AGENDA

UNIFORM BUILDING CODE COMMISSION
ARCHITECTURAL ADVISORY COMMITTEE
MECHANICAL ADVISORY COMMITTEE
JOINT MEETING

December 10, 2013 9:00 AM
Sandy Fire Station 32, 9475 S 2000 E, Sandy, UT
This agenda is subject to change up to 24 hours prior to the meeting.

ADMINISTRATIVE BUSINESS:

Sign attendance sheet

1. Approval of the minutes from the October 22, 2013 joint meeting and September 10, 2013 Mechanical Advisory Committee meeting

DISCUSSION ITEMS

2. Discuss update to REScheck program

INFO ITEMS

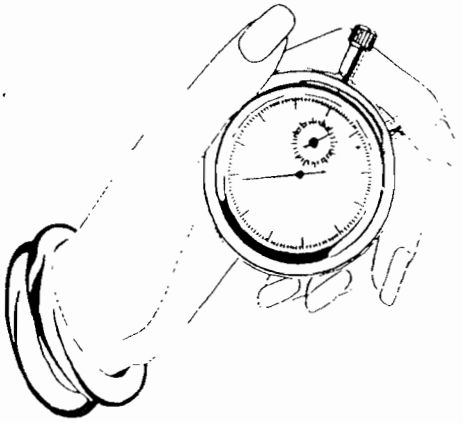
a. IBC Amendment Status Log

Next Scheduled Meeting: as needed

If you do not plan on attending this meeting, please call Sharon at 530-6163 or email at ssmalley@utah.gov or dansjones@utah.gov.

In compliance with the Americans with Disabilities Act, individuals needing special accommodations (including auxiliary communicative aids and services) during this meeting should notify Dave Taylor, ADA Coordinator, at least three working days prior to the meeting. Division of Occupational and Professional Licensing, 160 East 300 South, Salt Lake City UT 84115, Phone 530-6628 or toll-free in Utah only 866-275-3675.

AGENDA
ITEM # 1



MINUTES

UNIFORM BUILDING CODE COMMISSION

MECHANICAL ADVISORY COMMITTEE
ARCHITECTURAL ADVISORY COMMITTEE

October 22, 2013
Sandy City Hall Room 220
10000 Centennial Pkwy Sandy, UT

MINUTES

STAFF:
Dan Jones, Bureau Manager
Sharon Smalley, Board Secretary

MECHANICAL ADVISORY COMMITTEE:
David Wilson
Trent Hunt (absent)
Dennis Thatcher (absent)
Randy Beckstead (absent)
Tyler Lewis
Brent Ursenbach
Roger Hamlet (absent)
John Gassman (excused)

ARCHITECTURAL ADVISORY COMMITTEE
William Hall
Kenny Nichols
Scott Marsell
James Sullivan
Ron McArthur
Jerry Jensen
Gary Payne
Chris Jensen

VISITORS:
Ross Ford, Utah HBA
Kevin Emerson, Utah Clean Energy
Taz Biesinger, Utah HBA

SWEAR IN NEW COMMITTEE MEMBER	James Sullivan was sworn in as the new member for the Uniform Building Code Commission Architectural Advisory Committee.
APPROVAL OF THE MINUTES FROM THE SEPTEMBER 10, 2013 JOINT MEETING	A motion was made by William Hall to approve the minutes from the September 10, 2013 joint meeting as written. The motion was seconded by Kenny Nichols and passed unanimously. Approval of the minutes for the Mechanical Advisory Committee was deferred until the next meeting as there was not a quorum present.

REVIEW AND DISCUSS REPORT FROM ENERGY CODE AD HOC COMMITTEE	Brent Ursenbach gave a report on the recommendations for energy conservation that were presented to the Business and Labor Interim Committee in connection with the requirements of HB 202.
DISCUSS PENDING UPDATE TO RESCHECK PROGRAM	Kevin Emerson passed out a summary on the software update for REScheck. He reported that the Pacific Northwest National Laboratory has indicated that the updated REScheck software, that has incorporated some of the recommendations from the ad hoc committee's review, will be made available in mid November for public use. Those present discussed the use of the software and their concerns about this report. Brent Ursenbach pointed out that since the state did not adopt the 2009 IECC and therefore did not use that version of REScheck, the updated version of REScheck makes it look like there have been numerous changes made. Following the discussion by all present, a motion was made by Ron McArthur that the known deficiencies in the current test version of REScheck should be clearly identified and reported to the committees as to what the deficiencies and limitations are, anything that effects the calculations at this point. The committees should table any decision until they receive that report. The motion was amended to add that we receive a narrative addressing the concerns that have been submitted. The amended motion was seconded by William Hall. Following a discussion on the amended motion, the motion passed unanimously by the Architectural Advisory Committee. The Mechanical Advisory Committee could not vote on the motion as there was not a quorum present.
INFORMATION UPDATE	Scott Marsell spoke to those present concerning the fact that commercial contractors have indicated that they would like to see the 2012 IECC go into effect and he wanted their opinion about running a bill that will allow the commercial builders to use the 2012 IECC and leave the residential builders to use the 2006 IECC until the recommendation can be

made for the requirement of HB202.

He also informed the committees that there is a bill being proposed that would exempt fruit and vegetable seasonal stands from all requirements of building permits. He has submitted some proposed language for an alternate bill.

The meeting adjourned at 10:26.

Note: These minutes are not intended to be a verbatim transcript but are intended to record the significant features of the business conducted in this meeting. Discussed items are not necessarily shown in the chronological order they occurred.

