

ORIGINAL

William J. Tait, Jr., Esquire
Florida Bar Number 0125081
1061 Windwood Way
Tallahassee, Florida 32311
(850) 878-0500

RECEIVED-PPSC

AUG 12 PM 4:49

COMMISSION
CLERK

August 12, 2005

Ms. Blanca S. Bayo, Director
Division of Commission Clerk and
Administrative Services
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0870

040029-EG


Re: Consolidated Dockets Nos. 04-0660-EG and 04-0029-EG

Dear Ms. Bayo:

Enclosed for filing on behalf of Calcs Plus and its principals and individually, Jon Klongerbo and Dennis Stroer, are an original and fifteen (13) copies of Direct Testimony and Exhibits for the following Calcs Plus witnesses:

- Richard Dixon
- Philip Fairey
- Neil Moyer
- Jon Klongerbo
- Dennis Stroer
- Ken Fonorow

Sincerely,


 /s/William J. Tait, Jr.
 William J. Tait, Jr.
 Florida Bar No. 0125081

CMP _____
 COM 3
 CTR orig
 ECR _____
 GCL 1
 OPC _____
 RCA _____
 SCR _____
 SGA _____
 SEC 1
 OTH _____

Dixon 07872-05
 Fairey 07873-05
 Moyer 07874-05
 Klongerbo 07875-05
 Stroer 07876-05
 Fonorow 07877-05

ORIGINAL

RICK DIXON'S TESTIMONY-8/12/2005 12:06 PM

1 BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

2 CALCS PLUS

3 TESTIMONY OF RICHARD W. DIXON

4 DOCKET NOS. 040029-EG, 040660-EG

5 AUGUST 12, 2005

6 1. Please state your name, current position and address.

7 Richard W. Dixon

8 Government Analyst II

9 Florida Building Commission

10 Department of Community Affairs

11 2555 Shumard Oak Boulevard

12 Tallahassee, FL 32399-2100

13 2. Please provide us your educational background and any special credentials
14 or training that you have received relevant to your testimony in this case.

15 BS Engineering, University of Florida, 1973

16 Managed Research and Development Project to develop the second edition of the

17 Florida Energy Code. Administrator of Building Codes and Standards Office

18 responsible for Building Energy Efficiency Rating System Program.

19 3. Please provide us with your past and present professional association
20 memberships and positions you have held in those associations.

21 American Society of Heating, Refrigeration and Air Conditioning Engineers,

22 Associate Member

23 Building Officials Association of Florida, Associate Member

1 **4. Please provide us with a brief statement of your background and experience**
2 **in the areas of building science, standards of building practice and programs**
3 **involving residential energy efficiency and conservation.**

4 Research and Test Engineer, Research Project Manager, University of Florida, Solar
5 Energy and Energy Conversion Laboratories, 1973-1985, responsible for building
6 products and systems energy efficiency evaluation and conservation research.

7 Florida Energy Code Program Manager, Florida Department of Community Affairs,
8 1985-1990. Program Administrator at the time the law establishing the Building
9 Energy Efficiency Rating System was enacted and implemented by the Department of
10 Community Affairs.

11 **5. Please provide us with a brief statement of activities in which you have**
12 **initiated, supported, and managed the establishment and adoption of**
13 **standards in the areas of residential building construction practices.**

14 Managed the project contracted by the Department of Community Affairs with the
15 University of Florida to develop the second edition of the Florida Energy Code.

16 Managed the Department of Community Affairs, Florida Energy Code Program
17 during implementation of the second edition of the Code.

18 Administrator of the Building Codes and Standards Office during implementation of
19 the Building Energy Efficiency Rating System.

20 **6. How does the Florida Building Code measure and regulate residential**
21 **building energy efficiencies in Florida?**

22 The Florida Building Code incorporates the Florida Energy Efficiency Code for
23 Building Construction which establishes minimum performance standards for

1 residential and commercial buildings. The Code establishes an energy use target by
2 incorporating a standard set of building component efficiencies and the specific
3 building design into an energy use simulation program. The target energy use is then
4 compared to simulated energy use for the exact building design to determine
5 compliance. If the actual/"as built" building energy use estimated by the simulation
6 program is equal to or less than the energy use for the building with "standard"
7 features/components it will meet the energy target and comply with the Code.

8 **7. Are you familiar with other jurisdictions' efforts to measure and regulate**
9 **residential building practices and, if so, can you summarize their various**
10 **approaches?**

11 Some states such as California use a similar "performance" based compliance
12 approach. National model building codes, adopted by most states, utilize both a
13 performance compliance approach similar to Florida and California where the
14 building features can vary from the minimum efficiencies used to estimate total
15 building energy use so long as the overall estimated building energy use meets the
16 performance target and a prescriptive compliance approach where minimum
17 efficiencies must be met for individual building components.

18 **8. Are there national standards for the development of systems for rating the**
19 **energy efficiency of buildings? If so, describe and indicate where the**
20 **standards may be found.**

21 Systems were being developed 15 years ago when I was more directly involved in
22 this area. I would defer to others currently expert in this field.

