Energy Effective Housing Demonstration in Inner City
The Manchester Project
Pittsburgh, Pennsylvania

Applicant Name: Volker Hartkopf

2015 RUDY BRUNER AWARD PROJECT DATA

RUDY BRUNER AWARD FOR URBAN EXCELLENCE

PROJECT DATA

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

Project Name: Energy Effective Housing Demonstration in Inner City | Location | City: Pittsburgh | State: PA

Owner: City of Pittsburgh Urban Redevelopment Authority

Project Use(s): Residences (owner occupied and Rented

Project Size: One half city block, 1300 block of Sheffield Street | Total Development Cost: $1,000,000

Annual Operating Budget (if appropriate)

Date Initiated: 1978 | Percent Completed by December 1, 2014: 100%

Project Completion Date (if appropriate): 1983 | Project Website (if appropriate)

Attach, if you wish, a list of relevant project dates

Application submitted by:

Name: Volker Hartkopf | Title: Director of CBPD

Organization: Center for Building Performance and Diagnostics, Carnegie Mellon University

Address: 5000 Forbes Ave. | City/State/Zip: Pittsburgh, PA 15213

Telephone: (412) 268-2350 | Fax: (412) 268-6129

E-mail: hartkopf@cmu.edu | Website (if appropriate)

Perspective Sheets:

Organization	Name	E-mail
Public Agencies: Urban Redevelopment Authority	Steve George	elymie@embarqmail.com
Architect/Designer: Urban Design Associates	David Lewis	dl5i@andrew.cmu.edu
Developer		
Professional Consultant: Carnegie Mellon University	Volker Hartkopf	hartkopf@cmu.edu
Community Group: Manchester Citizens Corporation	LaShawn Burton-Faulk	lfaulk@manchestercitizens.org
Other		

Please indicate how you learned of the *Rudy Bruner Award for Urban Excellence*. (Check all that apply).

- ☐ Direct Mailing
- ☐ Online Notice
- ☑ Direct Email
- ☐ Previous RBA entrant
- ☐ Social Media
- ☐ Previous Selection Committee member
- ☐ Professional Organization
- ☐ Bruner/Loeb Forum
- ☐ Other (please specify) _____

The undersigned grants the Bruner Foundation permission to use, reproduce, or make available for reproduction or use by others, and to post on the Bruner Foundation websites, the materials submitted. The applicant warrants that the applicant has full power and authority to submit the application and all attached materials and to grant these rights and permissions.

Signature? V. Hartkopf | Date: 9 DEC 2014

2015 RUDY BRUNER AWARD PROJECT AT-A-GLANCE

RUDY BRUNER AWARD FOR URBAN EXCELLENCE

PROJECT AT-A-GLANCE

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

This sheet, the Project Data sheet, and the representative photo will be sent to the Committee in advance as the *Project Overview*.

Project Name: Energy Effective Housing Demonstration in Inner City

Address: 1300 Block Of Sheffield Street City/State/ZIP: Pittsburgh, PA 15233

1. Give a brief overview of the project. Approximately 500 words.

From 1978-81,the US Departments of Energy (DoE) and Housing and Urban Development (HUD) funded the research, architecture/engineering design and community cooperation for one of the first multi-ethnic redevelopments of a low-income historic neighborhood in the United States, the Pittsburgh North-Side Manchester Neighborhood. This enabled the cooperation to renovate historic buildings and build infill row houses on empty lots on one side of the entire 1300 block of Sheffield Street in Manchester. Beyond realizing best practices, the research, funded by the National Science Foundation measured, reported and verified the actual performance of the row houses by modeling and monitoring the energy and indoor environmental quality.
Beyond the energy, economic, human comfort effective realization, which lead to cost neutral, over 80% heating and cooling savings, the work published guidelines and workbooks for policy makers, architects/engineers, urban planning officials, construction companies and historic preservationists, home owners and occupants.

The multi- income, -ethnic, -professional, finance, community context, policy, architecture/engineering, construction, homeowner decision making was successfully addressed in our Manchester Neighborhood in Pittsburgh because its success became a breakthrough project by addressing multi-professional decision making challenges and opportunities. The public/private partnership thereby provided opportunities for successful collaboration and educated current and future decision making professionals. Low income, often ethnically separate, inner city neighborhoods do not have the resources to successfully address energy, human health, environmental performance, and security requirements. Often many of those neighborhoods are experiencing high crime rates which makes them even less attractive to middle income renters or homeowners. The Manchester North Side Pittsburgh Community experienced many interrelated challenges for instance, the infrastructure extension of Pittsburgh separated the Manchester Community from the Allegheny River and the new roads provided opportunities to move beyond inner city contexts leaving behind lowest income inhabitants. Those left behind often had less opportunities for family, education and career development.

Several major national and worldwide recognitions resulted from the success of the project:
The Second Place Award –Multifamily Category by American Gas Association's 1983 Passive Solar Design Awards, Co-sponsored by Solar Age Magazine;
The 1986 Progressive Architecture Applied Research Award for Energy-Efficient Housing Demonstration in the Inner City; and
The CADDET IEA OECD Result Nu. 51 Publication: "New Image and Energy Bills in Manchester Inner-City Neighborhood"

2. Why does the project merit the *Rudy Bruner Award for Urban Excellence*? (You may wish to consider such factors as: effect on the urban environment; innovative or unique approaches to any aspect of project development; new and creative approaches to urban issues; design quality.) Approximately 500 words.

Effect on the Urban Environment:
Already 50% of the world population lives in cities and when the expected population by 2050 will reach around 9 billion, it is expected that over 70% of the population will live in cities. Already buildings in US consume 70% of all electricity. The average power plant efficiency is slightly over 30% and is often very destructive for our environment and air qualities. In Pennsylvania urban environments lot as many as 40-50% of their population and increased the infrastructure by 50% and in our state as much agricultural land was lost through extension as the whole size of the states Connecticut and Rhode Island. Therefore, urban redevelopment and multi- ethnic and income communities provide major opportunities for securing our future proof economic, social and human health performances.

Innovative Approaches
Already in the late 1970's interrelated issues were addressed through the creation of a public/private partnership to collaborate with the Manchester North-Side community by attracting national, regional, and local governmental leadership to cooperate with urban designers, architects, engineers, construction companies, industries and the research and educational objectives of the first architecture, engineering and urban planning graduate program in the US. This provided major learning research development and innovative opportunities to address urban, environmental, social, economic, and low to middle income multi-ethnic community development.

Design Qualities, New and Creative Approaches:
By working with the community its leadership and its inhabitants, engaging urban designers, architects, engineers, policy, and political decision making professionals, as well as industry and academic/ research professionals and students, the collaborative team was able to create socially, environmentally to enable the creation of solutions to otherwise externalities decision making processes. For instance, by providing for each family private entrances and gardens the resulting historically relevant new row houses saved enough urban land and reduce energy consumption by 25% for heating cost neutrally and provided the resources for 50% increased insulation, additional 50% decrease of heating consumption by increased insulation, which resulted in 75% heating energy savings with no cost increase. By providing daylighting and southern facing private buffer spaces and decreasing the size of the windows on the north, the heating energy consumption was decreased to a total of about 80-90%. The human occupants performance depending age, family size and energy concerns was resulted in energy impact of effect of 3 to 1 (small family: 1 and older/large families: 3). In previous experience this resulted in $100-$300 for heating in winter months (approximately 6 months in a year) as opposed to $10-$30 in the new row houses.

2015
RUDY BRUNER AWARD
PROJECT DESCRIPTION

RUDY BRUNER AWARD
FOR URBAN EXCELLENCE

PROJECT DESCRIPTION

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

1. Describe the underlying values and goals of the project. What, if any, signifcant trade-offs were required to implement the project? Approximately 500 words.

Low income communities lack the resources and lack the access to advance best practices focused on national, regional, local, and neighborhood interrelated challenges and opportunities. Therefore, public private partnerships are necessary to successfully address many interrelated challenges and opportunities. When the initiator, Volker Hartkopf secured $750,000 from the Department of Energy to address major urban issues, he was told that this money would not be available unless the required $250,000 in addition would be secured from Housing and Urban Development. Therefore, he went to HUD and met the Assistant Secretary of the Office of Neighborhoods, Voluntary Associations, and Consumer Protection, Father Geno Baroni. When the Assistant Secretary asked why do Hartkopf's reason for doing such a project, he answered "Coming from a good university with resources in education and research I want to do something for a low income community" and Baroni wrote on a piece of paper that "you cannot do anything for somebody because if you it for somebody, you do it to somebody. You can only hope to do it with somebody to address our challenges and opportunities." On this basis, the community organization was engaged and the leadership required to include the whole community in the decision making processes. The main urban design/architectural professionals, the Urban Design Associates (UDA), in collaboration with CMU reached out to the Urban Redevelopment Authority, the Pittsburgh Mayor's Office, and US Senator John Heinz to hold workshops within which alternative neighborhood development opportunities and challenges were addressed providing the community leadership and occupants with alternatives showing the energy and environmental implications of low, medium and high density housing solutions. The community had to decide which was the best alternative addressing their interests and interconnected satisfaction. This provided them the opportunity to also address energy and environmental issues.

2. Briefly describe the project's urban context. How has the project impacted the local community? Who does the project serve? How many people are served by the project? Approximately 500 words.

The Manchester Project is located on the North Side of Pittsburgh, across the Allegheny River from Downtown. This area has been physically separated from downtown additionally through infrastructure development and the redevelopment of the arena areas. This project helps address the challenges to the environment posed by infrastructure development and additional land use in the State of Pennsylvania. Because of the exurbanization and infrastructure creation around the City of Pittsburgh, communities like Manchester have lost population. By creating residences that address human health, energy efficiency, and material consumption in the Manchester neighborhood, the benefits extend past those experienced by the inhabitants. Resource demand decreases as the need for infrastructure reduces and the car miles are decreased by reducing the need for long distance commuting back into urban centers. Creating healthy and effective housing in existing neighborhoods also encourages pedestrian accessibility and neighborhood connectivity.

3. Describe the key elements of the development process, including community participation where appropriate. Approximately 400 words.

Based on the experiences of the realization of the globally first passive/active inner-city home, funded by the Pittsburgh Urban Redevelopment Authority (URA), the first architecture, engineering, and urban planning multi-disciplinary graduate education program in the US, Carnegie Mellon University realized the importance of inner city neighborhoods to be improved to address interrelated decision making processes, challenges, and opportunities. That is why the team reached to the Pittsburgh mayor's office, the US Senate, as well as the Departments of Energy and Housing and Urban Development (HUD), and most importantly to the Manchester Citizens Cooperation in Pittsburgh's North Side. Because of this historic neighborhood resulting interest in cooperating with the emerging public/private partnership the team reached out to the Pittsburgh Historic Landmarks Foundation (PHLF).

The HUD Assistant Secretary of the Office of Neighborhoods, Voluntary Associations, and Consumer Protection, as mentioned before emphasized: "You cannot do anything FOR somebody, because if you it for somebody, you do IT to somebody. You can only hope to do it with somebody to address our challenges and opportunities."

