

**Evaluating the Economic Impacts of the Legislatively Delayed Provisions of the 5th Edition (2014)
Florida Building Code
Florida Solar Energy Center
August 10, 2015 -- DRAFT PROPOSAL**

Overview

This research proposes to provide an assessment of the potential economic impacts of implementing three legislatively delayed requirements of the Florida Building Code, 5th Edition (2014): 1) residential air leakage testing, 2) residential whole-house mechanical ventilation, and 3) two fire service access elevators for applicable buildings. This research is based on assessing the costs of implementing the measures without respect to timing. That is, costs of industry not being prepared are not included as the commission and legislature already addressed those concerns. Rather this addresses what would the steady-state direct costs and benefits for such measures be once implemented.

In order to provide information on such important topics the research team includes industry experts for each measure as well as an economist to ascertain the induced and indirect costs of including such measures in the code. The general process for conducting the research is depicted in Figure 1:

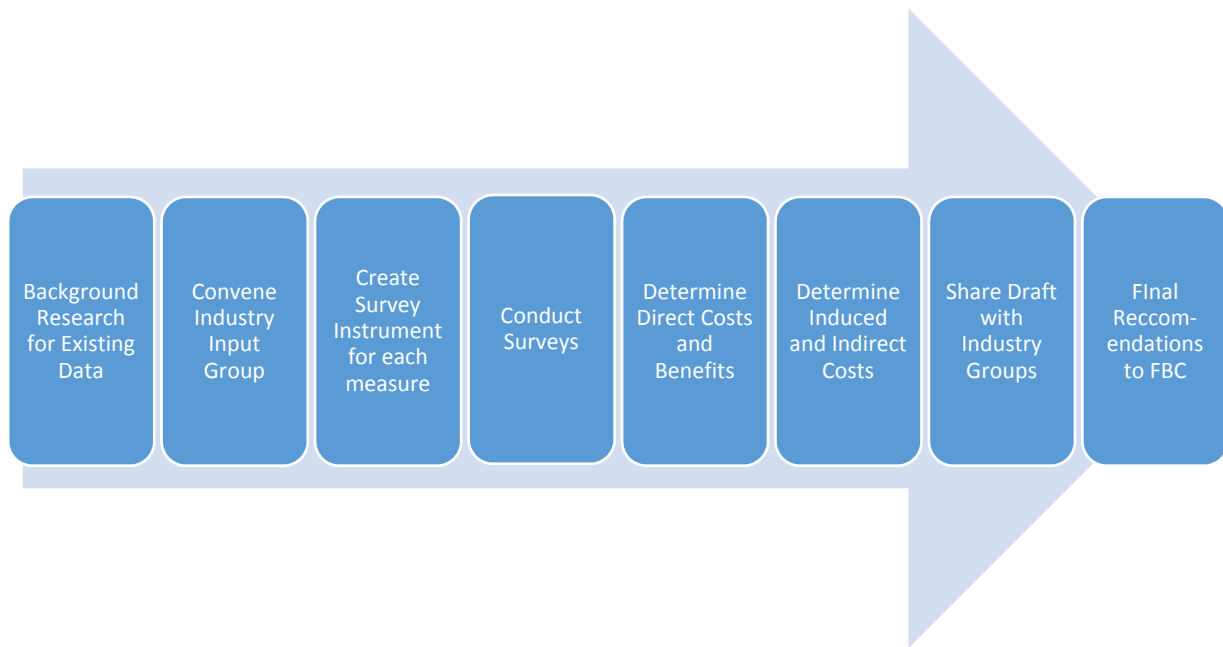


Figure 1. The research plans to study the economic impact of residential air leakage testing, residential mechanical ventilation systems and 2nd fire access elevators will each follow the general process shown.

The resulting economic information gathered for each of the three delayed code requirements will be provided to the Florida Building Commission (FBC) via a draft final report. If any of the information gathered is seen as providing clear direction for one or more code recommendations, the recommendation(s) will also be written up and presented to the Commission. Effort will be made to provide the draft findings by the end of November 2015 to allow the findings to inform code modification proposals during the current open comment code change cycle.