23

1 **9. How do you believe any residential program purporting to increase**
2 **residential building energy efficiencies should be measured and monitored?**

3 The effectiveness would be best measured via analysis of actual building energy
4 consumption data correlated to building size, location and climate factors.

5 **10. What is a building energy efficiency rating under Florida Law?**

6 An energy efficiency rating under Chapter 553, Part VIII, Florida Statutes is a statewide
7 uniform means of analyzing and comparing the relative energy efficiency of buildings.

8 **11. Please give us a brief description of your involvement in the development and**
9 **implementation of the Florida Building Energy Efficiency Rating Law,**
10 **Florida Statute Chapter 553, Part VIII, Sections 553.90 et seq. and Florida**
11 **Administrative Code Rule Chapter 9B-60.**

12 I participated in the development of statutory language based on model language used
13 in other states and in the lobbying for passage of the bill.

14 I was administrator of the office and supervised the program planning manager and
15 staff who worked on the implementation of the system through administrative rule.

16 **12. Are there any categories of ratings? If so, please describe them and the**
17 **services required to produce each of them.**

18 Yes, there are three categories or classes of ratings. These classes are determined by
19 the nature of the data that are used in the development of the rating and are conducted
20 in accordance with the Florida Department of Community Affairs' Rule 9B-60.

21 **Class 3 ratings** are developed based solely on the information provided in
22 construction documents and are considered "projected ratings based on plans"
23 because the properties have not yet been constructed.

1 **Class 2** ratings are developed based on inspection of the actual building, where
2 the energy characteristics of the building are inspected and confirmed.

3 **Class 1** ratings are developed based on inspection of the energy characteristics of
4 the actual building plus the results of specific tests that are performed on the
5 building to measure its air tightness and duct system integrity.

6 Therefore, class 1 and class 2 ratings are "confirmed" ratings.

7 **13. Is there any difference, other than filing and registering, between the process**
8 **of developing and completing a code compliance form and a Class 3 rating?**

9 **If so, describe the similarities and differences.**

10 The technical differences are relatively small because the Law requires that
11 Florida's rating system be compatible with state building codes. The Law also
12 requires that Florida be compatible with national rating system standards.

13 Nonetheless, there are small differences because the "baseline" building used in
14 Florida's code is not always exactly consistent with the HERS Reference home,
15 which, like Florida's code baseline, is the national standard used for comparison
16 in rating systems. BERS ratings also consider the relative efficiencies of lighting
17 and appliances, while the Code considers only heating, cooling and water heating
18 equipment for residential buildings.

19 **14. Is there any relationship between an e-ratio developed in the process of code**
20 **compliance work and a BERS score developed in the process of a Class 3**
21 **rating? If so, explain.**

22 There is no direct relationship; however, the same software is used to provide energy
23 use calculations for both. The code baseline homes that are distributed as examples

1 in the software have the following HERS Scores

2 - North Florida Baseline = 82.5

3 - Central Florida Baseline = 83.0

4 - South Florida Baseline = 82.9

5 **15. Has the Department taken any positions or issued any letters or opinions on**
6 **enforcing their uniform system for rating the energy efficiency of buildings?**

7 **If so, please attach a copy of any statement or letter.**

8 Official Department opinions must be promulgated through declaratory statement.

9 There are none on this system to my knowledge. There is an internal letter from a
10 staff attorney to a program staff member found in our files.

11 **16. The Department has periodically reviewed both its building code and its**
12 **rules relating to regulation of rating systems. What was your role in these**
13 **activities?**

14 I was the office administrator and supervisor of the program manager during the
15 period of most rating system rule amendments and code changes. I have been director
16 to the Florida Building Commission for the past 5 years.

17
18 **17. Are you aware of any minimum charges required to be charged for BERS**
19 **Audits, If so, what are the minimum charges for each classification? If, yes,**
20 **to the best of your knowledge, are there exceptions for charging these**
21 **minimums by individuals/businesses in State statutes or rules?**

22 Section 553.995, *Florida Statutes*, specifies that the Florida Department of
23 Community Affairs shall set by rule the appropriate charges for raters to charge for

1 energy ratings, not to exceed the actual costs. Rule 9B-60 specifies the following
2 fees:

3 Class 3 rating: \$25 above charges for providing the rating or no more than the
4 cost of conducting the rating.

5 Class 2 rating: \$75 above charges for providing the rating or no more than the
6 cost of conducting the rating.

7 Class 1 rating: \$125 above charges for providing the rating or no more than the
8 cost of conducting the rating

9 **18. What are the accepted duct testing method(s) recognized by Florida, other
10 state, national and international standards?**

11 Rule Chapter 9B-60 recognizes Appendices B and C of BSR/ASHRAE Standard
12 152-2004, "Method of Test for Determining the Design and Seasonal Efficiencies
13 of Residential Thermal Distribution Systems." This standard is recognized by the
14 American National Standards Institute (ANSI).

