Thermal Envelope Assessment of Energy Code Provisions for Pennsylvania

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Date: 2000

Preface and acknowledgments

This report is one of a series of reports by the Pennsylvania Housing Research Center (PHRC) that document the development of an alternative energy code for the Commonwealth of Pennsylvania. Its intended audience includes policy makers in state and local governments, building code officials, builders, contractors and others involved in the development or implementation of building code regulation in Pennsylvania.

This project was initiated at the request of members of the PHRC's Industry Advisory Council. The Council advises the PHRC to assure that projects that are selected are important and relevant to the housing industry in Pennsylvania. This project received financial and other support from the following groups:

·   The Pennsylvania Department of Community and Economic Development (DCED);

·   The individuals, associations, and corporations that are members of the PHRC; and

·   The Pennsylvania State University.

The report was researched and written by Mark Fortney, Assistant Director of the PHRC and Eric Burnett, Director of the PHRC. The assistance of Michelle McMullen and Angela Burnett in producing the final version of this report is appreciated.

The PHRC was responsible for initiating and producing this report. Two of our more general objectives are to stimulate discussion about housing and to promote the development of housing in Pennsylvania. We therefore welcome questions or other feedback regarding the report.
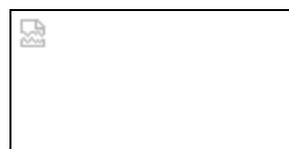
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Executive Summary

In November 1999, Pennsylvania's Governor Ridge signed the Uniform Construction Code (UCC) legislation into law, creating a statewide building code across Pennsylvania. The Act requires the Pennsylvania Department of Labor and Industry (DLI) to promulgate regulations to implement the requirements of the legislation. Chapter 3, Section 301 (c) Prescriptive Methods for Energy Conservation, requires the DLI to

promulgate regulations for prescriptive methods to implement energy requirements that take into account for the various climatic regions in the Commonwealth. In deriving these standards, "the DLI shall seek to balance energy savings with initial construction costs."

The PHRC developed the PA-Alternative Chapter 11 to replace the International Residential Code, Chapter 11, Energy Efficiency. The PA-Alternative Chapter 11 has been developed with the intention of providing a code that is simpler, more flexible, and focussed on Pennsylvania. It also seeks to have a rational code for Pennsylvania's climate characteristics.

This project was initiated with two main objectives:

·   to demonstrate that the PHRC PA-Alternative Chapter 11 is equivalent in terms of thermal envelope performance to the 2000 International Energy Conservation Code (IECC); as well as the IRC 2000 Chapter 11.

·   to demonstrate the difference between Pennsylvania's existing energy code, promulgated under the Building Energy Conservation Act, Act 222 of 1980, and the proposed PA-Alternative Chapter 11.

For this evaluation the PHRC used the methodology developed for the U.S. Department of Energy by the Pacific Northwest Laboratory. The methodology and examples are contained in the report *Comparison of Current State Residential Energy Codes with the 1992 Model Energy Codes (MEC) for One and Two Family Dwellings: 1994*. The scope of this project was limited to the evaluation of thermal envelope performance.

The findings demonstrate that the PHRC PA-Alternative is equivalent to the IRC 2000 and that both are essentially equivalent to the 2000 IECC. If the 2000 IECC and IRC 2000 codes were to be mandated, they would require significant changes to existing construction practices and would produce a minimum of 33.4% improvement in thermal envelope performance over existing Act 222 requirements. The PA-Alternative exceeded the requirements of the 2000 IECC by at least 3.2% and provided a minimum of a 31.7% improvement over existing Act 222 requirements.