What This Guide Will Do

This guide was developed for individuals interested in increasing energy efficiency while maintaining the historic integrity of our nation's buildings.

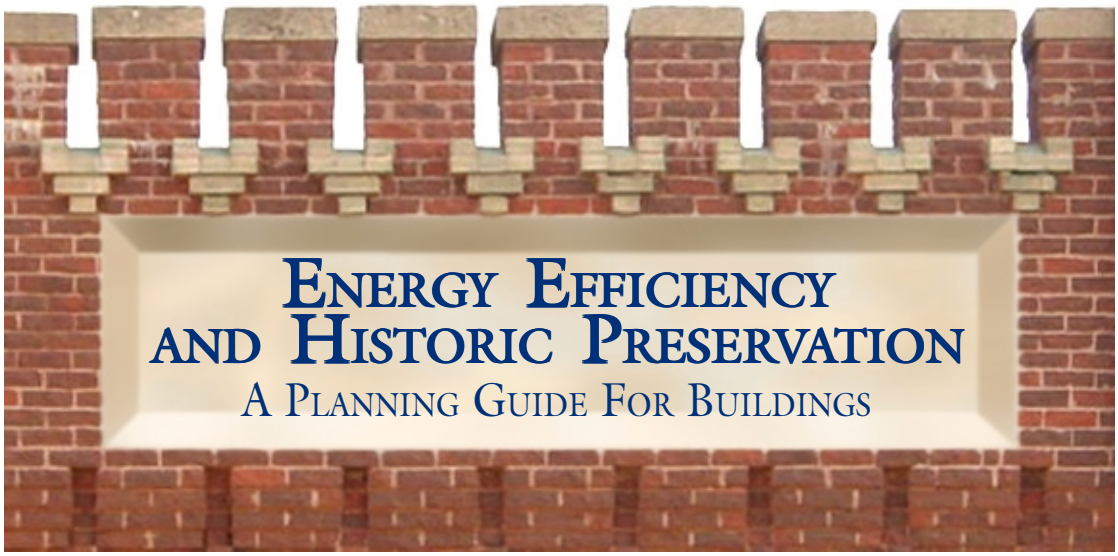
The guide gives a broad view of steps to take when planning and implementing energy efficiency projects in historic buildings. It discusses the importance of the "Whole Building Approach" which entails taking a current building inventory, determining project goals and developing a plan for the building. In order to increase the energy efficiency of a building and maintain its historic character, trade-offs may be necessary.

For instance, if the windows are a pertinent historic element and have air infiltration problems, instead of replacing the windows choose to apply a low-E coating and increase the size of the heating and cooling systems.

This guide will not give specific advise regarding building elements, but gives resources to contact to determine the appropriate building solutions.

Each historic building is unique and requires specific solutions to energy efficiency and historic preservation concerns that can be answered by qualified professionals who specialize in those fields.

Rebuild Nebraska



Energy Efficiency and Historic Preservation

A Planning Guide For Buildings

All buildings change either by the hand of Mother Nature as they deteriorate or by the hand of man as they are altered to serve new purposes. These structures change to meet the requirements of modern codes and comfort levels. Most of these changes are made for energy efficiency, code compliance or improved convenience and can be made within the historic context of the building's original form.

Utilizing the whole building approach when planning a restoration project can create a "win-win" situation with positive energy efficiency and historic preservation benefits. The whole building approach provides building owners with information on the various components of the building and how the components work together. Understanding the interaction among these components and the various trade-offs that exist will result in selecting the best improvements to gain the maximum investment benefits.

This planning guide was created to provide an easy to follow checklist for building owners, design-build professionals, architects and any other interested parties to follow when renovating a historic structure. Particular emphasis is placed on enhancing energy efficiency while maintaining the historic attributes of buildings.

Before beginning the process of renovating a historic structure, it is important to (1) categorize the project, (2) develop a plan and (3) capitalize on the opportunities.

Categorize the Project

Start with the checklist and create a base of information regarding the building. It helps to determine four elements that will be important in later stages of the project. These four elements include the owner type of the building, the current building use, the current condition of the building components and the fixtures and equipment with relation to both energy efficiency and historic preservation.