15 **19. What is the difference between the testing protocols? Which is more
16 accurate and why?**

17 I would defer to the experts in the field of duct testing for comparisons of test
18 protocols.

19 **20. Was Pressure Pan testing ever accepted by the State? If, yes, then is it still
20 accepted as a valid testing protocol? If no, then why not?**

21 Yes, in the past, pressure pan testing was accepted by the state as a "threshold"
22 test for the determination of acceptable duct leakage. As of the most recent
23 change to rule 9B-60 and to national standards, it is no longer an accepted test

1 protocol for duct leakage under that rule. The promulgation of a national
2 consensus standard (ASHRAE/ANSI Standard 152-2004) accredited by the
3 American National Standards Institute (ANSI), first published in 2004 provides
4 the standard protocol for the measurement of duct leakage.

5 **21. Did you provide any recommendation to the Florida Public Service**
6 **Commission when it adopted Rule 25-17.003(4)(a), F.A.C., as amended on**
7 **7/14/1996? If so, what was your recommendation and reasons therefore?**

8 **Please provide a copy of any written statement or letter that you submitted.**


9 Our records indicate that as a result of the Conservations Goals docket a staff working
10 group of Florida Public Service Commission staff and Florida Department of
11 Community Affairs staff was formed to assess what contribution the state thermal
12 building codes could make in meeting additional demand and energy goals above
13 those efforts of the utility sponsored efficiency programs. One
14 conclusion/recommendation of the workgroup of which I was a member was that the
15 Florida Building Energy Rating system should replace the individual ratings used
16 pursuant to the Five Star Rating programs required by FPSC Rule 25-17.0555. I also
17 co-signed a letter to Commission Chairperson, Susan Clark emphasizing this
18 recommendation. See attachment.

19 **22. Does this conclude your testimony?**

20 Yes.

21 I have prepared the above pre-filed testimony consisting of _____ pages and swear under
22 penalty of perjury that it is true to the best of my knowledge.

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Richard Dixon 8/12/05

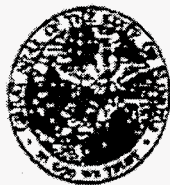
Sworn to and subscribed before me this

____ day of _____ 2005.

Notary Public

State of Florida

My Commission expires: _____



STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

EMERGENCY MANAGEMENT • HOUSING AND COMMUNITY DEVELOPMENT • RESOURCE PLANNING AND MANAGEMENT

LAWTON CHILES
Governor

JAMES F. MURLEY
Secretary

December 16, 1986

Joanne Weber
Codes and Standards Section
Department of Community Affairs
Sadowski Building
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Re: Building Energy Efficiency Rating Act

Dear Joanne:

You have advised me that an organization that evaluates buildings for energy efficiency has entered the State of Florida to pursue that activity here, and that the organization has announced that it will not use the rating calculations allowed by the Department under the Building Energy Efficiency Rating Act, but those of another state. You have asked me to advise you on the legal validity of the use of rating calculations other than those approved by the Department under the authority of the Act.

In the Act the Legislature intended "to provide for a statewide uniform system for rating the energy efficiency of buildings" in the State of Florida. § 553.991, Fla. Stat. (1995). In addition, the Legislature gave the Department authority to implement the Act by the adoption of "a statewide uniform building energy-efficiency rating system" by formal rulemaking. § 553.992, Fla. Stat. (1995). Upon its adoption, the system must "[p]rovide a uniform rating scale of the efficiency of buildings" based on annual usage. § 553.995(1)(a), Fla. Stat. (1995). What is more, the Act states that the system must enable the consumer to compare "the relative energy efficiency of buildings upon the sale of new or existing . . . buildings." § 553.995(2), Fla. Stat. (1995). It further states that "[a]ll ratings shall be determined using tools and procedures" approved by the Department. § 553.998, Fla. Stat. (1995). The rules of the Department rules approve one rating system which applies to all new and existing buildings in the State

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100

FLORIDA KEY AREA OF CRITICAL STATE CONCERN
FIELD OFFICE
3735 Overseas Highway, Suite 201
Naples, Florida 34103-1127

SOUTH FLORIDA RECOVERY OFFICE
P.O. Box 4022
3600 N.W. 35th Street
Miami, Florida 33169-4022

GREEN SWAMP AREA OF CRITICAL STATE CONCERN
FIELD OFFICE
155 East Sumner
Gainesville, Florida 32636-4461

Joanne Weber
December 18, 1996
Page 2

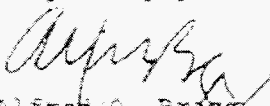
within the respective residential, commercial and governmental categories. Fla. Admin. Code R. 9B-50.004(1) (1996). The rules reiterate the uniformity requirements of the Act. Fla. Admin. Code R. 9B-60.002(11) (1996). The only variations allowed in the ratings are those that consider differences in "local climate conditions, construction . . . and building use." Id.

This mandate for uniformity permeates the Act and the rules that implement it. It is evident that the Legislature intended all ratings to be performed in accordance with the system approved by the Department. Not only is this evident from § 553.995(1)(a) and the other references to the uniformity requirement, but also from the recurrent requirements that all buildings be rated in accordance with the system approved by the Department. What is more, the consumer cannot very well compare the efficiencies of buildings, as § 553.995(2) contemplates, if he or she is faced with a choice between different buildings which have been rated under different systems. It was that very situation the Act was intended to prevent.

