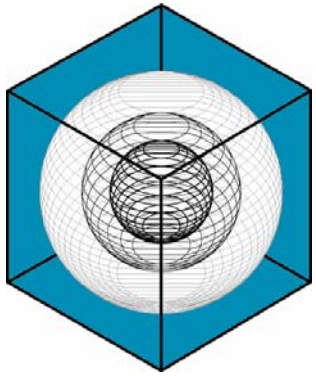


Towards Tomorrow: Development of a Rating Path to Energy Codes

2005 RESNET Conference

March 2, 2004



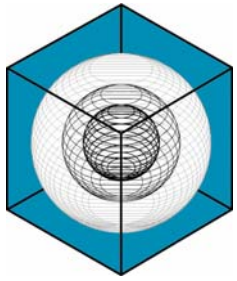
Towards Tomorrow: Development of a Rating Path to Energy Codes

Tom Fitzpatrick

Energy Systems Laboratory, Texas Engineering Experiment Station
Texas A&M University System

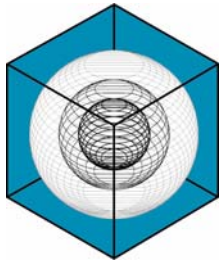
David Wilson

Energy Rated Homes of Utah



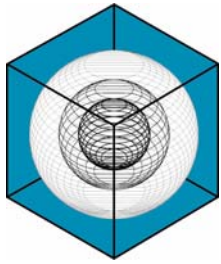
Texas

- A brief history
- Emissions link (SB 5, ESL)
- Looking ahead
- Summary: Ratings have already played a significant role in extending the reach and results of code implementation and market transformation.



Background

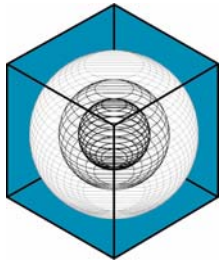
- Electric deregulation (SB 7, 76th TX Leg., 1999)
 - Regulated transmission and distribution utilities: 10% of planned growth must come from efficiency
 - Standard offer programs
 - Limited, targeted market transformation programs
- Air Quality
 - Major cities in non-attainment of standards
 - SIP commitments to improving efficiency
 - Houston-Galveston
 - Dallas/Fort Worth



Background

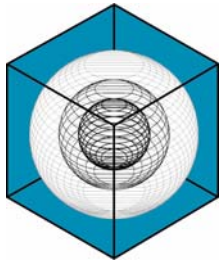


- North Central Texas Council of Governments Regional Codes Coordinating Committee (2000)
 - Recommended regional amendment to IECC:
 - **101.3.3. Alternative compliance.** A building certified through a voluntary energy performance testing program approved as meeting or exceeding the provisions of this code may be deemed to comply with the requirements of this code.
 - (Reason: This amendment would encourage participation in above-code programs and provide an attractive alternative path for unconventional builders who are committed to quality and efficiency, but concerned about mechanics of code compliance. NCTCOG will arrange advisory review of such programs.)



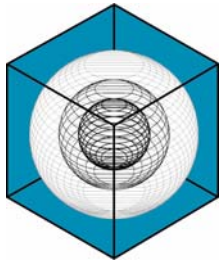
SB 5, 77th TX Leg., 2001

- Establishes **Texas Emissions Reduction Plan**, including
 - a diesel emissions reduction incentive program,
 - a motor vehicle purchase or lease incentive program,
 - a new technology research and development program,
 - an energy efficiency grant program, and
 - building energy performance standards.



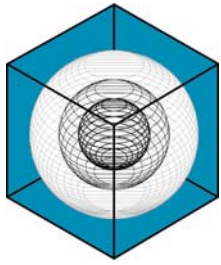
Energy Efficiency in SB 5

- Innovations of SB 5 re: the State Implementation Plan (SIP)
 - Emphasis on voluntary programs
 - Dependence on broad participation
 - Inclusion of building sector in solution set
- Building sector sources of EE
 - utility grant programs
 - political subdivision – owned facilities
 - construction standards and HERS



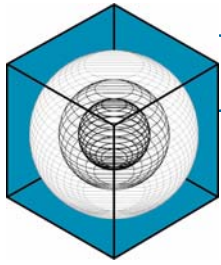
ESL in SB 5

- Sec. 386.205. Evaluation Of State Energy Efficiency Programs.
- Sec. 388.003. Adoption Of Building Energy Efficiency Performance Standards.
- Sec. 388.004. Enforcement Of Energy Standards Outside Of Municipality.
- Sec. 388.007. Distribution Of Information and Technical Assistance.
- Sec. 388.008. Development Of Home Energy Ratings.