UNIFORM BUILDING CODE COMMISSION

MECHANICAL ADVISORY COMMITTEE
ARCHITECTURAL ADVISORY COMMITTEE

September 10, 2013
Sandy City Hall Room 341
10000 Centennial Pkwy Sandy, UT

MINUTES

STAFF:
Sharon Smalley, Board Secretary

MECHANICAL ADVISORY COMMITTEE:

David Wilson	Tyler Lewis
Trent Hunt	Brent Ursenbach
Dennis Thatcher	Roger Hamlet
Randy Beckstead	John Gassman

ARCHITECTURAL ADVISORY COMMITTEE

William Hall	Ron McArthur
Kenny Nichols (excused)	Jerry Jensen
Scott Marsell	Gary Payne (excused)

VISITORS:

Ross Ford, Utah HBA	Dennis Thomas, UBIG
Daniel Wright, Wright Shed Co	Kevin Emerson, Utah Clean Energy
Miles "Cap" Ferry	

SWEAR IN NEW COMMITTEE MEMBER	Tyler Lewis was sworn in as the new member for the Mechanical Advisory Committee.
APPROVAL OF THE MINUTES FROM THE JULY 16, 2013 JOINT MEETING	A motion was made by William Hall to approve the minutes from the July 16, 2013 joint meeting as written. The motion was seconded by Ron McArthur and passed unanimously.
REVIEW PROPOSED AMENDMENT FOR IRC SECTION R105.2	Dennis Thomas spoke to the committees in connection with his proposed amendment. Those present discussed the proposal. Following the discussion on the proposal, a motion was made by Ron McArthur to deny the proposed amendment. The motion was seconded by Scott Marsell and passed with a vote of ten in favor and Dave Wilson and William Hall voting in opposition.

REVIEW AND DISCUSS REPORT FROM ENERGY CODE AD HOC COMMITTEE

Brent Ursenbach gave an overview of the ad hoc committee's review that they did on the new version of the REScheck software which was made available to them by the DOE. Mr. Ursenbach pointed out that the second version of REScheck, which is now available for review, seems to have incorporated all of the recommendations given by the ad hoc committee after their first review. (Roger Hamlet joined the committees at this point in the meeting.) The committees discussed having this second version of the test software looked at by some additional home builders and then having them submit their comments back to Kevin Emerson by the end of the month. Mr. Emerson will then pass those comments on to the DOE. The committees will meet again in October to make a final decision on whether or not REScheck is ready for public use.

Those present reviewed the recommendations that have been submitted regarding increasing residential energy performance and other ways of promoting energy efficiency so they can put together a recommendation that can be presented to the Business and Labor Interim Committee in October.

Brent Ursenbach submitted five recommendations that could be given to the Business and Labor Interim Committee in connection with the requirement of HB 202 Section 4 which directs these two committees to do a study on improving residential energy efficiency. (Trent Hunt joined the meeting at this point.) Those present reviewed the recommendations and made some additional recommendations. Following the discussion, it was suggested that the second recommendation be modified to read "Develop a disclosure system that provides information to buyers of both new and existing homes regarding home energy use."

Following further discussion it was suggested that a sixth recommendation be added to read, "Recommend that the State Office of Energy Development (OED) develops and maintains a website identify-

ing incentives and rebates that are available to builders, homeowners, builder owners - all energy consumers."

A motion was made by David Wilson to approve recommendations 1, 3, 4, and 5 as written, 2 as modified and 6 as added. The motion was seconded by Dennis Thatcher and passed unanimously. These recommendations will be given to the Business and Labor Interim Committee at their October meeting by Scott Marsell and Brent Ursenbach.

The meeting adjourned at 11:07.

Note: These minutes are not intended to be a verbatim transcript but are intended to record the significant features of the business conducted in this meeting. Discussed items are not necessarily shown in the chronological order they occurred.

Agenda Item #2

Report on *REScheck* Software Update for Utah as per House Bill 202, Energy Conservation Code Amendments

November 19, 2013

Submitted to Utah Uniform Building Code Commission
by Kevin Emerson, Utah Clean Energy

House Bill 202, which was passed during the 2013 Legislative Session, adopted a hybrid version of the 2006, 2009 and 2012 International Energy Conservation Code (IECC) in Utah ("Utah 2012") for residential buildings and the complete 2012 IECC for commercial buildings. The Utah 2012 and IECC 2012 commercial provisions take effect after the Uniform Building Code Commission certifies in writing to the Utah Legislature that the U.S. Department of Energy (DOE) has adopted a version of *REScheck* software that can be used to verify compliance with the provisions in H.B. 202.

DOE approved the development of a Utah-specific version of *REScheck*. On August 9, 2013 Pacific Northwest National Lab (PNNL) developed a review version of the Utah 2012 *REScheck* software for DOE, based on the amendments in H.B. 202, which PNNL subsequently revised and updated based on reviewer comments.

The Utah 2012 version of the *REScheck* software provides a working version of *REScheck* that verifies compliance to the requirements of House Bill 202; this software will be made available to the public on November 22nd, 2013[1].

The table and narrative that follow provide details about the specific changes PNNL, on behalf of DOE, made to the Utah 2012 version of *REScheck* to assure that it can be used to verify the requirements of H.B. 202.

Below is a guide to the complete list of 2012 residential IECC amendments contained in H.B. 202 and their implications for *REScheck* compliance verification:

N/A	✓ Software	✓ Text
Amendment does not apply and results in no change to *REScheck*	Amendment results in changes to *REScheck* software calculations	Amendment results in changes to text in *REScheck*, but not software calculations

[1] Email communication from Kym Carrey, Building Technologies Program, U.S. DOE, on November 14, 2013

1. SUMMARY OF *RESCHECK* SOFTWARE UPDATE

Between August 2013 and October 2013, PNNL, working on behalf of the U.S. DOE, developed a Utah-specific version of DOE's *REScheck* software to account for Utah's amendments to the 2012 IECC in H.B. 202. As per H.B. 202, the 2012 IECC version of *REScheck* is used as the basis of the modified Utah 2012 *REScheck* software.

