AGENDA

UNIFORM BUILDING CODE COMMISSION
MECHANICAL ADVISORY COMMITTEE

February 10, 2015 2:00
Room 474
Heber M Wells Bldg
160 E 300 S Salt Lake City, 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 January 13, 2015 meeting

DISCUSSION ITEMS

2. Review current amendment for Section 603.4 and M1601.1.1(2)
3. Review Section 403.2.9.1.3
4. Review 2015 IFGC and current amendments
5. Begin review of 2015 IECC

Next Scheduled Meeting: March 10, 2015

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.

UNIFORM BUILDING CODE COMMISSION
MECHANICAL ADVISORY COMMITTEE

January 13, 2015
Heber M Wells Building Room 474
160 E 300 S
Salt Lake City, Utah
MINUTES

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

MECHANICAL ADVISORY COMMITTEE:

David Wilson (excused)	Tyler Lewis (excused)
Trent Hunt	Brent Ursenbach
Dennis Thatcher	Roger Hamlet
Randy Beckstead	Kevin Bell (absent)

VISITORS:
Kevin Emerson

MINUTES

A motion was made by Dennis Thatcher to approve the minutes from the December 9, 2014 meeting as written. The motion was seconded by Trent Hunt and passed unanimously.

REVIEW 2015 IMC AND CURRENT AMENDMENTS

Brent Ursenbach asked that the recommendation for the current amendment for IMC Section 603.4 and IRC Section M1601.1.1(2) be tabled until the next meeting.

A motion was made by Trent Hunt to delete the current amendment for the IRC M1901.3. The motion was seconded by Randy Beckstead and passed unanimously.

The committee discussed the 2015 IEBC in connection with Chapter 34 no longer being in the 2015 IBC and how it could possible impact the energy and mechanical codes. Brent Ursenbach volunteered to talk with Scott Marsell, chair of the Architectural Advisory Committee, and Jerry Thompson, chair of the Structural Advisory Committee.

The committee began their review of the 2015 IECC. Kevin Emerson talked to the committee in connection with the energy code. He passed out the

Utah Energy Efficiency & Conservation Plan and the Clean Air Action Team Recommendations. He pointed out several of the recommendation that were similar in these two handouts. Brent Ursenbach volunteered to talk with Ross Ford of the Utah Home Builders Association to see what concerns they have with the 2015 Energy Code.

Trent Hunt asked the committee to look at C402 and C403.2.1 for the next meeting. Roger Hamlet will review C403.2.5.1.

Roger Hamlet asked the committee to look at section 403.2.9.1.3 for a possible correction.

The meeting adjourned at 3:30.

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.

RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

Energy Rating Index Performance Path

Implementation Guidelines for the ERI Performance Path

The Energy Rating Index (ERI) performance path gives builders yet another option for complying with the International Energy Conservation Code (IECC). In addition to the prescriptive and performance paths of previous versions of the IECC, builders now have the option of meeting a target ERI score through a wide range of performance options to demonstrate compliance. The ERI performance path also requires builders to meet the mandatory code requirements of the IECC, including piping provisions for water heating, as well as comply with the minimum insulation and window envelope prescriptive requirements of the 2009 IECC.

The ERI performance path allows a state or jurisdiction adopting the IECC to specify which qualifying Energy Rating Index method it will use. The Residential Energy Services Network (RESNET's) Home Energy Rating System (HERS) Index, based on ANSI/RESNET Standard 301-2014, is the existing compliant ERI method and is nationally recognized for inspecting and calculating a home's energy performance. To date, over 1.5 million homes have been rated in the U.S. under the RESNET standards and in 2013, half of all new homes were rated and issued a HERS Index Score.

The ERI compliance path, implemented through the HERS rating process, provides independent, third-party analysis and review of the energy using features of a house that includes:

- An initial analysis and preliminary energy rating of the proposed home prior to permit submittal
- Review for compliance with the energy code
- On-site inspection of energy features in the home
- A final energy rating of the home once construction is completed

A home complying with the ERI performance path demonstrates compliance with the IECC. The thoroughness of the HERS rating process reduces the need for the jurisdiction to conduct plan review and specific inspections focused on compliance with the energy code. Jurisdictions are encouraged to participate in the rating process as an observer to better understand how the ERI approach, as implemented through a HERS rating, demonstrates compliance with the energy code.

