2012 TERP Stakeholders’ Meeting

Agenda

- Introduction and Welcome
- Impact of Energy Codes Savings in Texas
- Texas Building Energy Performance Standards Rule-making Process
- 2012 IECC Significant Changes, DOE comments
- Comments Received by SECO to Changes in 2012 IECC
- 2015 IECC Proposed Changes
- Review of Available Compliance Software Tools
- IC3 History, Current Input, Planned Changes
- <BREAK FOR LUNCH>
- Input from Stakeholders
- Conclusion/Adjournment
IMPACT OF ENERGY CODES SAVINGS IN TEXAS
Impact of Energy Codes Savings in Texas

A recent study of energy savings in new single-family residential construction performed by the Texas Engineering Experiment Station’s Energy Systems Laboratory (ESL) showed:

- $1.7 billion in energy savings in Texas from the adoption and implementation of the new energy codes for the construction of new single-family homes in the first eight years following the passage of the Texas Emissions Reduction Plan (TERP)
  - $776 million in electricity savings,
  - $927 million avoided costs of constructing new power plants and transmission lines.
- $201 first year average utility bill reduction for one million homeowners in Texas.
- 1 percent reduction in total electric demand in Texas (694 MW), reducing brownouts; equal to the power supplied by one large power plant.
- 2.8 billion gallons of water saved at power plants in Texas, equivalent to supplying water to Austin residents for approximately 24 days.
- 879 tons of NOx emissions reduction in Texas (in 2009); equal to the annual emissions from 46,000 cars. NOx emissions reduction reduces ground-level ozone levels, resulting in the avoidance of dozens of premature mortalities per year and of tens of thousands of lost school and work days due to acute respiratory symptoms.
TEXAS BUILDING ENERGY PERFORMANCE STANDARDS

Rule-making Process

- Amended Chapter 388: Health and Safety Code
  - Delegated SECO the authority to adopt by rule the latest published editions
    - International Residential Code (IRC), Chapter 11 (Energy Efficiency) for single-family construction; and
    - International Energy Conservation Code (IECC) for commercial and other residential construction

- ESL mandated to review the latest ICC editions
  - Ensure stringency of the IRC and IECC compared to current adopted statewide energy codes
  - Provide a written recommendation based on analysis of stringency and public review to SECO

- Cities may amend the IECC and IRC, Chapter 11
  - Review by the Energy Systems Laboratory (ESL)
2009 IECC and 2009 IRC, Chapter 11

- 2009 ICC published new editions, triggering the SECO review and energy codes update process:
  - January: 2009 IECC published
  - March: 2009 IRC published
  - May: 30 days comment period on IECC
    - All comments were provided to ESL for a recommendation to SECO
  - July: 30 days comment period on IRC, Chapter 11
    - All comments were provided to ESL for a recommendation to SECO
  - 1,057 sets of comments received from elected officials, trade associations, builders, architects, environmental advocates
  - September: ESL recommended SECO the adoption of the 2009 IECC and 2009 IRC, Chapter 11
  - January-2010: SECO Stakeholder meeting
    - Allow input to draft rule prior to publication
  - March 2010: 30 days comment period for draft rule published
  - June-2010: Final rule published
§19.53. Building Energy Efficiency Performance Standards

(a) Single-family residential construction. Effective January 1, 2012, the energy efficiency provisions (Chapter 11) of the International Residential Code as they existed on May 1, 2009, are adopted as the energy code in this state for single-family residential construction as it is defined in Health and Safety Code, §388.002(12).

(b) All other residential, commercial, and industrial construction. Effective April 1, 2011, the International Energy Conservation Code as it existed on May 1, 2009, is adopted as the energy code for use in this state for all residential, commercial, and industrial construction that is not single-family residential construction under subsection (a) of this section.
ICC publishes a new edition, which triggers the SECO rule-making process:

- May, 2011: 2012 IECC published
- July, 2011: 2012 IECC available
- Dec, 2011: ESL provided a written recommendation to SECO
- SECO: 30 day public comment period on code recommendation published in Texas Register
  - March 30 – April 30, 2012
  - May 15, 2012 Comments forwarded to ESL for review and recommendation
- ESL will provide final recommendation on stringency to SECO
- SECO may publish rule in Texas Register
Prepare local amendment package and forward to the ESL with a request for review

TYPICAL REQUEST
The City of (your city) is adopting both the 2012 IRC and 2012 IECC for use in the jurisdiction and has worked to correlate them in the amendments. Attached is the amendment package.

