Energy Efficiency and Historic Preservation

Main Street Economic Vitality Workshop
Rural Development Initiatives
November 2025

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Clatsop Community College
Historic Preservation Program

RDI
RURAL DEVELOPMENT INITIATIVES

Clatsop Community College

Green HP

Energy Efficiency and Historic Preservation

Outline

- CCC Historic Preservation Program
- Sustainable Building
- Building Components
- Case Studies
- Conclusion

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Historic Preservation Program

Clatsop Community College

Clatsop Community College

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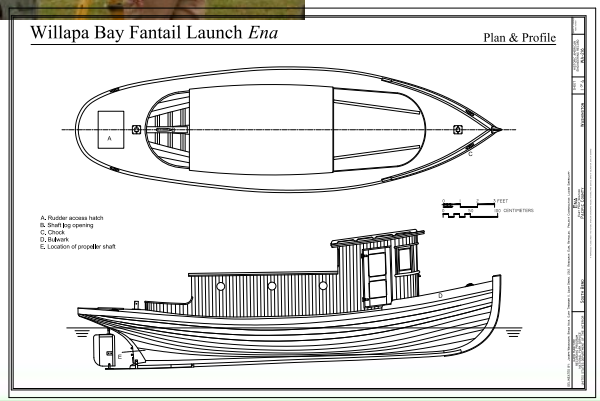
Willapa Bay Fantail Launch *Ena*
Plan & Profile
A. Rudder access hatch
B. Shaft log opening
C. Chock
D. Bulwark
E. Location of propeller shaft

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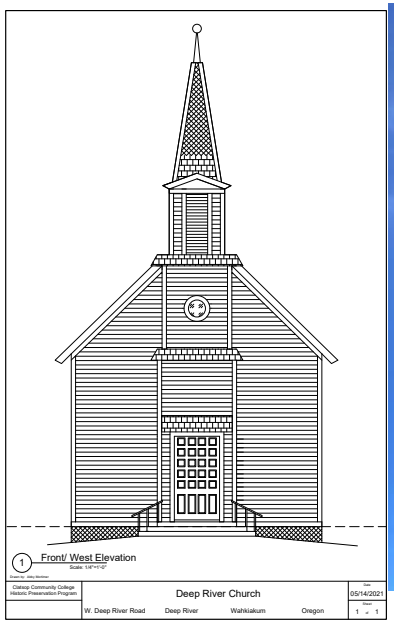
IGNORANCE



1
Front/ West Elevation
Deep River Church
W. Deep River Road
Deep River
Wahkiakum
Oregon
05/14/2021

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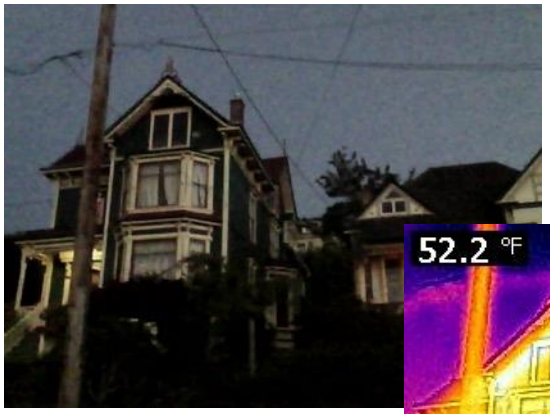
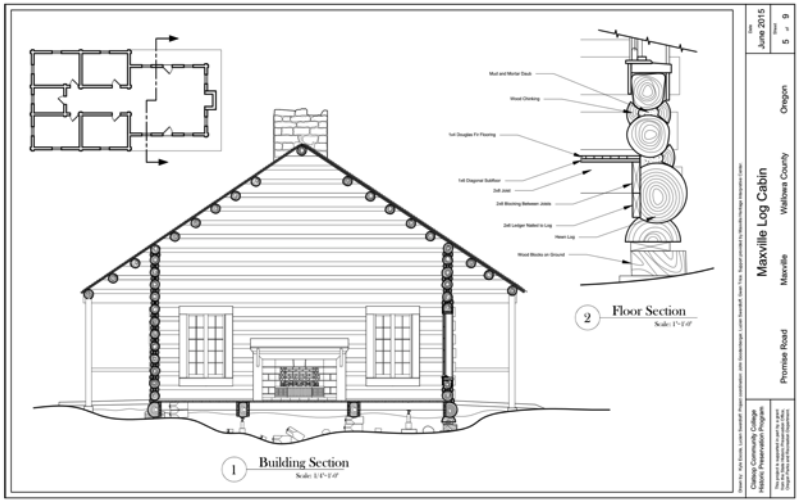
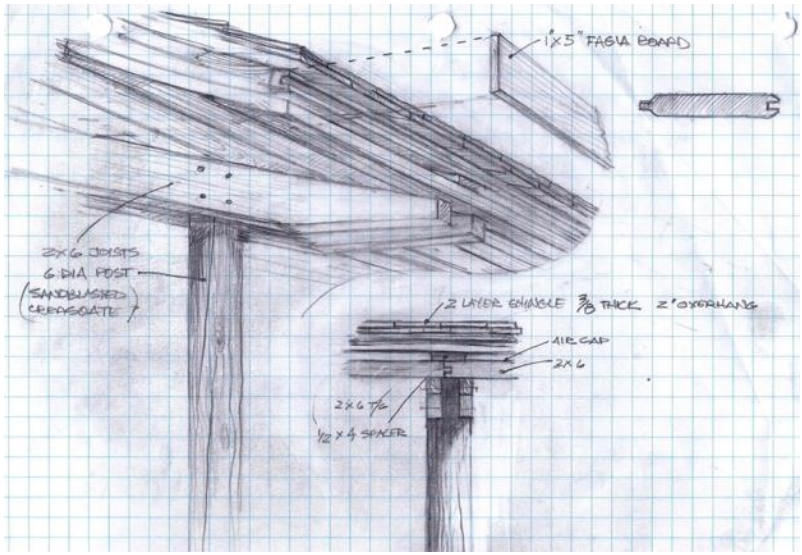



52.2 °F
59.0
-37.0
FLIR


Maxville Log Cabin
Maxville
Wallowa County
Oregon
Promise Road
June 2015
Floor Section
Building Section


1X5" FASIA BOARD
2X6 JOISTS
6 DIA POST
SANDBLASTED
CREOSOTE ?
2 LAYER ENHANCLE 3/8 THICK 2' OVERHANG
AIR GAP
2X6
2X6 T&G
1/2 X 4 SPACER

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Energy Efficiency and Historic Preservation

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Green Building

The greenest building is the one that is already built.
Carl Elefante, FAIA, Quinn Evans Architects

Ballard Library
2005

- 15000 sq. ft. Replaced 7300 sq. ft. 1963 building.
- Green roof with 18,000 plants provides insulation and reduces water flow into storm drains.
- Solar panels generate electricity.
- Windows and skylights provide natural daylighting.
- Occupancy sensors control interior lights.
- Recycled carpet, glass and tiles.
- Waterless urinals.
- $10.6 M.