The Implementation Guidelines for the ERI Performance Path are provided for the successful implementation of the ERI approach within a jurisdiction. A RESNET HERS rater that provides energy code plan review and inspection verification for a jurisdiction falls under the category of a Special Inspector as defined in Chapter 17, Special Inspections and Tests, of the ICC International Building Code (IBC). The recommended guidelines follow specific provisions within Chapter 17 that are applicable to the ERI and HERS rating process to ensure compliance with the IECC.

HERS RATING DOCUMENTATION

Documentation should be requested from the HERS rater to show that that the following requirements are met.

Independence. The HERS rater should be objective and competent for the work performed. The HERS rater should also disclose possible conflicts of interest so that objectivity can be confirmed. RESNET HERS Raters follow the Rating and Home Energy Survey Code of Ethics[1] that stresses the obligation of a home energy rater/auditor to present accurate and unbiased information on energy performance in a professional manner and disclose any potential conflicts of interest.

Personnel. The HERS Rater should provide certifications to demonstrate that they are experienced and educated in conducting, supervising and evaluating a HERS rating. The following RESNET HERS certifications demonstrate competency in this field:

- Home Energy Rater Certification
- Rating Field Inspector Certification (Can provide the infield testing and inspection but are not certified to provide an ERI)

Qualifications for each certification level are found in the Mortgage Industry National Home Energy Rating Systems Standard.[2]

The HERS rater should also demonstrate their knowledge of the residential provisions of the IECC. This is accomplished by holding the ICC IECC Residential Energy Inspector/Plan Examiner certification. In addition, the HERS rater must have knowledge of any state or local jurisdiction amendments to the IECC.

Energy Ratings Index Performance Path

DOCUMENTATION AND REPORTING REQUIREMENTS

As required by the IBC, records should be kept of all inspections and should be provided to the building official upon request. The Approved Rating Software Tool that is defined in ANSI/RESNET 301-2014[3] will generate reports and contain the following information:

- Property location, including city, state, zip code, street address or community/subdivision name, lot number and Plan Name for the rating
- Name and contact information (phone number and email address) of the Certified Rater conducting the rating
- Name, mailing address and telephone number of the Approved Rating Quality Assurance (Q/A) Provider under whose auspices the Rater is certified
- Date the rating was conducted
- Name of the Approved Software Rating Tool (including version number) used to determine the rating

In addition, the rating report must have the following statement in no less than 10 point font:

"The Home Energy Rating Standard Disclosure for this home is available from the Rating Provider."

Home Ratings. Documentation should be submitted to the building official for the following ratings:

Projected Rating: This rating shall be determined from the building plans that account for construction specifications, planned location and orientation of the home. Guidelines for generating the projected ratings are included in ANSI/RESNET 301-2014. Guidelines are also available for generating ratings for multifamily (3 stories and less) buildings in the RESNET Guidelines for Multifamily Energy Ratings. The projected rating should be provided as part of the plan submittal for permit. The HERS rating must be equal to or less than the maximum ERI referenced in the IECC.

Confirmed Rating: This rating shall be determined from field verified values. The HERS Rating from the confirmed rating must be equal to or less than the maximum ERI referenced in the IECC. The confirmed rating will be provided to the building official prior to issuance of the certificate of occupancy.

Sampled Rating (Option): Chapter 6 of the Mortgage Industry National Home Energy Rating Systems Standards outlines a process by which homes can be rated using a sample testing and inspection process. This formal process has been in place since 2008 and is recognized by the US Environmental Protection Agency, US Department of Energy and Internal Revenue Service. Raters working with a RESNET Accredited Sampling Provider are eligible to oversee and conduct a sampling process that follows Chapter 6.

Mandatory Requirements. Documentation must be provided to the building official demonstrating that the mandatory requirements contained in the residential provisions of the 2015 IECC have been met. This includes meeting the minimum requirements of the building envelope, heating and cooling, water heating and lighting systems. Documentation must also be provided that demonstrates that the building envelope meets the minimum insulation and glazing requirements as defined in the 2009 IECC.

QUALITY ASSURANCE REVIEW FOR ACCREDITED PROVIDERS

The Mortgage Industry National Home Energy Rating Systems Standard requires that a quality assurance review be conducted by a Quality Assurance Designee. The Quality Assurance Designee must not be involved in any part of the rating or inspection on the homes in this process. The greater of one (1) home or ten percent (10%) of each Rater's annual total of homes must be reviewed.