Please review and respond at your earliest convenience. If it is easier due to the necessity of timely code adoption, we would be happy to set up a phone conference to review the documents together.

Respectfully,
This change is recommended to mandate that cool roofs are required for low-slope roofs. This language was previously added in the prescriptive method only, but should be required for all compliance paths.

5.4.3.5 Cool roofs. Low-slope roofs up to 2:12 shall be provided with a roof covering where the exterior surface has:

(a) a minimum total solar reflectance of 0.70 when tested in accordance with one of the solar reflectance test methods listed below, and
(b) a minimum thermal emittance of 0.75 when tested in accordance with one of the thermal emittance test methods listed below.


Thermal Emittance Test Methods: ASTM C835, ASTM C1371, or ASTM E408.

ESL Comment (7/22/08): This change adds stringency because it is being moved from the prescriptive section to the mandatory section, thus requiring this for all options. IECC 2001 does not appear to give roof reflectance or emittance requirements.
Agenda

1. 2012 IECC – Significant Changes
   a) Organizational
   b) Commercial
   c) Residential

2. DOE Comments
Organizational Changes

- Two separate sets of provisions
  - Commercial
    - All buildings except for residential buildings 3 stories or less in height
  - Residential
    - Detached one- and two-family dwellings
    - Multiple single family dwellings
    - Group R-2, R-3 and R-4 buildings 3 stories or less in height
# Table of Contents

- Chapter 1 – Scope and Administration
- Chapter 2 - Definitions
- Chapter 3 – General Requirements
- Chapter 4 – Energy Efficiency
  - Commercial
  - Residential
- Chapter 5 – Referenced Standards

Each code section is preceded by a letter. “C” for Commercial provisions and “R” for Residential provisions.
# Chapter 4 (CE) – Table C402.1.2

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 EXCEPT MARINE</th>
<th>5 AND MARINE 4</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<td>Group R</td>
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<td>U-0.027</td>
<td>U-0.027</td>
<td>U-0.027</td>
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<td>U-0.079</td>
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<td>U-0.064</td>
<td>U-0.064</td>
<td>U-0.064</td>
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<td>U-0.322</td>
<td>U-0.322</td>
<td>U-0.322</td>
<td>U-0.076</td>
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<td>F-0.73</td>
<td>F-0.73</td>
<td>F-0.73</td>
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</table>

a. Use of opaque assembly U-factors, C-factors, and F-factors from ANSI/ASHRAE/IESNA 90.1 Appendix A shall be permitted, provided the construction complies with the applicable construction details from ANSI/ASHRAE/IESNA 90.1 Appendix A.

b. Where heated slabs are below grade, below-grade walls shall comply with the F-factor requirements for heated slabs.
Chapter 4 (CE) – Table C402.2

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
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<tr>
<td>Metal building</td>
<td>R-13 + R-6.5ci</td>
<td>R-13 + R-6.5ci</td>
<td>R-13 + R-6.5ci</td>
<td>R-13 + R-6.5ci</td>
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<td>Wood framed and other</td>
<td>R-13 + R-3.5ci or R-20</td>
<td>R-13 + R-3.5ci or R-20</td>
<td>R-13 + R-3.5ci or R-20</td>
<td>R-13 + R-3.5ci or R-20</td>
<td>R-13 + R-3.5ci or R-20</td>
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<td>Floors</td>
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<td>R-7.5ci</td>
<td>R-7.5ci</td>
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<td>Unheated slabs</td>
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<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
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<tr>
<td>Joint/framing</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
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<tr>
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<td>NR</td>
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<td>NR</td>
<td>NR</td>
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# Table R402.1.1

