

**Energy
Efficiency
In Nebraska:
A
Community
Investment**

Building Codes

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Many people can remember when gasoline cost only 20¢ a gallon. That was twenty years ago, when energy was an inexpensive abundant resource we could afford to use without concern. For most people and businesses today, however, the price of energy has risen faster in the last ten years than their incomes. It is now a significant part of their budgets.

How Big a Part?

In 1984, Nebraskans spent \$2.8 billion for the energy needed to run their machinery, to travel, and to heat, light and cool their buildings. Residential and commercial buildings alone account for 29% of Nebraska's total energy use -- second only to gasoline transportation

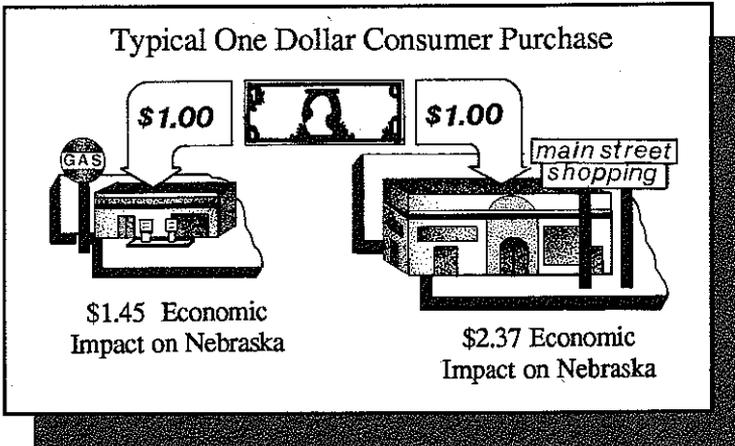


Approximately 80% of the state's \$2.8 billion energy bill leaves Nebraska's economy, exported to energy-producing regions such as Saudia Arabia, Canada and oil or coal-producing states. If that money instead remained in a Nebraska

community, it could provide larger benefits to its residents and businesses by cycling through the economy more times. In this way, it would create more income for more people. Energy efficient buildings, whether homes, offices or schools, can become a critical part of the economic development efforts of a town by reducing the money exported from it.

How Can Energy Efficiency Stimulate Economic Development?

Reducing energy consumption can benefit your local economy by increasing the amount of income available to its residents. Typical Nebraska towns collectively spend hundreds of thousands or even millions of dollars each year on energy. This spending means there is less money available for purchasing other consumer goods and services which, research suggests, tend to benefit the local economy more than energy purchases. This can best be explained by looking at the effect of spending just one dollar. One dollar spent on conventional energy supplies creates about \$1.45 in economic activity. On the other hand, \$1.00 spent on typical consumer items yields over \$2.30 in economic activity--quite a boost for your town's economy.



Energy efficiency improvements can benefit your local economy in two ways. First, efficiency boosts the economy directly by

stimulating business for local contractors and creating sales for the hardware stores and lumber yards which supply the materials needed to make a home or office more efficient. Second, energy efficiency effectively increases local incomes. Money that previously was spent to pay an energy bill can be spent instead for other consumer purchases in a town.

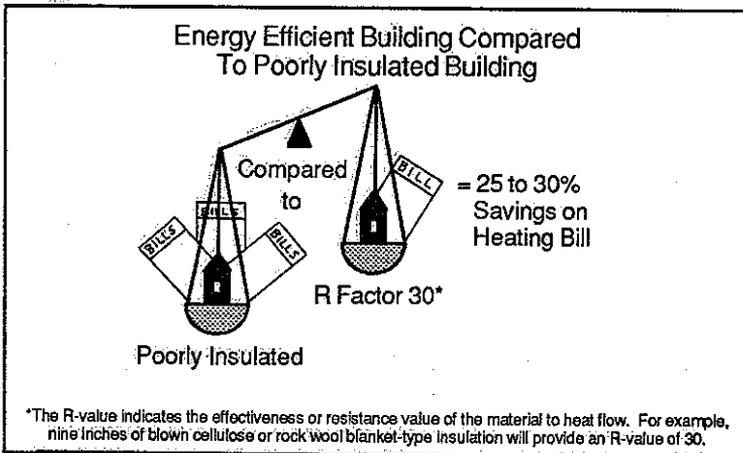
What Can You Do As a Community to Increase Your Energy Efficiency?

There are a number of ways. As noted earlier, commercial and residential buildings use about 29% of the energy in Nebraska communities.

One of the ways your community might tackle energy inefficiency would be to promote or adopt building efficiency standards, or "energy codes."

What Exactly are Building Energy Efficiency Standards?

