POTENTIAL ECONOMIC AND FISCAL IMPACTS OF A PENNSYLVANIA HOUSING TRUST FUND

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EXECUTIVE SUMMARY

Investments in the housing market have a significant impact on the overall economy. It is clear from the past couple of years that declines in the housing market have a negative impact on employment and on consumption; conversely, investments in housing construction and repair create construction jobs and lead to increased spending and jobs in other industries. Regardless of the state of the economy, there is always a great demand for homes affordable to lower income households. When homes values are rising, more families struggle to find a decent home they can afford, while low wage workers and those on fixed incomes are often priced completely out of the market; when the economy experiences downturns, unemployment leads to foreclosures and evictions, and the ranks of those in need of housing assistance swells.

This report was commissioned by the Housing Alliance of Pennsylvania to determine the economic impact of a state-funded Pennsylvania Housing Trust Fund. We find that the impact of such an investment would be significant: by investing in affordable homes, the Commonwealth of Pennsylvania can not only provide more homes for those in need, it can also create jobs and generate tax revenue, both of which help to offset the effects of the current recession. In fact, each $10 million invested via the Pennsylvania Housing Trust Fund, in addition to providing homes for families in need, could **generate up to $23 million in economic impact, up to 200 jobs, and up to $1.16 million in state tax revenues** within the Commonwealth (see Figure ES.1).

Figure ES.1: Estimated Economic and Fiscal Impacts within the Commonwealth of Pennsylvania Associated with Each $10 Million in Various Expenditures via Pennsylvania Housing Trust Fund

Expenditure Type	Total Expenditures Generated ($M)	Total Earnings Generated ($M)	Total Employment Generated	Total State Tax Revenues Generated ($M)
New Single-Family Construction	$16.2	$5.2	142	$0.82
New Multifamily Construction	$16.9	$5.4	148	$0.86
Remodel/Rehabilitation	$22.8	$7.3	200	$1.16

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

Furthermore, **low- to moderate-income households benefit directly via reduced** monthly housing payments and energy cost savings as well as improved living space and safety conditions. **Affordable homes also have broader benefits,** contributing to neighborhood stabilization, stemming the deleterious effect of foreclosures, and making housing stock more environmentally efficient. In short, the impact of the Pennsylvania Housing Trust Fund is projected to be **significant in both quantitative and qualitative terms:** direct investments yield an impressive multiplier of indirect and induced expenditures, creating employment opportunities and tax revenues, while also providing significant positive benefits to direct recipients of affordable homes as well as to blocks, neighborhoods, municipalities, and regions.

1.0 INTRODUCTION

The Housing Alliance of Pennsylvania proposes the creation of a statewide Housing Trust Fund to increase the supply of affordable homes to meet the rising demands of low and moderate-income residents. A primary focus of such a fund would be **to provide housing investment for rehabilitation and revitalization of the housing stock in distressed neighborhoods throughout the Commonwealth of Pennsylvania**, as well as to leverage additional resources to address local housing needs.

Earlier advocacy took place during the recent housing boom, amidst concerns about poorer citizens being squeezed by rising housing prices. The current recession, and its effects on employment and earnings, has made the issue of affordable homes even more pressing. Even as house prices have declined, the newly unemployed join the ranks of low wage workers and people on fixed incomes as those in need of affordable homes. Furthermore, the Housing Alliance believes that **such expenditures would not only have significant impacts, but they could be made effectively in short order**, thereby making such investment an ideal economic stimulus target.

This report estimates the potential economic impacts of the types of expenditures that would be made from the Pennsylvania Housing Trust Fund. A Housing Trust Fund is a dedicated source of public revenue for producing and preserving affordable rental and homeownership housing, leading to financial returns to producers as well as economic benefits that spread throughout the local community and extend to a statewide level.[1] There are nearly 600 Housing Trust Funds nationwide, including 38 state housing trust funds.[2]

The impact of affordable homes has traditionally been defined by social benefits such as improved household financial conditions, increased labor force participation, and health benefits for both children and the elderly.[3] Many neighborhoods throughout the Commonwealth are in desperate need of rehabilitation, and community revitalization is considered crucial for the overall well being of Pennsylvania residents. The need to expand the supply of affordable homes in the Commonwealth is well documented. A recent University of Pennsylvania study found that an additional 60,000 affordable homes are needed in the Commonwealth to meet demand.[4]

The importance of local housing development initiatives has been acknowledged, but little analysis has been done to empirically estimate the positive impacts of the development of affordable homes and overall economic benefits. As part of the development and implementation of the Pennsylvania Housing Trust Fund proposal, the Housing Alliance is interested in **measuring the potential economic impacts of the**

[1] "Statewide Housing Trust Fund Would Benefit Colorado Economy," Colorado Affordable Housing Partnership (Q1 2003).

[2] See Appendix A for a list of state housing trust funds. "Housing Trust Fund Progress Report 2007," Center for Community Change (2007).

[3] See, for example, "Health Costs of Poor Housing: A Review of the Literature," McCauley Institute (August 2002), which reported a 11 to 18 percent improvement in health for people who received rental assistance and a choice of where to live, and a 65 percent decline in the need for medical attention for the parents and their children.

[4] "Closing the Gap: Housing (un)Affordability in Pennsylvania," University of Pennsylvania Cartographic Modeling Lab (March 2003).

proposed construction and rehabilitation of homes attributable to a Housing Trust Fund. Econsult Corporation has undertaken the analysis and this report summarizes our findings.