### Insulation and Fenestration Requirements by Component

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Fenestration U-Factor</th>
<th>Skylight U-Factor</th>
<th>Glazed Fenestration SHGC</th>
<th>Ceiling R-Value</th>
<th>Wood Frame Wall R-Value</th>
<th>Masonry Wall R-Value</th>
<th>Floor R-Value</th>
<th>Basement Wall R-Value</th>
<th>Slab R-Value &amp; Depth</th>
<th>Crawl Space Wall R-Value</th>
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<tbody>
<tr>
<td>1</td>
<td>NR</td>
<td>0.75</td>
<td>0.25</td>
<td>30</td>
<td>13</td>
<td>3/4</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2</td>
<td>0.40</td>
<td>0.65</td>
<td>0.25</td>
<td>38</td>
<td>13</td>
<td>4/6</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0.35</td>
<td>0.55</td>
<td>0.25</td>
<td>38</td>
<td>20 or 13+5</td>
<td>8/13</td>
<td>19</td>
<td>5/13</td>
<td>0</td>
<td>5/13</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>0.35</td>
<td>0.55</td>
<td>0.40</td>
<td>49</td>
<td>20 or 13+5</td>
<td>8/13</td>
<td>19</td>
<td>10/13</td>
<td>10, 2 ft</td>
<td>10/13</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>0.32</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13+5</td>
<td>13/17</td>
<td>30f</td>
<td>15/19</td>
<td>10, 2 ft</td>
<td>15/19</td>
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<tr>
<td>6</td>
<td>0.32</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20+5 or 13+10</td>
<td>15/20</td>
<td>30f</td>
<td>15/19</td>
<td>10, 4 ft</td>
<td>15/19</td>
</tr>
<tr>
<td>7 and 8</td>
<td>0.32</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20+5 or 13+10</td>
<td>19/21</td>
<td>38f</td>
<td>15/19</td>
<td>10, 4 ft</td>
<td>15/19</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

- **a.** R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- **b.** The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- **c.** “15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. “10/13” means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- **d.** R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Climate Zones 1 through 3 for heated slabs.
- **e.** There are no SHGC requirements in the Marine Zone.
- **f.** Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.
- **g.** Or insulation sufficient to fill the framing cavity, R-19 minimum.
- **h.** First value is cavity insulation, second is continuous insulation or insulated siding, so “13+5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used, to maintain a consistent total sheathing thickness.
- **i.** The second R-value applies when more than half the insulation is on the interior of the mass wall.
Texas Energy and Cost Savings for New Single- and Multifamily Homes

2012 IECC as Compared to the 2009 IECC
The Department of Energy recently sponsored a series of cost analyses, covering the 2009 and 2012 editions of the International Energy Conservation Code (IECC) for new single and multifamily homes using the 2006 IECC as a baseline. Pacific Northwest National Laboratory (PNNL) assessed the cost-effectiveness of residential codes based on a life-cycle approach, balancing first costs against longer term energy savings over the life of the home.

The study of National cost-effectiveness, and analysis by climate zone, is complete as are several state analyses. These are posted to the Building Energy Codes website.
Moving to the 2012 IECC from the 2009 IECC is cost-effective over a 30-year life cycle.

Households save an average of $259 per year on energy costs with the 2012 IECC

Simple payback period is 6.4 years for the 2012 IECC

Energy costs, on average, are 19.8% lower for the 2012 IECC
Comments Received by SECO for ESL Review
Public Comments

- SECO forwarded comments to ESL concerning 2012 IECC and 2012 IRC adoption
  - 1525 comments were received
    - 858 comments from Sierra Club members and associates
    - 649 comments from Environment Texas supporters
    - 18 comments from other associations and public citizens
ESL Review

- 1523 Comments in favor of adoption
- Two comments in opposition to adoption
  - Coalition for Fair Energy Codes, American Wood Council, Texas Forest Industries Council, Texas Forestry Association, and American Forest & Paper Association
    - Economic concerns are outside ESL purview
  - Texas Builders Association
    - Included proposed amendments
Proposed Amendments