The test *REScheck* software was made available to all members of the UBCC's Architectural and Mechanical Advisory Committees, eight members of the Home Builders Association of Utah, and five energy code and energy modeling experts in Utah. Ten entities provided comments on the test version of the Utah *REScheck* software through two rounds of review and ran approximately 100 *REScheck* modeling scenarios. Review comments were submitted to PNNL on August 18, 2013 and October 11, 2013.

List of Utah 2012 *REScheck* Reviewers

NAME	AFFILIATION	# OF RESCHECK SCENARIOS
Ross Ford	Utah Association of Home Builders	0
Billy Giblin, et. al.	Nexant, Inc. (Rocky Mountain Power wattsmart New Homes Program)	35
Adam Heath	Elite Craft Homes	8
Ron McArthur	UBCC Architectural Advisory Committee/McArthur Homes	0
Matt Meyer	Provident Energy	5
Jim Meyers	Southwest Energy Efficiency Project	12
Damian Mora	Garbett Homes	12
Mitch Richardson	Survey and Testing Services, Inc.	3
Brent Ursenbach	UBCC Mechanical Advisory Committee/Salt Lake County	20
David Wilson	UBCC Mechanical Advisory Committee/Energy Rated Homes of Utah	5

All review comments were addressed by PNNL by either making refinements to the software based on the comments or providing explanations about why the comments did not result in changes to the software. The table below provides details about the specific changes that were made to the Utah 2012 version of *REScheck*.

Complete List of 2012 IECC Amendments from H.B. 202, Energy Conservation Code Amendments

2012 IECC SECTION	LINE NUMBER IN H.B. 202	IS RESCHECK IMPACTED?	ACTION	NOTES
Section R103.2 Information on construction documents	67-69, 180-182	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment modifies the scope of construction documents required for review by code official.
Section R202 General definitions	183-189	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment modifies definition of "conditioned space".
Section R303.3 Maintenance information	70, 190	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment modifies the maintenance information required to be furnished with the home.
Table R402.1.1 Insulation and fenestration requirements by component	71-80, 191-200	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	These amended values modify the prescriptive requirements and are not used by *REScheck*. The values from this table mirror equivalent U-factor values in Table R402.1.3 (see note below).
Table R402.1.3 Equivalent U-factors	81-86, 201-205	✓ Software	Incorporated the amended values from 2006 IECC as per H.B. 202	These values are used by *REScheck* to calculate the UA for insulation and fenestration requirements.
Section R402.2.1 Ceilings with attic spaces	87, 206	✓ Software	Reinstated allowance from 2006 IECC as per H.B. 202	This allowance enables a reduction in R value for this building assembly. This functionality is consistent with 2006 IECC.
Section R402.2.2 Ceilings without attic spaces	88, 207	✓ Software	Reinstated allowance from 2006 IECC with modification as per H.B. 202: "This reduction of insulation from the requirements of Section R402.1.1 shall be limited to 500 square feet (46 m^2) <u>or 20 percent of the total ceiling area, whichever is less</u>."	This allowance provides "credit" to be used within the ceiling assembly, when the building design calls for this allowance. This functionality is consistent with 2006 IECC.

Complete List of 2012 IECC Amendments from H.B. 202, Energy Conservation Code Amendments

2012 IECC SECTION	LINE NUMBER IN H.B. 202	IS RESCHECK IMPACTED?	ACTION	NOTES
Section R402.3.3 Glazed fenestration exemption	89, 208	✓ Software	Reinstated the allowance from 2006 IECC as per H.B. 202	This amendment allows the proposed Total UA for this building assembly to be increased by the allowance amount (up to 15 ft^2). This functionality is consistent with 2006 IECC.
Section R402.3.4 Opaque door exemption	90, 209	✓ Software	Reinstated the allowance from 2006 IECC with modified door area limit as per H.B. 202	This amendment allows the proposed Total UA for this building assembly to be increased by the allowance amount (24 ft^2). This functionality is consistent with 2006 IECC.
Section R402.4.1 Building thermal envelope	91-92, 210-211	✓ Text	Modified Requirements tab (Envelope) in *REScheck* to reflect amended language in H.B. 202.	Incorporated change to require *either* installation checklist (Table 402.4.1.1) or air leakage test (R402.4.1.2) as per H.B. 202
Section R402.4.1.1 Installation	93-96, 212-215	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment allows builder to certify compliance with components in Table R402.1.1 where allowed by the building official
Section 402.4.1.2 Testing	97-99, 216-218	✓ Text	Modified Requirements tab (Envelope) in *REScheck* to reflect amended language in H.B. 202.	This amendment sets air exchange rate at 5 air changes per hour
	100-105, 219-224	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment provides direction about what parties shall conduct blower door testing.
Section R402.4.4 Recessed lighting	106, 225	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	Text was deleted from the Utah 2012 code as per H.B. 202.