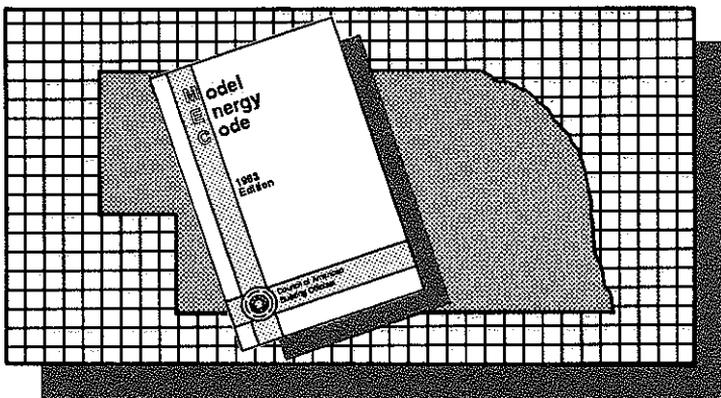
Energy efficiency standards are building codes which establish minimum levels of energy efficiency for specified structures.



For example, an energy code might require an R-value of 30 for ceiling insulation to be installed in all new homes, offices, and commercial buildings. This might save 25-30% on the heating bill compared to a building with a poorly insulated ceiling.

Does Nebraska Have an Energy Code?

Yes. The state code is the 1983 Model Energy Code developed by the Council of American Building Officials. Unless your community has adopted its own code which is equivalent or more stringent than the Model Energy Code, the buildings in your community are expected to meet the State-Model energy code.



What Does The Model Energy Code Require?

The Model Energy Code generally requires moderately tight buildings using readily available materials and techniques which are found to be cost-effective. On pages six and seven are the structural and mechanical requirements for a typical frame house in Nebraska.

Remember, these are only minimum requirements. Exceeding these minimum values will further improve the energy efficiency of a building and could benefit a community even more. Copies of the Model Energy Code are available for \$4.00 from the Nebraska Energy Office.

Simplified Requirements For a Frame House

Nebraska Building Energy Standards 1983

The requirements listed are very prescriptive, but following these will assure that the completed house will comply with the State's thermal and lighting codes.

See page 11 for definition of abbreviations.

Building Envelope

Ceiling roof.....R-30 insulation

Frame walls.....R-14 insulation

Exposed foundation walls.....R-5 insulation

Slab on grade, edge (24" down from top or down edge and under slab for 24" total).....R-6 insulation.

Floors over unheated spaces.....R-14 insulation

Windows.....double glazed, not more than 15% of wall area infiltration of 0.5 cfm/ft. of sash maximum.

Sliding glass doors.....double glazed, infiltration of 0.5 cfm/sq.ft. of door area, maximum.

Swinging doors.....infiltration of 1.25 cfm/sq.ft. of door area max.

Weatherstrip and caulking..... as needed to minimize infiltration.

Heating, Ventilating, and Air Conditioning Equipment

Furnaces and boilers.....75% combustion efficiency.

Heat pump (heating mode).....COP=2.5/1.5
airsource.

Air conditioners/heatpumps (cooling mode).....EER=6.8

Controls.....each system controlled by
thermostat (55-85 ° range)

Ducts (in unconditioned space).....R-6 insulation

Water Heating

Storage water heaters.....13 BTU per hour
sq. ft. maximum stand-
by loss.

Pipes (in unconditioned space).....3/4 inch
insulation.

Showerheads.....3 GPM. maximum.

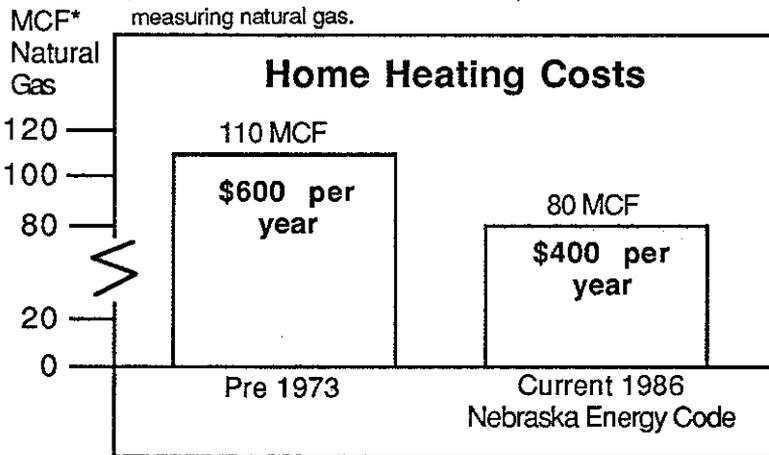
Are Homes The Only Buildings That Have to Meet The State Codes?

No. The code is applicable to all new houses, offices, commercial buildings, additions of 5% or more of total floor space, renovation costing more than 50% of the value of the building, or addition of new heating or cooling capability. Factories, garages and agricultural buildings are exempt.

How Can Energy Efficient Buildings Help You and Your Community?