- Two comments attached proposed amendments
  - Newport Ventures – in favor
    - Proposed the provisions for mechanical ventilation in the IRC also be adopted into the IECC
  - Texas Association of Builders – in opposition
    - Proposed several modifications to IECC
NAHB Recommendations

- Proposed Amendments that are acceptable
  - Remove the 20% limit for reduced ceiling R-value in ceiling without attics
  - Reintroduce equipment trade-offs in the standard reference design case

- Proposed Amendments that reduce stringency
  - Reduce the insulation R-values for wood frame
  - Increase the SHGC for Climate Zone 2 and 3
Proposed Amendments that are outside Texas
- Change basement wall R-value and $U$-value in Climate Zones 6, 7 and 8

Other Proposed Amendments
- Remove the option for post-construction tests for duct leakage
- Reintroduce language to include the use of building cavities as return ducts
The Laboratory’s recommendation to SECO will be posted on our website http://esl.tamu.edu when completed.
2015 INTERNATIONAL ENERGY CONSERVATION CODE

Proposed Changes
January 3, 2013 – Code Change Proposal due
  - March 11 - Web posting of proposed changes
  - April 1 – CD of proposed changes distribution

April 21 – 28, 2013 – Code Development Hearings
  - Sheraton Dallas Hotel, Dallas, TX
  - May 31 - Web posting of Report of the Public Hearing
  - June 21 – CD of Report of the Public Hearing

July 15, 2013 – Public Comments due
  - August 28 – Web posting of public comments
  - September 16– CD of public comments

October 2 – 9, 2013 – Final Action Hearings
  - Atlantic City Convention Center, Atlantic City, NJ
Chapter 1 - Scope and Administration

- **Commercial**
  - C106.2 Conflicting requirements
    - Add exception – when using C401.2 1. ASHRAE 90.1

- **Residential**
Chapter 3 – General Requirements

- Commercial
- Residential

- Remove the Warm-Humid designation from the Texas counties located in Climate Zone 2B
  - Bandera
  - Dimmit
  - Edwards
  - Frio
  - Kinney
  - La Salle
  - Maverick
  - Medina
  - Real
  - Uvalde
  - Val Verde
  - Webb
  - Zapata
  - Zavala

Proposed for 2015 IECC
Chapter 4 – Energy Efficiency

- Commercial
  - C402.3.3.1 SHGC Adjustment Multipliers
  - C402.4.1.2 – Air barrier compliance options
    - Resolve conflict between C402.4.1.2.1 (12) and C402.4.1.2.2 (2)
  - C403.2.4.4 Shutoff damper controls
    - Add an exception for kitchen hood dampers meeting the IMC
  - C403.4.1.1 Economizers for Complex Systems
    - Add Air Economizers
  - Table for High-Limit Shutoff Control Options for Air Economizers – inconsistent with ASHRAE 90.1
  - C407 – Total Building Performance
    - Remove and refer to ASHRAE 90.1
Chapter 4 – Energy Efficiency

- Residential
  - Removal of R401.1 Table and require a HERS rating from RESNET
  - R402.4 Air Leakage
    - Use of Table R402.4.1.1
    - Separation of Air leakage inspection from insulation inspection
  - R403.4.2 Hot water pipe insulation - footnotes
REVIEW OF AVAILABLE COMPLIANCE SOFTWARE TOOLS
RESNET Accredited IECC Performance Verification Software

- IC3 v 3.10.3
- OptiMiser
- EnergyGauge USA Version 2.8
- REM/Rate REM/Design v12.91
2009 IECC Performance Verification Software for Texas:

- IC3 v 3.12.2

- ENERGY STAR Approved Software
IC3 Updated to Version 3.12.0

User Login

Welcome! This is publicly accessible energy code compliance software based on the Texas Building Energy Performance Standards. You must register a username and password in order to continue. You may then access your records using your user name and password.

Email Address: 
Password: 

Login
Register  Forgot Password

THE IC3 WEBSITE

IC3.tamu.edu
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History of IC3
IC3 History

The development of IC3 was recommended by stakeholders and produced using technology originally developed under a US Environmental Protection Agency (US EPA) grant, administered by the Texas Commission on Environmental Quality, as an Engineering Proof of Concept.