Complete List of 2012 IECC Amendments from H.B. 202, Energy Conservation Code Amendments

2012 IECC SECTION	LINE NUMBER IN H.B. 202	IS RESCHECK IMPACTED?	ACTION	NOTES
Section R403.2.2 Sealing (Mandatory)	107-118, 226-237	✓ Text	Modified Requirements tab (Systems) in *REScheck* to reflect amended language in H.B. 202	Duct tightness requirements are presented in *REScheck*'s Requirements tab but actual testing is confirmed separately from *REScheck*, since actual test results are not available for input into *REScheck*.
	119-122, 238-241	✓ Text	Modified Requirements tab (Systems) in *REScheck* to reflect amended language in H.B. 202	This amendment exempts the duct testing requirement when at least 50% of ducts and air handlers are located inside of conditioned space.
Section R403.2.3 Building cavities (Mandatory)	123, 242	✓ Text	Modified Requirements tab (Systems) in *REScheck* to reflect amended language in H.B. 202	Allows building framing cavities to be used as plenums.
Section R403.4.2 Hot water pipe insulation	124-125, 243-244	N/A	No action was taken since REScheck does not utilize this code language for compliance calculation	Text was deleted from the Utah 2012 code as per H.B. 202.
Table R403.4.2 Maximum Run Length (feet)	124-125, 243-244	N/A	No action was taken since REScheck does not utilize this code language for compliance calculation	This table was deleted from the Utah 2012 code as per H.B. 202.
Section R403.5 Mechanical ventilation (Mandatory)	126, 245	N/A	No action was taken since the deleted text in H.B. 202 was not included in the 2012 IECC checklist	Text was deleted from the Utah 2012 code as per H.B. 202.
Section R404.1 Lighting equipment (Mandatory)	127-128, 246-247	✓ Text	Modified Requirements tab (Systems) in REScheck to reflect amended language in H.B. 202	Deleted high efficacy lighting requirement from Utah 2012 as per H.B. 202.
Table R405.5.2(1) Specifications for the Standard	131-132, 248-251	✓ Software	Incorporated software change as per H.B. 202	This amendment to the "Air exchange rate" portion of the table updates the standard reference air leakage rate for non-tested homes to 5 ACH

Complete List of 2012 IECC Amendments from H.B. 202, Energy Conservation Code Amendments

2012 IECC SECTION	LINE NUMBER IN H.B. 202	IS RESCHECK IMPACTED?	ACTION	NOTES
Reference and Proposed Designs	133-140, 252-259	✓ Software	Incorporated software change as per H.B. 202	This amendment to the "Heating systems" portion of the table brings back the "equipment tradeoff" for furnaces from the 2006 IECC by allowing HVAC equipment with efficiency levels above the federal minimum standards to contribute to compliance credit under the Performance Alternative
	141-144, 260-263	✓ Software	Incorporated software change as per H.B. 202	This amendment to the "Cooling systems" portion of the table brings back the "equipment tradeoff" for AC systems from the 2006 IECC by allowing HVAC equipment with efficiency levels above the federal minimum standards to contribute to compliance credit under the Performance Alternative
	145-149, 264-268	N/A	No action was taken since *REScheck* does not utilize this code language for compliance calculation	This amendment to the "Service water heating" portion of the table is outside of the scope of *REScheck*'s Performance Alternative method, which was designed for general users as a simplified performance modeling tool, not an advanced energy modeling software tool.
	150-152, 269-271	✓ Software	Incorporated software change as per H.B. 202	Applies a default value of 0.80 for both the required and the design building irrespective of the location of duct systems as per H.B. 202

Complete List of 2012 IECC Amendments from H.B. 202, Energy Conservation Code Amendments

2012 IECC SECTION	LINE NUMBER IN H.B. 202	IS RESCHECK IMPACTED?	ACTION	NOTES
Table R405.5.2(2) Default Distribution Systems Efficiencies for Proposed Designs	153-154, 272-273	✓ Software	Incorporated software change as per H.B. 202	This amendment uses same values for distribution system efficiencies and provides the same functionality as the 2006 IECC.

2. OVERVIEW OF *RESCHECK* SOFTWARE

REScheck is a free software tool developed by Pacific Northwest National Lab on behalf of the United States Department of Energy for the purpose of demonstrating energy code compliance by providing a Compliance Report, an Inspection Checklist, and a Panel Certificate.

REScheck provides additional flexibility to demonstrate compliance with the IECC's prescriptive requirements through the Total UA compliance method, and also provides an alternative compliance method called the Performance Alternative. *REScheck* software confirms compliance primarily with the fenestration and insulation requirements by utilizing the U-factor equivalents to the prescriptive R-value requirements as published in Table R402.1.3 *Equivalent U-Factors* of the 2012 IECC. REScheck is not used to demonstrate compliance with lighting, duct tightness, air leakage, service water heating, and other IECC provisions that do not impact the building envelope's Total UA. The exception to this is REScheck's Performance Alternative method of compliance, which is described below.

Total UA Method

REScheck's Total UA method of compliance, is based on calculating the heat loss (represented as *U-factor multiplied by area* to provide an overall "UA" of the building envelope) associated with each building assembly of the home being modeled.[2] Under the Total UA method of compliance, *REScheck* allows building envelope components to be "traded off" against each other. If the total heat loss (UA) through the building envelope is less than or equal to the prescriptive code requirements, the building complies with the Total UA method allowed by the code.

Performance Alternative Method

In addition to determining energy code compliance using the Total UA method, *REScheck* provides a

[2] "Envelope heat loss" is calculated by multiplying the UA by the temperature difference. "Total heat loss" includes infiltration and duct losses, accounted for in the mandatory requirements. REScheck doesn't of course look at temperature differences, other than climate zone information for requirements. The UA remains the same in all climate zones.

Performance Alternative that is based on a simplified or "limited" simulated energy performance of the proposed building's annual energy costs. This simulation involves an hour-by-hour energy simulation of the modeled house (taking into account insulation and fenestration components, HVAC system efficiency, and building orientation) to determine if the proposed home design is equal to or more efficient than the standard reference design home based on the simulated annual energy costs.