HERS in SB 5

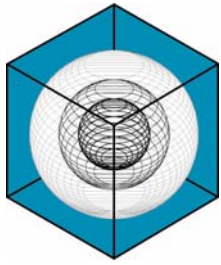
- Standardized HERS Report for Homeowner
- Public Information Program
 - Assurance that the rating has meaning to homeowner
 - Assurance to TCEQ that home performance has emissions impact



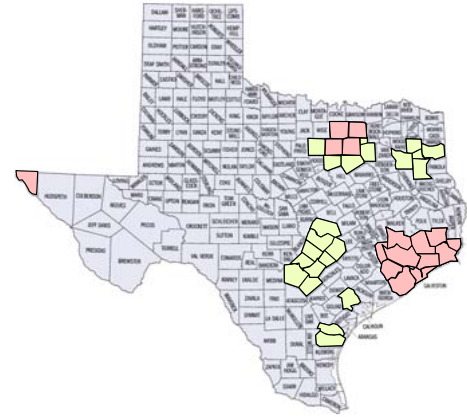
Building Energy Performance Standards Adopted

- energy efficiency chapter of the **International Residential Code**, as appropriate, for single family residential construction, and
- **International Energy Conservation Code** for all other residential, commercial and industrial construction in the state.
- Includes 2001 Supplement
- Requires that municipalities establish procedures
 - administration and enforcement
 - ensure that code-certified inspectors perform inspections.