The original version was delivered in 2004. In 2006 the lab began upgrading this version using input from stakeholders and IC3 users. The current version 3.12.2 was released in 2012.
Passing Single-Family Project

**Energy Code**

Choose Your Energy Code:
- IECC 2000

**Site Address**

NOTE: All fields on this page (except notes) must be completed to print a certificate.

- **Project Name:**
  - Passing Single Family F

- **Builder Name:**
  - Ross Morel

- **Builder Phone:**
  - 832-926-5121

- **Site Street Address:**
  - 100 First Street

- **City:**
  - Houston

- **County:**
  - HARRIS
Information Needed for IC3 Project

1. County, energy code
2. Number of floors, Number of Bedrooms
3. Foundation type and insulation
4. Window SHGC and U-Factor
5. Wall and duct insulation values
6. Siding Type
7. Roof Type, Area, and insulation
8. Heater, A/C, and water heater specifications
9. Blower door and duct blaster test results
10. For each floor
   - Area, Perimeter, Ceiling height
   - For each side of the floor
     - Area of windows
     - Horizontal projections
### Project Details for: Passing Single-Family Project

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<tr>
<td>Builder Phone</td>
<td>832-928-5121</td>
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<tr>
<td>Site Street Address</td>
<td>100 First Street</td>
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<thead>
<tr>
<th>First Floor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditioned Floor Area</td>
<td>2500 sq ft</td>
</tr>
<tr>
<td>Perimeter of Conditioned Space</td>
<td>250 ft</td>
</tr>
<tr>
<td>Ceiling Height</td>
<td>9 ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Floor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditioned Floor Area</td>
<td>2000 sq ft</td>
</tr>
<tr>
<td>Perimeter of Conditioned Space</td>
<td>200 ft</td>
</tr>
<tr>
<td>Area of Conditioned Over Unconditioned</td>
<td>100 sq ft</td>
</tr>
</tbody>
</table>

### Insulation / Mechanical
- Mechanical in Conditioned Space: No
- Wall Cavity Insulation: R-35
- Insulated Wall Sheathing: R-12
- Exterior Finish: Fibrous Cement Board
- Total Roof/Ceiling Insulation: R-50
- Blower Door: 5.09 (Tested)
- Duct Blaster: 1 (Tested)
- Supply Duct Insulation: 8
- Return Duct Insulation: 8

### HVAC/DHW
- Heating Type: Natural Gas
- Heating Efficiency: 0.7 AFUE
- A/C Efficiency (SEER): 13 SEER
- A/C Size (tons): 1
- Water Heater Type: Electric
- Water Heater Energy Factor: 0.97

### Project Status

**20.4% Above Code**

Congratulations! Your project has passed code requirements!
The Certificate

RESIDENTIAL ENERGY EFFICIENCY CERTIFICATE

Plan ID: test
Window U-Value: U-0.35
Window SHGC: 0.32
Wall Cavity Insulation: R-15
Roof/Ceiling Insulation: R-38 *
Floor/Foundation Insulation: NA
Supply Duct Insulation: R-6
Return Duct Insulation: R-6
*if applicable

Cooling Efficiency: SEER 15
Heating Efficiency: Heat Pump System HSPF-10.00
Water Heater Efficiency: Natural Gas Water Heater EF-0.90
Certificate Number: 761266
Builder Email: test@test.com
Builder Phone: 1234567890
Date Issued: 7/11/2012

Builder or Registered Design Professional

This certificate was generated by IC3 in compliance with IECC 2009 Section 401.3
The Energy Report

IC3

SINGLE FAMILY HOUSE ENERGY REPORT

Project Details for:
Passing Single-Family Project

Builder: Ross Morel
Builder Phone: 832-928-5121
Address: 100 First Street
City: Houston
County: HARRIS
Zip: 77845
Date Issued: 7/11/2012
Certificate #: 788449

Emissions Reduction:
NOx: 2.7 lbs
SOx: 1.2 lbs
CO2: 2678 lbs

Project Notes:
This is a test

20% Above Code

This single family residential project was found to be in compliance with the performance measures described in IECC 2009 using the v. 3.12.2 calculation tool developed by the Energy Systems Laboratory, a division of the Texas Engineering Experiment Station.