It is therefore my opinion that the use of any ratings system for buildings in this State in place of the one allowed by the Department under the authority of the Act is a violation of the Act. Given that the use of such a system also violates the rules which implement the Act, the violation may be redressed by an action for injunction in Circuit Court under the Administrative Procedure Act, as amended. See § 120.69(1)(a), Fla. Stat. (1996 Supp.). Based on my present information, my recommendation to the Secretary would be to take such action.

Please call me if you have any questions or if I may be of further assistance.

Very truly yours,


Alfred O. Bragg, III
Assistant General Counsel

cc: Richard W. Dixon
Mc A. Madani



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STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

EMERGENCY MANAGEMENT • HOUSING AND COMMUNITY DEVELOPMENT • RESOURCE PLANNING AND MANAGEMENT
JAMES F. MURPHY

LAWTON CHILES
Governor

[Redacted Name]
Secretary

March 15, 1996

Ms. Susan F. Clark, Chairman
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0862

Dear Chairman Clark:

We fully support the Commission's efforts to update your rules concerning energy audits by public utilities in Florida. The proposed amendments contained in the Notice of Rulemaking under Docket No. 960023-EG, and the repeal of unnecessary provisions, provide an opportunity for all of us engaged in encouraging energy efficiency in Florida to improve our economy and regulatory climate.

We would like to suggest that the Commission follow the recommendations of the Building Code Task Force, created pursuant to the current Memorandum of Understanding between the Commission and the Department of Community Affairs, as accepted by the Commission at its February 20th Internal Affairs meeting. Specifically, the recommendation made on page 11 as follows:

- ACK
- FA _____
- PP 1
- AF _____
- MU _____
- TR _____
- GE 1
- EG _____
- 5 _____
- 1 _____
- 4 _____
- 3 _____
- PS _____

"Finally, we would recommend that utilities adopt the state BERS rating system as the standard to replace their individual Five-Star Rating programs currently in place. It does not make sense to have different rating scales, especially given the consistency of the BERS program with the building code standards. Since audits will continue to be an ongoing service function of utilities, providing the customer with a standardized rating of their home seems to be an integral part of such a service."

In order to adopt the sense of this recommendation, we would suggest the Commission adopt the attached changes to the proposed rule. To ease evaluation, we have proposed our changes by striking out and underlining language to the rule as proposed rather than as currently in existence. We are committed to improving the computer software which supports both the commercial and residential Building Energy-Efficiency Rating System as specified in Florida Statutes (Section 553.990 et seq.).

DATE RECEIVED
03145 MAR 15 96
FPC-REG/REGS/REPORTING


2740 CENTERVIEW DRIVE • TALLAHASSEE, FLORIDA 32399-2110
FLORIDA KPIS AREA OF CRITICAL STATE CONCERN SOUTH FLORIDA RECOVERY OFFICE GREEN SWAMP AREA OF CRITICAL STATE CONCERN
FIELD OFFICE P.O. Box 4021 FIELD OFFICE
2795 Osceola Highway, Suite 212 8620 N.W. 14th Street 155 East Summerlin
Tallahassee, Florida 32300-2021 Tallahassee, Florida 32315-4021 Tallahassee, Florida 32310-4611

Letter to Chairman Clark, March 15, 1996, page 2

We have further attached a letter from our contractor, the Florida Solar Energy Center, on planned improvements to the software which we will make broadly available and which will be easily compatible to meet the standards set by the Commission for Class A audits. We also plan to be in compliance with any national standards or guidelines issued and anticipate a very effective national market and financing strategy to implement energy efficiency programs at both the residential and commercial levels. Florida is recognized as a leader in these efforts. We believe both the public utilities and the public, generally, will be well served by the adoption of these proposed changes.

If you have any further questions or desire greater information about our plans, please do not hesitate to request.

Sincerely,

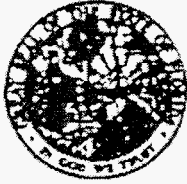


Jim Tait, Director
Florida Energy Office



Rick Dixon, Administrator
Florida Building Codes & Standards

Attachments



Public Service Commission

-M-E-M-O-R-A-N-D-U-M-

DATE: January 17, 1996

TO: William D. Talbott, Executive Director

FROM: *J. W. D.*
James W. Dean, Conservation Technologies Specialist

SUBJECT: Report of the Building Code Task Force

CRITICAL INFORMATION: PLACE ON THE FEBRUARY 20TH
INTERNAL AFFAIRS. REQUEST COMMISSION ACCEPTANCE OF THE
REPORT. NO CRITICAL DATES

You may recall during the conservation goals hearings that there was much debate on the role of mandatory building codes to achieve additional demand energy savings above those levels contained in the utility goals. To further explore this issue, the Commissioners directed that a staff level work group be formed with the Department of Community Affairs to assess possible changes to the code and recommend any legislative actions we felt appropriate. Attached is the report of that work group.

We are requesting the Commission accept the conclusions of the report. In summary, we are not recommending any changes to either the existing code standards or the administration and enforcement of the code.

Please schedule this item for the February 20th Internal Affairs.