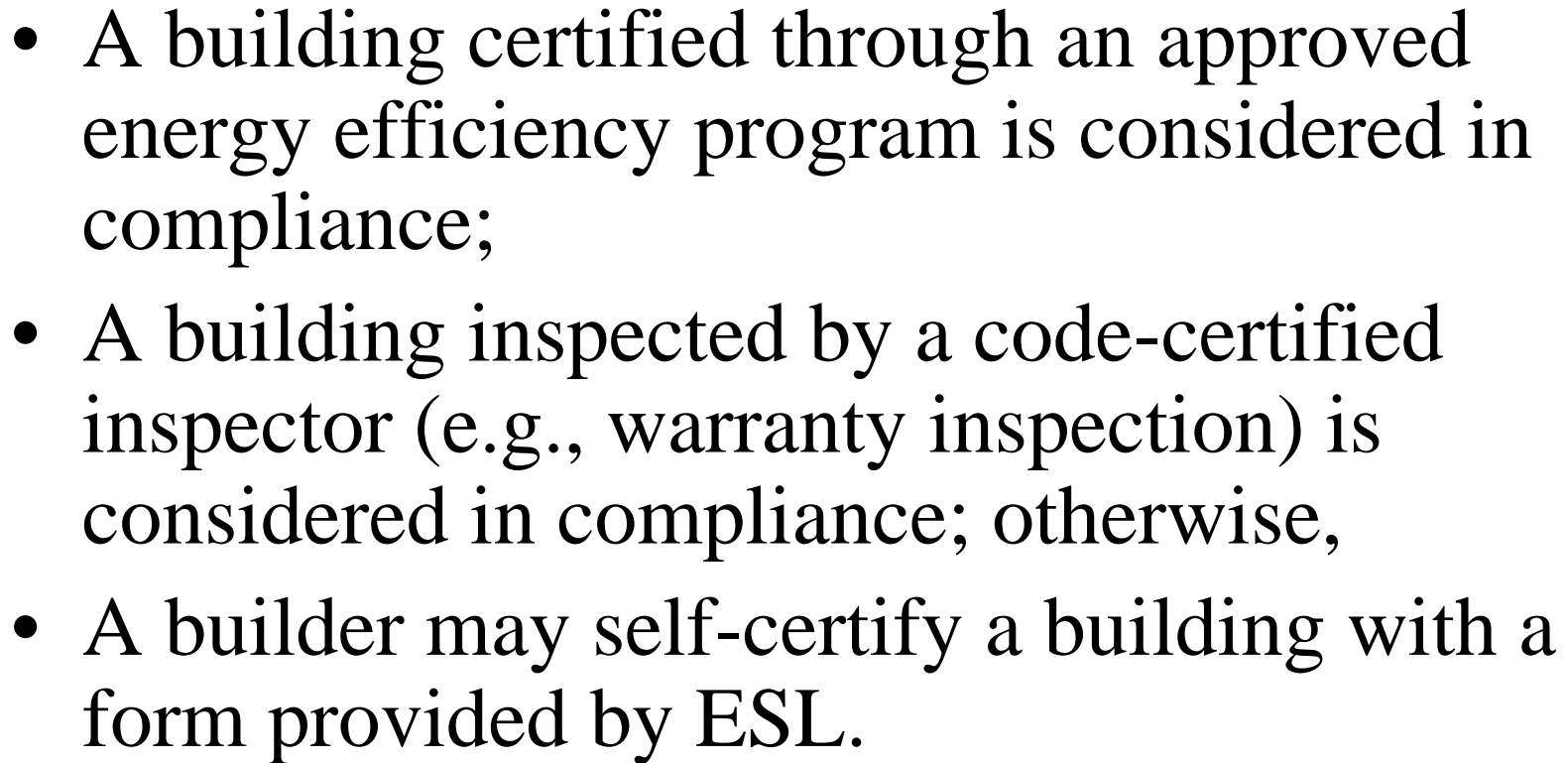


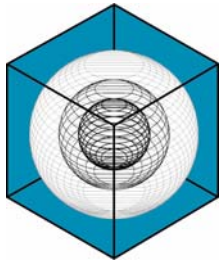


Local Amendments



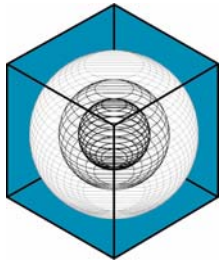
- Local amendments allowed.
- In non-attainment areas and affected counties, may not result in less stringent energy efficiency requirements.
 - Energy Systems Laboratory (ESL) to review local amendments and submit annual report of savings impacts to TCEQ.





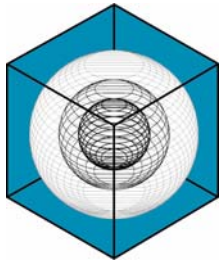
Changes in 2003

- 78th Texas Legislature
- HB 1365...
 - 388.003 (i) A building certified by a national, state, or local accredited energy efficiency program and determined by the laboratory to be in compliance with the energy efficiency requirements of this section may, at the option of the municipality, be considered in compliance. The United States Environmental Protection Agency's Energy Star Program certification of energy code equivalency shall be considered in compliance. ...
- HB 3235...
 - 388.009. CERTIFICATION OF MUNICIPAL BUILDING INSPECTORS. The laboratory shall develop and administer statewide a training program for municipal building inspectors seeking to become code-certified inspectors. ...



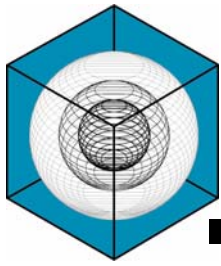
Energy Star

- EPA/DOE new home program adopted as a template for utility market transformation programs
- 2003, 2004: more than 25% of newly constructed homes were Energy Star-rated (TXU Electric Delivery, CenterPoint)
- Almost all were used for code compliance
- Achieving 30% of SB 7 energy efficiency



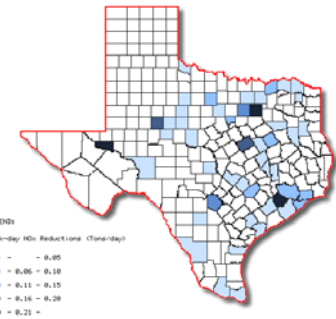
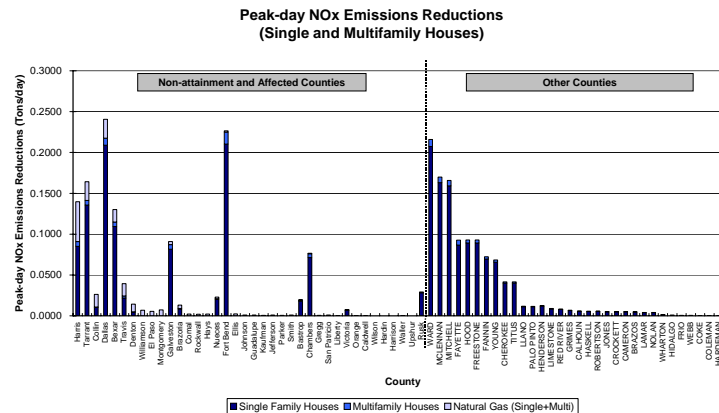
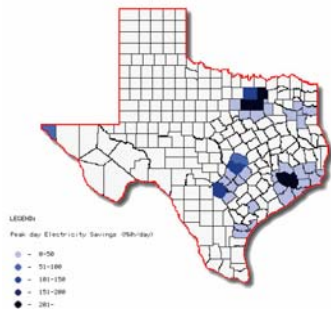
Developments in 2004