Lower income communities lack the resources and access to advance best practices focused on national, regional, local, and neighborhood interrelated challenges and opportunities. Therefore, public private partnerships are necessary to successfully address many interrelated challenges and opportunities.

On this basis, the community organization was engaged and the leadership was required to include the whole community in the decision making processes. The main urban design/architectural professionals, the Urban Design Associates (UDA), in collaboration with CMU reached out to the Urban Redevelopment Authority, the Pittsburgh Mayor's Office, and US Senator John Heinz to hold workshops within which alternative neighborhood development opportunities and challenges were addressed. This provided the community leadership and occupants alternatives showing the energy and environmental implications of their neighborhood redevelopment, including medium and high density housing solutions. The community and its citizens had to decide which was the best alternative addressing their interests and interconnected satisfactions.

4. Describe the financing of the project. Please include all funding sources and square foot costs where applicable. Approximately 400 words.

The Manchester Urban Redevelopment goals and objectives and the evolving public private partnership attracted support from the US Departments of Energy ($750,000) and Housing and Urban Development ($250,000). These resources were essential for supporting the research and development and education objectives, as well as engaging the architecture and urban design team and partially support the construction costs while also attracting material donations from industry. The URA provided the land necessary for the new row houses.

At the time, late 1970's early 1980's home prize estimates were:
Row house 1,600 SF, 2 stories plus basement, 2 bedrooms, living room, kitchen, 1 Bathroom, Basement, selling price: $40,000

Row house 2400 SF, 3 stories plus basement, 3 bedrooms, 2 bathrooms selling price $100,000

15 new infill housing units were realized as well as
12 units in renovated historic structures

5. Is the project unique and/or does it address significant urban issues? Is the model adaptable to other urban settings? Approximately 400 words.

At the time, the project was unique and because of its visionary future oriented public private partnership cooperation, was able to address many decision-making processes, and the most important of which are economic externalities. All of these challenges and opportunities are addressed in the workbooks and guidelines. These provided major building blocks to improve all interrelated processes.
Published Guidelines:
Energy Conservation Guidelines:
Volume 1: New Construction.
Volume 2: Rehabilitation
Effect of Occupant Behavior on Energy Use in an Inner City Neighborhood
Energy Conservation & Solar Design Guidelines for the City of Pittsburgh

Workbooks:
The Politicians Workbook
The Financiers Workbook
The Designers & Contractors Workbook
The Homeowners Workbook

Global:
The CADDET IEA OECD Result Nu. 51 Publication: "New Image and Energy Bills in Manchester Inner-City Neighborhood"

(Please see also attachments)

2015 RUDY BRUNER AWARD COMMUNITY REPRESENTATIVE **PERSPECTIVE**

RUDY BRUNER AWARD

FOR URBAN EXCELLENCE

Send to Contact

COMMUNITY REPRESENTATIVE PERSPECTIVE

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

This sheet is to be filled out by someone who was involved, or represents an organization that was involved, in helping the project respond to neighborhood issues.

Name: LaShawn Burton-Faulk | Title: Executive Director

Organization: Manchester Citizens Corporation | Telephone: (412) 323.1743

Address: 1319 Allegheny Avenue | City/State/ZIP: Pittsburgh Pa 15233

Fax: (412) 322.6448 | E-mail: lfaulk@manchestercitizens.org

The undersigned grants the Bruner Foundation permission to use, reproduce, or make available for reproduction or use by others, for any purpose whatsoever, the materials submitted. The applicant warrants that the applicant has full power and authority to submit the application and all attached materials and to grant these rights and permissions.

Signature: ? LaShawn Burton-Faulk | Date: 12.5.2014

1. How did you, or the organization you represent, become involved in this project? What role did you play? Approximately 400 words.

Building on the experience of having realized the first low-income inner-city passive active housing project globally in the South Oakland neighborhood with the support of the Pittsburgh Urban Redevelopment Authority in the late 1970s, it became apparent that major opportunities to advance socially, economically, energy and environmentally effective urban redevelopment would be important for urban citizens and address the interests of major federal agencies, including the Department of Energy and of Housing and Urban Development.
Given the many issues identified in the response of David Lewis, a coinventor of the discipline Urban Design, Partner in Charge of the Pittsburgh-Based Urban Design Associates and Professor at Carnegie Mellon University, to the Rudy Bruner Award questions focused on Manchester North Side neighborhood, the Manchester Citizens Corporation was approached by CMU to create a public private partnership to address challenges and opportunities to advance best practices within the multi-ethic, multi-income, historic community with the agreement that the Manchester community leaders would become partners. The team expanded to include the Mayor of Pittsburgh Richard Caliguiri, the Urban Redevelopment Authority, and the Department of Planning.

2. From the community's point of view, what were the major issues concerning this project? Approximately 400 words.

To provide life-cycle, cost effective residences to meet the needs and requirements of low to middle income families. Beyond just fulfilling those needs, the community also became more aware of the historic quality of existing buildings and how suburban infill housing designs began to destroy the high quality their historic neighborhood.

3. Has this project made the community a better place to live or work? If so, how? Approximately 400 words.

To provide life-cycle, cost effective residences to meet the needs and requirements of low to middle income families. Beyond just fulfilling those needs, the community also became more aware of the historic quality of existing buildings and how suburban infill housing designs began to destroy the high quality their historic neighborhood.

4. Would you change anything about this project or the development process you went through? Approximately 400 words.

This project was a stepping stone the realization of the wealth around us, within our community relating to our historic structures. Often there are triggers that allow communities to bring focus to revitalization strategies, this opportunity assisted in the way we think and see development differently. I truly believe that we could benefit again by the collaborative minds involved in this project, if put to task on future efforts. It is with pleasure to share the outcomes and community impact, as it should provide the story that is proof that efforts such as this are well worth the investment!

2015 RUDY BRUNER AWARD PUBLIC AGENCY **PERSPECTIVE**

✉ Send to Contact

PUBLIC AGENCY PERSPECTIVE

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

This sheet is to be filled out by staff representative(s) of public agency(ies) who were directly involved in the financing, design review, or public approvals that affected this project.

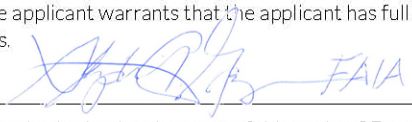
Name Steve George | Title

Organization Urban Redevelopment Authority | Telephone ( )

Address | City/State/ZIP Pittsburgh, PA

Fax ( ) | E-mail elymie@embarqmail.com

The undersigned grants the Bruner Foundation permission to use, reproduce, or make available for reproduction or use by others, for any purpose whatsoever, the materials submitted. The applicant warrants that the applicant has full power and authority to submit the application and all attached materials and to grant these rights and permissions.

Signature ?  | Date 9 Dec 2014

1. What role did your agency play in the development of this project? Describe any requirements made of this project by your agency (e.g., zoning, public participation, public benefits, impact statements). Approximately 400 words.

Pittsburgh Urban Redevelopment Authority's financial support of $40k for the first US inner city neighborhood passive/active house in South Oakland, Pittsburgh, gave me the experience how important the cooperation with the first interdisciplinary graduate program for Architecture, Engineering and Urban Planning at Carnegie Mellon University could assist the city of Pittsburgh and major neighborhoods to be redeveloped to address opportunities to engage larger scale cooperation to reach out to more potential partners. This helped us to initiate a public/private partnership. Our discussions with Mayor Caliguiri and Senator John Heinz, who opened the South Oakland breakthrough house, encouraged our evolving team to write strategic proposals to major federal agencies, including DOE and HUD, after connecting with the Manchester's Citizens Co-operation. Together we reached out to the Urban Design Associates, lead by Professor David Lewis, the co-inventor of the Urban Design discipline. DOE approved the project proposal and committed $750K and also assisted in convincing the Housing and Urban Development to provide an additional $250K in the late 1970's. These successful efforts resulted in the city of Pittsburgh to provide the necessary undeveloped land and encourage the neighborhood to renovate existing, but abandoned, buildings to address historic preservation objectives and provide energy and environmentally cost effective new housing units. This also assisted the URA to increase housing densities, while meeting community citizens' expectations for privacy and security, while saving land. Originally the citizens expected "free standing" sub-urban like housing. When convinced that each future home under design had separate entrance and private back yard gardens, as well as one garage per unit, thereby met all their expectations, future residents accepted the land saving higher density solutions. The URA support of the public/private partnership approach provided the framework to realize cost, environment and community effective solutions.

2. How was this project intended to benefit your city? What trade-offs and compromises were required to implement the project? How did your agency participate in making them? Approximately 400 words.

Pittsburgh lost many residents and had decaying environments because of ex-urbanization,and its region lost much farm and jobs but neither were counteracted. The city's tax income suffered as well, as did its school system's financial support. Therefore, major historic neighborhoods were disappearing and we needed to address these challenges. We did this by focusing on urban and neighborhood revitalization to increase the quality of neighborhood citizens life and security and encourage citizens to remain, help reinvestment and attract additional residents without gentrification. Our public/private partnership and the well focused cooperation with the Manchester Citizens Corporation, together with the Urban Design Associates, using the R/UDAT processes became very successful. Therefore, URA became a major public partner and shared the visionary of goals of the emerging private/public partnership.
Within this partnership the URA worked bottom up throughout local, city, state, federal, as well as professional decision making processes and we started on the same level as the Manchester Community Corporation and its neighborhoods citizens.

3. Describe the project's impact on your city. Please be as specific as possible. Approximately 400 words.

Our project strengthened the Manchester redevelopment opportunities and demonstrated the importance to collaborate within public/private partnership supporting educational, research, development and demonstrations of better and future oriented practices in urban design, architecture/engineering, construction, home ownerships and residents' involvement to cost effectively save energy and increase the quality of life, security and residents' comfort. These efforts lead to related workbooks and guidelines to inform decision-making processes in policy, finance, job creation, construction workers training, urban design, historic preservation and economics.
The demonstrated experiential beauty and its relationship to our history, privacy, security and pride of ownership encouraged other developments in Manchester and beyond to learn and apply from these experiences. Specifically, the heat energy consumption was up to 80% less compared to normal average homes at the time (25% were saved through the application of shared party walls). When reducing construction costs and land savings, the resources provided "the finances" for increasing the insulation of the remaining walls, roofs and basements saving another 50% of heating energy. The original 5% of water heating savings, when considering the already achieved 75% savings, amounted for another 20% savings of the remaining 25% bringing the total savings up to about 80% heat energy savings of conventional construction at the time.

Further more, the National Science Foundation funded a scientific modeling and measured indoor environmental qualities research. We applied this research in a test of one new row house and thereby measured, documented and verified the fact that the new dwellings had highest indoor environmental quality. However, we also had to recommend that gas burning stoves need to be used while the air was artificially or naturally removed from the kitchen stove to avoid potential air quality problems in bedrooms on the second floor, above the kitchen. This study also exemplifies the importance of securing the necessary resources within our public/private partnership approach and helped us to convince our city, county and national leadership of importance of these efforts. Now, we know from colleagues that this project still acts as a major stepping stone in Pittsburgh and beyond.

4. Did this project result in new models of public/private partnerships? Are there aspects of this project that would be instructive to agencies like yours in other cities? Approximately 400 words.