JWD:jn

xc. Joe Jenkins w/attachment
Lee Colson w/attachment
Mike Haff w/attachment
Rick Dixon (DCA) w/attachment

**ROLE OF MANDATORY BUILDING CODES IN
ACHIEVING ENERGY EFFICIENCY GOALS**

Report of the Staff Task Force

Florida Public Service Commission

and

Department of Community Affairs

**Tallahassee, Florida
January 1996**

EXECUTIVE SUMMARY

As a result of the Conservation Goals docket, a staff working group of the Florida Public Service Commission and the Department of Community Affairs was formed. The goal of this group was to assess what contribution the state thermal building codes could make in meeting additional demand and energy goals above those efforts of the utility sponsored efficiency programs. The task force reached the following conclusions:

- It is not possible under existing statutory constraints to make the state thermal efficiency codes more stringent than currently required by the Department of Community Affairs.
- While non-compliance with the code does occur, empirical evidence indicates the level of non-compliance is low and that the majority of builders do meet the standards prescribed by regulations.
- Utilities should continue to support the building code by offering seminars and training programs directed toward the design, building, and trades industries.
- The recently enacted Building Energy Rating (BER) system provides a statewide standard to score the efficiency of both new and existing buildings. The BER system should replace the individual ratings used pursuant to the Five Star Rating programs required by Commission Rule 25-17.0555.
- New efficiency technologies and building standards are promoted by way of "credit" points used to meet code standards.

At this time, it does not appear feasible to require tighter thermal standards for Florida's new construction market. In addition, Federal appliance standards preempt states from adopting standards more rigorous than the Federal standards. Thus, utility efficiency programs targeted toward specific market niches appear to be the most promising avenue to achieve additional demand and energy savings.

Role of Mandatory Building Codes in Achieving Energy Efficiency Goals

One of the difficult issues during the conservation goals docket was identifying the role and contribution of the state building codes in promoting energy efficiency. The debate revolved around the potential for codes to achieve energy efficiency in new residential and commercial construction via regulatory standards instead of utilities developing programs for the new construction markets.

Order No. PSC-94-1313-FOF-EG, Adoption of Numeric Conservation Goals, directed staff of the Public Service Commission to join with staff from the Department of Community Affairs and review the current status of Florida's building codes in respect to energy efficiency. The two agencies formed a task force to "evaluate the cost-effectiveness of the building code, possible revisions to the building code, evaluation of code compliance methodologies and the possibility of legislation to promote and encourage energy efficient building procedures." (Order, p. 54). This report contains the results of that evaluation.

BACKGROUND

The Florida legislature created the thermal building code requirements in 1980. The Florida Thermal Efficiency Code (the Code) is codified at Chapter 553.900 - 553.912, Florida Statutes. It directs the Department of Community Affairs to develop, implement and maintain a uniform state energy code for new construction and substantially renovated buildings. Inspection and enforcement responsibilities under the Code are retained by local building officials. It is important to recognize that these statutes specify that the standards adopted by the DCA must be "cost-effective to the consumer." This cost effectiveness standard becomes an important constraint in using mandatory standards to achieve efficiency goals.

The FPSC has had an enduring interest in using the building code as a vehicle to advance our own energy efficiency goals pursuant to the Florida Energy Efficiency and Conservation Act (366.80, Florida Statutes). Since 1981 the legislature has transferred some \$1.9 million from the FPSC Regulatory Trust Fund to the DCA for code development and

administration. For FY 94/95, the legislature discontinued the intergovernmental funding between the FPSC and the DCA.

RESIDENTIAL CODE

In 1984, the FPSC in conjunction with the electric utilities offered major revisions to the existing residential code standards. After the appropriate rulemaking process, the DCA adopted these revisions and implemented them by way of a two-year phase-in to allow builders time to adapt to the much tighter standards. The first phase of the new standards tightened the code by approximately 25 percent from the minimum baseline standards. Phase two would have resulted in additional tightening of the code by 25 percent.

During the interim of the phase one standards, the DCA contracted with the University of Florida to do a comprehensive analysis of the residential code. The results of these efforts were adopted by rule and essentially supplanted the FPSC/utility revisions that were in effect. The effective implementation date was 1986 for these revised standards.

This new code package included the now familiar Energy Performance Index (EPI) for each of the three climate zones in Florida. For each climate zone a baseline, energy efficient building was designed as the minimum standard that all new homes must meet. This baseline home had a calculated Energy Performance Index of 100 points. The EPI should be viewed as analogous to an energy budget in that the lower the EPI the lower the projected energy usage for a given home. All newly constructed homes must meet a minimum EPI level of 100 points or less to comply with the code, but the Code allows great flexibility as to the combination of equipment and thermal standards that can be installed to meet this minimum.

Understanding the methodology used to set these standards is important in answering the question are there further cost-effective efficiency improvements available through stricter code standards. Recall, the statute requires the Code to be cost-effective for the home buyer; the statute does not permit other tests such as the rate impact test or total resource test to be used as the basis for setting standards. Several key assumptions were made in the original work. First, a life cycle cost approach was used. A life cycle analysis assumes that any efficiency measure incorporated into the code would be recovered in

energy savings over a 30 year period. This technique maximizes the recovery period and thereby permits higher levels of efficiency to be cost-effective. Second, it was assumed that electric rates would increase in excess of six percent per annum over the analysis period. Last, the code set the strictest standards for the building envelope.