The potential economic impacts of this development can be seen as the sum of several distinct components, accruing to individual homeowners, communities, and the Commonwealth as a whole:

- Potential economic impact of upfront construction expenditures and rehabilitation spending;
- Increased disposable income associated with lower monthly rental or mortgage payment and/or potential energy use reductions as a result of more efficient housing stock; and
- Stabilization of neighborhoods and communities throughout the Commonwealth.

Our analysis finds that creating and funding a Pennsylvania Housing Trust Fund would likely generate significant positive economic impacts. In addition, due to the nature of construction and rehabilitation work associated with affordable homes, such expenditures could not only be made relatively quickly, but represent investments with reasonable payback timeframes in the form of reduced future energy use. These characteristics of Pennsylvania Housing Trust Fund investments are very much in line with current federal stimulus objectives and state-level priorities.

2.0 INPUT-OUTPUT METHODOLOGY

The first step in calculating the potential economic impact of the Pennsylvania Housing Trust Fund is to identify the **direct expenditures** associated with its existence. In this case, we are referring most prominently to one-time expenditures associated with the upfront construction of affordable homes.

Once these direct expenditures have been defined, an economic model, based on the US Department of Commerce's Regional Input-Output Modeling System II (RIMS II) model, is used to calculate the indirect and induced economic impacts generated by these direct expenditures:[5]

- The **indirect expenditures** are essentially those expenditures resulting from all intermediate rounds of production in the supply of goods and services. For example, upfront construction will necessitate various contractors ramping up their purchases of materials, thus creating a spillover effect on those suppliers.

- The **induced expenditures** are those that are generated through the spending of earnings generated by the direct activities as well as by the indirect activities of supplying firms. Thus, employees of a construction firm who work on an affordable home will themselves spend their earnings on various items, such as food, clothing, and housing.

Notably, construction and related expenditures are typically associated with a higher multiplier than other expenditure components. This is based on the fact that most of the money is spent locally and thus remains in the region.

Together, the direct, indirect, and induced expenditures sum to the total potential impacts that are generated by different aspects of the Pennsylvania Housing Trust Fund.[6] The models also estimate total employment generated by the activity, as well as total earnings associated with employment.

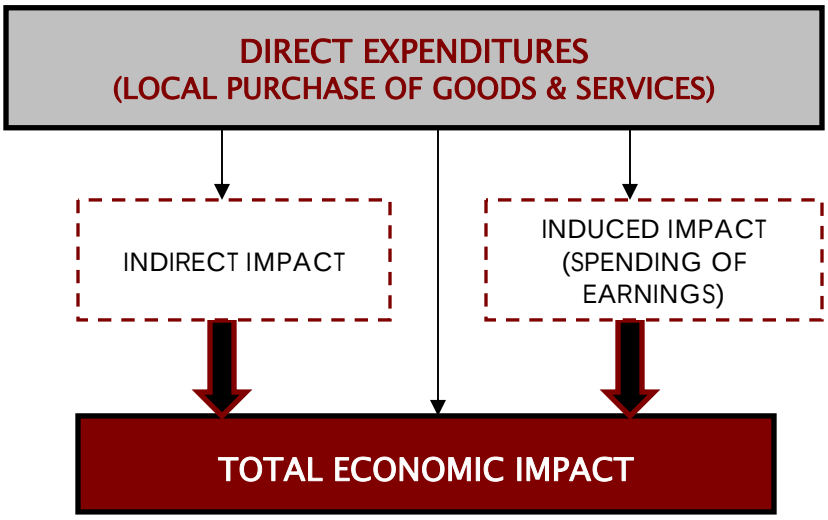
The input-output model provides summary measures of economic impacts generated from direct expenditures that are usually referred to as *multipliers*. An *expenditure multiplier* tells how much in total expenditures (direct, indirect and induced expenditures) can be expected following an increase in direct expenditures for the goods produced by a particular regional industry. For example, if an industry in a particular region is said to have an output multiplier of 2, this tells us that a $1 increase in the direct expenditures for the good produced by the industry leads to indirect and induced expenditures of another $1 and therefore total economic impact of $2 in the regional economy (see Figure 2.1).[7]

[5] The process for estimating the indirect and induced effects, as well as the taxes generated by the economic activity, relies on *regional input-output models*. These models are well established, having been used extensively since the 1950s, and are well adapted to this type of analysis.

[6] See also Appendix B for a more detailed overview of these models and the methodology that is employed in using them, and for a glossary of terms associated with these economic impacts.

[7] The $2 includes the various wages and salaries (which are referred to here as earnings) generated across industries in the particular region.

Figure 2.1: Input-Output Model Flow Diagram



Source: Econsult Corporation (2009)

3.0 POTENTIAL ECONOMIC AND FISCAL IMPACTS

This section presents the scale and composition of economic and fiscal impacts associated with the creation of a Pennsylvania Housing Trust Fund. These impacts include those generated by upfront construction expenditures and those generated by ongoing non-construction expenditures.

3.1 Potential Economic and Fiscal Impacts of Direct Construction Expenditures

The Pennsylvania Housing Trust Fund will primarily support construction expenditures for new construction, substantial and moderate rehabilitation, and home repair. Thus, direct expenditures attributable to construction and substantial rehabilitation costs include development costs, hard costs, estimated construction payroll, and all related expenditures.