After my retirement from the URA, I am pleased to still interact with David Lewis and Volker Hartkopf. Therefore, I know that the UDA work is still progressing and reaches beyond Pittsburgh even into Europe.
CMU's Center for Building Performance and Diagnostics, with support from industry, brought the new mayor of Pittsburgh, Bill Peduto, to the German city of Ludwigsburg to deliver with Volker Hartkopf an invited presentation to the national annual conference focused on Corporate Social Responsibility (CSR) in May 2014. Mayor Bill Petudo and the Pittsburgh team interacted with the Lord Mayor of Ludwigsburg, German industries and Ludwigsburger team to discuss major opportunities for cooperation. This will provide opportunities to learn from each other how to advance related best practices. Just recently a small Ludwigsburg team lead by Albert Geiger, Head of the Department of Sustainable Urban Development, came to Pittsburgh and met Bill Peduto's team and congressman Mike Doyle, the CEO of the Pittsburgh Green Building Alliance and its 2030 Challenge team, as well as leading professionals within the Energy Innovation Center, as well as visit the PNC Bank new downtown high-rise headquarter under construction.

Just last week Ludwigsburg was honored to be the leading edge midsize city in Germany, focused on successfully advancing sustainability. Already Ludwigsburg cooperates with major European cities within the European community. The CBPD acts as a major consultant within Chinese Universities and began co-operations with Universities in the UK, France, Germany, and the US within the emerging Doctoral Post Professional (DPP) program. Please also see attached letters from Ludwigsburg and Pittsburgh.

5. What do you consider to be the most and least successful aspects of this project? Approximately 400 words.

Addressing the listed and discussed challenges and opportunities require a long term future proof policy development globally, nationally, state by state, and locally. The bottom up public/private partnership efforts to address many interrelated issues is our most helpful approach, given our present political climate and many state by state goals and objectives. We are happy of successful local projects and are pleased that many cooperative opportunities are emerging. This reinforces the major potential benefits for our own city, its region, state and certain communities.

2015 RUDY BRUNER AWARD ARCHITECT OR DESIGNER **PERSPECTIVE**

RUDY BRUNER AWARD

FOR URBAN EXCELLENCE

✉ Send to Contact

ARCHITECT OR DESIGNER PERSPECTIVE

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

This sheet is to be filled out by a design professional who worked as a consultant on the project, providing design, planning, or other services. Copies may be given to other design professionals if desired.

Name David Lewis, FAIA | Title

Organization Urban Design Associates | Telephone (412) 263-5200

Address 707 Grant St | City/State/ZIP Pittsburgh, PA 15219

Fax ( ) | E-mail dl5i@andrew.cmu.edu

The undersigned grants the Bruner Foundation permission to use, reproduce, or make available for reproduction or use by others, for any purpose whatsoever, the materials submitted. The applicant warrants that the applicant has full power and authority to submit the application and all attached materials and to grant these rights and permissions.

Signature? David Lewis | Date 9 Dec 2014

1. Describe the design concept of this project, including urban design considerations, choice of materials, scale, etc. Approximately 400 words.

In the late 19th century Manchester was an affluent suburb across the Allegheny River from Downtown Pittsburgh. By the mid-1960's it was a distressed area. The "federal bulldozer" had displaced thousands of low income families, mostly African American, from the Hill District, an inner city neighborhood next to Downtown, and many of these uprooted families moved into Manchester. On Sheffield Street several burnt-out buildings were demolished, leaving vacant sites between other empty historic buildings deemed worthy of restoration. On three of these sites sequences of new townhouses for displaced families were to be designed and built to
re-stitch the historic architecture of the street, and at the same time would pioneer new ground in energy and maintenance efficiency for low income households.

2. Describe the most important social and programmatic functions of the design. Approximately 400 words.

A close-working collaboration between CMU, the Manchester Citizens Corporation, and Urban Design Associates (UDA) was set up. UDA was already a pioneer in actively involving citizens through open public workshops in all the stages of architectural design and construction. At
these workshops UDA listened to the inputs of low income displaced families, and responded with alternative designs to their calls for units that each had front doors to the street, back gardens and garages; and with brick facades, dormers and deep sun-shading eaves that would harmonize with the historic street.

Simultaneously the architectural designs responded to the technical innovations of CMU's energy-efficiency program briefly described in this submission. The construction and operational savings resulting from solar power and new techniques of insulation were handed on to the low income families, and this in itself was a highly innovative breakthrough at that time, forty years ago. The result was a Progressive Architecture Award for this project.

3. Describe the major challenges of designing this project and any design trade-offs or compromises required to complete the project. Approximately 400 words.

4. Describe the ways in which the design relates to its urban context. Approximately 400 words.

UDA's process for involving citizens in every aspect of the design and construction of this project became a forerunner for UDA's 600-unit Randolph development in Richmond, and for UDA's Hope VI projects in other cities, all performed with open citizen and inter-agency participation. It was also a demonstration project at the International Remaking Cities Conference in Pittsburgh in 1986, chaired by the Prince of Wales, with 950 attendees from American and European cities, which in turn led to the formation of C/UDATs, the British equivalent of R/UDATs in the US.

2015 RUDY BRUNER AWARD OTHER **PERSPECTIVE**

RUDY BRUNER AWARD FOR URBAN EXCELLENCE

Send to Contact

OTHER PERSPECTIVE

Please answer questions in space provided. If possible, answers to all questions should be typed or written directly on the forms. If the forms are not used and answers are typed on a separate page, each answer must be preceded by the question to which it responds, and the length of each answer should be limited to the area provided on the original form.

Name Volker Hartkopf

Title Director, Center for Building Performance & Diagnostics

Organization Carnegie Mellon University

Telephone (412) 268-2350

Address 5000 Forbes Ave

City/State/ZIP Pittsburgh, PA 15213

Fax ( )

E-mail hartkopf@cmu.edu

The undersigned grants the Bruner Foundation permission to use, reproduce, or make available for reproduction or use by others, for any purpose whatsoever, the materials submitted. The applicant warrants that the applicant has full power and authority to submit the application and all attached materials and to grant these rights and permissions.

Signature ?

Date 9 Dec 2014

1. What role did you play in the development of this project? Approximately 400 words.

Based on the experiences of the realization of the globally first passive active inner-city home, the first architecture, engineering, and urban planning multi-disciplinary graduate education program at Carnegie Mellon University realized the importance of inner city neighborhoods to be improved and address interrelated decision making processes, challenges, and opportunities. That is why the team reached out beyond the Urban Redevelopment Authority to the Manchester community, the Mayor's office, the US Senate, as well as the Department of Energy and Housing and Urban Development.

2. Describe the impact that this project has had on the your community. Please be as specific as possible. Approximately 400 words.

By supporting the community decision making context through design, engineering, construction, and operation best practice opportunities and challenges, the research team created guidelines and workbooks to relate to decision making needs of urban redevelopment, finance, architecture/engineering, construction, homeowners/occupants, historic preservationist, energy and housing professionals.

3. What trade-offs and compromises were required during the development of the project? Did you participate in making them? Approximately 400 words.

The research design and architectural team while cooperating with the community and local residents did not dictate by using the R/UDAT workshops approach what would be the "best solutions" but showed the impact of community density, housing, architectural and engineering design alternatives for the quality of life, privacy, security, and community interaction potential life cycle costs, economically affordable solutions and their alternatives. The adopted solution, while being land-use, energy, environmental, and occupant comfort effective, to some degree limited the potential number of future residents that could be served in one street building block.

4. What do you consider to be the the most and least successful aspects of this project? Approximately 400 words.

The most successful role of the Public Private partnership, focused on the needs of the community and its citizens, provided major opportunities for more future-proof construction, material, component and systems development, engaging major industries and advancing local, regional and national policy developments. While the project also included the installation of solar thermal systems on the south facing roofs, opportunities to create and install small-scale electric/energy cogeneration systems, which were just emerging, were not applied. Therefore, the current work that the City of Pittsburgh, the Green Building Alliance 2030 Challenge, and the Energy Innovation Center cooperation addresses these issues and how they relate to research, development, demonstration and workers/trade unions education and industrial/governmental relationships.

A long-term effect of the multi- and interdisciplinary education includes the fact that graduates of the Architecture, Engineering and Urban Planning program became leading edge practitioners. For instance, Steve Lee and his wife Yoko Tai started a successful practice focused on further advancing neighborhood redevelopments in the Pittsburgh Hill District Community and many other environments. Steve Lee, serves as Head of the School of Architecture since 2010, Donna Leban an energy expert, practices in Vermont, one of the leading edge conservation and renewable energy states of the US. Furthermore, over 40 PhD graduates advance practices, research, education, and demonstrations in China, Japan, Korea, Singapore, Europe, North and South America. After his graduation, Khee Poh Lam served as Dean of Architecture at the National University of Singapore and after joining the team of CMU's CBPD and SoA, serves as aboard member of the US Energy Foundation. Satish Kumar is the Energy Efficiency Ambassador at Schneider Electric in India.

Despite of the fact that it was a relatively small project, its achievements were the reason that President Jimmy Carter invited project leaders to the White House to address US related challenges and opportunities.

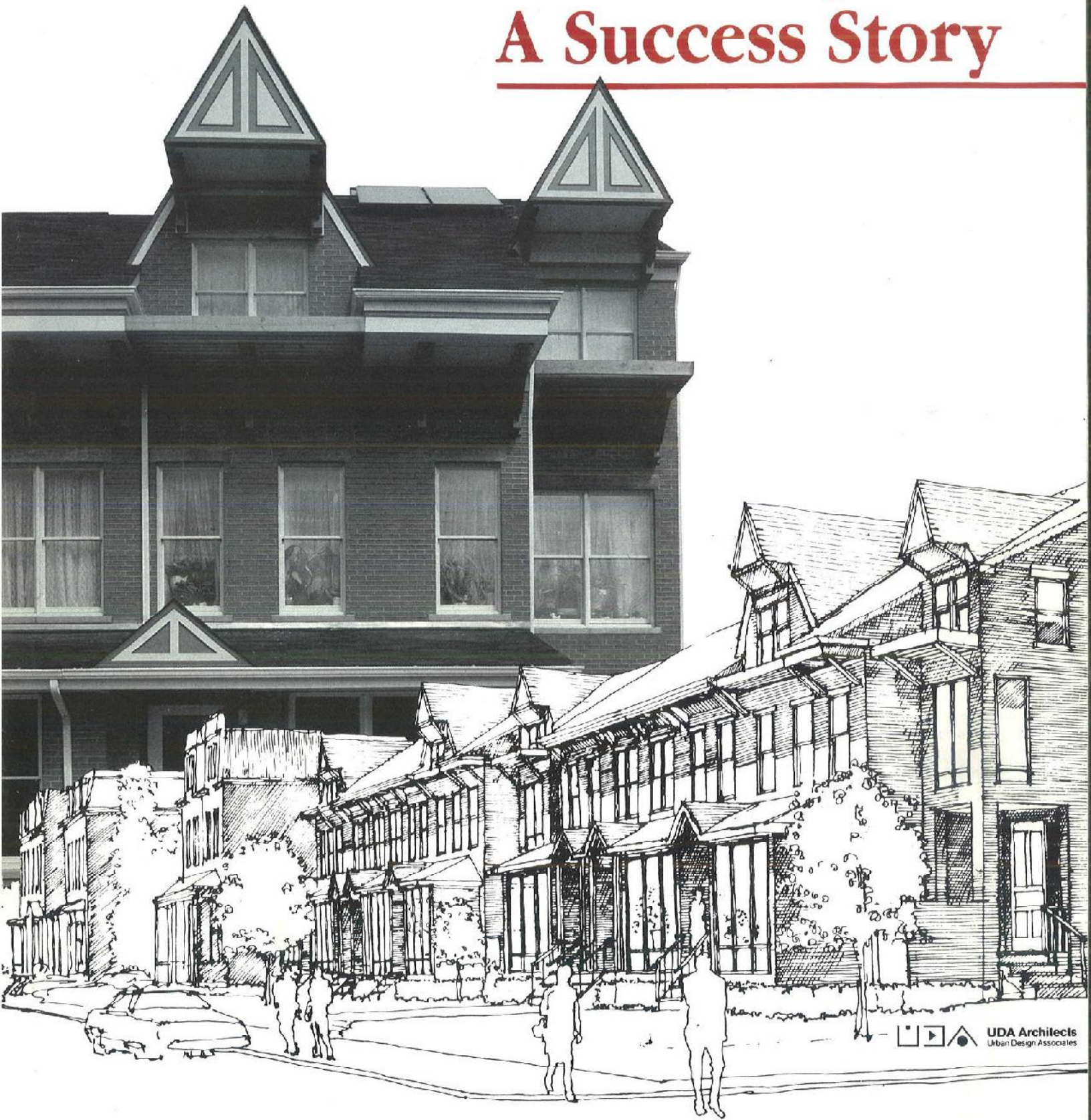
Pictures of 1300th Block of Manchester as on November 14, 2014