Ballard Carnegie Library
1904

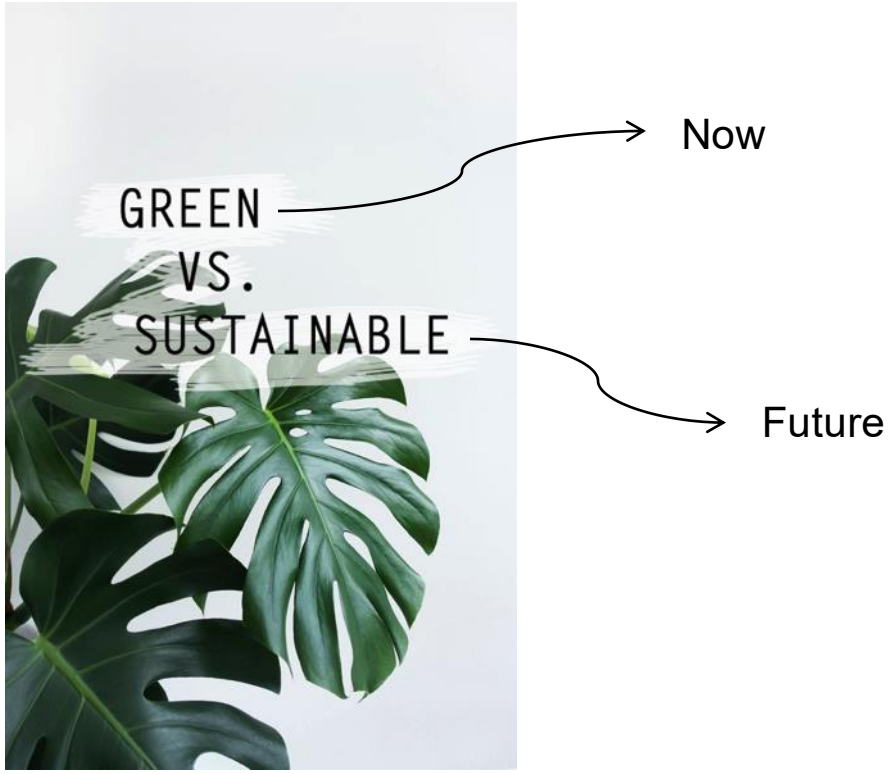
- Exterior walls: brick walls.
- Interior walls/ceilings: lath and plaster.
- Stone foundation.
- Library, 1904-1963. Antique store. Restaurant, 2003-2010. Pub, offices and wellness center, 2011-present.
- $15000. ($1.0 M 2005?)

Which is Greener?

It depends what we mean by green.

Green vs. Sustainable

- Green: environmentally friendly.
- Sustainable: meets the needs of the present without compromising the ability of future generations to meet their needs.



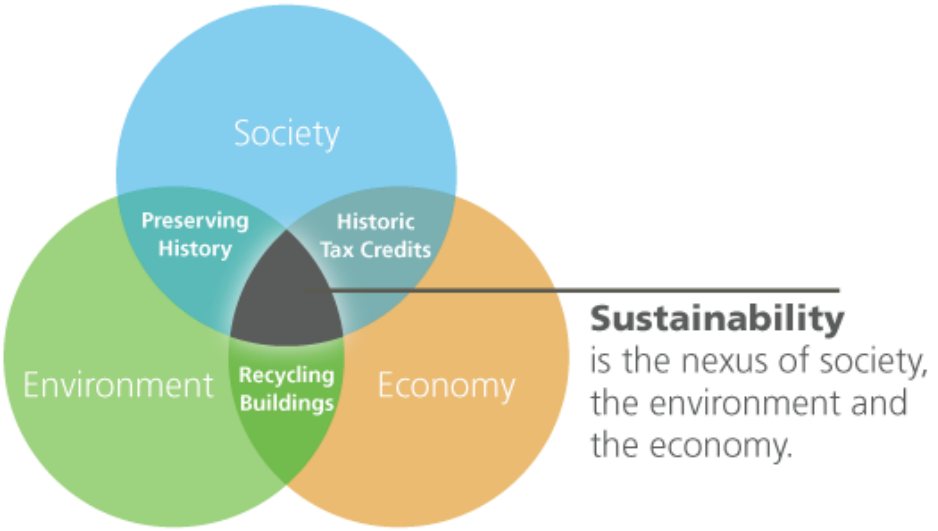
Examples

- Bamboo flooring: green (renewable, fast growing) but not necessarily sustainable (shipping, glues)
- Local recycled wood: green and sustainable
- Electric car: green (reduced CO^2 emissions), sustainable? (coal generated electricity, raw materials)

Sustainability

Historic Buildings are Inherently Sustainable

- Historic structures make up the heart of towns and cities (Society)
- Maintenance of historic buildings relies on local craftsmen (Economy)
- Traditional materials are durable (Environment)



National Park Service

Sustainability

Historic Buildings are Inherently Sustainable

- They were built with energy efficient features
- They can be made more efficient
- They are already here (demolition, new materials, transportation)

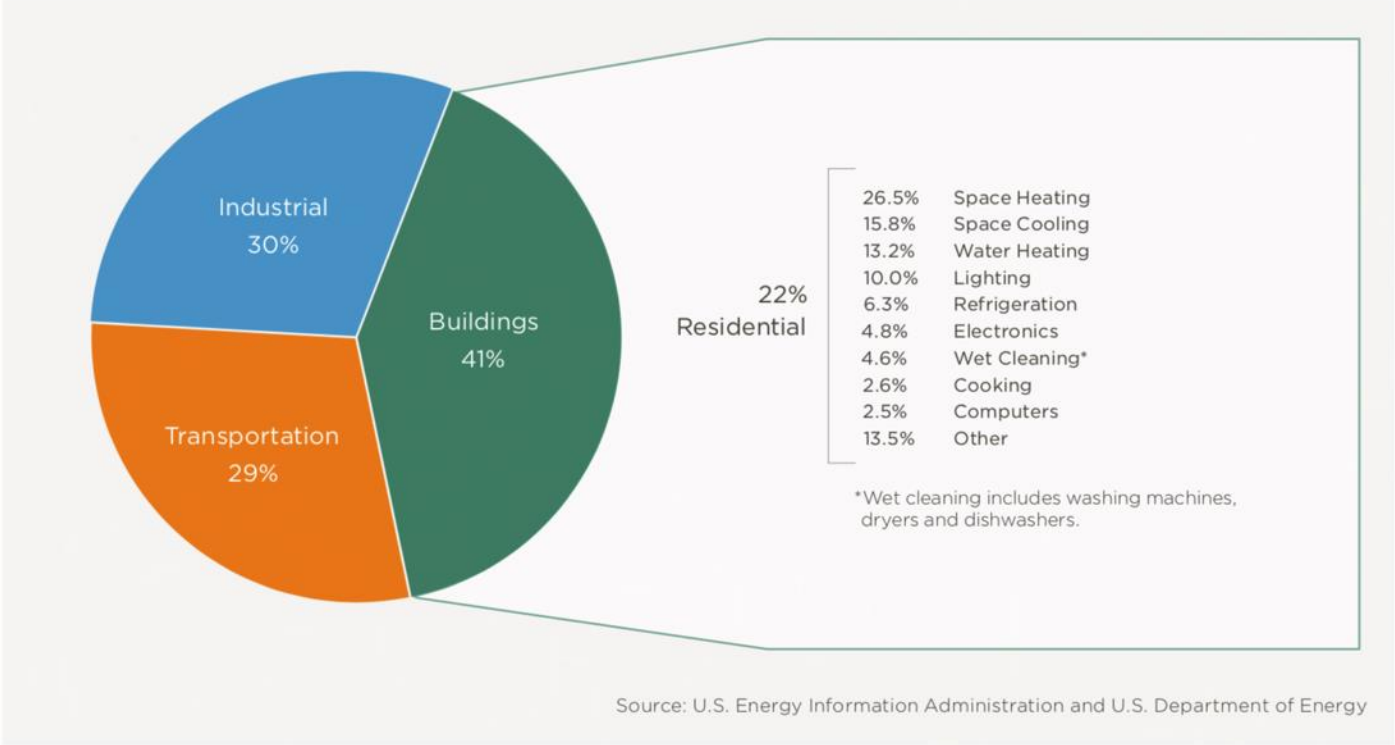
Sustainability
Why Buildings Matter

- Buildings account for 40% of all energy use in the U.S. (more than industry or transportation; U.S. DOA).
- 60% of electricity is generated by burning coal, petroleum or natural gas (21% renewable, 19% nuclear; U.S. EIA, 2023).
- About 50% of buildings are more than 50 years old.
- Reuse of buildings preserves materials and embodied energy, and reduces demolition debris. (Demolition of 5000 sq. ft. commercial building generates 432 tons of debris; of 2000 sq. ft. house, 183 tons.)