Importantly, state housing trust funds tend to leverage impressive amounts of additional public and private funds in support of the construction of affordable homes. In fact, leverage amounts reported to the National Housing Trust Fund ranged from $2 to $22, with an average of nearly seven dollars leveraged for every one dollar invested.[8] Pennsylvania Housing Finance Agency reports that $87.7 million in investments via its Homeownership Programs have leveraged $545 million in additional housing, infrastructure, and economic development investment in their first nine years from 2000 to 2008, for a ratio of over six dollars leveraged for every one dollar invested.[9]

This means that, even before one accounts for the multiplier effect associated with direct expenditures leading to additional indirect and induced expenditures as vendors ramp up and as workers spend their earnings, the Pennsylvania Housing Trust Fund could immediately catalyze a commendable amount of leveraging of additional funds from other public sector sources as well as private sector sources. Because actual leverage ratios vary across geography, time, and program, and because we are primarily interested in the economic impact of the Pennsylvania Housing Trust Fund's own investments, irrespective of the certainty or scale of any matching funds, for the purposes of this analysis we conservatively do not account for any leveraging of private or other public funds.[10]

Based on our RIMS II-based input-output model, we estimate that, in addition to providing homes for families in need, **each $1 million in Pennsylvania Housing Trust Fund direct expenditures within the Commonwealth of Pennsylvania generates an additional $0.62 million to $1.28 million in indirect and induced expenditures, for a total of $1.62 million to $2.28 million in total expenditures,** depending on the

[8] "Housing Trust Fund Progress Report 2007," Center for Community Change (2007).

[9] "Homeownership Choice Programs Funding Recap," Pennsylvania Housing Finance Agency (2009).

[10] Accounting for leverage would make the impacts even higher than the estimates depicted here, as they would increase the amount of direct investment associated with each dollar invested by the Pennsylvania Housing Trust Fund.

construction type. **These expenditures support $520,000 to $730,000 in earnings and 14 to 20 jobs within the Commonwealth, and generate $82,000 to $116,000 in state tax revenues** (see Figure 3.1).[11]

Figure 3.1: Estimated Economic and Fiscal Impacts within the Commonwealth of Pennsylvania Associated with Each $1 Million in Various Expenditures via Pennsylvania Housing Trust Fund (in 2009$)[12]

Expenditure Type[13]	Indirect and Induced Expenditures Generated ($M)	Total Expenditures Generated ($M)[14]	Total Earnings Generated ($M)[15]	Total Employment Generated [16]	Total State Tax Revenues Generated ($000)[17]
New Single-Family Construction	$0.62	$1.62	$0.52	14.2	$82
New Multifamily Construction	$0.69	$1.69	$0.54	14.8	$86
Remodel/Rehabilitation	$1.28	$2.28	$0.73	20.0	$116

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

The estimated economic impacts within the Commonwealth are spread widely across industries. Of course, the most impacted industry is Construction itself; but 59 percent of the impact is projected to take place in other industries (see Figure 3.2).

[11] These figures represent only amounts collected by the Commonwealth, and do not include any tax revenue amounts collected by local jurisdictions, such as property taxes, local income taxes, and local business taxes.

[12] See Appendix B for a glossary of terms associated with these economic impacts, and Appendix C for projected economic impacts by region.

[13] North American Industry Classification System (NAICS) codes used are as follows: new single-family construction = 236117: New Housing Operative Builders, new multi-construction = 236116: New Multifamily Housing Construction & Operative Builders, and remodel/rehabilitation = 236118: Residential Remodelers. See Appendix D for a description of expenditure types by industry.

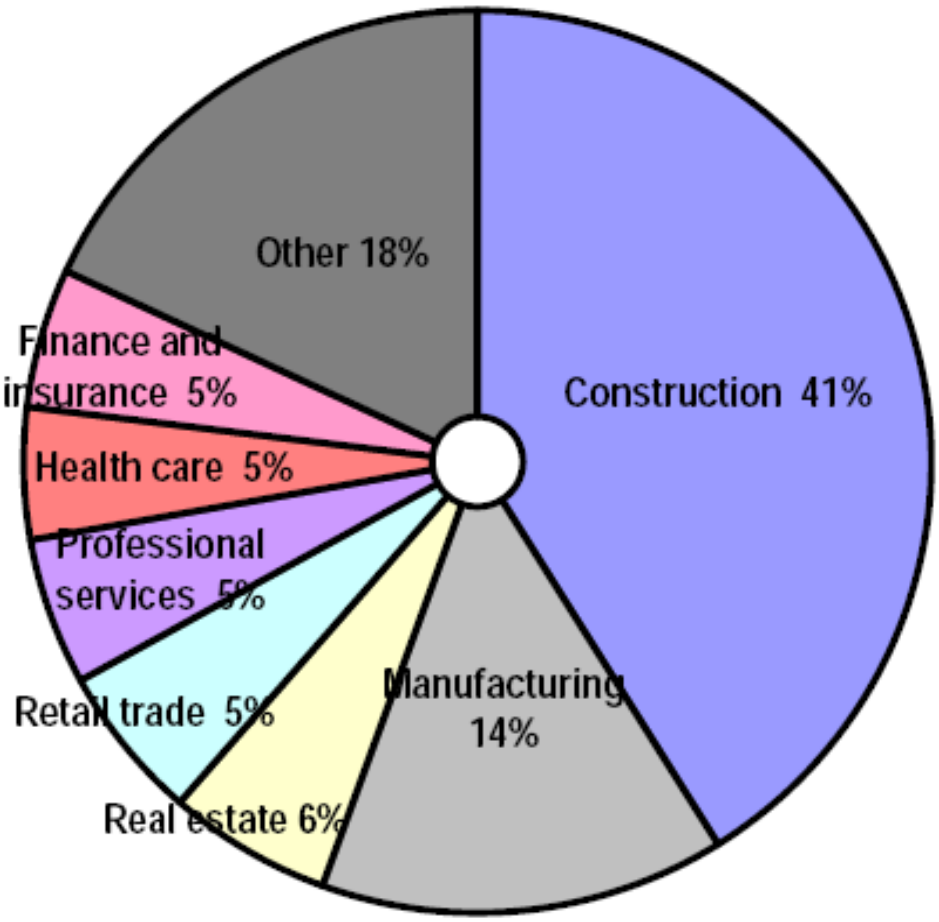
[14] "Total Expenditures" include total earnings.