STREET
CLEANING
NO PARKING

Pictures of the community from the past
Image source: UDA

Supplementary Pages for Rudy Bruner Award
The Manchester Project, PA

THE MANCHESTER PROJECT:
A Success Story



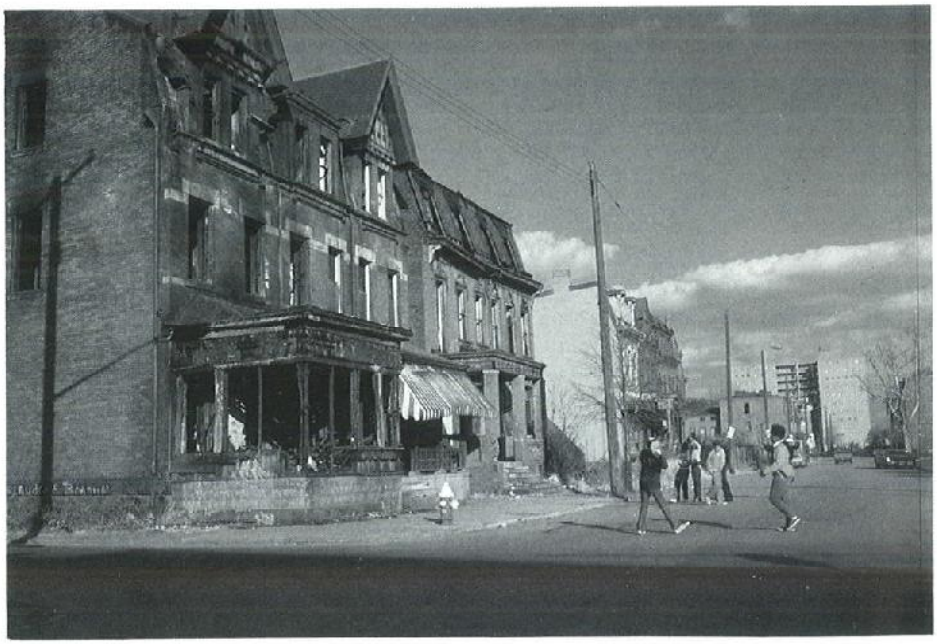
Energy Conservation as applied to **Inner-City Revitalization** made possible by **Community Action** and the intelligent folk at HUD, DOE, DOI, URA, MCC, and CMU.

THE MANCHESTER PROJECT:

Never before has there been such a case for inner-city residential revitalization.

Never before has energy conservation been so economical and politically astute.

Never before have so many community support groups worked as one.



The Manchester Project. Before...

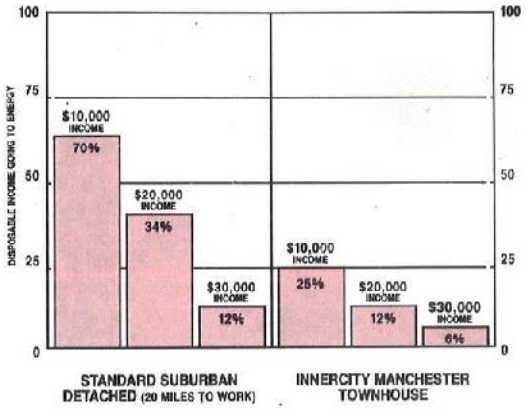
A typical declining inner-city neighborhood with a dwindling population, Manchester was faced with demolition, making way for warehouses and parking lots to improve the city's tax base. The remaining 1,000 households spent $1 million for gas and electricity, consuming up to 50% of disposable incomes, and relying more and more on fuel subsidies.

In the past decade, the problem of rising energy costs has increased for large segments of the population, offering an unprecedented stimulus for energy efficient design and construction practices.

For the past ten years, Carnegie-Mellon University's Institute of Building Sciences, funded in part by the Department of Energy and the City of Pittsburgh, has studied energy conservation in the inner city.

The published studies, which are ongoing, have been instrumental in creating a new social awareness for urban development. Energy efficient rehabilitation of abandoned housing and new infill construction is now decidedly desirable in the revitalization of the inner city. Energy conservation is no longer a unique feature of the new middle class suburb. It can happen anywhere. In fact, our cities' oldest neighborhoods offer the best prospect for energy efficient living.

The Manchester Project is one of the first energy conservation studies to have directed itself to key-decision making groups beyond the architect and buyer. The success of the project depends on widespread replication, fulfilling the following political and social goals.



PERCENTAGE OF DISPOSABLE INCOME NEEDED FOR ENERGY

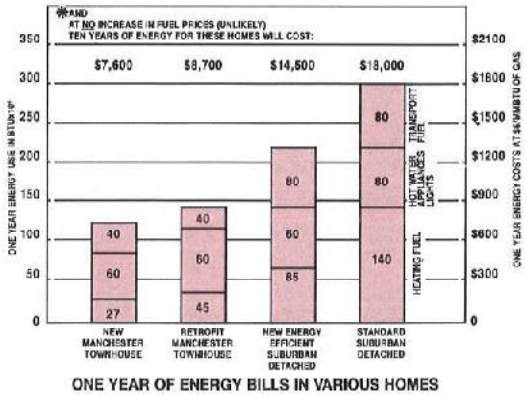
Low to moderate income homeowners and renters need to protect their dwindling disposable income (income after taxes, insurance and mortgage) from being eaten up by energy costs. If fuel prices continue to rise, you may be spending over half of your disposable income on heating and appliances, with little left for food, clothing, and entertainment.

A Success Story

Who would ever have thought it possible to spend as little as $250 a year on energy (heating, cooking, and hot water) and, yet, live in the vital old-style neighborhood of your choice?

The Manchester Project. ....and after.

Today, the work of the Manchester Citizens Corporation, and such innovative revitalizers as T. Mistick and Sons, has given Manchester a whole new future. One key performer in this revitalization is the Manchester Project, located on the Sheffield Block in Manchester, an inner-city neighborhood of Pittsburgh, Pennsylvania. The Manchester Project is successfully demonstrating the advantages of inner-city revitalization through the energy efficient rehabilitation of abandoned housing (12 units), the energy retrofit of existing housing (10 units), and the infill of new energy efficient construction on vacant land (15 units).



ONE YEAR OF ENERGY BILLS IN VARIOUS HOMES

Movement back to the cities can save homeowners' energy: 20-30% simply through the warmth of shared walls in townhouses; 50% of what remains through weatherizing old houses, and 85% through infilling energy efficient new homes; 30-50% savings in personal transportation costs, through the close proximity of jobs, services and entertainment.

Political Goals

Residential movement back to an energy efficient city offers an unparalleled potential for politicians: to improve the urban tax base; to increase urban infrastructure and service utilization; to reduce the need for alternative low to moderate income housing and housing subsidies; and to greatly improve the image of the increasingly abandoned city as a place to work, shop, and live.

Moreover, energy efficient revitalization can ensure that the low to moderate income family can continue to live in the city without relying on subsidies. If present energy costs continue to rise, lower income families will spend more than 50% of their disposable income (after taxes, insurance and mortgage) on home energy use.

Social/Homeowner Goals

The energy efficient Manchester homes were built at the same monthly "mortgage plus energy" costs as new, not so efficient homes sold as "economical." Yet, homeowners in the Manchester Project are guaranteed amazingly low energy bills ($300-$400 a year!) while the new "economy" homeowners may see energy bills over $1000 this year alone.

This economy of fuel not only gives back to the homeowner disposable income for food, clothing and entertainment, in their own neighborhood, but also helps to harness the nation's ever-increasing demand for energy.

The advantages of innovative "mortgage plus energy" financing cannot be overstressed to the financier or the politician.

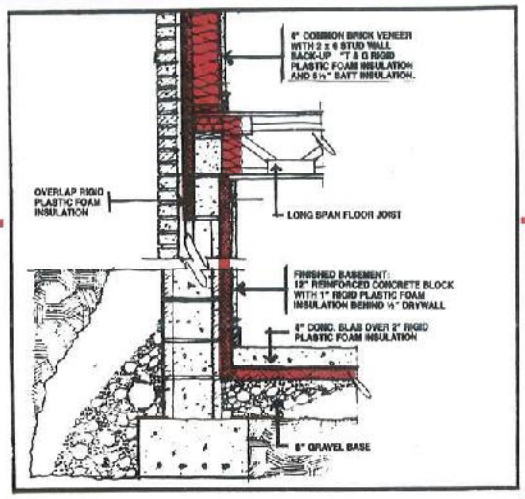
Guidelines for Each Decisionmaker

The scope of the Manchester project involved the rehabilitation of abandoned structures, the retrofitting of existing housing units and the construction of new housing units on vacant land.

The early energy studies and design guidelines for Manchester formed the basis from which the research team developed criteria for four key decision-making groups in other cities:..

Critical Design Criteria

The designer has the best chance to make a home energy efficient at no or little additional cost. Three guidelines are critical:



This detail shows the designer's clear desire for cost effective energy conservation: 5½ inches to batting in 2x6 studs; an exterior inch of R-8 to cover all thermal bridges; 2 inches of rigid insulation under the slab and up the basement wall, overlapped with the exterior insulation, and, extra insulation in the band joist.

1

Cluster to Reduce Surface

Build urban densities by grouping units into townhouses and apartments. 20-25% of home heating can be saved through shared walls. The reduced external surface will also save $3000 per unit in construction.