Work Scope:

Each code requirement will be treated as a separate task:

Task 1: Section R402.4.1.2, Energy Conservation volume - the air leakage testing requirement for residential buildings - herein referred to as “Testing”,

Task 2: Section R303.4, Residential volume - the whole-house mechanical ventilation requirement for residential buildings – herein referred to as “Ventilation”, and

Task 3: Section 403.6.1, Building volume - the requirement for two fire service access elevators - herein referred to as “Elevator”.

In Task 4 researchers will present preliminary findings for each requirement and at two local industry meetings to obtain stakeholder feedback.

For each of the three code requirements identified in Tasks 1 through 3 above, the following subtasks will be undertaken to assess the cost of implementation.

Subtask A - The research team will first gather direct cost data:

- A literature survey will be performed to gather existing published cost data
- Any existing aggregated cost data will be requested from relevant industry associations
- With input from an industry advisory committee, a survey instrument to assess costs will be developed
- With promotional assistance from industry groups and media contacts, the survey will be sent to samples of Florida contractors and other key stakeholders.

Subtask B - A direct benefits analysis will be performed for each code requirement using the acquired direct cost data and any direct energy or health/safety benefits.

Subtask C - Separate indirect and induced cost analyses will be performed for each requirement by University of Central Florida colleagues.

The resulting economic information gathered from these Subtasks for each of the three delayed code requirements will be provided to the Florida Building Commission via a draft final report. If any of the information gathered is seen as providing clear direction for one or more code recommendations, the recommendation(s) will also be written up and presented to the Commission. Effort will be made to provide the draft report by the end of November 2015 to allow findings to inform code modification proposals during the current open comment code change cycle.

Background: Concerns have been raised about the economic impact of implementing these three code requirements. An overview of several concerns is provided in a Petition for Emergency Rulemaking by the Florida Building Commission (original and amended) entered by the Florida Homebuilders Association and others (Amended Petition, 2015).

Air Leakage (Blower Door) Testing: The Petition highlights estimated additional cost of conducting the Testing to range from \$200 to \$300 per house calculated by the Florida Home Builders Association Green Building Council. In the interest of informed discussion of this issue, the Florida Solar Energy Center (FSEC) provided a professional opinion letter dated June 9, 2015 to Richard S. (Dick) Browdy, Chairman of the Florida Building Commission (Vieira, 2015). FSEC trains and certifies Home Energy Raters who would likely be among those approved to conduct the Testing. Based on professional experience, FSEC estimated that Testing for typical single family homes would involve 35 – 55 minutes on-site to conduct a seven-step process. More complex homes (e.g. multiple fireplaces) would warrant additional time. The estimate excluded time for contractor communications and delivering the required Testing report. Considering either of these estimates, the cost of the Testing will likely represent a very small fraction of overall home cost; however, it would impact tens of thousands of new homes built annually in Florida (Figure 2).

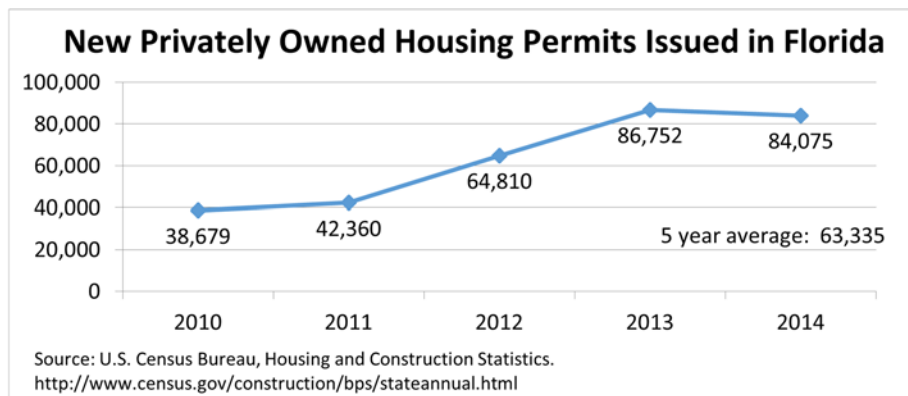


Figure 2: Florida Residential Construction Permitting 2010-14.