[15] "Total Earnings" refers to the salaries and wages associated with the estimated composition and scale of total expenditures.

[16] "Total Employment" includes full-time and part-time employees.

[17] See Appendix E for state tax revenue estimates by region and state tax category.

Figure 3.2: Estimated Industry Distribution of Economic Impact within the Commonwealth of Pennsylvania of Direct Construction Expenditures via Pennsylvania Housing Trust Fund [18]



Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

[18] See Appendix F for additional detail on industry distribution of economic impact.

3.2 Potential Economic and Fiscal Impacts of Other, Non-Construction Direct Expenditures

In addition to upfront construction expenditures, there are other expenditures associated with the work of the Pennsylvania Housing Trust Fund in providing affordable homes, which then have their own ongoing economic and fiscal impacts on the Commonwealth. First and foremost, in an age in which interest in environmental sustainability is at an all-time high, **more efficient housing means reduced energy usage**, whether through improving existing housing stock or constructing new homes.

To the extent that such cost savings are enjoyed by the new homeowners themselves, those savings represent **additional disposal income flowing directly into those homeowners' pockets**, which can then be spent locally and thus have a multiplier effect on the local economy. For example, money saved from lower energy bills can be plowed by new homeowners into housing-related services such as landscaping and remodeling, leading to additional local employment opportunities.[19] The same dynamics are in play if, in addition to lower utilities bills, new homeowners also enjoy lower monthly housing payments. In contrast, the economic impact of utilities expenditures is often otherwise diffused geographically, particularly for a state like Pennsylvania that is a net importer of energy.[20]

The provision of affordable homes can also help stem the **negative economic and fiscal impacts associated with foreclosures**, as can direct Pennsylvania Housing Trust Fund investments in homelessness prevention initiatives. In other words, the multiplier effect of expenditures associated with the upfront construction or rehabilitation of affordable homes is likely to be even greater than what was estimated earlier in this section.

[19] Of course, homeowners can also utilize some of their energy cost savings to further weatherize their homes, thus accruing additional cost savings that can be circulated back into their local economies through personal spending.

[20] See, for example, "The Potential Economic Impact Benefits Associated with a Proposed PGW-LNG Project," Econsult Corporation (2006), which estimated that each $1 million in ratepayer savings generated total local expenditures of approximately $1.4 million, supporting about $250,000 in earnings and roughly nine jobs.

4.0 CONCLUSION

Investments in the housing market have a significant impact on the overall economy. It is clear from the past couple of years that declines in the housing market have a negative impact on employment and on consumption. Conversely, investments in housing construction and repair not only create construction jobs, but also lead to increased spending and jobs in other industries.

Regardless of the state of the economy, there is always a great demand for homes affordable to lower income households. When homes values are rising, more moderate and even middle income families struggle to find a decent home they can afford. Low wage workers and those on fixed incomes are often priced completely out of the market. When the economy experiences downturns, unemployment leads to foreclosures and evictions, and the ranks of those in need of housing assistance swells.

This report was commissioned by the Housing Alliance of Pennsylvania to determine the economic impact of a state-funded Pennsylvania Housing Trust Fund. We find that the impact of such an investment would be significant: by investing in affordable homes, the Commonwealth of Pennsylvania can not only provide more homes for those in need, but can also create jobs and generate tax revenue, both of which help to offset the effects of the current recession. In fact, we estimate that each $10 million invested via the Pennsylvania Housing Trust Fund, in addition to providing homes for families in need, could **generate up to $23 million in economic impact, up to 200 jobs, and up to $1.16 million in state tax revenues** within the Commonwealth (see Figure 4.1).[21]

Figure 4.1: Estimated Economic and Fiscal Impacts within the Commonwealth of Pennsylvania Associated with Each $10 Million in Various Expenditures via Pennsylvania Housing Trust Fund (in 2009$)

Expenditure Type	Total Expenditures Generated ($M)	Total Earnings Generated ($M)	Total Employment Generated	Total State Tax Revenues Generated ($M)
New Single-Family Construction	$16.2	$5.2	142	$0.82
New Multifamily Construction	$16.9	$5.4	148	$0.86
Remodel/Rehabilitation	$22.8	$7.3	200	$1.16

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

[21] Again, because we are primarily interested in the economic impact of the Pennsylvania Housing Trust Fund's own investments, irrespective of the certainty or scale of any matching funds, for the purposes of this analysis we conservatively do not account for any leveraging of private or other public funds. Accounting for leverage would make the impacts even higher than the estimates depicted here, as they would increase the amount of direct investment associated with each dollar invested by the Pennsylvania Housing Trust Fund.