It should be noted that more comprehensive energy performance modeling software programs, such as EnergyPlus[3], REM/Rate,[4] and Energy Gauge[5], are widely available and commonly used by the home building industry. These software programs are used to provide comprehensive energy modeling, to model homes that are built to standards that exceed code (such as ENERGY STAR new homes requirements), and may also provide IECC compliance reporting.

3. UTAH RESCHECK REVIEW COMMENTS

As part of the software review process, reviewers submitted questions and comments about the performance of *REScheck*. Below are summaries and responses to these comments.

***REScheck* and Credit for Installing High Efficiency HVAC Equipment**

Reviewers provided comments questioning if/how *REScheck* provides "credit" toward compliance for installing high efficiency HVAC equipment. *REScheck* does provide the ability to receive "credit" in the modeling of a home with an HVAC system that is above the federal efficiency standards. However, *only the Performance Alternative method provides this functionality* (as has been the case since the 2006 IECC version of *REScheck*); the Total UA method doesn't provide credit for higher efficiency HVAC system, since its functionality is limited to *calculating heat loss of the building thermal envelope only*.

The Utah 2012 REScheck software preserves the identical functionality of the 2006 IECC version of REScheck regarding high efficiency equipment "trade-off" and therefore meets the requirements of H.B. 202.

How do the Total UA method and Performance Alternative method differ?

Several reviewer comments highlighted differences between the Total UA and the Performance Alternative methods of energy code compliance. Both compliance methods are included in *REScheck* and both can show compliance, with the Performance Alternative method considering additional features of the design, such as optimal orientation of the building for solar gains or shading from solar exposure. There are circumstances where a house could pass energy code compliance with one methodology and fail in another.

Differences in the results of these methods are not a fault of the software, but are the reality of the differences between the Total UA and Performance Alternative methods. Due to the different software

[3] See http://apps1.eere.energy.gov/buildings/energyplus/
[4] See http://www.archenergy.com/products/remrate
[5] See http://www.energygauge.com/

approaches between the Total UA and the Performance Alternative methods, *REScheck* users should not expect these different methods to provide the same results.

Comparing *REScheck* and REM/Rate

Several reviewers compared *REScheck* to REM/Rate a private sector software that is typically used to show compliance with ENERGY STAR new homes. *REScheck* was developed specifically to support energy code compliance, while REM/Rate was developed by Architectural Energy Corporation for HERS Raters to use in modeling high energy performing homes that exceed minimum energy codes, i.e. ENERGY STAR homes. However, REM/Rate has also incorporated energy code compliance reporting into its functionality.

Since these software products were developed for different purposes, these comments are not relevant to the function of the Utah 2012 *REScheck* software meeting the requirements in H.B. 202.

Multifamily and Multiple HVAC Systems

Reviewers commented about problems with the software in modeling multifamily buildings or buildings with multiple HVAC systems. The *REScheck* Performance Alternative method has limited functionality as it only supports single family and one HVAC system home configurations for all versions of the software. However, *REScheck* can be used to determine energy code compliance for multifamily buildings under the Total UA method. Builders who wish to use a *performance-based* software tool for multi-family homes or single family homes with 2 or more HVAC units must use a different software tool, such as EnergyPlus, REM/Rate, or Energy Gauge.

The first version of the software had a "bug" that allowed the program to be tricked to allow a Performance Alternative calculation in multi-family buildings. This bug was resolved in the second test version of the software.

***REScheck* and HERS Ratings**

One set of review comments compared HERS scores to passing the energy code, reporting that homes with low HERS score houses did not pass using the Utah 2012 version of *REScheck*. This is an "apples to oranges" comparison because there are code minimum requirements that are not included in the HERS process; if the mandatory requirements are not met then the house will fail even if the home scores a "0" on the HERS Index. However, as per Section R405 of the IECC, the code allows flexibility and could allow an alternate software tool and report, such as a HERS Rating, based on the decision by the code official.

***REScheck*, Duct Tightness, Air Infiltration, and Duct Location**

Reviewers also provided comments about the way *REScheck* accounts for *duct tightness* or *placement of duct systems* within the home. *REScheck* doesn't account for duct tightness, the location of ducts within the home, or air infiltration rates. If builders want home modeling software to take account of low air infiltration numbers and very tight ducts they would need to use another software tool such as EnergyPlus, REM/Rate, or Energy Gauge.

Another reviewer was looking for a bump in passing percentage when using the Total UA method by moving the ducts between conditioned and unconditioned space. This functionality is not part of the Total UA or Performance Alternative calculations but is part of IECC mandatory requirements and

therefore the UA passing score should not change. The same thing could be said if high efficacy lighting was part of the Utah 2012 code; including high efficacy lighting that exceeds the requirement does not add to the UA but does allow passing because it is a mandatory requirement.

***REScheck* and Exception for Ceilings without Attic Spaces**

There was also a question about the ceiling exception of 500 ft2 or 20% to allow a smaller ceiling area to comply with less than the prescriptive level of insulation. This 500 ft2 or 20% exception allows a lesser amount of insulation for a limited area in the home (i.e., the ceiling assembly) but does not "trade-off" against other envelope areas. This exception is only applicable when the Prescriptive path is the compliance method as per the 2012 IECC. *REScheck* recognizes this exception within the ceiling assembly only when the building design calls for it. Any "unused credit" from not applying this exception in the ceiling assembly cannot be applied to other building assemblies, since it's an exception to the Prescriptive insulation requirements and not a trade-off allowance.

***REScheck* Requirements Tab**

One reviewer noted that a home can pass the code requirement using *REScheck* without the software's "System" or "Envelope" requirements in the "Requirements Tab" being addressed. At the current time, PNNL is treating the completion of the requirements found in the Requirements Tab as optional for the builder and primarily for the benefit of energy code officials in reviewing and processing permit applications.