Sustainability

Why Buildings Matter

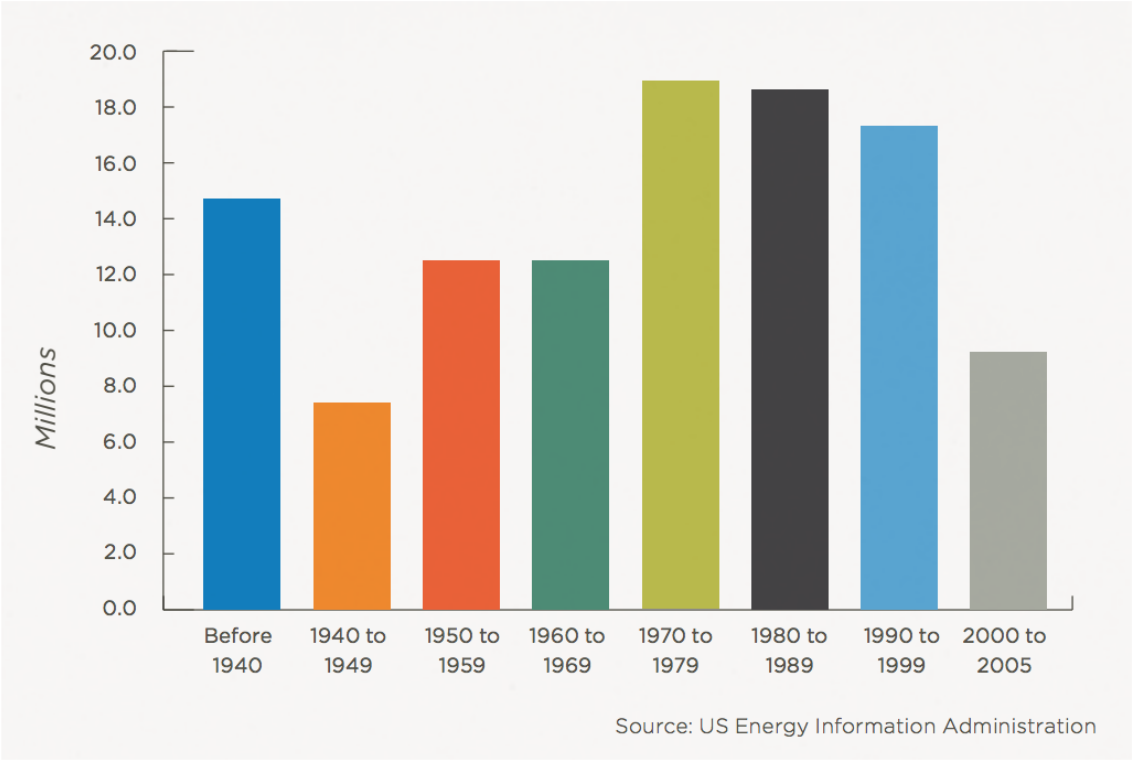
Figure 2: U.S. Energy Consumption by Sector



Sustainability

Why Buildings Matter

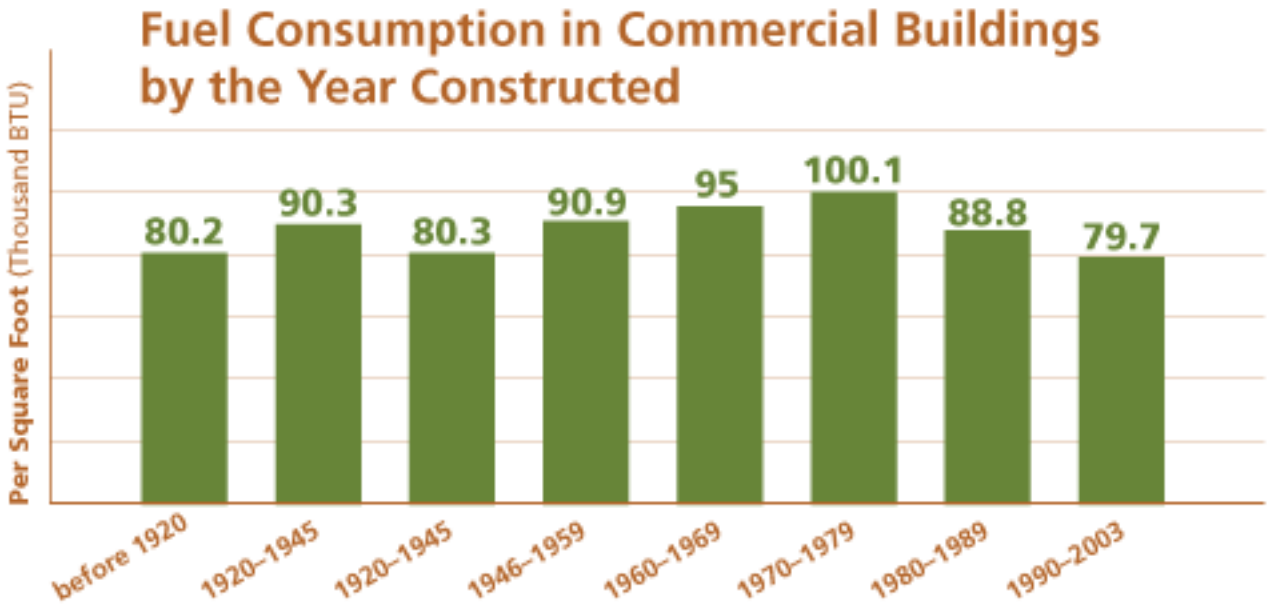
Figure 9: Number of U.S. Residential Units by Vintage



Energy Efficiency

Fuel Consumption

Historic buildings included energy-conserving features in their original designs. These features may have been altered over time, but often still exist.



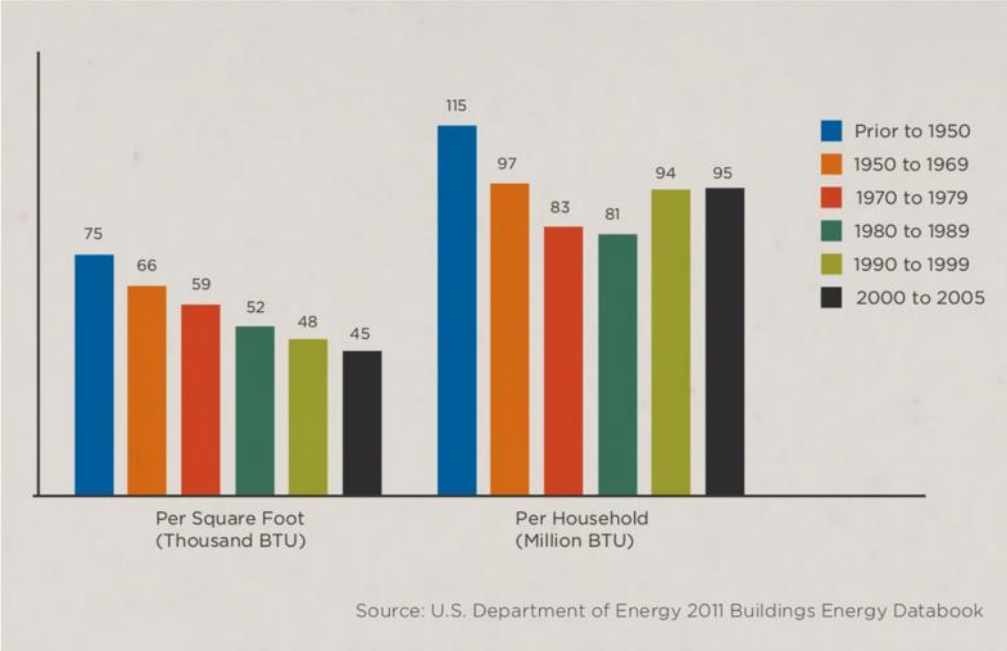
National Trust for Historic Preservation

Energy Efficiency

Fuel Consumption

Newer homes are more energy efficient on a square foot basis, however this has been offset by their larger sizes.