Determine the Owner Type

It is essential to determine the owner type in order to investigate available financial resources. Generally owners fall into the three classifications of private, public or non-profit.

Privately owned buildings are those owned by a single person or a group of owner/investors. Public buildings are owned by federal, state, county, city or village governments. Non-profit buildings are owned by organizations such as a churches, fraternal organizations or possibly community development groups.

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These classifications of owner types are helpful later in the *Determining Finance Options* on page 5.

Establish Common Language for Use and Occupancy Categories

It is important to maintain a "common language" as you begin to assemble data for any project. This will eliminate misconceptions related to the intended use of the building.

Building inspectors and most regulatory agencies recognize and use these terms:

- Assembly — theaters, auditoriums or gymnasiums
- Business — office space
- Educational — schools, training centers
- Factory and Industrial
- Hazardous — semiconductor fabrication, research and development
- Institutional — hospitals, nursing homes, nurseries, health care facilities
- Mercantile — display and sale of goods and merchandise, retail, wholesale
- Residential — single family, multi-family
- Storage — moderate to low hazardous materials storage including combustibles
- Utility — private garages, sheds, agricultural buildings, tanks, towers

Determine Current Building Condition

The current condition of the building is paramount in determining the extent of the restoration or renovation project. For example, the restoration required for a building currently in use will not be nearly as extensive as that required for a structure which has been vacant and/or allowed to deteriorate.

Go To 2. on the Checklist

Documenting the current building condition will give the owner an idea of what critical areas need work. Documenting may also help phase the project into manageable pieces as well as give engineers and contractors a clearer view of the project prior to a site visit.

The condition of the building components must be part of this documentation as well. These components are either fixtures and equipment that consume energy or restrict or regulate the transfer of heat, such as walls, ceilings, floors and windows, and reduce energy use.

If the building is currently in use and will be similarly used after the renovation, contact your State Historic Preservation Office for a walk-through to determine historically significant features. An energy audit of the building is also recommended at this stage.

If planning a major renovation project and the use of the building may change, wait until you have a plan in place before completing an energy audit. In both an energy audit and a historic walk-through, the professionals will be looking at the building components, the fixtures and the equipment.

Building Components

Go To 3. on the Checklist

The actual physical structure of a building includes many components such as the exterior walls, roof, foundation, windows and doors. Each type of material used in the various building components will carry an "R-value" rating. The term "R-value" refers to a measure of a material's resistance to heat flow given its thickness. The higher the R-value the more effective the particular insulation.

An experienced energy professional will be able to calculate heating or cooling losses in the building and determine which areas are critical to loss or gain.

Fixtures and Equipment

Go To 4. on the Checklist

Fixtures and equipment are also important considerations when compiling the base of information and are critical to the building's energy efficiency. Some may also be critical to the historic preservation of the building.

The Grand Army of the Republic Memorial Hall, built in 1894, is one of the historically-significant buildings that benefited by participating in the local Rebuild effort. Only four of an estimated 100 Civil War halls remain in Nebraska. The interior of the building has been historically restored and is used as a museum, housing civil war artifacts in Nebraska City.

The Eighth Street Center project combined two buildings, built in 1928, and is currently used as an office building and outlet store in the Nebraska City Historic District.

The evaluation of the existing fixtures and equipment will be essential in developing a renovation plan. It will help determine if some or all of the existing equipment is appropriate and energy efficient or if it will need to be replaced. Examination of the existing fixtures and equipment will also serve as valuable information to develop a long-term plan should it be necessary to phase the project.

When looking at replacing fixtures and equipment, be sure to look for the yellow EnergyGuide label. The EnergyGuide label shows the estimated yearly electricity consumption to operate the product and a scale of comparison of similar products.

Develop The Plan

Successful projects take serious planning. Planning is the most critical aspect of building restoration projects that maximize energy efficiency and historic preservation restoration projects. A properly researched energy efficiency and historic preservation plan can help deter numerous problems that could arise in a project. Some aspects of planning that need to be evaluated include establishing a building goal or plan, creating a project team and determining the financial resources for the project.

Look ahead.

The intended use of a building will create different goals for a project. For example, if the use of a building is to stay the same, the project is likely to have among its goals: improved energy efficiency, improved convenience for existing operations, lowered maintenance costs and/or improved appearance for occupant and customer appeal.