This has no impact on how the Utah 2012 *REScheck* is used to verify compliance with the provisions of H.B. 202.

Soil Contribution to UA

One reviewer noted that the basement wall value for CZ3 (Washington County) converts to an equivalent U-factor that allows significant "trade-off" opportunities, but in practice this will have minimal impacts on builders since virtually no basements are built in CZ3.

Another reviewer commented that soil is a better insulator than air spaces, and therefore suggested that the UA portion of the software wasn't working correctly. In fact, air spaces are much more effective insulators than soil as is easily seen with insulation materials such as fiberglass, cellulose, open-cell foam and others that trap air within the insulation material and the air becomes part of the insulation system.

Comments on "Performance Alternative general discussion"

Two reviewers provided comments about the determination by "DOE and interested parties" about the simplified performance alternative, contending that the determination requires builders to exceed code to show compliance in *REScheck* and that in the interest of simplifying the software, the software may only give partial credit for the value of energy saved through installing high efficiency furnaces.

REScheck provides full credit for the value of the energy savings from modeling high efficiency HVAC systems that exceed federal minimum standards. As noted above, by definition, *REScheck*'s Performance Alternative method of calculating compliance is simplified or "limited." (For additional explanation, see the document "Explanation of REScheck limitations" in the Appendix.)

The Performance Alternative calculations modified for the Utah 2012 version of *REScheck* have been fully modified as per H.B. 202 and provide a performance calculation that meets the requirements of H.B. 202.

Comments about Equipment Tradeoff for High Efficiency Hot Water Heaters

One reviewer provided comments questioning why high efficiency hot water heaters were not incorporated into *REScheck*'s equipment trade-off calculations. *REScheck* has never modeled an equipment trade-off for high efficiency water heaters, given the simplified performance modeling capabilities of *REScheck,* as described above, and given the complexity of modeling hot water heating systems. Water heating energy usage is virtually independent of the building thermal envelope, whereas the performance of HVAC systems is directly related to the efficiency of the building thermal envelope. Modeling water heating systems is outside of the scope of *REScheck*'s Performance Alternative method, which was designed for general users as a simplified performance modeling tool, not an advanced energy modeling software tool.

H.B. 202 and REScheck 2012-Utah

Brent Ursenbach <BUrsenbach@slco.org> Wed, Nov 27, 2013 at 12:22 PM
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Cc: "Kevin Emerson (Kevin@utahcleanenergy.org)" <Kevin@utahcleanenergy.org>, "Jim Meyers (jmeyers@swenergy.org)" <jmeyers@swenergy.org>, "'Sharon Smalley' (ssmalley@utah.gov)" <ssmalley@utah.gov>, "Dan S. Jones" <dansjones@utah.gov>

Dear Fellow Advisory Committee Members:

With the news that the U.S. Department of Energy has finished incorporating the energy code amendments from House Bill 202 into a Utah version of REScheck and with the updated REScheck software now available to the public, we need to meet to discuss REScheck and give direction to the UBCC. (Note, I'm attaching an html of the November 14, 2013 email from U.S. DOE forwarded by Kevin Emerson.)

I've personally run at least 20 scenarios using the updated version of REScheck and found that all of the amendments have been incorporated successfully. In total, about 100 scenarios were modeled by numerous reviewers who tested the functionality of the Utah REScheck software. In addition, Kevin Emerson has compiled a thorough and very helpful report that outlines all of the changes made to the Utah REScheck software. (I'm also re-sending Kevin's report as an attachment to this email for your convenience.) The software can be downloaded here: http://www.energycodes.gov/rescheck; choose "Utah 2012" from the "Code" dropdown menu to use the modified Utah energy code.

Given that the software has been modified and is now available to the public for use, **I propose that the Architectural and Mechanical Advisory Committees send a joint memo to the UBCC that the they certify to the Utah Legislature that the REScheck software has been modified in accordance with the requirements in HB 202** (Please review and consider the brief memo attached for Committee member). With the Commission's certification, builders, code officials, commercial design professionals and other interested parties will finally be able to move forward with the updated energy code that was passed by the Utah Legislature over 8 months ago!

To make sure all Committee members understand how the Utah REScheck works, I suggest that we hold a final joint "ad hoc" meeting for the Mechanical and Architectural Advisory Committees during the week of December 9th. At this meeting, Committee members and other interested stakeholders would:

- Review the report detailing how REScheck was modified to account for the amendments in House Bill 202, and

- Hold a live walk-through of the updated REScheck software
- Finalize our memo to the UBCC

It would be great to have all Committee Members present at the ad hoc meeting so everyone can understand all the due diligence that has gone into making these amendments, and also to insure all committee members understand how the Utah REScheck software works. Please let me know what day and times work for you during the week of December 9th ASAP. Of course, your comments, questions and suggestions are welcome.

May each of you have a wonderful Thanksgiving weekend!