Figure 3: Annual Energy Intensity by Housing Vintage



Energy Efficiency
Environmental Impact

When comparing buildings of equivalent size and function, building reuse almost always offers environmental savings over demolition and new construction.

Table 12. Number of Years Required for New Buildings to Overcome Climate Change Impacts from Construction Process

According to this study, it takes 10 to 80 years for a new building that is 30 percent more efficient than an average-performing existing building to overcome, through efficient operations, the negative climate change impacts related to construction. This table illustrates the number of years required for different energy efficient, new buildings to overcome impacts.

Building Type	Chicago	Portland
Urban Village Mixed Use	42 years	80 years
Single-Family Residential	38 years	50 years
Commercial Office	25 years	42 years
Warehouse-to-Office Conversion	12 years	19 years
Multifamily Residential	16 years	20 years
Elementary School	10 years	16 years

The Greenest Building: Quantifying the Environmental Value of Building Reuse. National Trust for Historic Preservation. 2016.

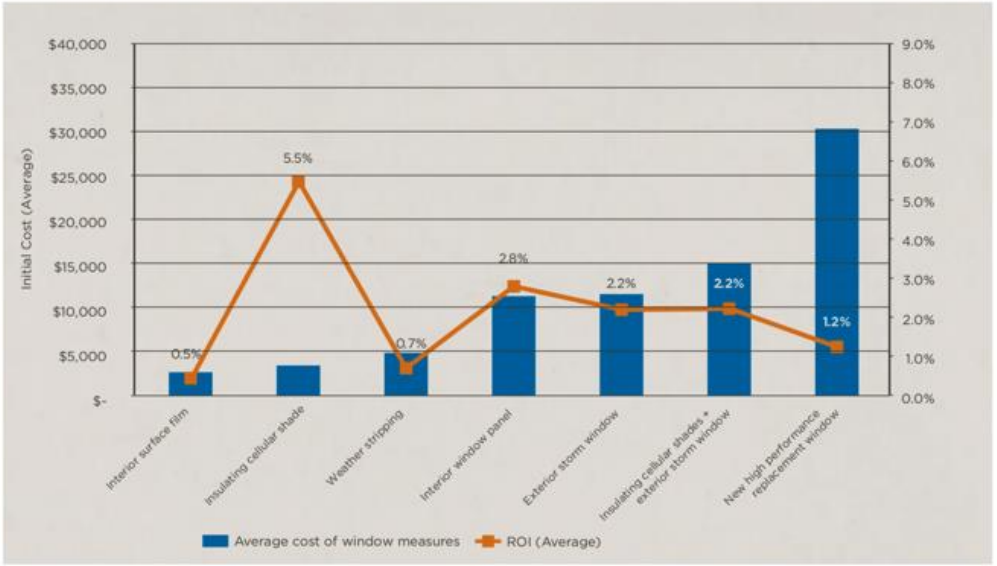
Energy Efficiency
Infrared Camera

- An infrared camera can be used to detect heat loss.
- Insulation and window retrofit can be simple and cost effective treatments.

Energy Efficiency
Windows

- Retrofit measures can achieve performance results comparable to new replacement windows.
- Almost every retrofit option offers a better return on investment than replacement windows.

Figure 10: Average Annual Return on Investment — Portland



Saving Windows, Saving Money: Evaluating the energy performance of window retrofit and replacement. Preservation Green Lab. 2012.

Which is ~~Greener~~ More Sustainable

- Energy efficiency
- Demolition (debris and transportation)
- New construction (manufacture and transportation of materials)

Energy Efficiency
Green Roof

Historic buildings can be green and sustainable.

Turf House, Iceland

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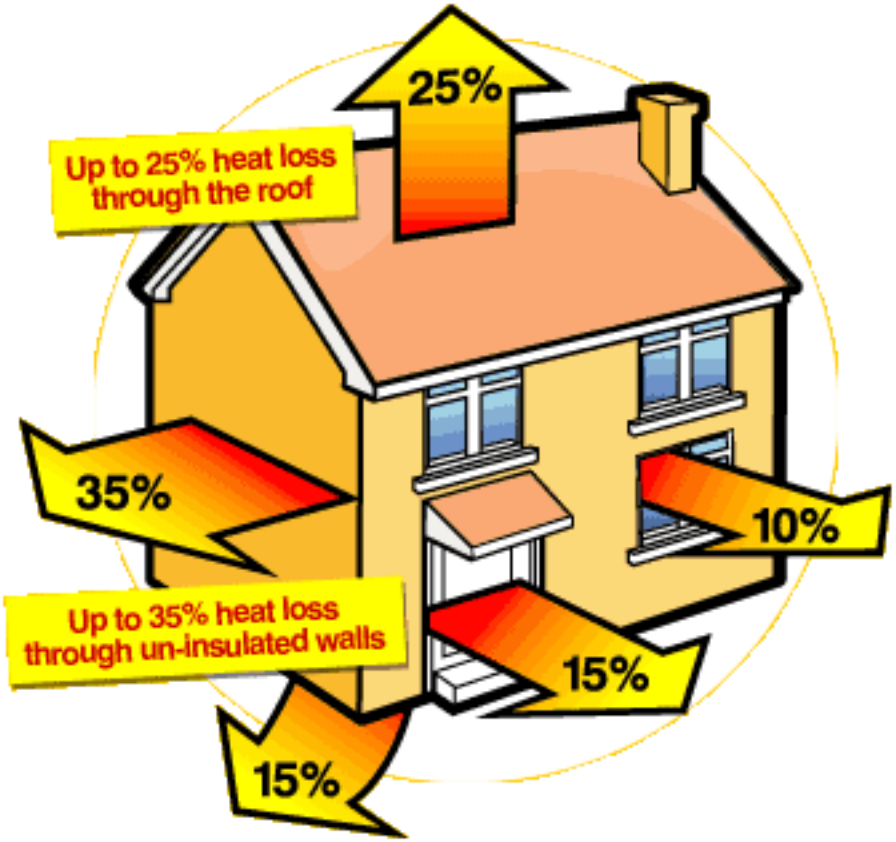
Historic Buildings Can Function Efficiently…