2

Insulate and Seal Well

Double the quantity of standard insulation (to R-25 in the walls and R-35 in the roof,) specify quality thermal windows, and carefully detail to reduce infiltration. These measures are **most** critical to the effective use of solar energy.

3

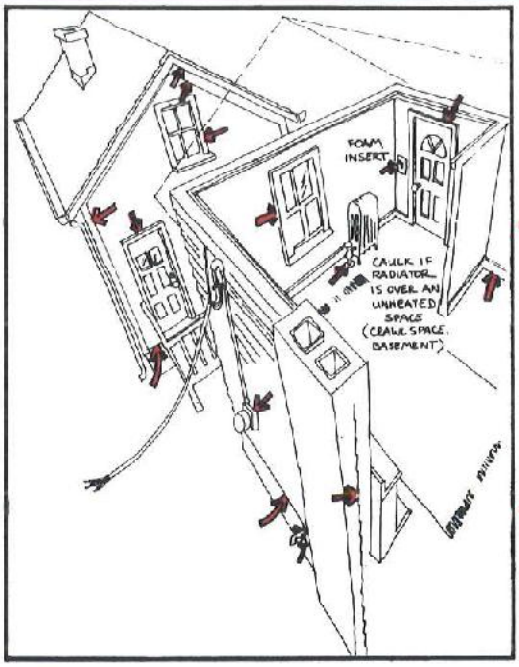
Open to the Warming Sun

Organize the home so that the real living areas can be in the sun. Strategically move windows to the south and let the sun shine in!

These windows were moved to the south side of the Manchester homes to ***let the sun shine in.***

...Owners and Renters
Designers and Builders
Financiers, Appraisers and Developers
Politicians and Community Officials

With the efforts of each of these decisionmakers, revitalization of the inner city can become a priority for urban redevelopment, funded by the economics of energy conservation alone. Some of the critical criteria for various decisionmakers will be discussed in the next few pages.



The job of making a continuous moist — air barrier or windbreaker is not complete without caulking and weatherstripping all of these weak points.
Illustration credit: The Energy Saver's Handbook, Massachusetts Audubon Society, Rodale Press, 1982.

Critical Construction Criteria

The construction team can lose much of that energy efficiency if they are not careful to make three barriers truly continuous:

Build for Thermal Insulation Continuity

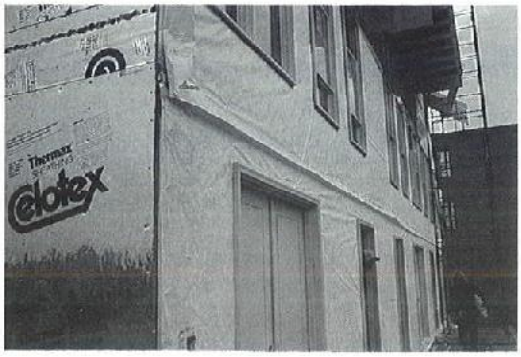
Insulate more than the standards demand and insulate **completely**. Much of the heat loss from homes sneaks through the connections between floor and outside wall, ceiling and outside wall, and foundation walls. Take care to pack material around all awkward connections and openings.

1

Build for Moist — Air Barrier Continuity

On the heated side of the insulation, install a continuous polyethelene wrapper. Overlap around corners and window/door openings. Be careful not to puncture the moist — air barrier with outlets, light fixtures and finish cutting or nailing.

2



Tyvek™, an inexpensive windbreaker for your home, goes right under the final brick or wood cladding, outside the insulated framing. When overlapped at connections and wrapped around frame openings, the Tyvek windbreaker has been shown to reduce cold air infiltration by over 25% — a payback of less than one year. The extra inch of R-8 rigid board is also shown in the photo. It is easy to install and very effective in reducing infiltration and conductive losses through the studs.

Build for Wind Barrier Continuity

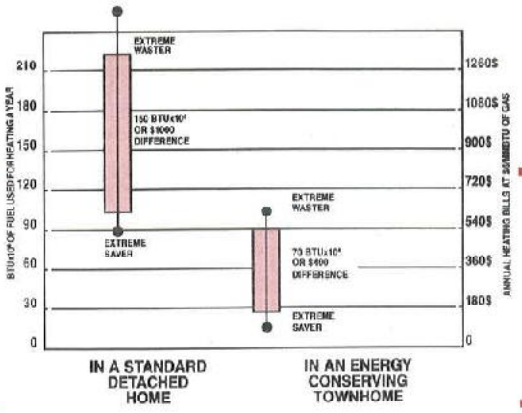
Before the final exterior cladding, wrap the outside of the house in a vapor-porous "windbreaker," such as Tyvek™ Overlap around corners and window and door openings.

3

During construction, be careful that the **continuity** of the thermal, moisture and wind barriers are not broken by plumbing, electrical fixtures, interior finish materials, windows, doors, or exhausts.

Critical Home Caretaking

Getting the full benefit of owning or renting the energy efficient home depends on a few critical activities from day to night and from summer to winter. Energy management does not need to be time consuming, and offers you the benefits of real thermal comfort, like basking in the sun in winter and living in the breeze in summer, not to mention saving you money.



THE IMPORTANCE OF HOME CARETAKING

The care that a homeowner takes in managing energy use can make a $1000 a year difference in energy bills! Luckily, the Manchester homeowner can be a luxurious energy waster and still only pay a maximum of $400 a year more for energy.

1

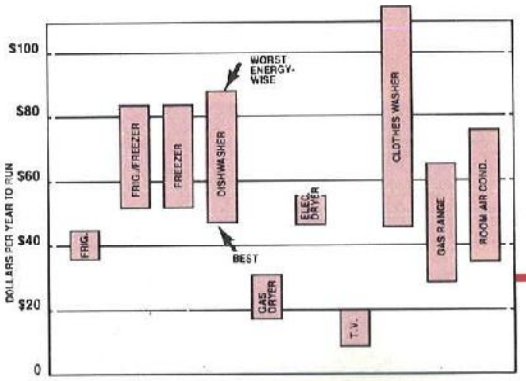
Zone Your House

"Live" in those rooms in your house where you can take the best advantage of the sun's free energy. Close off doors to cold spaces on the northern side of the house and to the unused stairwells. When entering or exiting, use the "airlocks" by closing one door before opening another, reducing the infiltration of cold winter air.

2

Use Day/Night Controls

Wisely invest in a setback thermostat. At night, lower the thermostat temperature, lower window shades, and close off unused rooms. On sunny days, open the insulating curtains and the doors between rooms to let the sunshine in!



AVERAGE ANNUAL ENERGY COSTS IN USING VARIOUS (BETTER OR WORSE) APPLIANCES

The refrigerator, dishwasher, and clothes washer are the biggest energy consumers in your home. Buying the **right** refrigerator (an energy efficient one) could save you as much as $50 a year, and the right clotheswasher could save you $70 a year. Look at the Energy Guide label when buying a new appliance to see how much it will cost you **every** year, not just the first time.

3

Use Energy Efficient Appliances

Buy new refrigerators, washers, dryers and hot water heaters by looking at the Energy Guide which is attached to the new home appliances. A cheaper appliance may cost twice as much to run per year.

The Homeowners' Workbook (page 8) describes daily and seasonal steps that could save you $400 to $900 a year!

Critical Political and Financial Criteria

Energy efficiency does not mean more carrying costs. No additional investment is needed for the sake of conserving our earth's natural resources. What we do use, we can use more efficiently. Conserving energy also means conserving disposable income, increasing a city tax base, and reducing endless subsidies.

Pittsburgh's Mayor Richard S. Caliguiri breaks ground for Greenlee Gables with the Manchester Citizens Corporation.

Use a Given Endowment

Our inner city areas are the best residential investments we can make, because they've proven themselves. The infrastructure exists: gas, electricity, water, streets, transportation — even jobs — are there, ready to be tapped for efficient use. Why create more housing in the suburbs, where the public amenities needed will so heavily tax our system? Revitalize the inner city!

1

Try a Preventive Measure

We must protect the low and moderate income family from rising energy costs. Without even being warm, they can pay up to 70% of their disposable income on energy costs, which is truly appalling. In addition, our "futility" subsidies in non-energy efficient communities have reached $150 million a year in Pennsylvania alone (1.5 billion nationally.)

2

Repeat a Proven Investment

Critical to the success of revitalizing our inner cities is the provision of innovative financial support. The real carrying costs of new homes or renovated homes are the "mortgage plus energy" costs. Energy efficient revitalization of our cities is economical, not experimental. Buyers and homeowners, developers and builders, all should be rewarded for their efforts to save energy.

3

Housing that is densely clustered, in a mixed use urban area that offers close proximity of jobs and services, creates vastly more energy efficient neighborhoods than present suburban models. The residential revitalization of the inner-city offers renewed utilization of existing infrastructure, an increased tax base, an alternative to housing subsidies, **and** a new look for the city as a place to work, shop and live.

Manchester...15 new infill homes [redacted], 12 new apartments in abandoned buildings [redacted], 10 retrofit homes [redacted]; each are energy efficient and comfortable for today and tomorrow.

This publication is dedicated to Geno Baroni

Carnegie-Mellon University has prepared a series of guidelines and workbooks, based on the Manchester Project, intended to stimulate further energy efficient residential revitalization of the inner city.

These workshops can be ordered by writing directly to the principal investigator for the project, **Volker Hartkopf, c/o Department of Architecture, College of Fine Arts, Carnegie-Mellon University, Pittsburgh, Pennsylvania, 15213.**

☐ **ENERGY CONSERVATION GUIDELINES for the Sheffield Block Development** Volume 1 (New Construction), Volume 2 (Rehabilitation); Department of Energy Inner-City Case Study and Demonstration Project; illustrated. $20.00

☐ **THE HOMEOWNERS' WORKBOOK for Energy Conserving Urban Living** by Vivian Loftness, Volker Hartkopf, Naomi Yoran; illustrated. $10.00

☐ **THE DESIGNERS' AND CONTRACTORS' WORKBOOK for Energy Conserving Design** by Stephannie Bartos Design and Architectural Research with Andrew Collins; illustrated. $10.00

☐ **THE FINANCIERS' WORKBOOK for Energy Conservation Benefits** by Stephannie Bartos Design and Architectural Research with Andrew Collins and Mary Ann McGunigle; illustrated. $10.00

☐ **THE POLITICIANS' WORKBOOK for Energy Conserving Urban Revitalization** by Vivian Loftness, Volker Hartkopf, Naomi Yoran; illustrated. $10.00

☐ **ENERGY CONSERVATION AND SOLAR DESIGN GUIDELINES for the City of Pittsburgh** by Stephannie Bartos; illustrated. $10.00

☐ **MAKING HISTORIC DISTRICTS ENERGY EFFICIENT** by Richard Glance & Associates and CMU; illustrated. $10.00

name _____

address _____

city _____ state _____ zip _____

Checks or money orders only. Please allow 4 to 6 weeks for delivery. Penna. residents add 6% sales tax.

The research and studies forming the basis for this report were conducted pursuant to a contract with the U.S. Department of Energy. The statements and conclusions contained herein are those of the contractor and do not necessarily reflect the views of the U.S. Government in general or DOE in particular. This report is not an official standard, and neither the United States nor DOE nor Carnegie-Mellon University makes any warranty, expressed or implied, or assumes responsibility for the accuracy or completeness of the information herein.