Thank you,

Brent

Brent Ursenbach

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3 attachments

FW ResCheck for Utah.htm
33K

Report on REScheck software update for Utah as per HB 202_FINAL.pdf
504K

DRAFT Memo to UBCC re REScheck in Utah.docx
24K

Info Items

IBC AMENDMENT STATUS LOG
PENDING
G:\Commission\067.wpd

Section to Amend	Proponent & Agency	Approved/Denied by Committee	Commission Appr/Deny for Hearing	Published	Public Hearing	Commission Appr/Deny Amendment	Effective Date
3401.7	Structural Advisory	7-18-13 approved	10-9-13 no action taken				
R105.2	Dennis Thomas	9-10-13 denied	10-9-13 no action taken				
R156-15A-402	Structural Advisory	11-7-13 approved					

Kevin Emerson

From: Carey, Kym <Kym.Carey@EE.Doe.Gov>
Sent: Thursday, November 14, 2013 2:40 PM
To: Kevin Emerson
Cc: Bartlett, Rosemarie; 'David Karmol'; 'dnichols@iccsafe.org'; 'ggonzales@murray.utah.gov'; 'dansjones@utah.gov'; Williams, Jeremiah
Subject: ResCheck for Utah

Hello,
This is to inform you, that the modifications requested for the UTAH version of ResCheck have been completed. The redesigned Inspection Checklist organizes code requirements by stage of construction, provides code section numbers corresponding to each code requirement, and provides online links to references and clarifications for most code requirements. Coupled with this report redesign is the Requirements screen within the RES*check* user interface that gives the user an ability to review, verify, and document mandatory and prescriptive energy code requirements that are listed in the Inspection Checklist.

The PNNL engineers have incorporated Utah-adopted changes to the 2012 IECC (the Utah Energy Code described in HB 202), as instructed by DOE, and are confident that the Utah ResCheck software, when used according to instructions by a competent plan reviewer or inspector, will produce an accurate report on whether a building complies with the new Utah Energy Code, as described in HB 202. Furthermore, the updated Utah REScheck software will be released for public use on 11/22/2013.

Let me know if you have any questions or concerns. Thanks.

Kym Carey
Code Deployment Project Manager
Building Technologies Program
Department of Energy
Office: 202.287.1775
Email: Kym.Carey@ee.doe.gov

RES*check* Software Version 4.5.0
Compliance Certificate

Project Title: REScheck2006-SLC-2400sqft-1 story-Test1

Energy Code:	**2006 IECC**
Location:	**Salt Lake City, Utah**
Construction Type:	**Single Family**
Project Type:	**New construction**
Building Orientation:	**Bldg. faces 0 deg. from North**
Conditioned Floor Area:	**2400 ft2**
Glazing Area Percentage:	**2%**
Heating Degree Days:	**5765**
Climate Zone:	**5**

Construction Site: Owner/Agent: Designer/Contractor:

Compliance: Passes on UA trade-off

Compliance: **0.0% Better Than Code** Maximum UA: **294** Your UA: **294**

The % Better or Worse Than Code index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	2400	38.0	0.0		72
Wall 1: Wood Frame, 16" o.c. Orientation: Front	489	19.0	0.0		28
Window 1: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Front	12			0.350	4
Door 1: Solid Orientation: Front	18			0.210	4
Wall 2: Wood Frame, 16" o.c. Orientation: Right Side	489	19.0	0.0		29
Window 2: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Right Side	2			0.350	1
Wall 3: Wood Frame, 16" o.c. Orientation: Left Side	489	19.0	0.0		29
Window 3: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Left Side	6			0.350	2
Wall 4: Wood Frame, 16" o.c. Orientation: Back	489	19.0	0.0		27
Window 4: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Back	18			0.350	6
Door 2: Solid Orientation: Back	18			0.210	4
Basement Wall 1: Solid Concrete or Masonry Orientation: Front Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0		22
Basement Wall 2: Solid Concrete or Masonry Orientation: Right Side Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0		22

Basement Wall 3: Solid Concrete or Masonry Orientation: Left Side Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	22
Basement Wall 4: Solid Concrete or Masonry Orientation: Back Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	22

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2006 IECC requirements in RES*check* Version 4.5.0 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Name - Title	Signature	Date

Project Notes:

Perscriptive table values- tradeoff option

RES*check* Software Version 4.5.0
Compliance Certificate

Project REScheck2006-SLC-2400sqft-1 story-Test1

Energy Code:	**Utah Energy Conservation Code**
Location:	**Salt Lake City, Utah**
Construction Type:	**Single-family**
Project Type:	**New Construction**
Orientation:	**Bldg. faces 0 deg. from North**
Conditioned Floor Area:	**2,400 ft2**
Glazing Area	**2%**
Climate Zone:	**5 (5765 HDD)**
Permit Date:	
Permit Number:	

Construction Site: Owner/Agent: Designer/Contractor:

Compliance: Passes using UA trade-off

Compliance: **0.0% Better Than Code** Maximum UA: **294** Your UA: **294**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules. It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	2,400	38.0	0.0	0.030	72
Wall 1: Wood Frame, 16" o.c. Orientation: Front	489	19.0	0.0	0.060	28
Window 1: Vinyl Frame:Double Pane with Low-E Orientation: Front	12			0.350	4
Door 1: Solid Orientation: Front	18			0.210	4
Wall 2: Wood Frame, 16" o.c. Orientation: Right side	489	19.0	0.0	0.060	29
Window 2: Vinyl Frame:Double Pane with Low-E Orientation: Right side	2			0.350	1
Wall 3: Wood Frame, 16" o.c. Orientation: Left side	489	19.0	0.0	0.060	29
Window 3: Vinyl Frame:Double Pane with Low-E Orientation: Left side	6			0.350	2
Wall 4: Wood Frame, 16" o.c. Orientation: Back	489	19.0	0.0	0.060	27
Window 4: Vinyl Frame:Double Pane with Low-E Orientation: Back	18			0.350	6
Door 2: Solid Orientation: Back	18			0.210	4
	350	13.0	0.0	0.064	22

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Basement Wall 2: Solid Concrete or Masonry Orientation: Right side Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	0.064	22
Basement Wall 3: Solid Concrete or Masonry Orientation: Left side Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	0.064	22
Basement Wall 4: Solid Concrete or Masonry Orientation: Back Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	0.064	22

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the Utah Energy Conservation Code requirements in RES*check* Version 4.5.0 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Name - Title | Signature | Date