If they are allowed to function as originally intended

Green HP

Energy Efficiency

Heat Loss



Building Envelope

Masonry Structures

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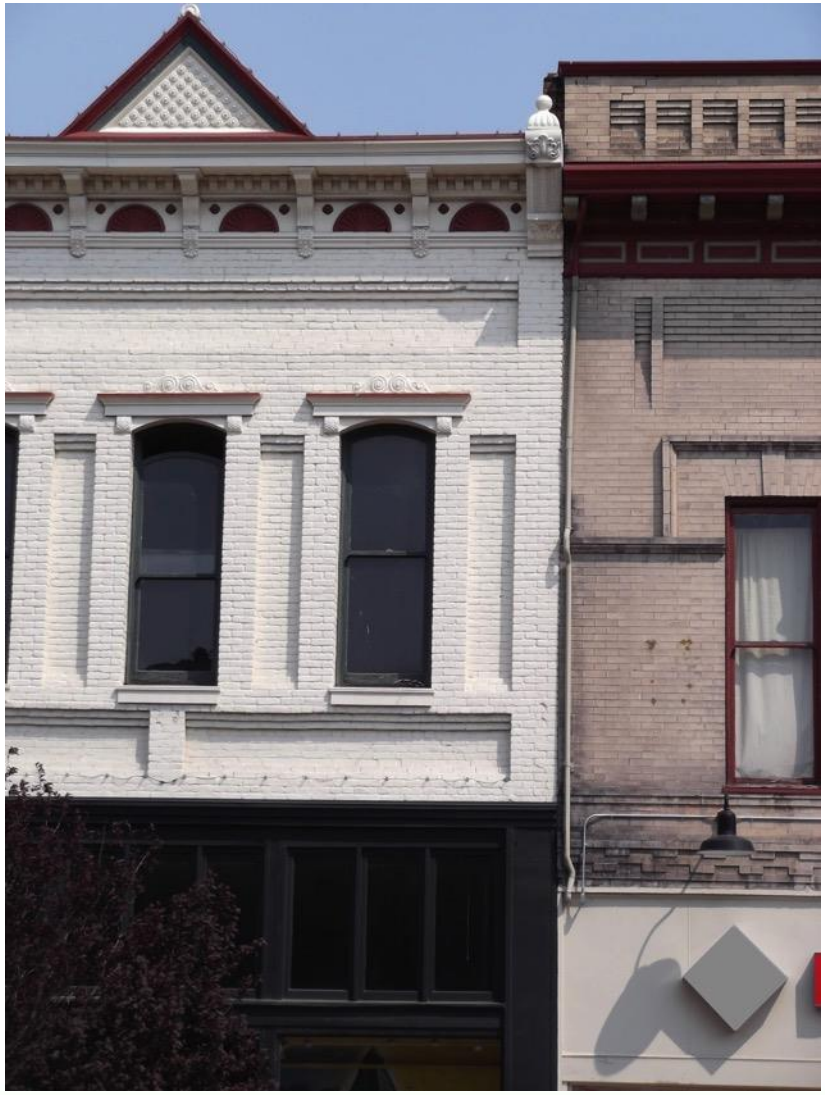
Building Envelope

Wood Structures

Building Envelope

Shared Walls



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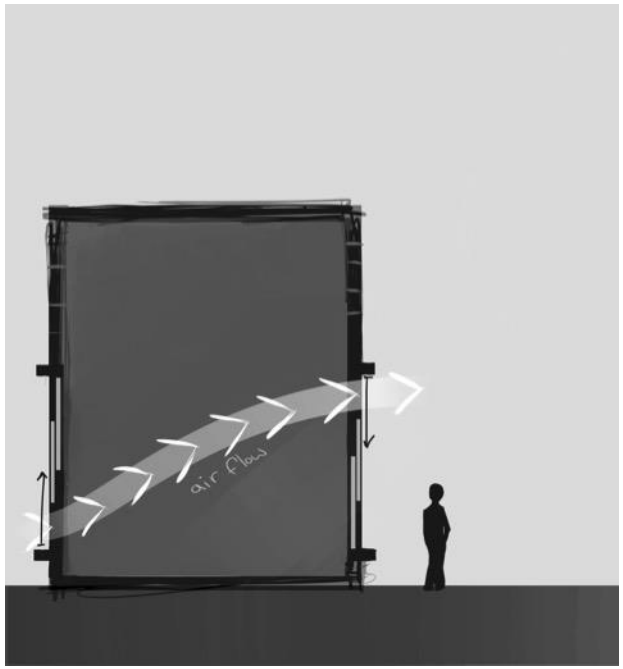
Ventilation