Since efficiency measures are interactive, that is, one system affects the performance of others, it is necessary to prioritize the measures in order of cost-effectiveness. For example, the mandated standards for cooling equipment will be dramatically affected by the thermal properties of the house. A cost-effective level for an air conditioning system would result in a much higher efficiency standard if the house were poorly insulated. However, if the insulation is adequate then a substantial amount of the potential energy savings would be captured by this efficiency measure and a lower efficiency air conditioner would be selected. This is an inherent optimization problem when analyzing interactive effects of thermal systems.

Thus, the DCA standards were designed to optimize first on the structural features of the baseline home. Such features included insulation levels, the area of exposed glass, and shading coefficients. The rationale for optimizing first on these attributes is straightforward -- these kinds of efficiency improvements are permanent and can not be easily removed, do not degrade over time nor are their impacts mitigated due to the occupants' behavior or energy consuming choices. Next, minimum efficiency standards for heating, cooling and water heating equipment were incorporated into the baseline home using the same set of economic parameters. At that time, the result of this effort pushed SEER¹ levels for air conditioners higher than the market averages and resulted in very high efficient electric water heaters being installed as the baseline equipment.

The combination of these structural measures and equipment efficiency standards became the code minimums for the baseline 100 EPI home. This is the standard for which all homes must be built. Keep in mind, by definition and by result, this was the "most cost-effective" standard given the assumptions used.

¹Seasonal Energy Efficiency Ratings - a standard rating of air conditioners and heat pumps that is linear in respect to efficiency. A high SEER will require less energy than a lower rated SEER unit to do the same amount of cooling.

The DCA adopted two approaches to allow builders to meet this 100 EPI standard - a prescriptive approach and a performance approach. Under the prescriptive approach, a builder must construct a home with specific efficiency standards which may not be altered by the builder. For example, a typical home in North Florida could meet the prescriptive code by installing R-30 insulation in the attic, having R-19 insulated walls, having a slab-on-grade foundation, having no more than 15 percent glass to floor ratio, meeting the infiltration and duct insulation standards, and meeting the mandated equipment levels. Again, no deviation from these standards would be permitted under the prescriptive approach.

As an alternative, builders could meet the Code standards by use of a "performance calculation." Under this approach, a personal computer based simulation is used to calculate the EPI based on the interactions of various equipment and thermal systems. This approach allows the builder to "trade-off" more efficient level equipment with structural changes to the house such as installing a higher glass-to-floor ratio. In either case, each "as-built" home would have an overall energy usage budget that is equal to or less than the baseline home. Other measures and equipment such as heat recovery units or higher SEER air conditioners could be installed and "credits" would be given for higher efficient equipment or envelope improvements. Specific credits are also given for technologies such as solar water heating, ceiling fans, and natural gas. These will tend to lower the overall EPI ranking, thereby resulting in a more efficient structure. This performance approach allows builders great flexibility to customize a home to meet the demands of the homeowners in terms of features and design considerations.

COMMERCIAL CODE

Because of the vast differences in energy consumption patterns, occupancy patterns, and unique uses of commercial buildings, a single one-code-fits-all approach is not a desirable code compliance model for this market. For example, an unconditioned storage warehouse has a dramatically different set of energy needs than a commercial office park with space conditioning, lighting and water heating loads. Thus, a Florida specific code for every type of building is simply not an obtainable regulatory goal for the Code. For this

reason, national codes have been adopted as part of the building and trades industries through a process known as "consensus adoption." Relevant architectural, engineering, and building firms review acceptable engineering standards, equipment, climate conditions and construction practices and through a set of technical review committees, these standards are adopted as national codes.

The American Society of Heating, Refrigeration and Air Condition Engineers (ASHRAE) has developed a consensus commercial code entitled ASHRAE 90.1. This code has been adopted by the DCA, with a few Florida specific standards, as the minimum construction and efficiency standards for Florida's commercial construction industry.

IMPACT OF NATIONAL APPLIANCE STANDARDS

In 1987, Congress passed the National Appliance Energy Conservation Act and in 1992 passed the Energy Policy Act. Both of these set a variety of minimum efficiency standards for specific types of residential and commercial end-use equipment including air conditioners, furnaces, hot water systems and lighting. A requirement of these statutes preempts states from adopting appliance standards more stringent than those adopted pursuant to the Federal legislation. These events had a major impact on the Florida building code.

The standards required for heat pumps and air conditioners under the Federal standards exceeded those required in the baseline house. Because the baseline home in each climate zone was first optimized on structural features, the higher level of equipment mandated by Federal standards was not cost-effective for the baseline homes. In essence, the Federal standards explicitly increased the overall efficiency of new homes in Florida beyond what could have been justified under the Florida statutes. Moreover, a host of smaller appliances such as ranges, stoves, dishwashers, and refrigerators and freezers not covered under the Florida Code now must meet the Federal standards. This results in even more efficient appliances being purchased when a contractor installs appliances. In general, the stringent structural thermal requirements contained in the Florida code coupled with more efficient equipment mandated by Federal standards results in an overall combination of energy efficiency features substantially more strict than standards that could meet the statutory constraint embodied in 553.900, Florida Statutes.