Supplementary Pages for Rudy Bruner Award Letters of Support

A letter of support of the application of the Center for Building Performance and Diagnostics in the School of Architecture at Carnegie Mellon University for consideration of a 2015 Rudy Bruner Award for Urban Excellence

As a multi-year resident in one of the homes created through the innovative bottom up community, university, governmental agencies, industry and urban leadership public/private partnership, I am pleased to write this letter of support.

From approximately 1985 to 1991 my family and I lived in a 'sustainable' home in the Manchester neighborhood on the Northside of Pittsburgh. This home was part of the 'Manchester Project', and was the product of a collaborative effort of several organizations: a neighborhood community group, several governmental, and private agencies. The energy effective 'lived-in' project was based on the collaborative and research work performed by Carnegie Mellon University's Institute of Building Sciences, now the Center for Building Performance.I understood the project was intended to help low and moderate income families to dramatically reduce home and water heating costs, while improving indoor environmental quality.

My experience was quite financially and environmentally beneficial, and was realized immediately. As a result of the research and application work that was conducted on-site and in the homes, there was a significant reduction in our usage of gas for home and water heating. The reduction in monthly bills over a period of several years amounted to significant savings while assuring good lived-in qualities for my young family.

In the meantime, I am pleased to know that the pioneering work in the Manchester Neighborhood in Pittsburgh received many national and international awards and is of importance for many households in similar communities locally and across the country that benefit from the result of this work.

Sincerely,

Darlene Covington Davis
Graduate Program Coordinator
School of Architecture

Carnegie Mellon University

Center for Building Performance and Diagnostics
Robert L. Preger Intelligent Workplace
MMCH Suite 415
5000 Forbes Avenue
Pittsburgh, Pennsylvania 15213-3890

Phone: (412) 268-2350
Fax: (412) 268-6129
http://www.arc.cmu.edu/cbpd

December 5, 2014

To the Rudy Bruner Award Committee

The Manchester Energy Effective Housing Demonstration Project has many remarkable features, but one of the most timeless is the series of workbooks created for the project:

- Designers' & Contractors' Workbook
- Homeowners' Workbook
- Politicians' Workbook
- Financiers' Workbook
- Energy Conservation & Solar Design Guidelines for the City of Pittsburgh
- Making Historic Districts Energy Efficient: A Case Study

These documents pre-date the digital era, so they are hard copy only. The rich illustrations and photographs, however, and the careful thought, analysis and guidance are still highly relevant. In addition, the complete set of workbooks acknowledges the multi-faceted nature of urban redevelopment and the importance of providing information and education to each redevelopment sector about the benefits and techniques used to achieve energy effective performance in urban housing. As an example, the Designers' & Contractors' Workbook recommends the kind of tight, highly insulated building envelopes and low levels of air leakage that the most current energy codes (IECC 2012 and 2015) require. This workbook even advocates that cogeneration and district heat pump loop systems be considered for building conditioning, ideas that are currently being evaluated for redevelopment sites such as the Mellon Arena and Almono.

As a faculty member focused on high performance housing and the Principal Investigator on a current Pillars of Sustainable Education grant from the Alcoa Foundation for collaborative and sustainable community redevelopment in the Hazelwood neighborhood in Pittsburgh, I can see the intense level of effort and high value offered by the Manchester project. With minor updates, the Homeowners' Workbook could be adapted for our work and for other projects in similar climates. This kind of enduring value deserves recognition.

I highly recommend that the Manchester Energy Effective Housing Demonstration Project be recognized for its enduring value and contribution to innovative thinking and excellence in the urban environment.

Sincerely,

Nina J. Baird
Adj. Assistant Professor & Principal Investigator
Center for Building Performance & Diagnostics
Carnegie Mellon University

THE AMERICAN INSTITUTE OF ARCHITECTS

December 4, 2014

Rudy Bruner Award Selection Committee

Subject: Robert L. Preger Intelligent Workspace Award Submission

Dear Selection Committee:

I am privileged to write a letter of support for the Urban Excellence Award focused on the Manchester Neighborhood Project and how it is benefiting the work of the Center for Building Performance and Diagnostics, our city and beyond to advance the practices of multi-professional collaboration in energy efficient urban building design.

This Manchester project provided the building blocks for the creation of Carnegie Mellon University's Robert L. Preger Intelligent Workspace. The project is an award winning net zero laboratory that provides data for shaping the built environment of the future. This experimental building was designed as a result of years of research gleaned from successful urban townhouse energy retrofit projects in the historic neighborhoods of Pittsburgh. The information gathered from these projects served as inspiration for the intelligent workspace which in turn has proven to be a harbinger of new and innovative architectural designs for urban living globally.

I currently teach a graduate class in construction management in the building and find the unique design and features of the building to be very useful in demonstration of construction quality techniques. The data being collected from the building's daily energy intelligence assessment systems is providing a bright beacon for the evolution of new energy efficiency construction principles and shifting the paradigm for future urban work / living environments. The architect learns by pushing the boundaries of the building's functions. This building as laboratory is informing the current and next generation of architects how to design healthier and more sustainable buildings in the future.

As a result of its sweeping sustainability initiative Robert L. Preger Intelligent Workspace is serving the profession at levels that have not been experienced before. This effort is worthy of national recognition and I trust that the committee will agree that the built environment will be better as a result of this project's contributions.

Sincerely,

William J. Bates, AIA
Vice President 2015

1735 New York Avenue, NW
Washington, DC 20006-5292
Information Central: 800-242-3837

LUDWIGSBURG

REFERAT
NACHHALTIGE STADTENTWICKLUNG

STADT LUDWIGSBURG, Postfach 249, 71602Ludwigsburg

Leitung
Gebäude: Wilhelmstraße 5
Kontakt:HerrAlbert Geiger
Telefon: 07141910-2850
Telefax: 07141910-2401
E-Mail: a.geiger@ludwigsburg.de
Internet: www.ludwigsburg.de
Zeichen: I R 05 Ge/Wi

Ludwigsburg, 05.12.2014

Meeting in Pittsburgh on 20th and 21st November.

Dear Rudy Bruner Award Selection Committee,

As the Head of the Department of Sustainable Urban Development of Ludwigsburg, Germany, I am impressed by the important future oriented work towards urban excellence in Pittsburgh. The achievements of public/private partnerships advancing energy and environmental effective neighborhood redevelopments, supported by interdisciplinary education, research, and multi-professional decision making processes created groundbreaking livable communities.

The Manchester Neighborhood redevelopment project provides an outstanding example of long lasting advanced practices.

The cities of Ludwigsburg and Pittsburgh are now pursuing opportunities to collaborate and learn from each other how we can create sustainable built environments. In early May 2014, the Mayor of Pittsburgh, Bill Peduto, came to Ludwigsburg with US industrial and community colleagues to interact with the Lord Mayor of Ludwigsburg, Werner Spek, his team and German industries. In November I had the pleasure to visit Pittsburgh and experience the performance of major breakthrough projects.

Just after I returned to Ludwigsburg in November we learned that our city was honored as the leading midsize sustainable city of Germany. The possibility that you, the Rudy Bruner Award Selection Committee would recommend to support the application of the private/public partnership work of the Center for Building Performance at Carnegie Mellon University in Pittsburgh would further strengthen our future oriented cooperation.

I was impressed by the great examples that you created by the extension of your new institute because of the newest knowledge regarding to a sustainable construction industry. It was especially interesting to see the already existing network for a future-oriented sustainable urban development in Pittsburgh. Furthermore I appreciate our prospective cooperation between Ludwigsburg and Pittsburgh.

I was fascinated by the other best practice examples which could be lighthouse-projects for other cities.

It was very an instructive and almost unsurpassable event to visit the Intelligent Workplace (IW) at the Carnegie Mellon University. The depiction of this energetically and climatically area was inspiring. In addition to that the excellent research impressed my accompanists and me deeply.

Particular the discussion at the Carnegie Mellon University helped to outline the common features and differences between Pittsburgh and Ludwigsburg referring to the long term objectives. We can both learn from each others experiences.. All in all this will give us the chance to stay in close contactand follow the same course.

The sustainable redevelopment of the Energy Innovation Center shows us how you and your team routes Pittsburgh to the future. The retrofitting of the building was impressive because of the innovative conversion and the high-quality sustainable renovation. Therefore I want to thank you forthe information and discussion concerning the funding of the building.

From my point of view the Energy Innovation Center contains a lot of potential to be copied by other cities worldwide. Due to such projects we will be able to spread the issue of Energy and Sustainability to our society. I myself took out al lot of suggestions for Ludwigsburg for our almost similar center.

Furthermore other best practice examples like the energetically renovation of the PNC bank, the active/passive building in South Oakland and the neighborhood redevelopment project showed us why Pittsburgh is called the leading city of the United States for sustainable building retrofitting and Sustainability.

It was an honor for me to spend these two interesting days with you and your. Not only the informative study trips of the best practice examples but also the successful discussions with the deputies of the citizenship of Pittsburgh strengthened us in our future cooperation. I look forward to this possibility of working together which will both give us a synergetic effect by carrying out our projects.

Best regardsfrom Ludwigsburg,

Albert Geiger

Supplementary Pages for Rudy Bruner Award Awards and Media

Progressive Architecture Award

The 33rd Annual P/A Awards Program

UDA Architects
Institute of Building Sciences, Department of Architecture, Carnegie-Mellon University

Project: *Energy Effective Housing Demonstration in the Inner City*

For UDA Architects:

David Lewis
Raymond L. Gindroz
Donald K. Carter
James P. Goldman
Partners

Stephen R. Lee
Project architect

For Institute of Building Sciences, Dept. of Arch., Carnegie-Mellon University:

Volker Hartkopf
Project director, principal investigator

Stephannie Bartos
John Einsiedler
Elizabeth Fox
Marcela Gaskill
Bennett Halpern
Lawrence R. Hoffman
Chien-Hsun Huang
Donna Leban
Bruce Leslie
Vivian Loftness
Meredith Myers
Travis L. Price, III
Stewart Rehr
John E. Roth, Jr.
Robert Woodbury
Amos Yoran
Naomi Yoran
Research team

For Dept. of Civil Engin., Carnegie-Mellon University:

Cliff Davidson
Jim Osborne
John Borazzo

Glance and Associates
Historic preservation consultants

Carl Detwiler & Associates
Rehabilitation consultants

P. J. Joy Construction Co.
Metrobuild Construction Co.
New housing construction

Architectural Energy Corp.
Performance monitoring

Manchester Citizens Corp: S. Lowe, W.D. Thompkins, E. Holmes, S. Cecchetti, L. Olszewski, R. Wooten
Client

City of Pittsburgh, Urban Redevelopment Authority: Chm. J.P. Robin; S. George, P. Brophy

Dept. of Planning: Dir. R. Lurcott; Planner E. Holmes

Dept. of Energy, Office of Buildings and Community Systems: Dir. J. Millhone; Dir. of Building Systems Div. (until 1982) J. Cable; Project Mgr. J. Boulin. Brookhaven National Lab.: R. Jones, D. Hagen, W. Loss