In cases where there is a new use for an occupied building, the project is likely to have among its goals: improved economic return on investment, lowered maintenance costs, improved energy efficiency, improved convenience for employees and clientele and/or improved appearance and customer appeal.

In cases where there is a new use for an unoccupied building, the project is likely to have economic return on investment among its goals. The project will likely not have increased energy efficiency as a goal because it is virtually impossible to improve the energy efficiency in a structure when it is not currently consuming any energy.

Define the project goal.

The first thing to do is to define the primary goal for the project. The primary goal may be a simple one-line statement to a paragraph describing the anticipated use of the building and the energy savings and efficiency you would like to achieve or maintain. For example, in an existing building where use is to stay the same the primary goal may be to reduce energy consumption by 15% per year.

In cases where extensive remodeling is anticipated, a more comprehensive "program statement" will be of great benefit. A program statement takes the primary goal one step further and looks at such things as, the actual space (volume) required for the new use(s), anticipated budget and the existing areas with historic character to be preserved.

Once the primary goal and/or program statement is established, a project team must be selected. The project team will include a number of professionals who will look at various aspects of the project such as engineering, finance and design.

Organize the project team.

The project team will vary with different kinds of projects. The team put together must be appropriate to the project. Experienced people need to be consulted in all aspects of a project involving an existing structure. The initial examination of a structure should be as thorough as possible using the trained eyes of professional engineers and architects. This is especially important when making structural changes to the building.

For projects relating to energy efficiency and improvements of the interior support systems (heating, air conditioning, ventilation, lighting, communication and electrical power) it may be advisable to use more than one engineer with specialized skills in those areas. These engineers will assess the capability of the existing systems, as well as the remaining life of the equipment in place, and aid in the design of replacement systems and sizing of specific equipment to assure appropriate efficiency levels are achieved. If an energy audit on the building has not been performed, the engineer may be able to perform the audit so the building's energy use can be calculated before and after improvements are made.

An architect should be consulted to evaluate the condition of the building "envelope" (the skin of a building). The role of the architect is essential to determine the current condition and "R-Value" of existing insulation materials. The architect needs to work closely with the engineer(s) to calculate the current and estimated heat gain and loss of the structure.

The efficiency of the equipment used within the structure may have the highest efficiency rating available, however if the building is not properly insulated and sealed, the benefits of the equipment decrease dramatically. Therefore, it is important to utilize the whole building approach and measure the trade-offs associated with all energy efficiency and historic preservation improvements.

A member of the project team may be certified to perform an energy audit of the building. Local utilities or the State Energy Office may be contacted for assistance in finding an energy auditor.

Evaluation of the historic elements of a building by a preservation architect will identify major character-defining features that need to be preserved, restored or replicated. When planning for the renovation of a historic structure, when the building will have a new use, it is essential to determine the significant historic features to help make appropriate design decisions. The State Historic Preservation Office may provide assistance in determining historically significant elements in a building.

When beginning any restoration project it is important to remember that a number of local agencies need to be involved in the project. Include your local building, electrical, mechanical, plumbing and fire safety inspectors.

The First National Bank Building was constructed in 1908 and serves as the cornerstone in the Unadilla Historic District.

Potential Funding Sources

Cash The investor puts up all of the money without financial assistance from other sources.

Conventional Loan The investor puts up a portion of the necessary funds and borrows the remainder of the money from a lending institution. The construction loan may be converted to a traditional mortgage after construction is complete.

Equity Loan The property owner can apply for an equity loan where the existing value of the property is used as the collateral for the loan to perform the work.

Energy Loan Energy loans, available in some states, are revolving loan pools available for energy efficiency improvements in a structure. The loans are calculated to be paid back by the savings generated by the improved energy efficiency and require before and after documentation of cost and consumption.

Grants Many State and Federal Agencies have grants available for specific types of structures, uses or development areas.

Tax Credits The most common Tax Credits are those for the rehabilitation of historic structures.