Notably, as mentioned previously, the aforementioned economic impacts are projected to be generated relatively quickly; this "hammer ready" characteristic of the construction and rehabilitation of affordable homes, as demonstrated in this report, is of heightened importance amidst the current economic slowdown. This adds a qualitative advantage to the Pennsylvania Housing Trust Fund as **an avenue for economic stimulus**.

Furthermore, there are other clearly positive impacts that should be considered as part of the advantage of a statewide Housing Trust Fund. Of course, **low- to moderate-income households who benefit directly from the provision of affordable homes** are given a much better financial position in terms of their housing expenditures, both in terms of monthly housing payments as well as any energy cost savings they are able to enjoy from more efficient housing stock. Recipients also enjoy improved living space and safety conditions associated with new or rehabilitated housing.

These are heightened considerations in light of the employment and earnings effects felt by working families amidst the current recession. Bear in mind, also, that despite plummeting house prices, house prices in many regions are still significantly up since earlier this decade, exacerbating the problem of affordability for this population.

Leaving aside direct benefits to the recipients themselves, **affordable homes can also be seen as having broader benefits**: they contribute to the stabilization of neighborhoods, both by improving housing stock as well as by facilitating the vibrancy of mixed-income blocks, and thus have a positive effect on entire municipalities and regions in their efforts to provide a decent quality of life for a diversity of residents. To make this point from the opposite direction, the deleterious effect of foreclosures on neighborhoods and regions has been well documented.[22] Finally, as noted above, housing stock is made more efficient, which not only provides higher quality and lower costs for users, but also has broader environmental returns in the form of reduced resource consumption.[23]

In short, the impact of the Pennsylvania Housing Trust Fund is projected to be **significant in both quantitative and qualitative terms**. Direct investments yield an impressive multiplier of indirect and induced expenditures, creating employment opportunities and tax revenues; they also provide significant positive benefits to direct recipients of affordable homes, as well as to blocks, neighborhoods, municipalities, and regions.

[22] See, for example, "One Industry's Risk is Another Community's Loss: The Impact of Clustered Mortgage Foreclosures on Neighborhood Property Values in Philadelphia," Ira Goldstein and Richard Voith (2006), in which houses were shown to lose 1 percent in value for each foreclosure that took place within 1/8 of a mile and one year before the date of sale.

[23] See, for example, "Energy Efficiency and Comfort in Affordable Housing," State of Colorado Division of Housing (2002), which highlights the relatively short payback period for various energy-conserving upfront installations that are encouraged via various policy initiatives.

APPENDIX A – STATE HOUSING TRUST FUNDS

State	*Housing Trust Fund Name*	*Established*
Arizona	Housing Trust Fund	1988
California	Housing Trust Fund	1985
Connecticut	Community Investment Act	2005
Connecticut	Interest on Real Estate Brokers Trust Account	1992
Connecticut	Housing Trust Fund for Economic Growth and Opportunity	2005
Delaware	Housing Development Fund	1986
District of Columbia	Housing Production Trust Fund	1988
Florida	William E. Sadowski Act	1992
Georgia	Homeless Trust Fund	1988
Hawaii	Rental Trust Fund	1992
Idaho	Housing Trust Fund	1992
Illinois	Affordable Housing Trust Fund	1989
Illinois	Rental Housing Support Program	2005
Indiana	Affordable Housing and Community Development Fund	1989
Iowa	Housing Trust Fund	2003
Kansas	Housing Trust Fund	1990
Kentucky	Affordable Housing Trust Fund	1992
Louisiana	Housing Trust Fund	2003
Maine	Housing Opportunities for Maine	1985
Maryland	Affordable Housing Trust	1992
Massachusetts	Affordable Housing Trust Fund	2000
Massachusetts	Community Preservation Act	2000
Michigan	Housing and Community Development Fund	2005
Minnesota	Housing Trust Fund	1988
Missouri	Housing Trust Fund	1994
Montana	Revolving Loan Account for Housing	1999
Nebraska	Affordable Housing Trust Fund	1992
Nebraska	Homeless Assistance Trust Fund	1994

State	*Housing Trust Fund Name*	*Established*
Nevada	Account for Low Income Housing	1989
Nevada	Assistance for Low-Income Owners of Mobile Homes	1992
New Hampshire	Affordable Housing Trust Fund	1988
New Jersey	Balanced Housing Program	1985
New Jersey	Special Needs Housing Trust Fund	2005
New Mexico	Housing Trust Fund	2005
North Carolina	Housing Trust Fund	1987
Ohio	Housing Trust Fund	1991
Oklahoma	Housing Trust Fund	1996
Oregon	Housing Development Grant Program	1989
Oregon	Low Income Rental Housing Fund	1991
Rhode Island	Housing and Conservation Trust	1990
South Carolina	Housing Trust Fund	1992
Texas	Housing Trust Fund	1991
Utah	Olene Walker Housing Trust Fund	1986
Vermont	Housing and Conservation Trust	1987
Washington	State Housing Trust Fund	1987
Washington	Homeless Trust Fund	2005
Washington	2060 Program	2002
West Virginia	Affordable Housing Trust Fund Account	2001
Wisconsin	Interest Bearing Real Estate Trust	1993

APPENDIX B – INPUT-OUTPUT METHODOLOGY

B.1 Measuring Expenditure Impacts with Input-Output Models: Deriving Multipliers

The methodology and input-output model used in this economic impact analysis are considered standard for estimating such expenditure impacts, and the results are typically recognized as reasonable and plausible effects, based on the assumptions (including data) used to generate the impacts.