While these estimates are based on sound professional judgement, input from more stakeholders is needed to understand the economic impact. Several industry associations likely have access to cost data from members who conduct this testing.

Mechanical Ventilation: The new residential mechanical Ventilation requirement when implemented will also affect thousands of new Florida homes requiring augmented and/or additional equipment. In some cases, additional space may be needed to accommodate a particular mechanical ventilation system. A limited set of first cost data for mechanical ventilation may be available for above-code homes in Florida, such as those certified under the ENERGY STAR for New Homes program. Input from a broader spectrum of contractors is needed to understand how the requirement would be met in the market at large.

Fire Service Access Elevator: The space needed to accommodate an additional fire service access elevator is a concern for the economic feasibility of high-rise building projects. Because high-rise projects generally maximize use of the land, setting aside otherwise salable/rentable space for building services will reduce revenue. Case study analysis of residential high-rise buildings by Fishkind & Associates indicated that the additional elevator could be accommodated with an estimated 250 square feet on each floor. The lost revenue must be combined with construction costs which Fishkind’s analysis estimates from \$770,000 to \$1.3 million for structures 12 to 16 stories tall (Amended Petition, 2015).

Exclusions: In addition to direct, indirect, and induced costs, there may be costs associated with wait time, corrective actions, increased or reduced call backs, and product availability under new demand conditions. These costs are highly variable and unpredictable and fall outside the scope of the proposed research. Technical concerns also fall outside the scope of the proposed research.

Research Strategies: FSEC will conduct a literature search for documentation of direct benefits and costs for each requirement. With direction from the FBC, FSEC will form and convene two Industry Advisory Committees to include FBC Staff: one for the residential testing and ventilation requirements, the Residential Committee, and one for the elevator requirement, the Elevator Committee.

Together with the Residential Committee, researchers will develop one survey instrument covering both testing and ventilation requirements (see example draft Testing survey questions in Exhibit B) to collect cost estimates and other relevant input from home energy raters, builders, trade contractors, and other key industry stake holders identified by the Committee. The survey will include at least one example specification that survey respondents will be asked to comment on and provide an estimated cost for. Survey responses will be collected electronically when possible using an online survey tool, and otherwise through phone interviews and/or hard-copy submissions. Survey outcomes will include estimated direct cost and other information used with census data to estimate job creation. In economic analysis, “direct” effects are those that result from of the money initially spent to pay for services, salaries, supplies, raw materials, and operating expenses associated with a specific factor, such as a new code requirement.

Researchers will use EnergyGauge[®] USA, a whole-house annual energy use simulation software, to assess the impact of the mechanical ventilation requirement and the associated infiltration limit on annual household energy use. Census data and input from the Committee will be used to develop a set of prototype houses representative of Florida’s new construction market in terms of housing types, sizes, and characteristics. A variety of ventilation approaches gleaned from the survey results will be modeled for each prototype.

Together with the Elevator Committee, researchers will also develop a cost survey for key elevator code requirement stakeholders. Questions will focus on the cost of additional construction, effect on current labor resources, and associated revenue losses. Researchers will rely on Koffell Associates to develop an assessment of the benefits anticipated when the International Code Council made the change in the code.

FSEC will work with colleagues in the Office of Research and Commercialization at UCF to project induced and indirect economic effects for each of the three delayed requirements. Induced effects are resulting changes in the industry due to increased costs or changes in sales. Indirect economic effects are the results of business-to-business transactions indirectly caused by the direct effects. Businesses initially benefiting from the direct effects will subsequently increase spending at other local businesses. Induced economic effects are the results of increased or decreased personal income caused by the direct and indirect effects.