Determining financing options

The financial considerations for any project vary. Privately owned buildings may be eligible for conventional loans, equity loans, energy loans or state and federal grants. If the building is listed on the National Register of Historic Places and is privately-owned, it may be eligible for Historic Tax Credits as long as the Secretary of the Interior's "Standards of Rehabilitation and Guidelines for Rehabilitating Historic Buildings" are followed. Have the project plan reviewed by the State Historic Preservation Office early in the process to ensure planned work complies with the Standards and Guidelines.

The State Energy Office can be helpful for technical assistance and can refer various options for financing energy efficiency improvements.

Projects developed by any of the owner types may be eligible for support by federal funds. Grants and loans, which include even a small percentage of federal funds, are likely to trigger compliance with the Secretary of the Interior's "Standards for Rehabilitation of Historic Structures".

The Whole Building Approach

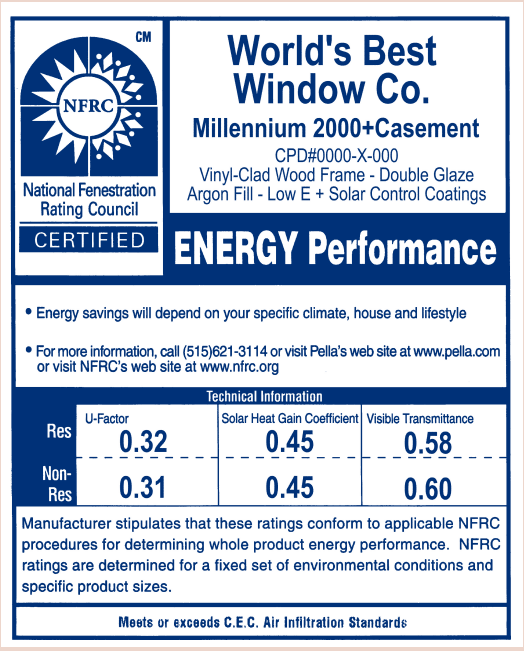
The "Whole Building Approach" takes into consideration all aspects of the existing building condition, the interaction among the building elements, the established project goals and evaluates potential solutions to achieve the goals. This approach also enables the total project to be broken into manageable stages of development, especially if financial circumstances dictate spreading the project over an extended period of time.

When analyzing a building utilizing the "Whole Building Approach", it is essential to analyze the current condition of anything that consumes energy within the building and anything structurally that increases or decreases heat transfer.

When performing energy efficiency improvements on historic buildings refer to the Secretary of the Interior's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings" for guidance. Typically these standards strive to encourage people to maintain the historic characteristics of the building and building materials. Contact the State Historic Preservation Office with plans prior to implementing changes to ensure they are acceptable methods.

Building Envelope-Structure and Windows

Studying the foundation of a building to make sure it is structurally sound — as well as the exterior walls, the roof and the windows — is essential. Each element should be looked at with relation to its energy efficiency, as well as its historical integrity.



Source: NFRC Certified Products Directory. For more information contact NFRC Incorporated at (301)589-6372.

The National Fenestration Rating Council

The National Fenestration Rating Council (NFRC), is a non-profit, public/private collaboration of manufacturers, buildings, designers, specifiers, code officials, consumers, utilities and regulators. The Council is establishing a national energy performance rating system for fenestration products (windows and doors) as required by the *Energy Policy Act of 1992*.

The NFRC does not set minimum performance standards or mandate specific performance levels. Instead, Council ratings are a measurement of product energy performance and energy-related properties which can be used to determine whether a product meets state or local codes or other performance requirements. The Council has established a rigorous process by which products are rated. By certifying and labeling their products, manufacturers are demonstrating their commitment to providing accurate energy and energy-related performance information.

An example of NFRC's temporary certificate label is shown on this page. This label is designed to provide consumers, builders and code officials with energy performance ratings in a comparable, easy-to-read format. The label proves that the product is NFRC certified. It also identifies and describes the product and shows its U-factor and other energy-related performance ratings. The temporary label is accompanied by a permanent label or imprint somewhere on the product.

The Bender Building has seen many changes since it was constructed in 1890 by William Koontz, a local carpenter, contractor and builder. The building was owned by Karsten and Patterson who used the facility as a furniture store and funeral parlor. A new energy-efficient heating and cooling system puts this over 50 year old building to good use as retail, office and apartment space in downtown Nebraska City.

Changes related to the building envelope will likely relate closely to the air infiltration levels, which will be discussed later.