The economic potential of energy efficiency buildings can best be understood by looking at homes built to different energy efficiency standards. Assume a typical home of 1,500 square feet is in a climate much like Lincoln or Omaha. To heat

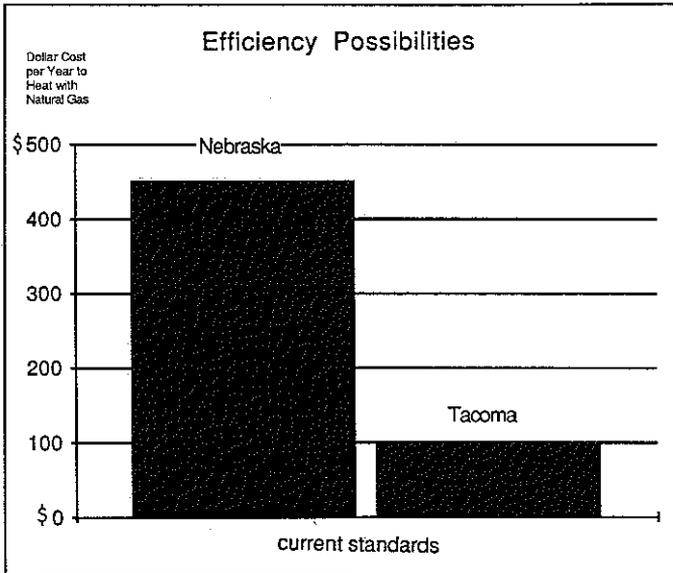
* MCF stands for one thousand cubic feet, a standard method of measuring natural gas.



such a home, built to pre-1973 construction practices, would require 110 MCF of natural gas for heating at a cost of \$600 per year, at today's prices. A home built to the current Nebraska energy code would consume perhaps 80 MCF--a fuel cost of \$450, thus saving a homeowner about \$150 per year.

Is It Possible to Exceed Nebraska's Current Standard?

Yes. Tacoma, Washington adopted an energy code which reduced the space heating requirements for a 1500 square foot home by 66%! A Nebraska home built to the Tacoma standard



would require less than \$100 per year to heat with natural gas, and in the summer, the extra insulation will also help save money on cooling. As good as that is, however, it is technically feasible to build the house to use as little as 2 MCF a year. The natural gas bill would then be only \$11 per year! Tacoma officials estimate that it will only cost an additional \$1.50 to \$2.00 per square foot to comply with the tougher energy code. The money spent on the energy efficiency improvements and the money not spent on your energy bill as a result of those improvements works to benefit your local economy.

What are The Advantages to Having an Energy Code?

An energy code helps influence the amount of energy Nebraska's buildings will use over the next 30 to 50 years. By improving energy efficiency in your buildings, your utilities can more accurately plan for future energy needs -- which saves you money by avoiding building of unneeded plants and equipment. The energy code also benefits the state by reducing consumer spending on energy. Money saved through energy efficiency can be spent within the state to provide greater incomes and more economic benefits.

How Could a Community Promote Energy Efficiency?

To begin, a community group, possibly the city council or village board, could work with area developers, contractors and building owners to show them that energy efficient buildings should be thought of as an economic development opportunity for the community. This should encourage them to voluntarily improve the energy efficiency of their buildings.

Another option is a formal local building energy code (either the Model Energy Code or another which is at least as stringent). The process would be exactly like the passage of any other ordinance, and would depend on the rules governing the operation of the community's governing body. The Energy Office can provide assistance in this process by educating interested citizens and community leaders on the advantages of building codes and by providing copies of a "model ordinance" which has been used by a number of Nebraska communities to adopt the MEC.

If We Choose a Formal Energy Code, How Could It be Enforced?

Primary responsibility for administering the code rests with the Nebraska Energy Office, but normal building code enforcement procedures (such as issuing permits and inspecting buildings under

construction) are not practical at the state level. It is up to each community to decide how they would like to enforce their energy code.

Communities have a unique opportunity to further promote their economic development by adopting a local code more stringent than the State code. Higher energy efficiency standards mean even less money is spent on energy costs, allowing dollars to stay in a community. If you're interested in building energy efficiency and need help getting your community started, call the Nebraska Energy Office.

Should you want a copy of Tacoma, Washington's Energy Code References on page seven, contact:

Jacob C. Fey, Energy Conservation Coordinator
Office of Intergovernmental Affairs
Tacoma Municipal Building
740 St. Helen's Avenue - Suite 1220
Tacoma, WA 98402-3766

Definitions of Abbreviations

R = Resistance factor, or ability of material to prevent heat transfer

CFM = Cubic feet per minute

COP = Coefficient of Performance: the rate of the net heat output to the rate of total on-site energy input to the heatpump, expressed in consistent units and under designated rating conditions

EER = Energy Efficiency Ratio - The ratio of net equipment cooling capacity in Btu/h to total rate of electric input in watts under designated operating conditions

Btu/h = Btu is equivalent to energy produced by completely burning one wooden kitchen match

GPM = Gallons per minute



STATE OF NEBRASKA

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