In general, we can say that any economic activity can be described in terms of the total output generated from every dollar of direct expenditures. If an industry in a given region sells $1 million of its goods, there is a direct infusion of $1 million into the region, called the *direct expenditure effect*. However, the economic impact on the region does not stop with that initial direct expenditure. Regional suppliers to that industry have also been called upon to increase their production to meet the needs of the industry to produce the $1 million in goods sold. Further, suppliers of these same suppliers must also increase production to meet their increased needs as well. When all these indirect effects are added to the direct effect (the $1 million in sales), we get an estimate of the total regional output generated, often called the *total direct and indirect expenditure, or economic, effect*.

However, the total economic effect of the $1 million in final demand sales contains another dimension beyond the indirect effect. All the economic activity, whether direct expenditures or the indirect expenditures, requires workers, and these workers must be paid for their labor. This means that part of the total output produced is actually in the form of wages and salaries paid to workers in various affected industries. These wages and salaries will, in turn, be spent in part on goods and services produced locally, engendering another round of impacts. This final effect on the regional economy through the spending of wages and salaries is known as the *induced expenditure, or economic, effect*.

Direct expenditures are "fed into" a model constructed by Econsult Corporation and based on data provided by the US Department of Commerce's Bureau of Economic Analysis. The model then produces a calculation of the total expenditure effect on the regional economy. This total effect includes the initial direct expenditure effect, as well as the ripple effects described, the indirect and induced expenditure effects.

Part of the total expenditure effect is actually the increase in total wages and salaries (usually referred to as earnings), which the model can separate from the expenditure estimates. Direct payroll estimates are fed into the "household' industry of the input-output model. Impacts of this industry are estimated using the personal consumption expenditure breakdown of the national input-output table and are adjusted to account for regional consumption spending and leakages from personal taxes and savings. The direct, indirect, and induced earnings represent a component of the total economic impact attributable to wages and salaries.

Finally, the model calculates the total expenditures affecting the various industries and translates this estimate into an estimate of the total labor (or jobs) required to produce this output.[24] Direct employment must also be incorporated into the total employment impact.

In short, the input-output model estimates the total economic activity in a region that can be attributed to the direct demand for the goods or services of various industries. This type of approach is used to estimate the total economic activity attributable to the expenditures associated with various types of housing-related spending in the region.

Figure B.1 – Glossary of Terms for Input-Output Models

Multiplier Effect – the notion that initial outlays have a ripple effect on a local economy, to the extent that direct expenditures lead to indirect and induced expenditures.

Economic Impacts – total expenditures, employment, and earnings generated.

Fiscal Impacts – local and/or state tax revenues generated.

Direct Expenditures – initial outlays usually associated with the project or activity being modeled; examples: one-time upfront construction and related expenditures associated with a new or renovated facility, annual expenditures associated with ongoing facility maintenance and/or operating activity.

Direct Employment – the full time equivalent jobs associated with the direct expenditures.

Direct Earnings – the salaries and wages earned by employees and contractors as part of the direct expenditures.

Indirect Expenditures – indirect and induced outlays resulting from the direct expenditures; examples: vendors increasing production to meet new demand associated with the direct expenditures, workers spending direct earnings on various purchases within the local economy.

Indirect Employment – the full time equivalent jobs associated with the indirect expenditures.

Indirect Earnings – the salaries and wages earned by employees and contractors as part of the indirect expenditures.

Total Expenditures – the sum total of direct expenditures and indirect expenditures.

Total Employment – the sum total of direct employment and indirect employment.

Total Earnings – the sum total of direct earnings and indirect earnings.

Source: Econsult Corporation (2009)

[24] In the input-output model, the estimate of increased employment will always be in terms of the employment required for a given level of production, usually referred to as *person-years* of employment. As such, these estimates can never be interpreted as specifying *permanent jobs.*

B.2 Input-Output Multipliers

The input-output model provides summary measures of economic impacts generated from direct expenditures that are usually referred to as *multipliers*. Multipliers show the additional change to the economy resulting from each change in a selected industry. A multiplier is always greater than one because the one represents the original level in the selected industry. Multipliers can vary widely by industry and area. Multipliers are higher for regions with a diverse industry mix. Industries that buy most of their materials from outside the state or "region" tend to have lower multipliers. Multipliers tend to be higher for industries located in larger areas because more of the spending by the industry stays within the area.