According to the Secretary of the Interior's "Standards for Rehabilitation", repairing masonry walls and other masonry features by repointing the mortar joints, where there is evidence of deterioration, is a recommended procedure. Similarly, making windows weathertight by recaulking or replacing and installing weatherstripping may be done to decrease air infiltration while maintaining the building's historic integrity.

Air Infiltration

Various techniques are used for infiltration control, such as installing storm windows, recaulking windows and tuckpointing brick structures, replacing sashes in window frames, replacing or adding weatherstripping on doorways and recaulking door frames.

Heating, Ventilation and Air Conditioning Equipment

The equipment used to heat and cool the interior space consumes energy, so improving energy efficiency of mechanical equipment is a means of saving energy. Many older structures have obsolete equipment that consumes far more energy than newer modern efficiency units and thus costs more to maintain a comfortable environment.

The architect or engineer on the project team will size the building's heating, ventilation and air conditioning equipment. When replacing heating, ventilation, air conditioning systems, be sure to check insulation levels as well. Higher efficiency equipment placed in a building with inadequate insulation levels, will not give the best return on investment possible. Be careful when sealing historic buildings too tight, as too tight of a seal without proper ventilation may damage the historic materials used in the construction of a building.

When dealing with obsolete heating, air conditioning, electrical and plumbing equipment, it is important to identify, retain and preserve the visible features of the early mechanical systems that are important to the overall historic character of a building. For example, when replacing a boiler system that utilizes radiators with a centralized heating and cooling system, leave the radiators in the building even though they will not be used. The radiators are historically significant features of the building.

Appliances

Appliances and office equipment use energy and produce heat. Most modern appliances and equipment, such as refrigerators and photocopiers, are more energy efficient than those manufactured just a few years ago. Those appliances often have an energy efficiency rating that helps consumers make educated purchases based on their particular situation (hours of use of the product and local utility costs). Be sure to

Energy Guide Labels and ENERGYSTAR™ Program

In the 1970s the U.S. government established a mandatory compliance program requiring certain types of new appliances to help consumers compare the energy efficiency of similar products. The EnergyGuide label shows the estimated yearly electricity consumption to operate the product along with a scale for comparison of similar products. An example of an EnergyGuide label is show at right. More information about EnergyGuide labels can be found at **www.eren.doe.gov/buildings/consumer_information/energyguide.html**

The ENERGYSTAR™ program is a voluntary program sponsored by the U.S. Department of Energy and the Environmental Protection Agency. This label signifies that the product exceeds the minimum national efficiency standards. For additional information check out **www.energystar.gov**

check the energy efficiency rating of any new appliances that may be purchased to insure the best value for your investment.

Lighting

Artificial lighting is another energy consuming convenience that is often overlooked. It is generally understood that fluorescent lamps are more energy efficient than incandescent. Likewise, halogen lamps, in certain applications, are more energy efficiency than florescent lamps.

In many cases lighting retrofits provide a great return on investment in a relatively short period of time. When retrofitting lighting in historic buildings it is important to maintain the visible features of the lighting systems whenever possible. Severely deteriorated or missing parts can often be replaced in kind or with a compatible substitute material pertinent to the era of the building.

For information on various lighting technologies and their energy efficiency implications, go on the web and check out **www.erendoe.gov/EE/buildings_lighting.html**

Insulation

Improving the insulating value of the skin of a building is one means of saving energy. All materials that make up the building envelope or the skin of a building, act to retard the movement of heat from one side to the other. When we expend energy to warm or cool the inside spaces of structures, it is to our advantage to slow the transfer of the conditioned air through the building's skin. According to the Secretary of the Interior's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings", when adding insulation to a historic building, typically thermal insulation can be added in attics and unheated cellars and crawlspaces to increase the efficiency of the existing mechanical systems. Increasing wall insulation is dependant on the historic integrity of the wall and the planned method of insulation. Contact the State Energy Office to determine the level of insulation recommended for your area.

Making The Most of Opportunities

When developing a plan for renovating a historically significant building, some energy savings are given priority over others based on how the different parts of the building interact. For example, restoring an original skylight may seem like a big energy mistake because of the potential heat loss through the skylight system. However, if the atrium space being developed beneath the skylight area requires minimal or no heat, then there may be a great deal of savings possible by the reduced amount of artificial light required.