Tall, Operable Windows



Ventilation

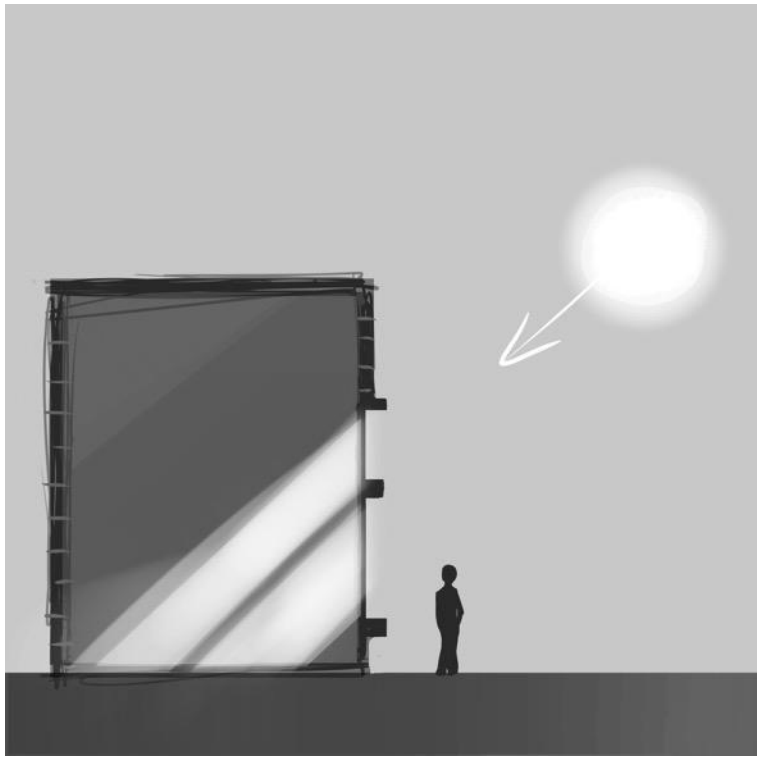
Bulkhead Grates

Ventilation

Awning Windows

Natural Light

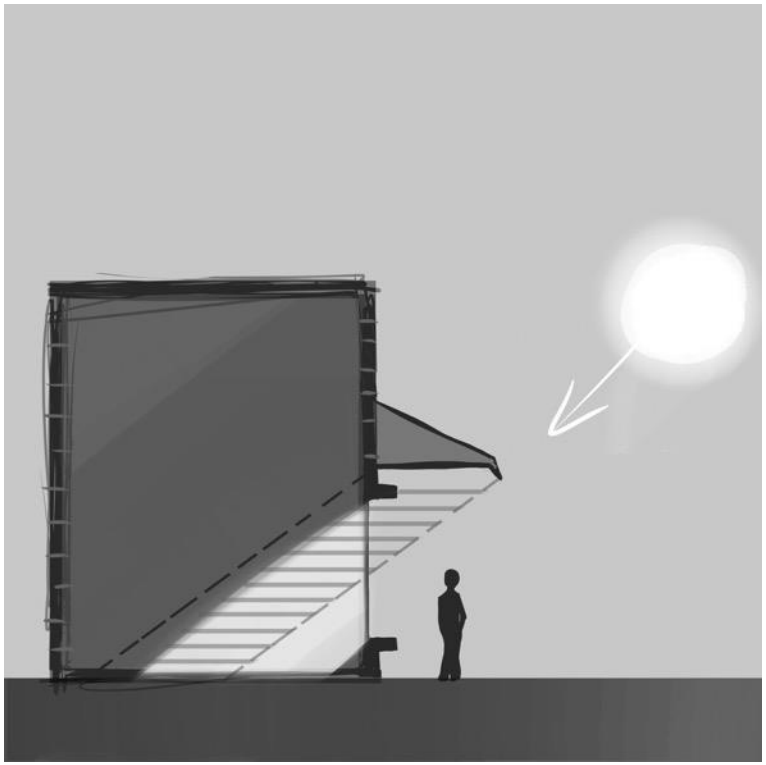
Transoms



Prism glass

Additional Aids

Awnings



Additional Aids

High, Reflective Ceilings

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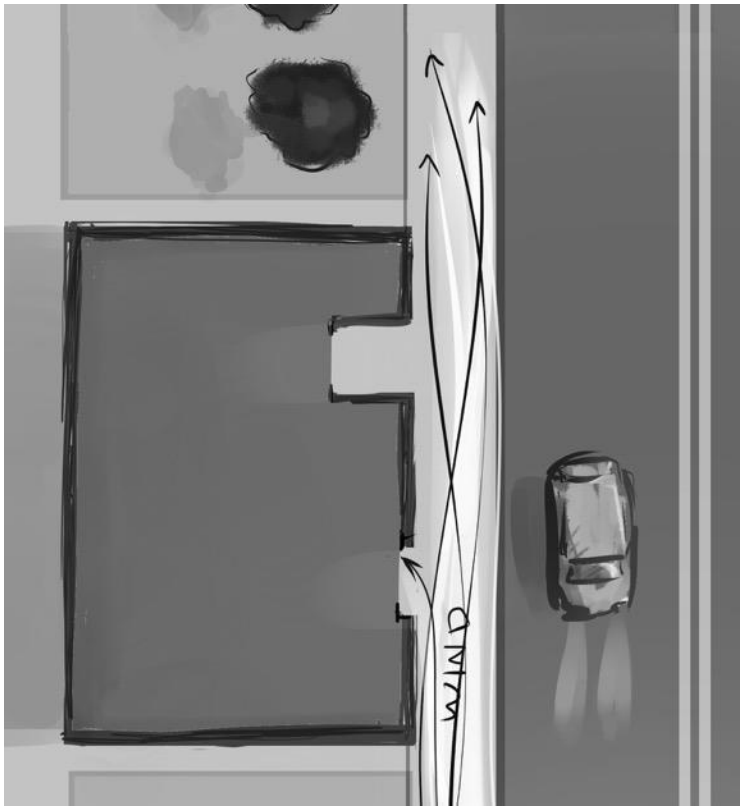
Additional Aids

Recessed Entries



Why Restore?
Windows

- History/aesthetics: character defining
- Quality: materials and craftsmanship
- Economics: use local craftspeople, lifecycle costs
- Sustainable: existing material, longevity, improve efficiency
- Repairable: windows are inherently repairable

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Energy Efficiency

Building Preservation

Green HP

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Getting Passed The Intimidation Of Renovating Historic Buildings

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Farmer's Union Cooperative Building

Eugene

Green HP

Accomplishments

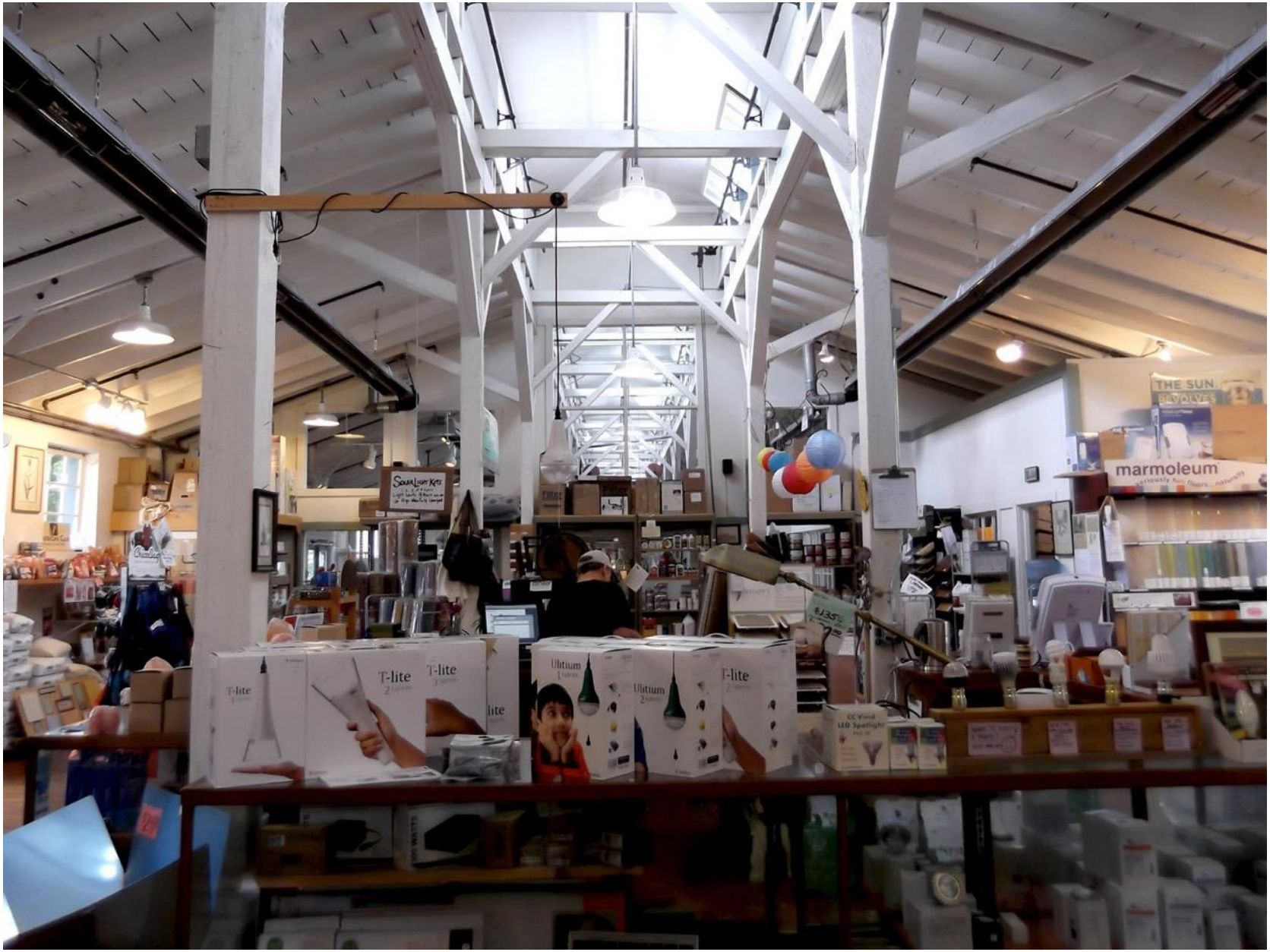
- Ceiling insulation installed
- Wood windows repaired
- High-efficiency, gas, condensing furnace installed
- Replaced lights with high-efficiency T8 ballast