1 http://www.resnet.us/professional/standards/ethics
2 http://www.resnet.us/professional/standards/mortgage
3 http://www.resnet.us/standards/ANSI-RESNET_301-2014.pdf

Developed by **Britt/Makela Group** *(brittmakela.com)*

Utah Residential Energy Code Analysis

Impacts of Adopting the 2015 IECC in Utah

This fact sheet provides the potential impacts from updating Utah's current residential energy code to the 2015 International Energy Conservation Code (IECC).[1]

The benefits of new homes in Utah being built to the 2015 IECC are significant. If homes built in 2016 met the 2015 IECC then by 2040 Utah would...

Protect families from losing an estimated $99 million annually and $1.17 billion cumulatively in energy costs[2]

Reduce energy demand by about 7.92 trillion Btu of energy anually including 3.68 trillion Btu in electricity, 3.37 trillion Btu in natural gas, and 0.87 trillion Btu in liquefied petroleum gas[3]

- **Lower the projected energy demand of Utah's building sector in 2040 by 4.3%[4]**

Reduce CO_2 emissions by an estimated 5.56 million metric tons[6]

- **Equivalent to about one year of CO_2 emissions from 38,321 homes' energy use and the greenhouse gas emissions from 88,421 passenger vehicles[7]**

Improve Utah's Housing Stock and Avoid Costly Retrofits

Buildings that meet or exceed the 2015 IECC are more durable, comfortable, have fewer drafts, and protect homeowners and tenants from high energy costs.

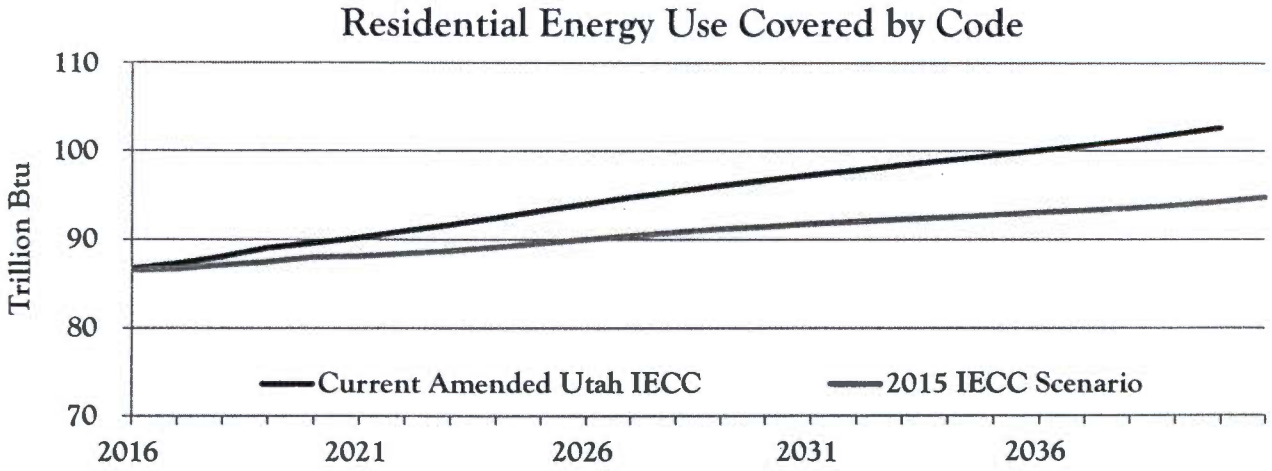
Ensuring that homes are built to current energy efficiency standards is more cost-effective than retrofitting the homes later or providing homeowners with subsidies to reduce high energy costs. Over $20 million is spent annually to assist low-income Utah households with energy bills.[7] Over time, strong energy codes reduce the need for families to rely on assistance to afford energy for their homes.