The Bishoff Hardware Building was constructed in the late 1870s. After being vacant for nearly five years, a oriental restaurant was opened in this renovated building in the Nebraska City Historic District.

With all of the different aspects of planning for a building's use, it is important to take each stage of the design into consideration. The "Whole Building Approach" can help determine the relative amount of savings for the dollars invested in a project.

For the best results in a renovation project, utilize the "Whole Building Approach". Create a comprehensive plan to ensure the greatest benefit from the energy efficiency and historic preservation project.

Acknowledgments

Rebuild Otoe County strives to show that energy efficiency and historic preservation can work together to help improve and maintain our historic districts. Rebuild Otoe County is a part of the Rebuild Nebraska program which is affiliated with Rebuild America, a national energy efficiency program from the U.S. Department of Energy.

This planning guide was developed through a cooperative effort among the Nebraska Energy Office, the Nebraska State Historical Society and the River Country Economic Development Corporation with the assistance of many individuals including: Jerry Berggren, Berggren & Woll Architects; Lynn Chamberlin, Nebraska Energy Office; Melissa Dirr, Nebraska State Historical Society; Leroy Frana, Nebraska City Utilities; Nancy Hoch, River Country Economic Development Corporation; and Amy Pinney, Rebuild Otoe County.

A special thank you goes to the Rebuild Otoe County Advisory Council for the guidance and support on this planning guide, and the entire Rebuild Otoe County program.

Old Merchants National Bank Building Gets a Makeover

The Old Merchants National Bank building, constructed in 1857, is on the National Register of Historic Places. The stone-faced building features a modified Neo-Classical revival style. Originally, the building featured a large glass area on the first floor and stone beams visually supported the second floor, as shown below in an 1886 photo. A horizontal decorative beamed portico, originally above the first floor entrance, remains intact. At some point, the entrance facade was updated with opaque glass tiles and the entrance moved to the opposite side of the building. Removal of the glass tiles on the front of the building — a 20th century remodeling which is now considered historic — is not deemed possible.

This two-story structure has rock mortar foundation walls and standard three brick sidewalls of the period. Neither the sidewalls nor the ceiling are insulated, but commercial buildings abut two sides of the structure.

The Whole Building approach to restoration of the historic structure identified a number of recommendations, based on the planned new use of the building: a hair, nail and tanning salon. Most of the recommendations focused on air infiltration problems around doors and windows, or how adding insulation could reduce heating and cooling needs.

The photo of one of the second floor windows illustrates the elaborate ornamental details above the windows.

The building's new use necessitated a higher level of lighting, especially the need for task lighting, that offered a way to enhance the historical integrity of the structure. The owners were fortunate to find original light fixtures in the building which aided in the selection of new, replacement fixtures that nearly replicate the originals. Adding a few spotlights on the same track solved the task lighting issue. Use of compact fluorescent bulbs in the new fixtures allowed the owners to garner energy savings even though the amount of lighting had been increased.

The interior photo above illustrates the new light fixtures which closely resemble historical fixtures used in the building.

The first floor glass-fronted entrance to the Bank as it appeared in 1886.

Resources

Energy Efficiency and Renewable Energy Clearinghouse
www.eren.doe.gov/erec/factsheets/factsheets.html

Energy Efficiency Resources Energy Efficiency and Renewable Energy Network
www.eren.doe/rso.html

EnergyStar™ Program
www.energystar.gov

Rebuild America National Main Street Center
www.mainst.org

National Park Service Heritage Preservation Services Division
www2.cr.nps.gov

National Trust for Historic Preservation National Office
www.nthp.org

Nebraska State Historical Society
www.nebraskahistory.org

Preservation Tax Incentives
www.cr.nps.gov

Rebuild America
www.rebuild.org

U.S. Department of Energy
www.eren.doe.gov/buildings
www.eren.doe.gov/consumerinfo
www.energy.gov
phone: 800-dial-DOE

Recommended Reading

Brand, Stewart, *How Buildings Learn: What Happens After They're Built*, Penguin Books, 1994.