Line Starts here
kitchen
EXIT


BOGS
fertilizer
Cactus
CONTAINER
PLANTS

Pacific Cooperative Poultry Producers' Egg-Taking Station Building

Eugene



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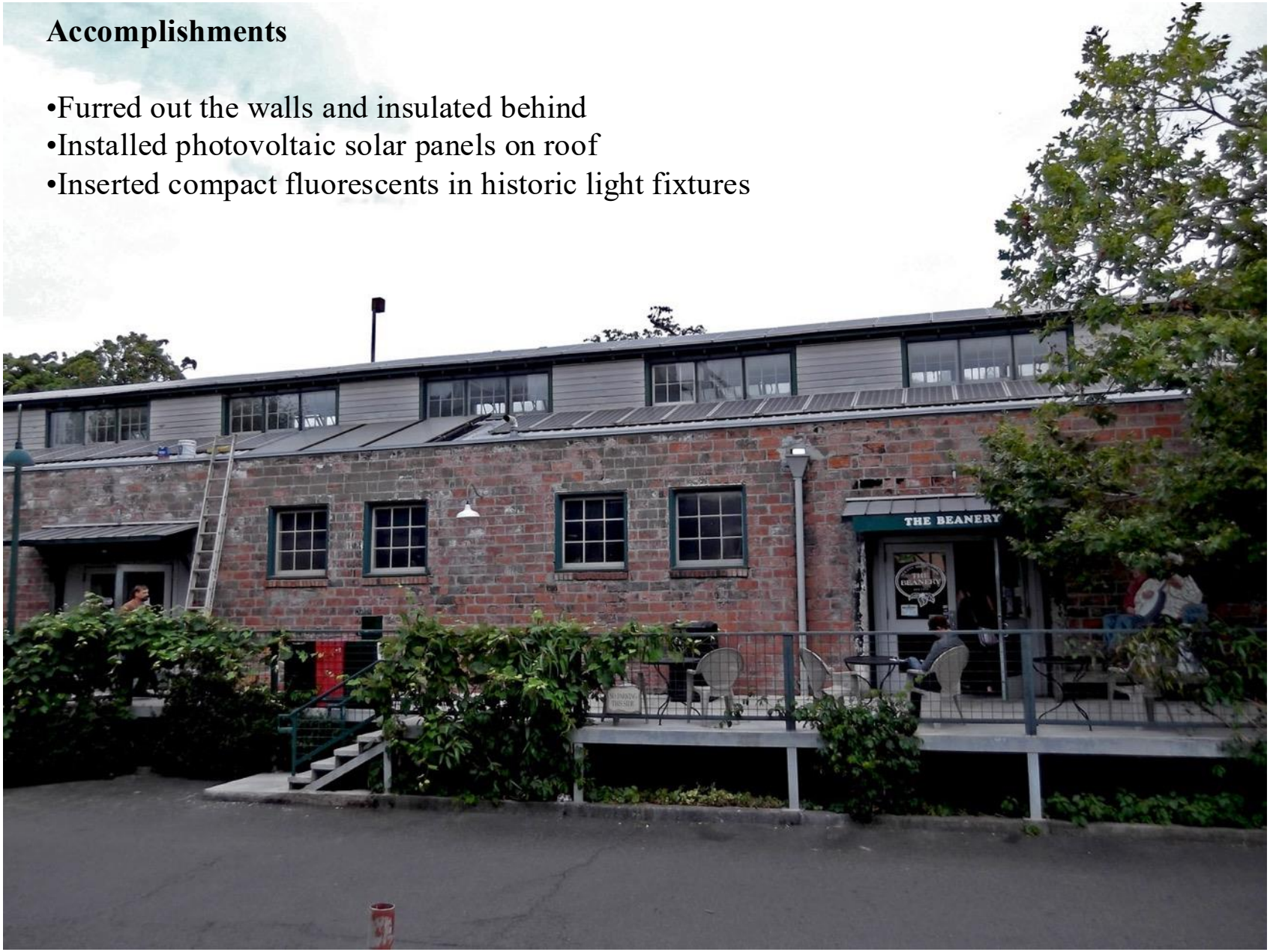
Accomplishments

- Furred out the walls and insulated behind
- Installed photovoltaic solar panels on roof
- Inserted compact fluorescents in historic light fixtures



Green HP

Figure 23. Solar collectors installed in a compatible manner on low sloping sawtooth monitors. Top Photo: Neil Mishalov, Berkeley, CA.

Solar panels installed on a historic property in a location that cannot be seen from the ground will generally meet the Secretary of the Interior's Standards for Rehabilitation. Conversely, an installation that negatively impacts the historic character of a property will not meet the Standards.

Preservation Brief 3: Improving Energy Efficiency in Historic Buildings, National Park Service

Conn & Huston Grocery Building

Albany

Green HP

Accomplishments

•Insulated building, better heat retention and cooling
•New heating system
•Daylighting and ventilation through transoms, double-hung windows and skylights
•Increased ventilation by incorporating fans on 15’ ceilings
•New Energy Star refrigerator and washing machine in apartment
•Embodied energy retention by saving wood floors, retaining lath-and-plaster walls, re-using windows and renovating the building