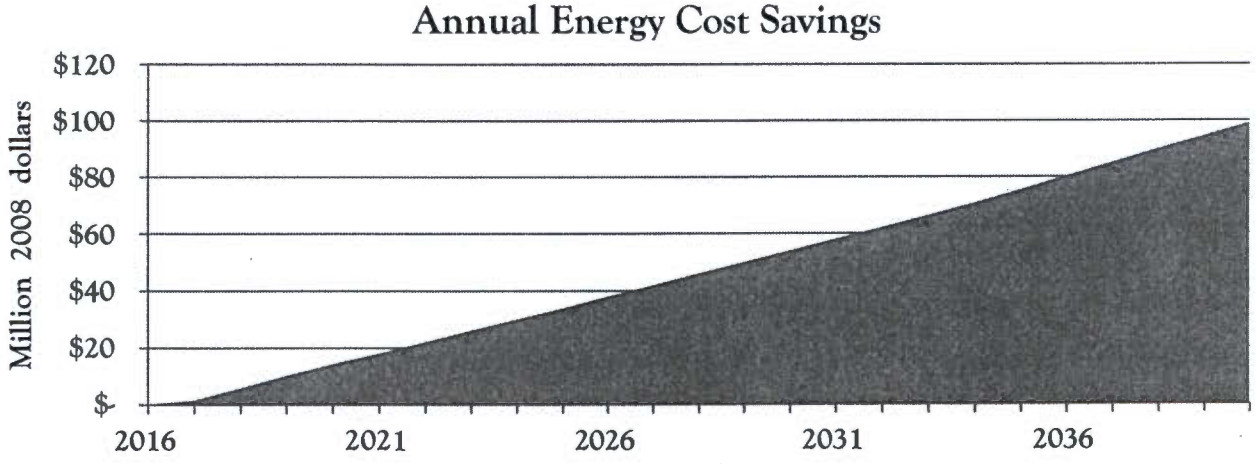
Consumers Come Out Ahead

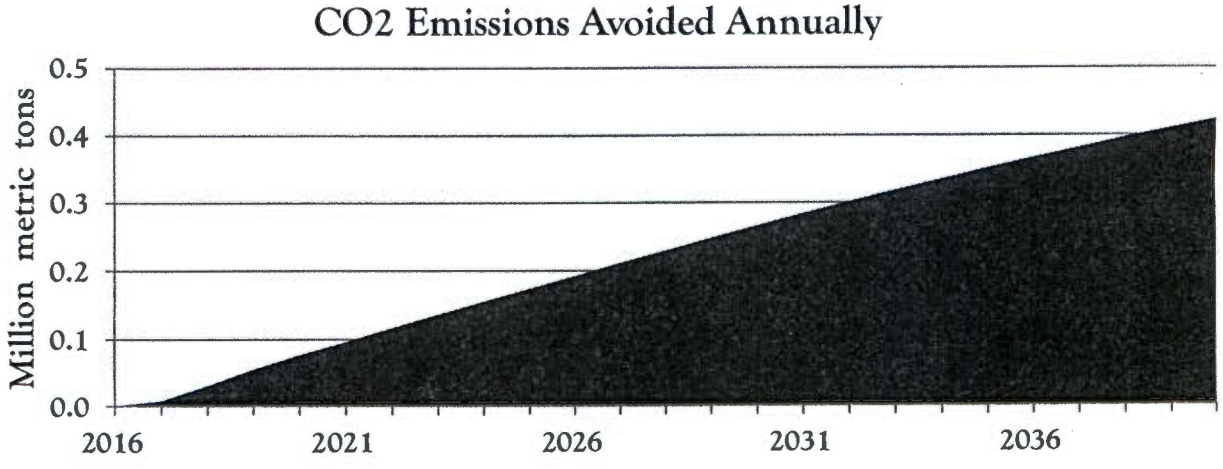
Homes built to updated energy codes typically result in monthly energy cost savings that exceed increases in the down payment and monthly mortgage,[8] providing a positive cash flow for consumers.

Lower monthly energy bills also:

- Improve the standard of living for families
- Strengthen local economies across Utah by providing consumers with more disposable income


Residential Energy Use Covered by Code
Trillion Btu
110
100
90
80
70
Current Amended Utah IECC
2015 IECC Scenario
2016
2021
2026
2031
2036


Annual Energy Cost Savings
Million 2008 dollars
$120
$100
$80
$60
$40
$20
$-
2016
2021
2026
2031
2036


CO2 Emissions Avoided Annually
Million metric tons
0.5
0.4
0.3
0.2
0.1
0.0
2016
2021
2026
2031
2036

SAVINGS ESTIMATES

	Annual savings by year...				Cumulative savings through year...			
	2020	2025	2030	2040	2020	2025	2030	2040
Overall source energy savings (trillion Btu)	1	3	5	8	3	16	37	103
Energy cost savings (millions of 2011 dollars)	$14	$34	$54	$99	$32	$162	$392	$1,173
CO2 emissions reduction (million metric tons)	0.08	0.17	0.27	0.42	0.17	0.85	1.99	5.56
Natural gas savings (trillion Btu)	0.66	1.47	2.20	3.37	1.52	7.31	16.88	45.64
Electricity savings (trillion source Btu)	0.61	1.40	2.18	3.68	1.33	6.72	16.06	46.17
Fuel Oil, Kerosene, LPG (trillion Btu)	0.15	0.35	0.54	0.87	0.35	1.73	4.06	11.33