NEW TECHNOLOGIES:

Mr. Richard Dixon, Section Administrator of the Building Code at the DCA, testified during the goals docket on the role of new technologies and how they are incorporated in the Code. He explained that his review of 28 potential measures indicated that none were likely to be adopted as mandatory standards during the current code revision process. He commented that the measures reviewed would not likely be made a formal requirement since most of the technologies were recognized by the Code as offsets under the performance compliance approach or, the technology was not widely adopted by the building and trades industries.

Mr. Dixon indicated that many new technologies are introduced into the code by way of "credit" points to meet the minimum EPI standard. In other words, new technologies are encouraged by allowing builders to incorporate them into homes and be given credit toward the EPI standard. Technologies that have been incorporated into the code in this manner include radiant barriers, solar water heating, heat recovery, ceiling fans and natural gas for space and water heating. In addition, some common construction practices such as tighter infiltration standards and higher insulation levels are incorporated into the code in a similar fashion.

Florida code standards are changed if national codes such as the Council of American Building Officials Model Energy Code are modified and these national standards are more strict than the existing Florida standards. Mr. Dixon testified that, consistent with building code mandates, the current code was a minimum standard of acceptable performance. Through the triennial code revisions, new standards will be incorporated as appropriate. However, because of the stringent efficiency levels currently embodied in the Code, it was unlikely that substantially higher efficiency standards will be incorporated in the immediate future unless Federal law or the national consensus codes are made more stringent.²

²For example, ASHRAE is proposing a new 90.2 standard called Energy/Efficient Design of New Low-Rise Residential Buildings.

ROLE OF FLORIDA UTILITIES:

With the passage of FEECA in 1980, Florida utilities viewed the new home market as one market segment that could be targeted to help achieve their mandated energy and demand goals. A number of new home programs were developed, some of which predate FEECA, which offered either incentives or awards to builders and home buyers who constructed homes to efficiency design levels prescribed by the host utility. As the size and cost of these programs increased, the Commission moved in the direction of using the mandatory code standards in place of the voluntary programs on the part of the utilities to achieve energy and demand savings.

To this end, the major electric utilities were instrumental in developing the technical standards that were ultimately adopted by the DCA in the 1984 code revision process. With the formal adoption of the 1986 Code, most utility new home programs were phased out or modified to reduce their cost. Most utilities continued to offer workshops and training as a customer service function to builders, contractors, and trade allies.

As a result of the most recent conservation goal setting docket, several utilities have proposed new home programs that are purportedly designed to complement the objectives of the Code by targeting incremental demand savings above that which would occur due to meeting the baseline EPI standards. Several utilities have programs that target air conditioning duct leakage (Gulf Power, Florida Power Corporation, Tampa Electric Company, Florida Power & Light). In addition, Florida Power & Light has a multi-year study to examine efficiency improvements in new construction and to monitor compliance with code standards. Both TECO and Florida Power Corp have proposed programs targeted to builders to continue their activities in the new construction arena. Gulf is promoting a new technology -- ground source heat pumps -- which offers substantially higher cooling and heating efficiencies coupled with better humidity control. Gulf Power Company continues to operate the Good Cents Program, but does not seek recovery of their expenses through the Conservation Cost Recovery clause. They do recover some costs through base rates.

In addition, utilities have both formally and informally sponsored seminars, industry trade exhibits, and other customer service functions to train and educate builders and

contractors about the standards and compliance mechanisms associated with the Code. These efforts have not been systematic, and since the elimination of utility new home programs are generally not done under the auspices of a commission approved conservation program.

CODE ENFORCEMENT:

Enforcement and inspection of the code standards are delegated to local building officials. The local officials have jurisdiction for both health and safety standards and the thermal efficiency standards. There has been much anecdotal evidence to suggest that these inspectors generally viewed the health and safety standards as their most important priority and in some cases gave either a cursory or no inspection of the energy standards and equipment efficiencies. Hard empirical evidence documenting the extent of non-compliance with the Code has not been systematically collected.

Fortunately, as part of the FPL New Home Program, detailed data was taken from a sample of 423 newly constructed homes specifically addressing the level of non-compliance. FPL calculated the EPI for these homes and compared them to the EPI reported to the building department at time of construction. Approximately 23% of the homes had EPIs above the 100 EPI minimum. On average these homes exceeded the minimum EPI by 5 percent. Conversely, a number of homes reported EPIs higher than the actuals for the site built house. It appears that a number of builders do not take full credit for those efficiency measures actually installed in the home and therefore could have claimed a lower EPI value. Given the imprecision of some of the input values used to calculate the EPI value, these results tend to suggest that for the most part builders in the counties studied by FPL are complying with the Code and variations around the 100 point minimum are inconsequential.

BUILDING ENERGY RATING SYSTEMS

Chapter 553.990-998, Florida Statutes, requires the Department of Community Affairs to develop a standardized rating system to evaluate the energy efficiency of commercial, residential and public buildings. The rating system must be consistent with the

energy code and national rating systems. These systems are being developed to encourage the use of efficiency ratings in the home mortgage market. While the rating system is completely voluntary, the objective of this statute is to make available information about the thermal performance of buildings, especially at time of sale. In doing so, it is hoped that energy efficiency will become an important marketing attribute and thereby encourage more efficient buildings. Finally, the DCA is responsible for training and certifying the people who perform the ratings.