- TCEQ published guidance on allowing energy efficiency and renewable energy as emission reduction measures in the State Implementation Plan for improving air quality (Feb '04)
- EPA published guidance on allowing EE/RE in State Implementation Plans (Aug. '04)
- Emission reduction measures in SIP must be quantifiable, surplus, permanent and enforceable



Emissions Calculation

- To analyze NOx emissions reductions from buildings, ESL developed for TCEQ a code-compliant DOE-2 simulation capable of peak day modeling linked to EPA's eGRID database.
- TCEQ has submitted for SIP credit.
- Analysis can be applied to code implementation, enhanced local codes, and above code building performance



Emissions Reductions Calculator

- Emissions calculator developed for 3 classes of EE/RE projects:
 - New Buildings
 - Community Projects
 - Renewables
- Currently used to calculate annual emissions reductions from impact of 2000 IRC/ IECC.
- Available on the web for use by decision-makers to determine impact of emissions reductions from different measures in non-attainment and affected counties.
www.ecalc.tamu.edu

TEXAS ENGINEERING EXPERIMENT STATION
The Energy Systems Laboratory
Energy & Emissions Calculator - eCalc

New Building Models

- SINGLE FAMILY
- MULTI-FAMILY
- OFFICE
- RETAIL

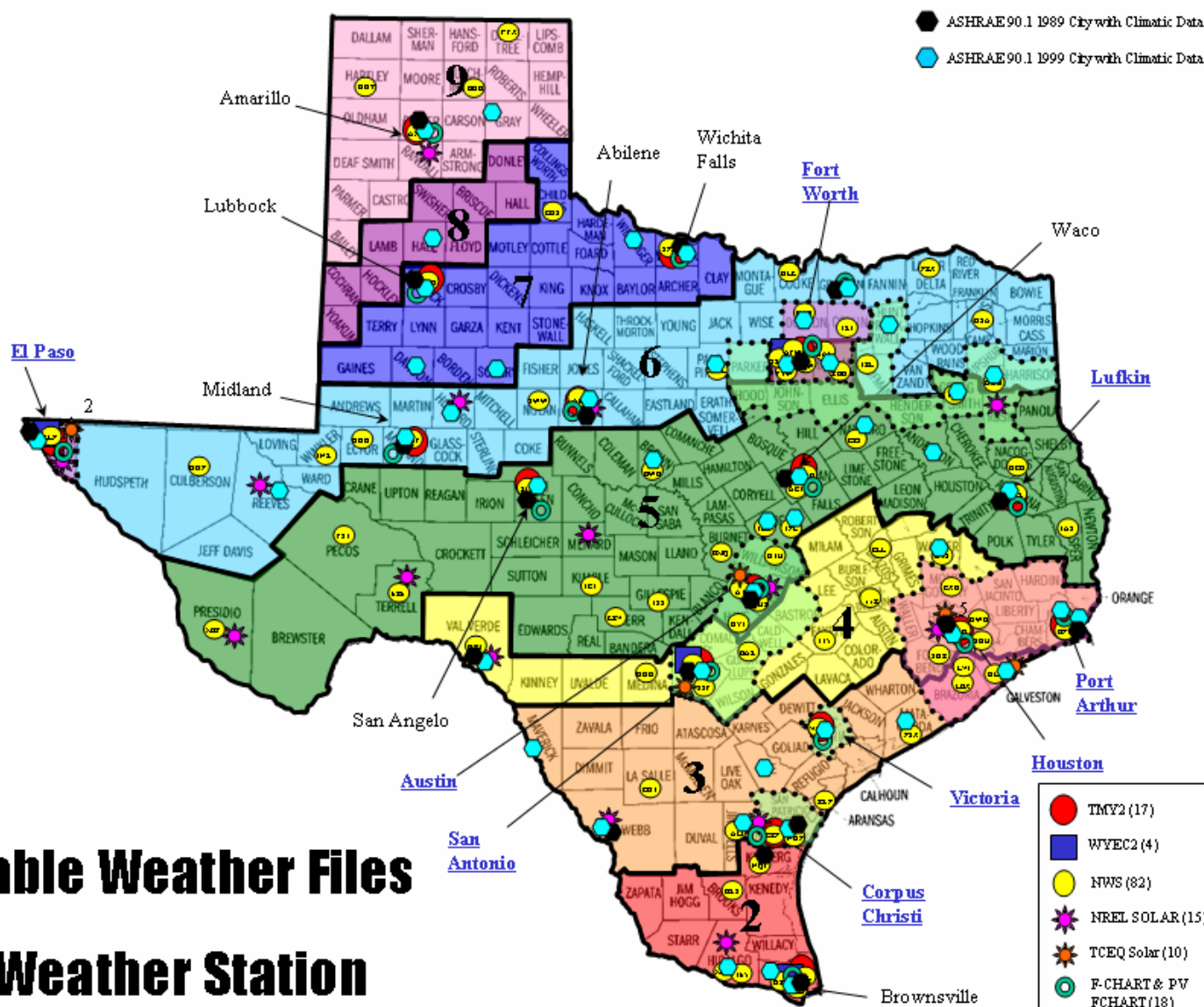
Community Projects

- MUNICIPAL
- STREET LIGHTS
- TRAFFIC LIGHTS
- WATER SUPPLY
- WASTE WATER

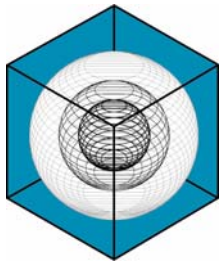
Renewables

- SOLAR PV
- SOLAR THERMAL
- WIND

DEVELOPMENT VERSION WG1.06+CE04.10.05.0+DB1.57=B48 Date: 10/12/2004
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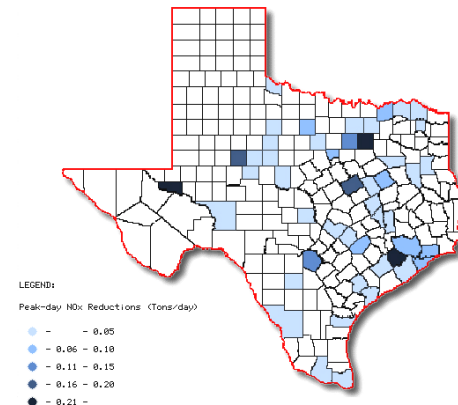


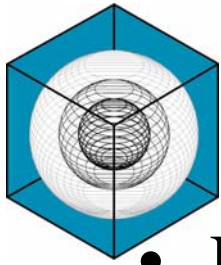
Available Weather Files & Weather Station



Emissions Calculation – Code Impact

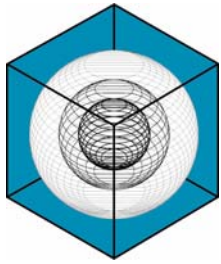
- Cumulative NO_x emissions reductions required for SIP
- Values for 2003 projected to 2007 and 2010
 - Assumed 20% of plant emissions
 - SF & MF as reported in 2003 report.
- Residential Results:
 - 2007 cumulative NO_x emission reductions:
 - Annual: 824 Tons
 - Peak-day: 3.83 Tons
 - 2012 cumulative NO_x emission reductions:
 - Annual: 1,416 Tons