"Energy Conservation and Historic Preservation," supplement to 11593, Vol. 2. No. 3, Office of Archeology and Historic Preservation, U.S. Department of the Interior, Washington D.C., June 1977.

"Energy Conservation Guidelines for Existing Office Buildings," General Services Administration, Washington, D.C., February,1977.

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Fram, Mark, *Well Preserved*, Boston Mills Press, 1988.

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Sardinsky, Rocky, et al., *The Efficient House Sourcebook*, Rocky Mountain Institute, 1992.

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May 2001

Project Checklist

1. BUILDING OWNER TYPE

☐ Private ☐ Public ☐ Nonprofit ☐ Other _____

2. BUILDING CONDITION

☐ Currently in Use ☐ Vacant ☐ Other _____

3. BUILDING COMPONENTS

Exterior Walls

Structure
- ☐ Frame
- ☐ Wood
- ☐ Solid Masonry
- ☐ Hollow Masonry
- ☐ Other _____

Exterior Finish
- ☐ Masonry
- ☐ Wood Siding
- ☐ Stucco
- ☐ Metal Panel
- ☐ Vinyl Siding
- ☐ Other _____

Insulation Type
- ☐ Batt
- ☐ Blown-in
- ☐ Loose-fill
- ☐ Rigid
- ☐ Other _____

Insulation Material
- ☐ Fiberglass
- ☐ Rock wool
- ☐ Cellulose
- ☐ Polystyrene
- ☐ Urethane
- ☐ Wood
- ☐ Fiberboard
- ☐ Other _____

Interior Finish
- ☐ Plaster
- ☐ Gypsum Board
- ☐ Masonry
- ☐ Wood Paneling
- ☐ Metal/Plastic Panel
- ☐ Other _____

NOTES:

Roof

Structure
- ☐ Frame
- ☐ Wood
- ☐ Steel
- ☐ Other _____

Exterior Finish
Built-Up Roof
- ☐ Single Ply Membrane
- ☐ Asphalt and Gravel
- ☐ Other _____

Exterior Finish
Sloped Roof
- ☐ Composition or Wood Shingles
- ☐ Tiles
- ☐ Slate
- ☐ Metal
- ☐ Other _____

Insulation Type
- ☐ Batt
- ☐ Blown-in
- ☐ Loose-fill
- ☐ Rigid
- ☐ Other _____

Insulation Material
- ☐ Fiberglass
- ☐ Rock wool
- ☐ Cellulose
- ☐ Polystyrene
- ☐ Urethane
- ☐ Wood
- ☐ Fiberboard
- ☐ Other _____

Interior Finish
- ☐ Plaster
- ☐ Gypsum Board
- ☐ Masonry
- ☐ Wood Paneling
- ☐ Metal/Plastic Panel
- ☐ Other _____

NOTES:

Foundation — Crawl Space or Basement

Structure
- ☐ Frame
- ☐ Solid Masonry
- ☐ Hollow Masonry
- ☐ Stone
- ☐ Other _____

Exterior Finish
- ☐ Masonry
- ☐ Wood Siding
- ☐ Stucco
- ☐ Metal Panel
- ☐ Vinyl Siding
- ☐ Other _____

Insulation Type
- ☐ Batt
- ☐ Blown-in
- ☐ Loose-fill
- ☐ Rigid
- ☐ Other _____

Insulation Material
- ☐ Fiberglass
- ☐ Rock wool
- ☐ Cellulose
- ☐ Polystyrene
- ☐ Urethane
- ☐ Wood
- ☐ Fiberboard
- ☐ Other _____

Interior Finish
- ☐ Plaster
- ☐ Gypsum Board
- ☐ Masonry
- ☐ Wood Paneling
- ☐ Metal/Plastic Panel
- ☐ Other _____

NOTES:

Windows

Glazing Material
- ☐ Clear
- ☐ Low-E Coated
- ☐ Storm Windows
- ☐ Glass Block
- ☐ Tinted
- ☐ Single or Thermopane
- ☐ Insulated Panels
- ☐ Other _____

Frame Material
- ☐ Wood
- ☐ Aluminum (solid or thermally broken)
- ☐ Steel
- ☐ Vinyl
- ☐ Clad
- ☐ Bronze
- ☐ Other _____