The results from Subtasks A and B will be used by UCF colleagues for Subtask C. In this subtask, modeling will be done with IMPLAN[®] Version 3.0 software, which includes the capability to model a specific regional economy. Rather than extrapolating regional data from national averages, IMPLAN[®] projects economic impacts from data representing actual local economies. Analysis results are projected

effects of local changes on supporting industries and households including job creation, income, production, and taxes.

Researchers will compile preliminary findings from Subtasks A, B, and C for discussion at local stakeholder events (Task 4) organized through relevant industry associations. The intent is to give industry proponents an opportunity to comment and provide input prior to finalizing the material. If any items in the preliminary findings raise concerns, they will be mentioned and, if possible, resolved in the final report to the FBC.

Expected Outcome and Impact on the Code: If research can begin by the first week of September, FSEC will likely have a report available by the end of November 2015 so the findings can be used to inform 2017 Florida code modification proposal submissions during the current open comment code change cycle period.

DRAFT Budget: In development, will be ready by TAC chairs meeting.

References:

“Amended Petition for Emergency Rulemaking by the Florida Building Commission.” June 9, 2015. Accessed July 29, 2015:

http://www.floridabuilding.org/fbc/commission/FBC_0615/Commission/Amended_Petition_for_Emergency_Rulemaking_by_the_FBC.pdf

ICC. (2015). “Florida Building Code, Energy Conservation, 5th Edition (2014).” Country Club Hills, IL: International Code Council, Inc. Accessed July 28, 2015:

<http://floridabuilding2.iccsafe.org/app/book/toc/2014/Florida/Energy%20Conservation%20Code/index.html>.

ICC. (2015). “Florida Building Code, Residential, 5th Edition (2014).” Country Club Hills, IL: International Code Council, Inc. Accessed August 6, 2015:

<http://floridabuilding2.iccsafe.org/app/book/toc/2014/Florida/Residential%20Code/index.html>.

ICC. (2015). “Florida Building Code, Building, 5th Edition (2014).” Country Club Hills, IL: International Code Council, Inc. Accessed August 6, 2015:

http://ecodes.biz/ecodes_support/free_resources/14FloridaDraft/Building/14FL_Building_Draft.html

Vieira, R. Letter to Florida Building Commission Chairman Richard Browdy. June 9, 2015.

Exhibit A – Relevant Code References

- Excerpt 1 from the Florida Building Code, Energy Conservation, 5th Edition (2014):

“R402.4.1.2 Testing.

The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

“During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

- Excerpt 2 from the Florida Building Code, Residential, 5th Edition (2014):

“R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c (50 Pa) in accordance with Section R402.4.1.2 of the Florida Building Code, Energy Conservation the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

-Excerpt 3 from the Florida Building Code, Building, 5th Edition (2014):

“Section 403 High Rise Buildings

“403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, no fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3500 pounds (1588 kg).

Exhibit B – Draft Example Testing Survey Questions

Name: _____

Florida counties (only) you serve: _____

Are you a certified home energy rater with training to conduct blower door tests? Yes No

If not, are you currently conducting blower door testing as part of a business? Yes No

If not, have you conducted such testing in the past? Yes No

If not, do you plan to become an approved third party? Yes No

In consideration of new air leakage testing requirements in Section R402.4.1.2, Florida Building Code, Energy Conservation, 5th Edition (herein referred to as “Test” or “Testing”), effective June 30, 2016, please answer the following questions:

Considering your current work capacity, estimate the number of houses per week you could Test within your normal service area: _____

Estimate the cost and time allowances for Testing one single-story, 2,100 ft² single family detached house with no gas equipment within your normal service area and producing the required report:

Cost: \$ _____

On-site time: _____ minutes

Additional time: _____ minutes

Would the cost estimate be affected by any of the following:

Square footage? Yes No

Number of stories? Yes No

Two family dwelling? Yes No

Building characteristics (i.e. frame, block, two-story, crawl space)? Yes No

Location outside your normal service area? Yes No

Presence of combustion equipment? Yes No

Contracted by same builder to test multiple houses in the same development? Yes No

Is there any other factor that would warrant an increase or decrease in your estimate?

Increase: _____

Decrease: _____