The values produced are generated by the DOE2 building energy analysis program. These values do not constitute a guarantee of actual energy usage by ESL or TEES.

Authorized Signature: ________________________________

© 2012 Energy Systems Laboratory, Texas Engineering Experiment Station

Energy Systems Laboratory 7/17/2012
# Floorplan Information

## General
- **Total Conditioned Area**: 4500 sqft
- **Average Ceiling Height**: 8' 6"
- **Number of Bedrooms**: 1
- **Orientation**: North
- **Foundation Type**: Slab
- **Insulation**: R-12

## Windows
- **Solar Heat Gain Coefficient**: 0.35
- **U-Factor**: 0.32

## First Floor
- **Conditioned Floor Area**: 2500 sqft
- **Perimeter of Conditioned Area**: 250 ft
- **Ceiling Height**: 9 ft
- **Front Window Area**: 100 sqft
- **Right Window Area**: 50 sqft
- **Back Window Area**: 50 sqft
- **Left Window Area**: 50 sqft
- **Front Horizontal Projections**: 6' 0"
- **Right Horizontal Projections**: 0' 0"
- **Back Horizontal Projections**: 0' 0"
- **Left Horizontal Projections**: 0' 0"

## Second Floor
- **Conditioned Floor Area**: 2000 sqft
- **Perimeter of Conditioned Area**: 200 ft
- **Conditioned Area Over Uncond. Area**: 100 sqft
- **Ceiling Height**: 8 ft
- **Front Window Area**: 50 sqft
- **Right Window Area**: 50 sqft
- **Back Window Area**: 50 sqft
- **Left Window Area**: 50 sqft
- **Front Horizontal Projections**: 0' 4"
- **Right Horizontal Projections**: 0' 4"
- **Back Horizontal Projections**: 0' 4"
- **Left Horizontal Projections**: 0' 4"

## Insulation and Mechanical
- **Blower Door Measurements are Tested**: No
- **Duct Blaster Measurements are Tested**: No
- **Wall Cavity Insulation**: R-35
- **Insulated Wall Sheathing**: R-12
- **Exterior Wall Finish**: Cement Board
- **Total Roof/Ceiling Insulation**: R-50
- **Supply Duct Insulation**: R-8
- **Return Duct Insulation**: R-8
- **Slab Insulation**: R-12

## Roof
- **Roof Covering Material**: Comp Shingle
- **Uses Radiant Barrier**: Yes
- **Flat Roof Area**: 500 sqft
- **Cathedral Ceiling Area**: 1 sqft
- **Attic Floor Area**: 2500 sqft
- **Wall Area Next To Attic**: None

## Heating, Air Cooling, & Water Heater
- **Heating Type**: Natural Gas
- **Heating Efficiency**: 0.7
- **A/C Efficiency**: 13 SEER
- **A/C Size**: 1 tons
- **Water Heater Type**: Electric
- **Water Heater Energy Factor**: 0.97
### Estimated Annual Energy Usage

<table>
<thead>
<tr>
<th>Energy Usage Category</th>
<th>Proposed Design</th>
<th>Standard Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gas (therms)</td>
<td>Electric (kWh)</td>
</tr>
<tr>
<td>Area Lights</td>
<td>—</td>
<td>6126</td>
</tr>
<tr>
<td>Miscellaneous Equipment</td>
<td>—</td>
<td>7709</td>
</tr>
<tr>
<td>Electric Space Cooling</td>
<td>—</td>
<td>3634</td>
</tr>
<tr>
<td>Pumps and Miscellaneous</td>
<td>—</td>
<td>59</td>
</tr>
<tr>
<td>Ventilation Fans</td>
<td>—</td>
<td>1583</td>
</tr>
<tr>
<td>Gas Space Heating</td>
<td>254</td>
<td>—</td>
</tr>
<tr>
<td>Electric Domestic Hot Water</td>
<td>—</td>
<td>1788</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td><strong>Total source</strong></td>
</tr>
<tr>
<td></td>
<td>254</td>
<td>20898</td>
</tr>
<tr>
<td></td>
<td>373</td>
<td>22158</td>
</tr>
<tr>
<td></td>
<td><em><em>Total source</em> energy usage converted to MMBtu</em>*</td>
<td>253.2</td>
</tr>
<tr>
<td></td>
<td><strong>Total source</strong></td>
<td><strong>279.9</strong></td>
</tr>
</tbody>
</table>