Multipliers may be Type I (open) or Type II (closed). If the input-output model classifies households as part of final demand rather than part of the region's productive economy (Type I models), then income received as earnings is considered a leakage, and household respending does not contribute to the multiplier effect. Households earn incomes by providing their labor services, and it is assumed that they spend their incomes as consumers in a predictable fashion. Although households will purchase goods for final consumption, the amount of their purchases is directly related to their income. In Type II models, the household sector is included in the interrelated processes of all sectors of the economy. This type of model assumes that labor services are used as inputs throughout the economy as consumption purchases are distributed among various sectors. Type II multipliers remain the focus of this analysis because it is used when the change in final demand (direct expenditure) is known and we want to estimate the total (direct, indirect, and induced) change in production or output in the impact region.

If we use a Type II model to include the impacts generated by direct payments to employees (wages), the multiplier will be larger than that estimated in a Type I analysis. The "real" multiplier is likely somewhere in between the two.

These multipliers are the basis for calculating not only the indirect and induced effects, but also the employment effects estimated for various economic development projects. An *output multiplier* tells how much total regional production (direct, indirect and induced expenditures) follows an increase in direct expenditures for the good produced by a particular regional industry. For example, if an industry in a particular region is said to have an output multiplier of 2, this tells us that a $1 increase in the direct expenditures for the good produced by the industry leads to a total output or expenditures of $2 in the regional economy.

Multipliers can also be used to estimate employment effects. *Employment multipliers* tell us how much total regional employment is generated following an increase in the demand for the good produced by a particular regional industry. These multipliers are typically presented as figures that indicate how much regional employment is generated from $1 million of final demand for the good of a particular regional industry. Finally, *income multipliers* outline the total wages and salaries generated across all industries for a given increase in the demand for the good produced by a specific regional industry.

We note that another peculiar assumption built into these models leads to an upward bias in the estimates of total economic impacts and multipliers. In addition to using Type II multipliers, the input-output models assume that purchases are made from local firms *first*, and then from firms outside the impact area. This bias should not be too serious for entities with a high proportion of local expenditures, including payroll.

APPENDIX C – PROJECTED ECONOMIC IMPACTS OF CONSTRUCTION EXPENDITURES BY REGION

Estimates of total output, earnings, and employment generated by an initial $1 million in direct construction expenditures are provided below (see Figure C.1, Figure C.2, and Figure C.3). These impacts can be shown for the Commonwealth of Pennsylvania as a whole, as well as by regions within the Commonwealth (see Figure C.4).[25]

Figure C.1: Estimated Final Demand Output per $1 Million in Direct Construction Expenditures (in 2009 $M)

NAICS Code	NAICS Description	PA State	NC	NE	NW	SC	SE	SW	Phila City
236117	New Housing Operative Builders	$1.62	$1.22	$1.36	$1.27	$1.44	$1.43	$1.43	$1.01
236116	New Multifamily Housing Construction & Operative Builders	$1.69	$1.27	$1.41	$1.32	$1.50	$1.49	$1.49	$1.02
236118	Residential Remodelers	$2.28	$1.71	$1.91	$1.78	$2.02	$2.01	$2.01	$1.37

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

[25] These impacts represent the estimated amounts enjoyed within a particular geography, so the larger the geography, the larger the impact. At the smaller geographies, more of the impact ripples out to areas outside that geography. Thus, Philadelphia multipliers are relatively small, because it is quite easy for impact to leak outside of city boundaries to other, neighboring jurisdictions. Pennsylvania multipliers, in contrast, are relatively large, because much more of the impact from the initial expenditures is captured within its boundaries.

Figure C.2: Estimated Final Demand Earnings per $1 Million in Direct Construction Expenditures (in 2009 $M)

NAICS Code	NAICS Description	PA State	NC	NE	NW	SC	SE	SW	Phila City
236117	New Housing Operative Builders	$0.52	$0.39	$0.44	$0.41	$0.46	$0.46	$0.46	$0.32
236116	New Multifamily Housing Construction & Operative Builders	$0.54	$0.41	$0.45	$0.42	$0.48	$0.48	$0.48	$0.33
236118	Residential Remodelers	$0.73	$0.55	$0.61	$0.57	$0.65	$0.65	$0.65	$0.44

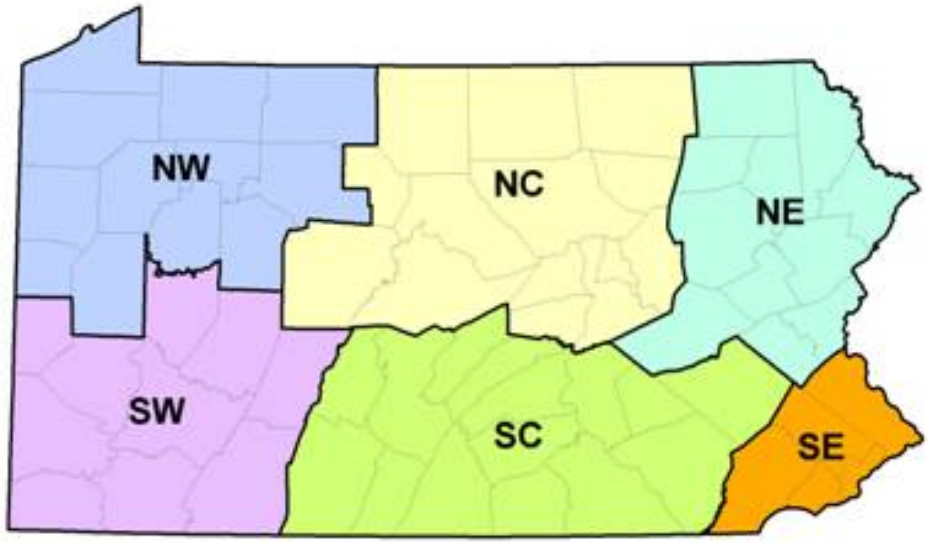
Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