HUD: G. Baroni, W. Jabzanka
Dept. of Interior: L. Nelson, AIA
National Science Foundation: Program Dir. G.H. Albright
Government Client Agencies

January 1986

SOLAR AND ENERGY EFFECTIVENESS HISTORY OF THE CENTER FOR BUILDING PERFORMANCE & DIAGNOSTICS AT CARNEGIE MELLON UNIVERSITY 25 SEPTEMBER 2002

HOUSING:

1976 – 1977	Passive/active solar house in an inner-city context in the United States (Worldwide?), the South Oakland House, Pittsburgh, PA. (Funded by City of Pittsburgh.) Still fully operational.
1981 – 1985	Neighborhood wide energy effectiveness program with city block scale demonstration (1300 Block Sheffield Street), Manchester neighborhood, Pittsburgh, PA. (Funded by DOE & HUD.) Still fully operational.
2001-2002	Solar Decathlon "ReSOLution"

COMMERCIAL BUILDINGS:

1994 – 1997	Robert L. Preger Intelligent Workplace at Carnegie Mellon University. (Funded by Advanced Building Systems Integration Consortium (ABSIC), Carnegie Mellon University, & private donors.) ABSIC, founded in 1987, is the first and largest private/public partnership for research development and demonstration of high performance commercial buildings.
1997 – Present	Partial Technology Transfer Spin-off projects: Kangnam Tower, Seoul, Korea OC Headquarter, Toledo, Ohio Soffer Organization Tech Offices, Pittsburgh, PA Adaptable Workplace Laboratory, GSA, Washington, D.C. Region 3 Headquarter, DEP, Harrisburg, PA Laboratory for the Design of Cognition, EDF, Paris Beijing Energy Efficient Office Building, Beijing, jointly with US DOE, MOST (China), and NRDC
1999 – present	Research & Development Phase of Building As Power Plant (BAPP). (Funded by Advanced Building Systems Integration Consortium.)
2003 – 2004	Construction of Building As Power Plant (BAPP). (Funded by federal, university, private, and Advanced Building Systems Integration Consortium resources.)

Department of Energy
Washington, DC 20585

FEB 2 6 1986

Mr. Volker Hartkopf
Institute of Building Sciences
Department of Architecture
Carnegie-Mellon University
Schenley Park
Pittsburgh, Pennsylvania 15213

Dear Volker:

I am writing to congratulate you on receiving the Award for Applied Research from Progressive Architecture magazine for the project on Energy Effective Housing Demonstration in the Inner City.

As the project director and principal investigator for the project, your vision and diligence are the ingredients which made this successful project possible.

The project is an important contribution to energy research in this country, not only because of its technical characteristics and findings, but because of its attention to the human dynamics and human impacts in an urban area that too often have been ignored.

Sincerely,

John P. Millhone, Director
Office of Buildings and Community Systems
Conservation and Renewable Energy

Energy-Efficient Housing

UDA Architects; Carnegie-Mellon University, Department of Architecture, Institute of Building Sciences

Research firms: UDA Architects, Pittsburgh (David Lewis, Raymond L. Gindroz, Donald K. Carter, James P. Goldman, partners; Stephen R. Lee, project architect).
Inst. of Building Sciences, Center for Building Diagnostics, Dept. of Architecture, Carnegie-Mellon University, Pittsburgh (Volker Hartkopf, project director and principal investigator; Stephanie Bartos, John Einsiedler, Elizabeth Fox, Marcela Gasshill, Bennett Halpern, Lawrence R. Hoffman, Chien-Hsun Huang, Donna Leban, Bruce Leslie, Vivian Loftness, Meredith Myers, Travis L. Price III [1980–81 project manager], Stewart Rehr, John E. Roth, Jr., Robert Woodbury, Amos Yoran, Naomi Yoran. Department of Civil Engineering: Cliff Davidson, Jim Osborne, John Borazzo).
***Consultants:** Glance & Assoc., historic preservation; Carl Detweiler & Assoc., rehabilitation; P.J. Joy Construction Co., new housing construction; Metrobuild Construction Co., Architectural Energy Corp., performance monitoring.*
***Clients:** Manchester Citizens Corporation, Pittsburgh (exec. dirs. S. Lowe, to 1982, W.D. Tompkins, 1982–84; E. Holmes, 1984–present); S. Cecchetti, J. Olszewski; R. Wooten.*
***Government client agencies:** Urban Redevelopment Authority, Pittsburgh (exec. dirs. S. George, to 1982; P. Brophy, 1982–present); Dept. of Planning, Pittsburgh (R. Lurcott, director; E. Holmes, planner); U.S. Dept. of Energy, Office of Buildings & Community Systems (J. Millhone, dir.; J. Cable, dir., building systems division until 1982; J. Baudin, proj. mgr.; Brookhaven National Laboratory, R. Jones, D. Hagen, W. Loss).*
U.S. Dept. of Housing and Urban Development, Office of Neighborhoods, Voluntary Assoc. & Consumer Protection (G. Barosi, asst. dep. secy.; W. Jabzanka, special asst.).
U.S. Dept. of the Interior, National Park Service, National Trust for Historic Preservation, Technical Preservation Service (L. Nelson,

Title: Energy Effective Housing Demonstration in the Inner City

Recent energy research and practice has had only limited impact on those hardest hit by rising fuel costs—low-income families in urban areas. They often occupy the least efficient housing, usually in the oldest and most decayed parts of the city. This project's case study and demonstration project are intended as a model for the organization of energy-efficient, economically sound rehabilitation of inner-city neighborhoods. It is aimed at community groups, governmental agencies, and even homeowners.

The case study consists of four parts. Part One outlines the program and design of the demonstration project. Part Two offers technical energy guidelines for architectural and construction design and specifications. Part Three comprises four demonstration workbooks—for designers and contractors, homeowners, financiers, and politicians. Part Four includes local energy guidelines, a section on making historic districts energy efficient, and a report on the success of the demonstration project.

The demonstration project itself focuses on Pittsburgh's inner-city Manchester neighborhood, which is listed on the National Register of Historic Places. Working with a nonprofit citizens' development corporation in collaboration with local government agencies, the research teams chose a typical block—Sheffield Street—for the demonstration site. It combined the rehabilitation of existing buildings with new building construction on infill sites. The architectural goal was to incorporate active and passive solar design with residential design that responded to family and community aspirations, within a design envelope that conformed to guidelines for new infill in the National Register district. It produced 14 demonstration units, four of which, after monitoring for a full year, met computerized energy performance predictions. Public and private loan/subsidy programs have been designed to assist other citizens' groups and homeowners, and the project's next phase will include the rehabilitation of historic buildings within the demonstration block.

Jury comments

Bryan: This is a very long-term project. It went on for several years, involved a team of maybe a dozen or more researchers, designers, etc., and it's a total project: research, design, and post-occupancy evaluation. It includes energy, infill housing, an urban-low-income, inner-city situation, solar energy, management, community meetings, design meetings, historic preservation, and energy evaluation. It shows that a team with tenacity can stick with something and come up with an array of documents that capture that comprehensive quality of the project over time. One set of documents is directed toward the financial community, one's for local politicians, one's for contractors, and one's for homeowners, to suggest how you would go about managing or dealing with the project.

Carpman: They could have taken a problem like that and come up with a mess, because it's so inclusive, but they don't do that. They really handle all the pieces very well and define their problem in a specific enough way. They concentrate here on four units for low and moderate-income families in an inner-city historic district. Their active and passive solar design is being monitored, so it's a post-occupancy evaluation in that sense. There's a lot of community participation involved, and the research team has taken all the information that has come out of all those things and put it into accessible formats. They have design guidelines for energy conservation in both new construction and renovation in inner cities. And they have this amazing series of workbooks for all the different people who might need to plan these things. The project represents creativity, tenacity, and a breadth of vision we don't usually see.

Bryan: I think the patience that is expressed in these documents is worth the award in itself. And any one of these documents could stand up by itself as a piece of work. ■

National Science Foundation, Division of Mechanics, Structures, and Material Engineering (G.H. Albright, program director)

All requests for published information relating to the study should be addressed to the Department of Architecture, Carnegie-Mellon University, Pittsburgh, Pa. 15213. Attn.: Volker Hartkopf.

SECOND PLACE AWARD—MULTIFAMILY CATEGORY

HDA Architects
249 North Craig Street
Pittsburgh, Pennsylvania
(412)681-8500
Carnegie-Mellon University
Institute of Building
Sciences,
The Manchester Citizens
Corporation, and
Volker Hartkopf, Energy
Consultant

PROJECT DATA

Location:	Pittsburgh, Pennsylvania 40° North Latitude
Climate:	Cool, Northern 5,278 Heating Degree Days, 946 Cooling Degree Days.
Living Area:	1,600 to 2,400 sq. ft. 3 Stories plus basement 1 to 3 Bedrooms 1 or 2 Baths
Selling Price:	$40,000 to $100,000/unit est.
Approximate Annual Solar Contribution:	70 percent (including energy conservation)
Auxiliary Heat Energy Requirements:	19 to 32 million Btu/year
Auxiliary Heating System:	Natural gas-fired furnaces

Note: All estimates of energy consumption are based on the designer's calculations.

Sheffield Street Demonstration Project

This demonstration project is in an historic inner city neighborhood in Pittsburgh. It is typical of many older neighborhoods in Northeastern cities in which historic streets are perforated with empty sites.

After years of decline, a resurgence of interest and investment is occurring in these neighborhoods. The neighborhood now has been declared an historic district and considerable investment in scholarly renovation is being made by individual owners. As a result, the demonstration project has been designed with care to integrate a modern housing solution with the existing architecture of these historic streets.

The neighborhood is integrated: comprising black and white, low and moderate income families, young and old. On this particular block, for example, there are town houses, mansions, public housing, and new infill housing.

The client for the demonstration project is a Citizens' Non-Profit Development Corporation, acting with a Self-Help Grant from HUD (Office of Neighborhoods, Voluntary Associations and Consumer Protection).

The Institute of Building Sciences of Carnegie Mellon University, supported by a contract from the Department of Energy, furnished energy guidelines for the new construction, and also for a second demonstration project yet to be started: the rehabilitation of a burned-out and gutted mansion, as part of a community-wide energy planning effort. The Institute and the architects for the demonstration project worked with full citizen involvement throughout the design, financing and construction phases.

The demonstration project is intended to develop prototypes that can be monitored for energy performance and construction cost, for application to the urban mass housing market, particularly in inner-city situations in the northern states of the United States and in Canada.

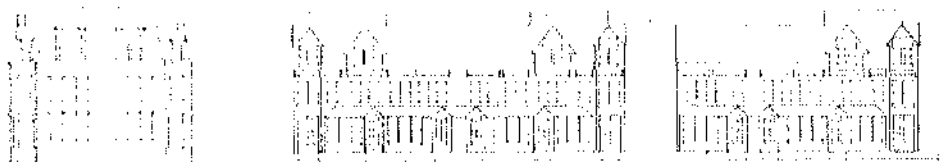
The total Demonstration Project will include 15 new in-fill housing units to be constructed on vacant city lots, and 12 units in renovated historic structures.