Green
HP

Allen Building

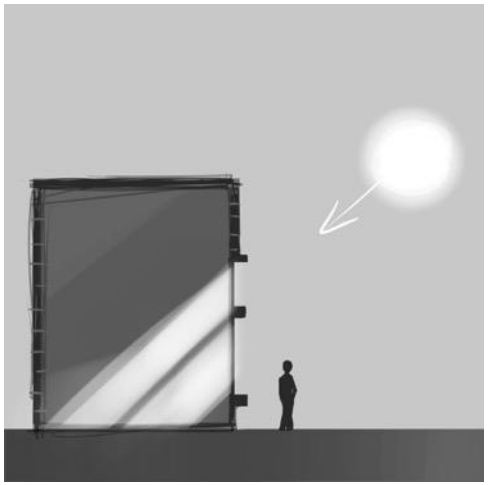
Astoria

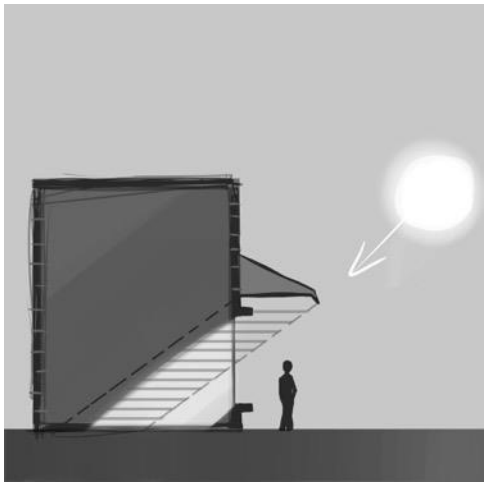
Allen Building

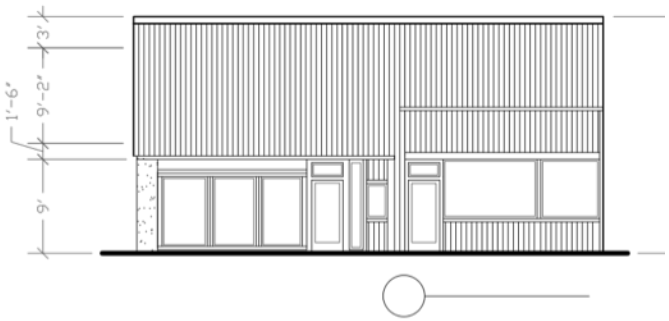
Astoria

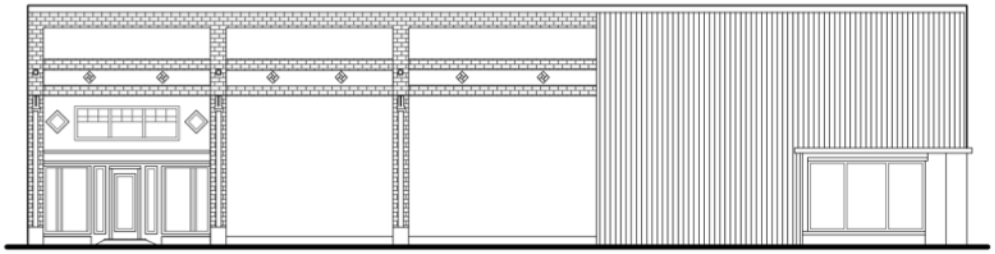
Allen Building

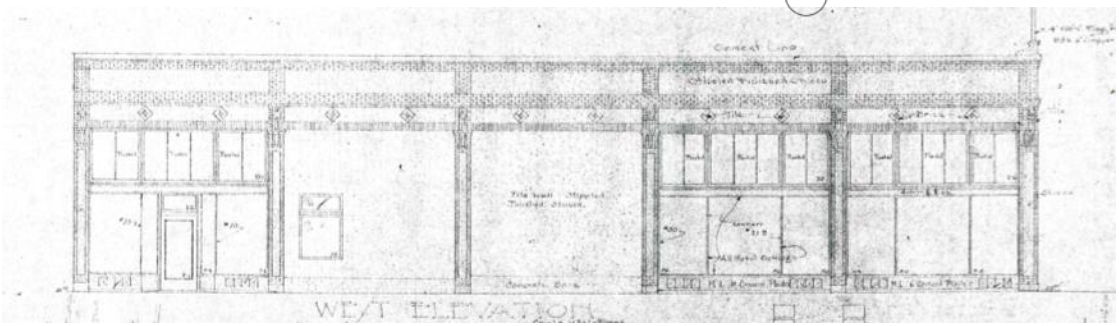
Astoria











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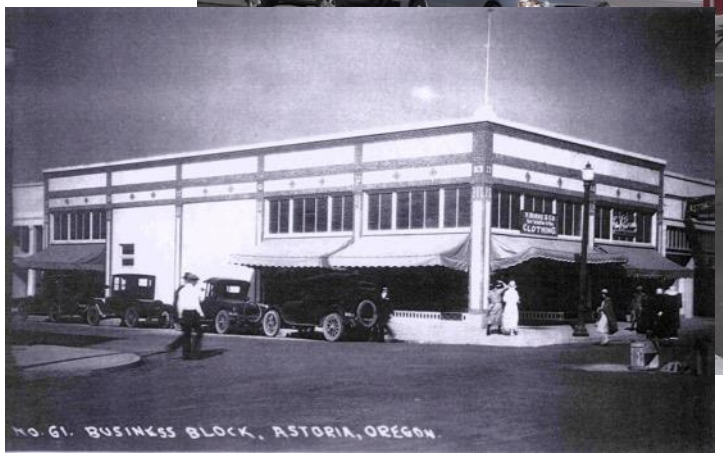
Allen Building

Astoria



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Allen Building

Astoria

Accomplishments:

•Added R12 and R18 insulation on exterior walls and R33 insulation below roof.
•Upgraded the heating system to a ductless heat pump HVAC unit.
•Installed ceiling fans.
•Restored original skylight openings.
•Painted ceilings white to aid light reflectivity.
•Reconstructed storefront window system included double-pane transom windows for heat retention, operable transom windows for air circulation and increased natural light for visibility and solar gain.

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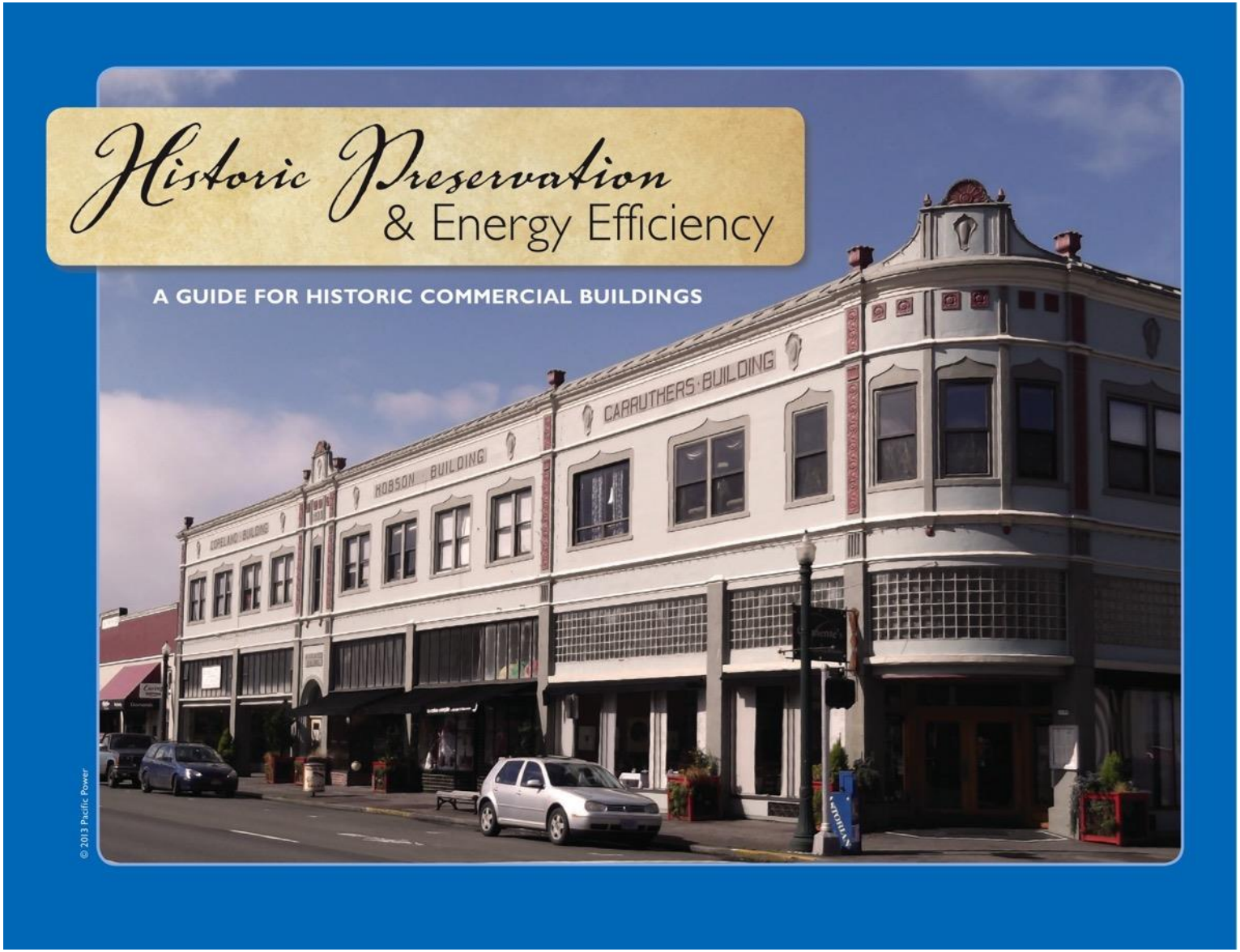

https://www.pacificpower.net/content/dam/pcorp/documents/en/pacificpower/savings-energy-choices/wattsmart-business/PP_OR_Historic_Preservation_and_Energy_Efficiency_Booklet.pdf

Resources

NPS Sustainability: https://www.nps.gov/orgs/1739/sustainability.htm
Energy Efficiency in Historic Buildings: https://www.nps.gov/orgs/1739/upload/preservation-brief-03-energy-efficiency.pdf
Building Stronger Communities: https://savingplaces.org/building-stronger-communities
Energy Trust: https://www.energytrust.org/
Pacific Power Efficiency: https://www.pacificpower.net/savings-energy-choices.html
Rural Development Initiatives (RDI): https://rdiinc.org/

Contacts

CCC HP Program: https://www.clatsopcc.edu/study/historic-preservation-restoration/
CCC HP Instagram: https://www.instagram.com/hpclatsopcc/
CCC HP Facebook: https://www.facebook.com/ClatsopPreservation
John Goodenberger email: jgoodenberger@clatsopcc.edu

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Community Case Study

Fenton Building

Warrenton

Building Description: Mixed use with residents on second floor and 5,000 square feet of commercial space below

Green HP

Fenton Building
Warrenton

Restoration Plans: The building has significant deferred maintenance and the goal is to improve the space by prioritizing structural improvements and removal of hazardous materials. The upstairs will have 7 residential units with new windows, HVAC, plumbing, flooring and kitchens. For the downstairs, we will provide affordable commercial spaces for local entrepreneurs, reducing barriers to entry for small business owners. The planned buildout includes a coffee shop, children's play studio with after school care, and micro enterprise spaces providing businesses with affordable commercial space, helping them launch and sustain their operations.

Green HP

Fenton Building

Warrenton

Goals: Complete the project by April 2025. Future plans include restoring the exterior facade, improving the exterior stairs, and adding an outdoor patio in the alley between the building and neighboring business.

Budget: $1.8 Million to update major systems, add structural support, add a studio to the second floor.

Green HP