CARBON EMISSION EQUIVALENCIES

	Annual savings by year...				Cumulative savings through year...			
	2020	2025	2030	2040	2020	2025	2030	2040
Note: equivalencies based on average annual emissions equivalent to the CO_2 emissions reduction								
CO_2 emissions reduction (million metric tons)	0.08	0.17	0.27	0.42	0.17	0.85	1.99	5.56
Equivalent greenhouse gas emissions of # passenger vehicles	16,842	35,789	56,842	88,421	35,789	178,947	418,947	1,170,526
Equivalent CO_2 emissions from annual energy use of # homes	7,299	15,511	24,635	38,321	15,511	77,555	181,569	507,299
Equivalent CO_2 emissions of # coal power plants	0.021	0.045	0.071	0.11	0.045	0.223	0.522	1.5

ENDNOTES AND REFERENCES

1. This analysis assumes that Utah's current residential energy code is 10.3% more efficient than the 2006 IECC. The current Utah residential energy code includes provisions from the 2006, 2009, and 2012 International Energy Conservation Code IECC. The stringency of the current residential energy code is based on findings in the following report:
Southwest Energy Efficiency Project. "Energy Savings Analysis of HB 202 as compared to 2006 IECC." (2013).

2. Building Code Assistance Project (BCAP) and Nils Petermann. (2012). "BCAP Code Calculator."
BCAP's Code Calculator is a tool that estimates energy, utility cost (in 2011 dollars), and carbon emissions (CO_2 equivalent) savings at a state level through the adoption and implementation of residential and commercial energy codes. The Code Calculator compares the desired "target code" scenario to the "business-as-usual" baseline scenario based in part on the Annual Energy Outlook (AEO) reference case published by the U.S. Energy Information Administration (see http://www.epa.gov/cleanenergy/energy-resources/refs.html#houseenergy for more details). Energy costs are based on AEO 2013.
Details on the methodology behind BCAP's code calculator are available in the BCAP Code Calculator Primer at: http://energycodes-ocean.org/resource/bcap-codes-savings-estimator-primer
This analysis assumed a 85% compliance rate across code cycles.

3. BCAP and Nils Petermann. (2012). "BCAP Code Calculator."
NOTE: Savings are based on U.S. Energy Information Administration (EIA) Annual Energy Outlook Reference Case. The 0.87 trillion Btu savings represents savings from all petroleum products, including distillate fuel oil and kerosene in addition to liquefied petroleum gas. EIA Residential Sector Energy Consumption Estimates (Table C5) provides a ratio of residential petroleum-based energy consumption for Utah. Utah's petroleum-based residential energy consumption is primarily through liquefied petroleum gas.

4. U.S. Department of Energy (DOE). "Table 1.1.3. Buildings Share of U.S. Primary Energy Consumption (percent)." Building Energy Data Book. http://buildingsdatabook.eren.doe.gov/tableview.aspx?table=1.1.3.
The U.S. commercial and residential building sector comprised about 41.2% of the 96.9 quadrillion Btu ("quads") of total U.S. energy consumption in 2012, or about 40 quads.
NOTE: All figures for energy savings refer to source energy – the total amount of raw fuel required to operate the building, including all transmission, delivery, and production losses in getting the energy from the power plant to the building. For example: Electricity, as a fuel, requires roughly three times the energy input (source energy) to produce one unit of energy consumed by or at the building itself (site energy). For more information, visit http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_benchmark_comm_bldgs.

5. Estimate from 2016 through 2040. BCAP and Nils Petermann. (2012). "BCAP Code Calculator."

6. Based on an estimate of 0.42 million metric tons of CO_2 annual emission reductions by 2040. U.S. Environmental Protection Agency (EPA). "Greenhouse Gas Equivalencies Calculator." http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

7. U.S. Department of Health and Human Services. LIHEAP Clearinghouse. "Funding." http://liheapdev2013.ncat.org/profiles/Utah.htm# The federal Low-Income Home Energy Assistance Program (LIHEAP) is a program that pays a portion of utility bills for low-income households. Data cited includes tribal awards.

8. NOTE: Assuming a standard 15-year or 30-year mortgage, where a buyer's 20% mortgage down payment is increased incrementally due to the increased home price resulting from building to the energy code.