The Building Efficiency Rating (BER) system is expected to largely replace FPSC Rule 25-17.0555 (Five Star Rating). The Five Star Rating is a similar rating concept implemented by the utilities, but only applies to residential homes. Requests for such ratings from customers have been sparse. There is no standardization under the Five Star program and the utilities have not heavily marketed the concept. With the entrance of the state into this area, standardized ratings, and a solid technical basis for evaluating both commercial and residential structures, it is anticipated that the BER program will experience greater success than its utility counterpart.

CONCLUSIONS:

It is staff's opinion that it is not possible to make the current baseline home, which is the foundation of all existing residential standards, substantially more stringent. This assessment is based on the current requirement contained in 533.900 Florida Statutes which requires any new code to be cost-effective to the home buyer. In fact, if the code were re-evaluated there is some possibility that technical work could support a relaxation in the current standards due to the decline in real electric prices. The original code was first optimized on the envelope standards. Then the new Federal National Appliance Standards superseded -- and exceeded -- those equipment standards contained in the 1986 Code revision process. This resulted in a combination of thermal envelope standards and equipment efficiencies higher than could reasonably be expected to be adopted if the code were revised today. While it is true that there is more efficient equipment available today, the newer technology generally carries a premium price over the baseline equipment installed in homes. Thus, based on a consumer's cost-effectiveness standard, the likely result

of a major code revision would be to reduce the envelope standard. In Florida, this would result in a larger glass-to-floor ratio or lower insulation levels which would result in a higher energy budget for the baseline home.

Second, the only systematic survey of code compliance seems to suggest while some improvements could be made in achieving code standards, builders are not blatantly ignoring the minimum standards dictated by the Code. Only one in four homes surveyed by FPL did not meet the minimum EPI and the average non-compliant home had a calculated EPI of 105. Given today's political environment, a new legislative initiative effort to improve code enforcement is probably not a realistic objective. DCA has not sought additional legislative powers to enhance code enforcement. Their strategy has instead focused on using education and training to teach builders and contractors why code compliance leads to a better product for the customer and to assist the local building departments in understanding how to enforce the Code. In addition, the DCA has provided personal computer based compliance tools which are both easy to use and allow the builder to use the EPI standards as a design tool to improve the energy performance of the home. FPL's field studies indicate this voluntary compliance and education approach has worked reasonably well, given the caveat that FPL's study only covered a limited number of counties.

Furthermore, the current standards contained in both the residential and commercial codes are not static standards. The standards are constantly being revised based on changes to the national codes such as the ASHRAE 90.1 and 90.2 standards. This year, for example, the DCA has contracted with the Florida Solar Energy Center to explore modifying HVAC duct multipliers, credits for ceiling fans, infiltration standards, and new technologies. If appropriate, such changes will be adopted into the Code under the auspices of good design and construction practice.

From the programs submitted as a result of the Conservation Goals Docket it appears that utilities have identified niche areas involving new construction where they believe that cost-effective demand savings remain. These types of program activities have the flexibility to maximize or optimize savings based on the demand savings associated with efficiency measures. Thus, a strict consumer-based cost-effective test is not a constraint. Even programs targeted at demand savings must contain some energy savings for non-

demand billed customers or they will not participate. However, with careful marketing and program standards, utilities can use incentives to entice builders and consumers to take incremental efficiency measures that generate demand savings for the utility but may not pass a strict consumer cost effective standard. This appears to be the case with the new home programs. A case in point might be in the area of proper air conditioning sizing. FPL's new home study indicated substantial oversizing of air conditioning systems was occurring in many residential units.

The synergy of the utilities' maximizing demand related savings and the Code itself maximizing energy related savings creates a double benefit for Florida consumers. They get an energy efficient home and, in many cases, additional utility enticements to install demand reducing measures. It is our opinion that the combination of these two functions have, for the time being, exhausted the potential of the Code to achieve additional demand and energy savings. There are a number of factors that could change this prognosis. These factors include technology change that either lowers first time equipment cost or dramatically improves energy performance, sharply increasing real electric prices, mandatory time-of-use or demand based rates for commercial and residential customers, or changes in building materials and construction practices that improves thermal performance. None of these factors appear on the near term horizon.

We would encourage utilities to be creative in continuing their support and training activities related to the Code. The involvement of utility service representatives with the building, design, construction, and trade ally communities in promoting the benefits of energy efficiency and code compliance is an important customer service function. While it may not be easy to design a specific cost-effective program that would qualify for conservation cost recovery, such practices might be appropriate service related functions eligible for full recovery in rate cases assuming usual prudence standards are met.

Finally, we would recommend that utilities adopt the state BERS rating system as the standard to replace their individual Five-Star Rating programs currently in place. It does not make sense to have different rating scales, especially given the consistency of the BERS program with the building code standards. Since audits will continue to be an ongoing service function of utilities, providing the customer with a standardized rating of their home seems to be an integral part of such a service.