Figure C.3: Estimated Final Demand Employment per $1 Million in Direct Construction Expenditures

NAICS Code	NAICS Description	PA State	NC	NE	NW	SC	SE	SW	Phila City
236117	New Housing Operative Builders	14.2	10.6	11.9	11.1	12.6	12.5	12.5	8.8
236116	New Multifamily Housing Construction & Operative Builders	14.8	11.1	12.4	11.6	13.1	13.1	13.0	8.9
236118	Residential Remodelers	20.0	15.0	16.7	15.6	17.7	17.6	17.6	12.0

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

Figure C.4: Map of Pennsylvania Regions for which Economic Multipliers Are Derived



Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

APPENDIX D – EXPENDITURE TYPE DESCRIPTIONS, CONSTRUCTION INDUSTRIES

New Single-Family Housing Construction (except Operative Builders)
North American Industry Classification System (NAICS) Code - 236117
This U.S. industry comprises establishments primarily engaged in building new homes on land that is owned or controlled by the builder rather than the homebuyer or investor. The land is included with the sale of the home. Establishments in this industry build single and/or multifamily homes. These establishments are often referred to as merchant builders, but are also known as production or for-sale builders.

New Multifamily Housing Construction & Operative Builders
NAICS Code - 236116
This U.S. industry comprises general contractor establishments responsible for the construction of new multifamily residential housing units (e.g., high-rise, garden, town house apartments, and condominiums where each unit is not separated from its neighbors by a ground-to-roof wall). Multifamily design-build firms and multifamily housing construction management firms acting as general contractors are included in this industry.

Residential Remodelers
NAICS Code - 236118
This U.S. industry comprises establishments primarily responsible for the remodeling construction (including additions, alterations, reconstruction, maintenance, and repair work) of houses and other residential buildings, single-family, and multifamily. Included in this industry are remodeling general contractors, operative remodelers, remodeling design-build firms, and remodeling project construction management firms.

APPENDIX E – PROJECTED FISCAL IMPACTS OF CONSTRUCTION EXPENDITURES BY REGION, STATE TAX CATEGORY

Estimates of total state tax revenues generated by an initial $1 million in direct construction expenditures are provided below (see Figure E.1 and Figure E.2). These estimates are derived from the estimates for expenditures and earnings displayed in Appendix C. Specifically, Econsult Corporation has constructed a model that combines estimated outputs with US Census Bureau County Business Patterns data to produce estimates of the distribution of additional employment and earnings by county.

In addition, the 2000 Census "Journey to Work" data on commuting flows are utilized to estimate income earned by residents of each county within the Commonwealth, regardless of where they work. The fiscal model can then estimate the increase in earned income taxes resulting from the new project. Pennsylvania state business and sales taxes are then estimated based on the most recent data on average sales tax base per employee by major industry, as contained in publications from the Pennsylvania Department of Revenue.

Figure E.1: Estimated State Tax Revenues per $1M in Direct Expenditures (in 2009 $000)[26]

NAICS Code	NAICS Description	PA State	NC	NE	NW	SC	SE	SW	Phila City
236117	New Housing Operative Builders	$82	$62	$69	$65	$73	$73	$73	$51
236116	New Multifamily Housing Construction & Operative Builders	$86	$65	$72	$67	$76	$76	$76	$52
236118	Residential Remodelers	$116	$87	$97	$91	$103	$102	$102	$70

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

[26] These impacts represent the estimated amounts enjoyed within a particular geography, so the larger the geography, the larger the impact. At the smaller geographies, more of the impact ripples out to areas outside that geography. Thus, Philadelphia multipliers are relatively small, because it is quite easy for impact to leak outside of city boundaries to other, neighboring jurisdictions. Pennsylvania multipliers, in contrast, are relatively large, because much more of the impact from the initial expenditures is captured within its boundaries.

Figure E.2: Estimated State Tax Revenues per $1M in Direct Expenditures (in 2009 $000)

NAICS Code	NAICS Description	Personal Income	Sales and Use	Corporate Net Income	Total
236117	New Housing Operative Builders	$37	$36	$10	$82
236116	New Multifamily Housing Construction & Operative Builders	$38	$38	$10	$86
236118	Residential Remodelers	$52	$51	$13	$116

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)

APPENDIX F – INDUSTRY DISTRIBUTION OF ECONOMIC IMPACTS OF CONSTRUCTION EXPENDITURES

Figure F.1: Estimated Industry Distribution of Economic Impacts of Construction Expenditures

Rank	Industry	% of Exp	Rank	Industry	% of Exp
1	Construction	41%	6	Health care	5%
2	Manufacturing	14%	7	Finance and insurance	5%
3	Real estate	6%	8	Wholesale trade	3%
4	Retail trade	5%	9	Information	3%
5	Professional services	5%	10	Transportation	3%
				All other industries	10%

Source: Econsult Corporation (2009), US Department of Commerce – Bureau of Economic Analysis (2007), US Census Bureau (2007)