The innovative energy features of the Demonstration Project are:

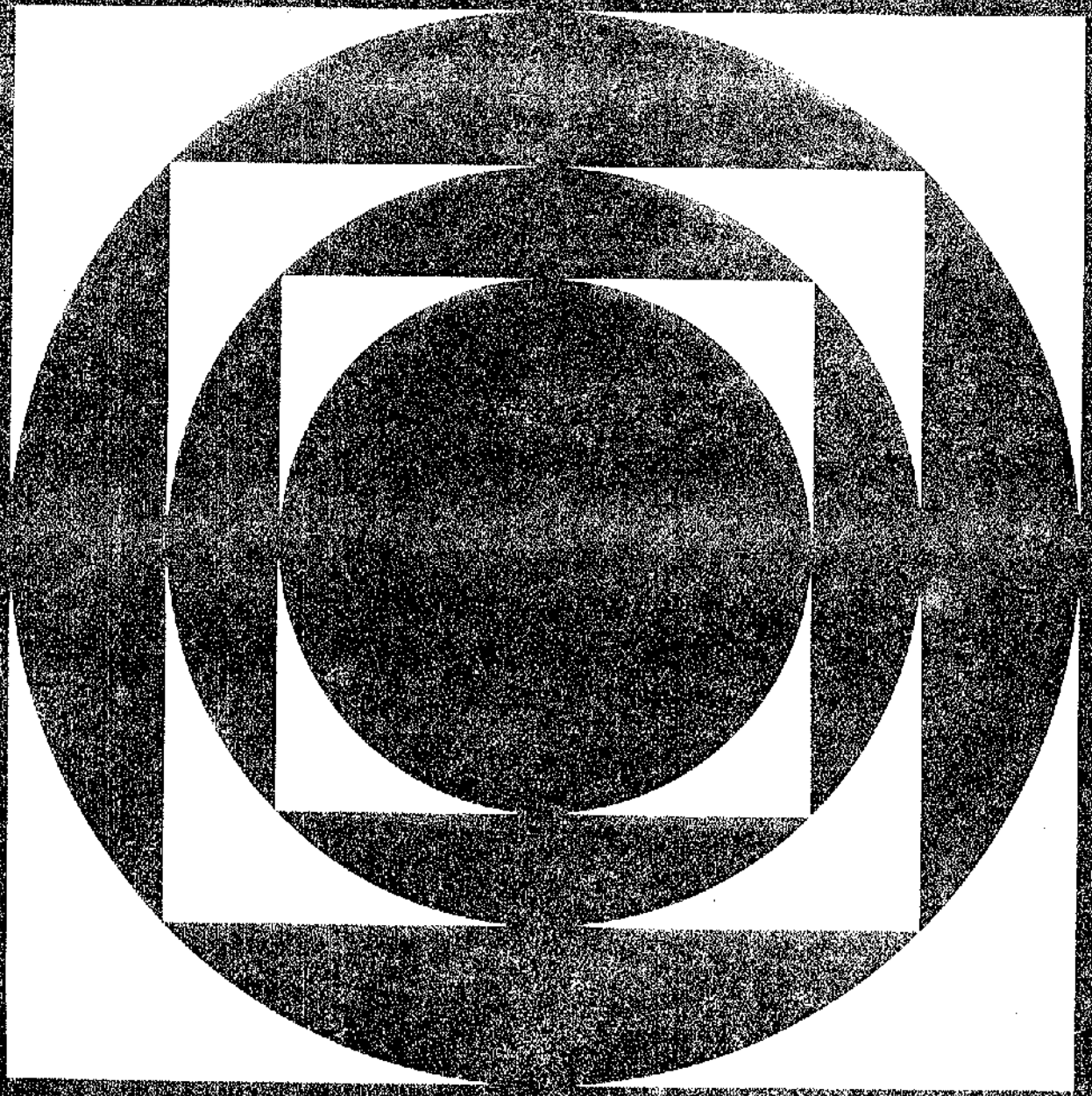
- Reduced embodied energy requirements through inner-city infill using existing infrastructures.
- Lower energy demand through site design and orientation, and architectural design including compactness, insulation, tightness, overhangs, screening, etc.
- Augmentation of non-renewable energy resources with passive solar for space heating, active solar for domestic hot water.
- Energy efficient gas heating back up and appliances.
- Avoidance of indoor air pollution through air-to-air heat exchangers and exhaust systems.
- Reduced demand through User Management Handbook and guidelines.
- Computerized monitoring of energy consumption patterns and dissemination of results.

Jury Comments

- The Pittsburgh project is one of the few that has carried through consistently and in a conventional manner, the problems of orientation, energy and fitting in with the urban environment in a simple way. It is just so free of uncertainties.
- It really has a clarity of architectural approach.
- This could be typical in all of the Northeastern cities.
- The urban solution is very strong here.



SHEFFIELD STREET DEMONSTRATION PROJECT



The American Gas Association's

1983 Passive Solar Design Awards

Co-Sponsored by
Solar Age Magazine

Supplementary Pages for Rudy Bruner Award Publications

Volker H. Hartkopf[1] *and Vivian E. Loftness*[1]

Promoting Energy-Efficient Rehabilitation and New Infill Construction in the Inner City

Authorized Reprint from Special Technical Publication 901 1986

REFERENCE: Hartkopf, V. H. and Loftness, V. E., **"Promoting Energy-Efficient Rehabilitation and New Infill Construction in the Inner City,"** *Building Performance: Function, Preservation, and Rehabilitation, ASTM STP 901*, G. Davis, Ed., American Society for Testing and Materials, Philadelphia, 1986, pp. 93–110.

ABSTRACT: During the past decade, major technical advances were made in energy conservation and in the use of alternate energy sources for residential construction. At the same time, the problem of rising energy costs has increased for large segments of the population, offering an unprecedented stimulus for energy-efficient construction practices. Nonetheless, the actual introduction of the new energy technologies into the planning, design, construction, and use of housing today still remains surprisingly unsophisticated and often is localized to new middle-class suburbs. This paper introduces an inner-city case study and demonstration project in Pittsburgh, Pennsylvania, that has attempted to penetrate these problem areas by demonstrating the political, economic, social, and technical reality of major energy savings afforded by inner-city rehabilitation and infill construction. To promote the introduction of the available new materials and energy technologies into the existing housing development process, the project team has developed workbooks of relevant guidelines, targeted at key decision-making groups: politicians and community officials; financiers, appraisers, and developers; designers and builders; and owners and renters.

KEY WORDS: inner-city revitalization, urban redevelopment, energy-conscious urban infill, rehabilitation, retrofit, energy-efficient housing

Project History

The Manchester inner-city case study and demonstration project deals with the needs of a typical declining inner-city neighborhood with a dwindling population of low to moderate income residents. As with many nongentrified urban neighborhoods, rising energy and housing costs combined with stagnant incomes have resulted in greatly reduced disposable incomes for the resi-

[1] Associate professor and adjunct associate professor, respectively, Institute of Building Sciences, Department of Architecture, Carnegie-Mellon University, Pittsburgh, PA 15213.

Atmospheric Environment Vol. 21, No. 2, pp. 299–311, 1987.
Printed in Great Britain.

MODELING AND MONITORING OF CO, NO AND NO_2 IN A MODERN TOWNHOUSE

JOHN E. BORRAZZO, JAMES F. OSBORN, ROY C. FORTMANN*, RANDALL L. KEETER and CLIFF I. DAVIDSON

Departments of Civil Engineering, Engineering & Public Policy and Biomedical Engineering, Carnegie-Mellon University, Pittsburgh, Pennsylvania 15213, U.S.A.

(First received 25 September 1985, in final form 9 May 1986 and received for publication 30 July 1986)

Abstract—Mass-balance models for indoor concentrations of CO, NO and NO_2 were applied to an energy-efficient townhouse. Model parameters include source emission rates, infiltrating airflows, and, for NO_2, loss rate coefficients. Emission factors for CO, NO and NO_2 were estimated for each of the gas-fired appliances in the house. Airflows were estimated using sulfur hexafluoride (SF_6) decay techniques. Loss rates for NO_2 were calculated as the difference between NO_2 removal rates and estimated air exchange rates. CO and NO concentrations decayed at a rate not significantly different than that for SF_6. Comparing model predictions with measured concentrations yielded differences averaging 17% for CO and NO, and 28% for NO_2.

Key word index: Indoor air quality modeling, CO, NO, NO_2, range-top burners, emission factors, SF_6, loss rates.

INTRODUCTION

Mass balance models have been proposed to predict indoor air quality for more than two decades (e.g. Turk, 1963). Over this time, considerable effort has involved refining these models and developing better methods for estimating the model parameters (National Academy of Sciences, 1981; Yocom, 1982). Of particular importance has been the need for accurate estimates for three categories of parameters: source emissions, air exchange rates and sink terms.

Source emissions from indoor combustion have usually been characterized in terms of emission factors, defined as the mass of pollutant emitted per unit of fuel input. Past studies focusing on combustion sources have involved laboratory measurement of emissions from gas-fired ranges (Himmel and DeWerth, 1974; Yamanaka *et al.*, 1979; Traynor *et al.*, 1982a; Moschandreas *et al.*, 1985) and from unvented gas or kerosene-fired heaters (Girman *et al.*, 1982; Porter, 1984). Such emission factors have been used in models to predict indoor pollutant concentrations (Traynor *et al.*, 1982b; Caceres *et al.*, 1983; Moschandreas and Relwani, 1985).

Techniques for estimating air exchange rates with tracer gas decay methods are well-established. These methods have been used primarily to estimate whole-house infiltration rates (Grimsrud *et al.*, 1980; Bassett *et al.*, 1981). Use of tracer gases to measure room-to-room airflows or rates of internal mixing has not been as extensive.

In studying sink terms, some researchers have focused on the development of a model incorporating NO_2 reactive chemistry (Ozkaynak *et al.*, 1982). Others have concentrated on estimating the values of the resulting loss rates (Hoon *et al.*, 1984).

The overall objective of the current study is to develop and verify a non-dimensional one-compartment mass-balance model for indoor airborne concentrations of CO, NO and NO_2 in an energy-efficient townhouse equipped with gas-fired appliances. This involves evaluating the three categories of model parameters. First, obtaining source emissions estimates has required the development of a sampling system to determine emission factors for the cooking range in the townhouse. Emphasis has been placed on the variation of emission factors with time and the influence of gas flow rate on emission factors after achieving steady-state. Second, air exchange rate measurement in this study includes estimation of infiltrating airflows as well as rates of internal mixing. Third, in evaluating sink terms, observed pollutant concentrations are used to estimate loss rates due to factors other than exfiltration.

EXPERIMENTAL

In order to acquire a data base for estimating model parameters and for subsequent model verification, an urban townhouse in Pittsburgh, Pennsylvania has been selected for study. Construction followed guidelines for energy-efficiency established by the Institute of Building Sciences at Carnegie-Mellon University under contract with the U.S. Department of Energy (Hartkopf *et al.*, 1981). Figure 1 includes a schematic floor plan of the house. Each floor has overall dimensions of 9.2 m × 5.5 m with a height of 2.5 m. The living

*Current address: Geomet Technologies, Inc., 20251 Century Blvd, Germantown, Maryland 20874, U.S.A.