 - Peak-day: 6.58 Tons





What's next?

- ESL expand public information program about HERS
 - Industry forums with Texas HERO to clarify impacts of changes,
 - New information aimed at homeowner/buyer choice
 - Data collection on voluntary participation
 - Quality assurance/verification of creditable results
- SB 5 success is enhanced by broad participation
 - continue to grow new home ratings
 - start rating 8 million existing homes
- Continue to improve compliance/enforcement



What's next?

IECC CODE CHANGE PROPOSAL (ACEEE).

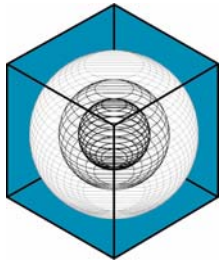
Delete:

103.1.1 Above code programs. The code official or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code. Buildings approved in writing by such an energy efficiency program shall be considered in compliance with this code.

Substitute with the following:

103.1.1 Home Energy Ratings: A proposed building for which the builder or the buyer obtains a final rating certificate by an accredited Home Energy Rating System (HERS) may, at the code official's discretion, be considered to comply with the intent of this code. A copy of the final rating certificate, indicating that it is based on a physical inspection of the property address and that the point score for the finished building meets or exceeds the score based on plans will be submitted to the code official before the Certificate of Occupancy is issued. The final rating certificate must indicate compliance with this code, and must meet the following requirements:

- (a) the rating organization or agency must be accredited by the Residential Energy Services Network (RESNET) or the authority having jurisdiction;
- (b) the compliance analysis and rating score must be based on the "Mortgage Industry National Home Energy Rating Standard" developed by the National Association of State Energy Officials (NASEO) and RESNET, with the score on a scale of 0 -100 points; and
- (c) a report which includes a verification that the design complies with this code, a description of the building's energy features, and a statement that the rating score is "based on plans".



Thanks!

- <http://esl.tamu.edu>
- Tom Fitzpatrick, (512) 475-6982