The values produced are generated by the DOE-2 building energy analysis program. These values do not constitute a guarantee of actual energy usage by ESL or TEES.

* Source to site conversion electric: 3.16, other: 1.1 (IECC 2009 405.3)

** Conversion factors. 1 MMBtu = 10 therms or 293.1 kWh.

*** For IECC 2009 or IECC 2009 Austin energy codes, percent above code is calculated using space cooling, ventilation fans, space heating, pumps & misc. and hot water only. Additional energy categories were not considered.
The Inspection Checklist

Residential Data Collection Checklist
2009 International Energy Conservation Code
Climate Zone 2

Building ID: _________  Date: ___________  Name of Evaluator(s): ________________________________

Building Contact: Name: _____________________  Phone: ___________  Email: ________________________

Building Name & Address: ________________________________

Subdivision: ________________________________  Lot #: ___________  Conditioned Floor Area: _______ ft²

State: ___________  County: ___________  Jurisdiction: ________________________________

Compliance Approach (check all that apply): □ Prescriptive  □ Trade-Off  □ Performance

Compliance Software Used: ________________________________  Green Building/Above-Code Program: ________________________________

Building Type: □ 1- and 2-Family, Detached  □ Single Family  □ Modular  □ Townhouse  □ Apartment  □ Condominium

Multifamily:

Project Type: □ New Building  □ Existing Building Addition  □ Existing Building Renovation

<table>
<thead>
<tr>
<th>IECC Section #</th>
<th>Pre-Inspection/Plan Review</th>
<th>Code Value</th>
<th>Verified Value</th>
<th>COMPILIES</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2 [PR1]</td>
<td>Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance.</td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>403.6 [PR1]</td>
<td>HVAC loads calculations. Heating system size(s): Heating system size(s):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Comments/Assumptions: ________________________________
The IC3 generates monthly reports that are posted online for anyone to access. They are located at

http://esl.tamu.edu/terp/code-compliance-calculators/ic3/tbr-ic3-reports
How many people are using IC3?
Who is using IC3?

By County

Top 10 Counties generating IC3 Certificates from 10/1/2009 to 7/1/2012

By City

Top 10 Cities generating IC3 Certificates from 10/1/2009 to 9/1/2011
This table and map shows which Texas Counties have the highest SEER values in their new home construction over the last twelve months.
Recent changes in IC3

There were some major changes to the IC3 website this year.
IC3 changes for 3.12

- The State of Texas has mandated that all new residential construction complies with the 2009 IECC
- Austin Energy asked for their local amendments to be added to the IC3 website as a separate energy code. The top cities using this code are:

<table>
<thead>
<tr>
<th>City</th>
<th>Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>206</td>
</tr>
<tr>
<td>Houston</td>
<td>25</td>
</tr>
<tr>
<td>Princeton</td>
<td>11</td>
</tr>
<tr>
<td>Round Rock</td>
<td>11</td>
</tr>
<tr>
<td>Ft Worth</td>
<td>7</td>
</tr>
<tr>
<td>Garden Ridge</td>
<td>6</td>
</tr>
<tr>
<td>Garland</td>
<td>5</td>
</tr>
<tr>
<td>Bryan</td>
<td>5</td>
</tr>
<tr>
<td>Canyon</td>
<td>5</td>
</tr>
<tr>
<td>Coppell</td>
<td>5</td>
</tr>
<tr>
<td>Fort Worth</td>
<td>5</td>
</tr>
</tbody>
</table>

- The energy report, certificate, and inspection list were modified to comply with the 2009 code
2012 TERP
STAKEHOLDERS’ MEETING