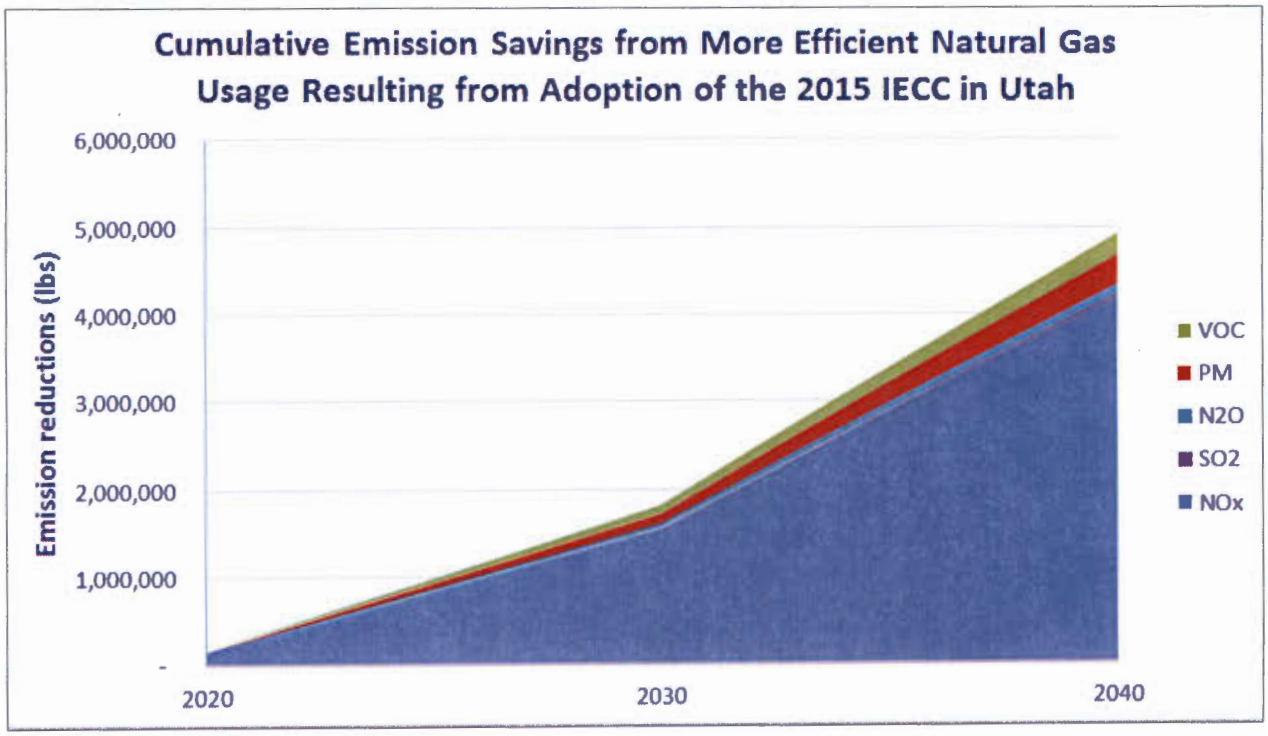
Adoption of the 2015 IECC for Homes Improves Utah's Air Quality

Improving the energy efficiency of new homes directly benefits Utah's air quality. The reduced air pollution comes largely from **reduced natural gas combustion** due to more efficient building envelopes, such as improved wall and ceiling insulation values and reduced air leakage.

Most new homes in Utah will be built in counties that are currently listed as areas "non-attainment" for National Ambient Air Quality Standards. The direct pollution reductions will also take place within these counties.

The estimated pollution emission savings from all new homes built between 2020 and 2040 is 4,917,486 pounds in 2040 or 2,459 tons in 2040.

The primary air pollutant reduced is nitrogen oxide (NOx) and other emissions reduced are volatile organic compounds (VOCs), direct particulate matter (PM), and smaller amounts of nitrogen dioxide (N2O) and sulfur dioxide (SO2).



NOTES:

- Estimates are based on the BCAP energy code calculator using data from U.S. Energy Information Administration and U.S. Census data.
- Emissions data is based on natural gas combustion emission factors from U.S. Environmental Protection Agency's *Compilation of Air Pollutant Emission Factors*, AP 42., Fifth Edition, Volume I, Chapter 1: External Combustion Sources (1998), Table 1.4-1 and Table 1.4-2, URL: http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf
- HVAC system efficiency improvements are not included in this analysis, since appliance standards are not set by building codes. Including HVAC system efficiency improvements would reduce air emissions further.

Developed by Utah Clean Energy, 2015