Energy Efficiency Codes Fact Sheet

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Energy Efficient homes are more costly to build.

Building energy codes mandate certain construction practices that can drive up home costs. For example, the Pacific Northwest National Lab[1] estimates that the construction cost increase to build a 2400 sq. ft. home in Idaho to the 2012 International Energy Conservation Code (IECC) is $1438 to $2568 as compared to a similar home built to the 2009 IECC.

Energy codes lead to more efficient homes and more efficient homes are more affordable in the long run.

Increasingly, businesses and banks are considering the "life cycle costs" of investments. For residential buildings, this means considering the cost of energy bills over the life of the home. In such analyses, small changes in efficiency provide big payback over the long haul. Here is the conclusion by a 2012 US Department of Energy Study from Pacific Northwest National Lab (PNNL-21483)[1] comparing the 2009 Energy code to the 2012 code **for Idaho homeowners**:

- Life-cycle cost savings, averaged across climate zones and building types, are $4,057 for the 2012 IECC
- Simple payback period is 6 years for the 2012 IECC
- Households save an average of $285 per year on energy costs with the 2012 IECC
- Net annual consumer savings, including energy savings, mortgage cost increases, and other associated costs in the first year of ownership average $186 for the 2012 IECC
- Energy costs, on average, are 25.5% lower for the 2012 IECC

Other results from the literature:

> *"Results suggest that the cost savings from higher efficiency standards are significant over 25 years and 40 years time horizons, particularly in view of increasing energy prices. Beyond the first few years of occupation, the energy cost savings associated with more thermally efficient building designs outweigh the higher build costs."* [2]

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[1] "Idaho Energy and Cost Savings fro New and Single- and Multifamily Homes: 2012 IECC as compared to the 2009 IECC. Pacific Northwest National Lab Report 21483, June 2012. (www.energycodes.gov/development/residential)

[2] Morrissey, J., and R. E. Horne. "Life Cycle Cost Implications of Energy Efficiency Measures in New Residential Buildings." *Energy and Buildings* 43, no. 4 (April 1, 2011): 915–24. https://doi.org/10.1016/j.enbuild.2010.12.013.

"Advanced building energy codes are a cost-effective way to help consumers save energy and money, make new housing and commercial buildings more affordable, improve comfort, and reduce air pollution. All of these benefits are difficult or impossible to capture if not taken into consideration at the time of construction. There are also additional benefits: codes increase the reliability of utility systems, mitigate harmful environmental conditions such as ground-level ozone and climate change, and boost job creation nationwide".[3]

"We evaluate the effect of a change in the energy code applied to buildings using residential billing data on electricity and natural gas, combined with data on observable characteristics of each residence. The study is based on comparisons between residences constructed just before and after an increase in the stringency of Florida's energy code in 2002. We find that the code change is associated with a decrease in the consumption of electricity by 4% and natural gas by 6%. We estimate average social and private payback periods that range between 3.5 and 6.4 year." [4]

Prospective homeowners qualify for larger mortgages for efficient homes.

Over the past decade, the lending community has embraced a new model for home lending called the Energy Efficient Home Mortgage. These are lending mechanisms that allow lending agencies to take into account likely utility costs in computing the eligibility of home buyers, thus negating the impact of the incremental cost increases for more efficient homes. Here are just a few sources for information on this trend.

https://www.hud.gov/program_offices/housing/sfh/eem/eemhog96
https://www.energystar.gov/newhomes/mortgage_lending_programs/energy_efficient_mortgages
https://boise.rehabloannetwork.com/energy-efficient-mortgage-eem/

EE Codes help keep costs down for everyone.

Energy costs are largely driven by two factors, the cost of the fuel and the cost of the infrastructure to deliver that energy. For the electric grid, the latter costs are increasingly the dominant driver for consumer prices. Energy efficient homes help keep costs low for everyone by deferring or avoiding new infrastructure projects like power plants and transmission lines.

While Idaho still enjoys some of the lowest energy costs in the US, they are rising. According to the Energy Information Administration[5] of the US Department of Energy, the average retail rates in Idaho nearly doubled from 5.28 cents/kWh in 1998 to 10.15 cents/kWh in 2018.

Idaho is recognized as a leader in energy efficiency, being one of the first states to remove the disincentive for utilities to participate in energy efficiency programs to keep costs down across the board. This regulatory approach, known as 'decoupling', and first approved by the IPUC in 2006, allows

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[3] : https://aceee.org/policy-brief/advanced-building-energy-codes

[4] Jacobsen, G.D and M. J. Kotchen. "Are Building Codes Effective at Saving Energy? Evidence from Residential Bulling Data in Florida." Review of Economics and Statistics 95 (2013):34-39.

[5] https://www.eia.gov/electricity/data/state/

utilities to invest in energy efficiency programs as a means to meet the needs of all customers[6]. Idaho Power is recognized as a leader in this area having successfully used efficiency measures to the benefit of Idaho ratepayers and Idaho Power shareholders.

Efficient homes are better prepared to participate in the smart grid.

Increasingly, electric utilities are relying on demand response programs as a way of economically balancing generation with load. An example of this program is the AC Cool Credit program implemented by Idaho power (approved by the IPUC in 2009[7]). These programs allow the utility to cycle residential appliances (e.g. air conditioning compressor) off for a short period of time, thus shedding load and avoiding the purchase of high-priced electricity on the open market. Analysists predict that these programs are likely to expand in future years as the penetration of variable generating resources (i.e. wind and solar) increases to meet stated goals by utilities. More efficient homes are more likely to be able to participate in these programs with little or no impact experienced by the occupants.

This is a once-in-a-generation chance.

The current population growth in Idaho has led to an unprecedented construction boom that includes new construction, extensive renovation of existing homes and in some cases, the removal of older homes to make room for new houses. When older homes are removed they are sometimes replaced by 2 or 3 new homes. This is a once-in-a-generation chance to make a significant impact on the overall energy efficiency of our housing stock, significantly 'bending the curve' on building energy use in the state.

About CEERI

The CAES Energy Efficiency Institute (CEERI) was created by order of Governor Otter in October of 2010 and was organized as part of the Center for Advanced Energy Studies. The mission of CEERI is to promote the effective and efficient use of energy resources through cutting-edge research, effective outreach and accessible education.

About John Gardner, PhD, PE

Dr. Gardner is a professor of mechanical and biomedical engineering at Boise State and directs the Energy Efficiency Research Institute at the Center for Advanced Energy Studies (CEERI). John recently spent 6 months at the Universities of Melbourne and Auckland studying advanced control of microgrids. He has published more than 60 peer-reviewed research publications, 2 textbooks, co-inventor of 3 US patents and gave a talk in the TEDxBoise conference in 2019. John is a registered professional engineer in the state of Idaho and a Fellow of the American Society of Mechanical Engineers (ASME) , a senior member of the Institute of Electrical and Electronics Engineers (IEEE) and a member of the American Society of Heating Refrigeration and Air-conditioning Engineers (ASHRAE).

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[6] https://puc.idaho.gov/fileroom/PublicFiles/elec/IPC/IPCE0415/ordnotc/20070312FINAL_ORDER_NO_30267.PDF
[7] https://puc.idaho.gov/fileroom/PublicFiles/elec/IPC/IPCE0905/staff/20090501COMMENTS.PDF