOTO COURTESY OF MARKS, THOMAS ARCHITECTS

pany building (also known as the Census Building) at 26th and Howard streets in Baltimore. The redevelopment is planned as a LEED Gold facility and is projected to save energy at a rate that is 34 percent below a code-compliant baseline, according to architect Tom Liebel of Marks, Thomas Architects.

The project will provide 30,000 square feet of office space for nonprofits such as Teach for America and the Baltimore Urban Debate League, as well as 40 apartments targeted for new teachers in the Baltimore City public school system. Employees and residents will be able to enjoy the benefits of locating in a highly walkable community—the project ranks as a "walkers paradise," a rating of 91 out of 100 points on www.walkscore.com. The project also has other VMT reduction characteristics—urban density, access to public transit, and "interconnected" grid streets. The project can be predicted to be on the high end of the 20 to 40 percent reduction in VMTs that is attributed in national research to "compact development."

If this building achieves its internal energy objectives and reduces VMTs by 40 percent, it will lower CO_2 emissions by 296 metric tons, relative to norms (the majority—55 percent—of the savings coming from VMT reduction).

Policymakers are only beginning to understand the significance of this powerful combination—the dual benefit of energy-efficient buildings in energy-efficient

locations. Preservation incentives have been successfully established as community revitalization tools, but the new data emerging which tie preservation to smart growth and climate change present another avenue for convincing decision-makers that preservation investments are worthy. There are few public investments that can legitimately claim to contribute to so many critical societal objectives: investments in underserved communities; aesthetic enhancement; efficient use of public infrastructure funding; and, now, energy conservation and response to climate change.

Lastly, a question was posed above: Do cities need the "new" in "new urbanism" in order to transform the urban environment into a more sustainable form? The clear answer from this analysis is "No." Historic preservation is essentially the equivalent of new urbanist walkable and sustainable communities. The concept of walking to work and taking the metro for a night on the town is not really "new" urbanism; it is historic urban ecology being re-discovered as the most sustainable way to re-invent our cities. **FJ**

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8 See www.sflcv.org/density.

9 Holtzclaw, ibid; see also: Lawrence Frank and Gary Pivo, *Relationships Between Land Use and Travel Behavior in the Puget Sound Region*, Washington State DOT, WA-RD 351.1, 1994.

10 US Environmental Protection Agency, "Comparing Methodologies to Assess Transportation and Air Quality Impacts of Brownfields and Infill Development," August, 2001.

11 The weighted average uses project investment as the weighted variable.

12 A flaw in the data/methodology is that the Baltimore County data is only represented as a mean.

13 See Table 4, Evans Paull, "The Environmental and Energy Conservation Benefits of the Maryland Historic Tax Credit Program," March, 2009, available at www.nemw.org/images/EnvEnergyImpactsMDHistTaxCredit.pdf.

14 Calculated from www.thegreenestbuilding.org with a clarification from Patrice Frey at the National Trust for Historic Preservation.

15 For more information on the H. F. Miller Building project, see:

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