NOTES:

Doors

Type
- ☐ Swinging Door
- ☐ Storm Doors
- ☐ Revolving Doors
- ☐ Garage
- ☐ Overhead
- ☐ Sliding Door
- ☐ Other _____

Material
- ☐ Wood (solid slab or paneled)
- ☐ Aluminum (solid or glazed)
- ☐ Steel
- ☐ Bronze
- ☐ Other _____

Frame Material
- ☐ Wood
- ☐ Clad
- ☐ Steel
- ☐ Bronze
- ☐ Metal (hollow or insulated)
- ☐ Other _____

Insulation Material
- ☐ Urethane
- ☐ Polystyrene
- ☐ Other _____

Glazing Material
- ☐ Clear
- ☐ Tinted
- ☐ Low-E Coated
- ☐ Single or Thermopane

NOTES:

4. FIXTURES AND EQUIPMENT

Heating System
- ☐ Boiler
- ☐ Wood Stove
- ☐ Electric Resistance Heaters
- ☐ Furnace
- ☐ Fireplace
- ☐ Space Heaters
- ☐ Solar System
- ☐ Other _____

Cooling System
- ☐ Central Air Cond.
- ☐ Window Air Cond.
- ☐ Swamp Cooler
- ☐ Other _____

Combination Heating and Cooling System
- ☐ Central Systems with Remote Condensing Units
- ☐ Heat Pumps
- ☐ Other _____

Ventilation and Circulation
- ☐ Exhaust Fans
- ☐ Heat Exchangers
- ☐ Circulation Fans
- ☐ Other _____

NOTES:

4. FIXTURES AND EQUIPMENT (continued)

Lighting Systems
- ☐ Incandescent
- ☐ Fluorescent
- ☐ Halogen
- ☐ High-Pressure Sodium
- ☐ Other_____

Lighting Function
- ☐ Task
- ☐ Ambient
- ☐ Display
- ☐ Security
- ☐ Emergency
- ☐ Warning
- ☐ Other_____

Cooking Equipment
- ☐ Stoves
- ☐ Ranges
- ☐ Refrigerators
- ☐ Microwaves
- ☐ Walk-in Coolers
- ☐ Other_____

Office Equipment
- ☐ Copiers
- ☐ Fax Machines
- ☐ Computers
- ☐ Shredders
- ☐ Telephones
- ☐ Other_____

Shop Equipment
- ☐ Welders
- ☐ Grinders
- ☐ Saws
- ☐ Drills
- ☐ Pumps
- ☐ Other_____

NOTES:

5. LOOK AHEAD — Will The Building Use Change?

Existing Use of Building _____

Use of Building to Stay the Same? ☐ YES ☐ NO

Building Currently Occupied? ☐ YES ☐ NO

Future Use of Building _____

6. DEFINE GOAL OR PROJECT STATEMENT — What Do You Want to Do?

Develop the project goal or program statement. What is to be accomplished with the building? What energy efficiency and historic preservation goals are to be achieved?_____

7. ORGANIZE THE PROJECT TEAM — Who Can Help?

What professionals may be helpful during the project?

Engineer_____

Architect_____

State Energy Office _____

Banker _____

State Historic Preservation Office _____

Contractor _____

Other_____

8. ANALYZE THE TRADE OFFS

When developing the plan, be sure to analyze the energy efficiency and historic impact of the changes. For example, if a proposed change is to replace the windows, that change could have a negative impact on the historic integrity of the building. Using the "whole building approach", an alternative might be increasing the level of insulation in the walls and ceiling instead of replacing the windows. Considering alternatives may gain the same energy savings without harming the building's historic integrity. To evaluate each proposed changes, ask the following:

1. Does the proposed change have a positive energy efficiency impact?
   - ☐ Yes (Check historic impact)
   - ☐ No

2. Does the proposed change have a negative historic preservation impact?
   - ☐ Yes (Consult Preservation Architect, State Historic Society and your Contractor, Architect or Engineer to discuss potential solutions that will not negatively impact the historic character of the structure.)
   - ☐ No (Proceed with improvement)

Using the "Whole Building Approach" in the planning stages of the project, you can create a comprehensive plan that will maximize energy efficiency without destroying the historical integrity of the structure.