Project Notes:

Perscriptive table values- tradeoff option

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RES*check* Software Version 4.5.0
Compliance Certificate

Project Title: REScheck2006-SLC-2400sqft-1 story-Test1

Energy Code:	**2006 IECC**
Location:	**Salt Lake City, Utah**
Construction Type:	**Single Family**
Project Type:	**New construction**
Building Orientation:	**Bldg. faces 0 deg. from North**
Conditioned Floor Area:	**2400 ft2**
Glazing Area Percentage:	**2%**
Heating Degree Days:	**5765**
Climate Zone:	**5**

Construction Site: Owner/Agent: Designer/Contractor:

Compliance: **Passes on UA trade-off**

Compliance: **0.0% Better Than Code** Maximum UA: **296** Your UA: **296**

The % Better or Worse Than Code index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	1900	38.0	0.0		57
Ceiling 2: Cathedral Ceiling	500	30.0	0.0		17
Wall 1: Wood Frame, 16" o.c. Orientation: Front	489	19.0	0.0		28
Window 1: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Front	12			0.350	4
Door 1: Solid Orientation: Front	18			0.210	4
Wall 2: Wood Frame, 16" o.c. Orientation: Right Side	489	19.0	0.0		29
Window 2: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Right Side	2			0.350	1
Wall 3: Wood Frame, 16" o.c. Orientation: Left Side	489	19.0	0.0		29
Window 3: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Left Side	6			0.350	2
Wall 4: Wood Frame, 16" o.c. Orientation: Back	489	19.0	0.0		27
Window 4: Vinyl Frame:Double Pane with Low-E SHGC: 0.40 Orientation: Back	18			0.350	6
Door 2: Solid Orientation: Back	18			0.210	4
Basement Wall 1: Solid Concrete or Masonry Orientation: Front Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0		22
Basement Wall 2: Solid Concrete or Masonry Orientation: Right Side Wall height: 10.0' Depth below grade: 7.0'	350	13.0	0.0		22

Insulation depth: 10.0'				
Basement Wall 3: Solid Concrete or Masonry Orientation: Left Side Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	22
Basement Wall 4: Solid Concrete or Masonry Orientation: Back Wall height: 10.0' Depth below grade: 7.0' Insulation depth: 10.0'	350	13.0	0.0	22

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2006 IECC requirements in RES*check* Version 4.5.0 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Name - Title	Signature	Date

Project Notes:

Perscriptive table values- tradeoff option

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RES*check* Software Version 4.5.0
Compliance Certificate

Project 2006, 2012 Utah Test UA-Trade Off

Energy Code:	**Utah Energy Conservation Code**
Location:	**Salt Lake City, Utah**
Construction Type:	**Single-family**
Project Type:	**New Construction**
Orientation:	**Bldg. faces 180 deg. from North**
Conditioned Floor Area:	**2,400 ft2**
Glazing Area	**17%**
Climate Zone:	**5 (5765 HDD)**
Permit Date:	
Permit Number:	

Construction Site: Owner/Agent: Designer/Contractor:

Compliance: Passes using performance alternative

Compliance: **2.4% Better Than Code**

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Ceiling 1: Flat Ceiling or Scissor Truss	1,920	38.0	0.0	0.030	58
Ceiling 2: Cathedral Ceiling	480	30.0	0.0	0.034	16
Wall 1: Wood Frame, 16" o.c. Orientation: Front	489	19.0	0.0	0.060	23
Window 1: Vinyl Frame:Double Pane with Low-E Orientation: Front	80			0.350	28
Door 1: Solid Orientation: Front	20			0.220	4
Wall 2: Wood Frame, 16" o.c. Orientation: Right side	489	19.0	0.0	0.060	27
Window 2: Vinyl Frame:Double Pane with Low-E Orientation: Right side	41			0.350	14
Wall 3: Wood Frame, 16" o.c. Orientation: Left side	489	19.0	0.0	0.060	28
Window 3: Vinyl Frame:Double Pane with Low-E Orientation: Left side	22			0.350	8
Wall 4: Wood Frame, 16" o.c. Orientation: Back	489	19.0	0.0	0.060	24
Window 4: Vinyl Frame:Double Pane with Low-E Orientation: Back	41			0.350	14
Door 2: Glass Orientation: Back	40			0.350	14

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Glazing or Door U-Factor	UA
Basement Wall 1: Solid Concrete or Masonry Orientation: Front Wall height: 8.0' Depth below grade: 6.5' Insulation depth: 8.0'	350	13.0	0.0	0.062	20
Window 5: Vinyl Frame:Double Pane with Low-E Orientation: Front	32			0.350	11
Basement Wall 2: Solid Concrete or Masonry Orientation: Right side Wall height: 8.0' Depth below grade: 6.5' Insulation depth: 8.0'	350	13.0	0.0	0.062	20
Window 6: Vinyl Frame:Double Pane with Low-E Orientation: Right side	32			0.350	11
Basement Wall 3: Solid Concrete or Masonry Orientation: Left side Wall height: 8.0' Depth below grade: 6.5' Insulation depth: 8.0'	350	13.0	0.0	0.062	21
Window 7: Vinyl Frame:Double Pane with Low-E Orientation: Left side	16			0.350	6
Basement Wall 4: Solid Concrete or Masonry Orientation: Back Wall height: 8.0' Depth below grade: 6.7' Insulation depth: 8.0'	350	13.0	0.0	0.061	18
Window 8: Vinyl Frame:Double Pane with Low-E Orientation: Back	48			0.350	17

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the Utah Energy Conservation Code requirements in RES*check* Version 4.5.0 and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Name - Title | Signature | Date