Major Changes from 2009 – 2018 IECC – Residential Const.

- When submitting plans more detail will be required to show energy compliance. The Building Thermal Envelope is to be shown on the plans, details to include insulation, air sealing details, window u-values, mechanical system design criteria, duct sealing, duct and pipe insulation.
- The Energy Code allows 3 paths of compliance.
    - Prescriptive Path Basically follow the stated R-Values, U-Values, etc. This is the most common path used.
    - Performance Based Compliance. This is done with software that can trade different components of the home. An example would be the windows may not meet the U-Values in the code, this software will allow additional insulation elsewhere and allow tradeoffs. ResCheck is typically used, it's a free software supplied by the Department of Energy. Anybody can use it to submit.
    - Energy Rating Index Compliance Alternative. This is a modeling program that is performed by a licensed professional and is held to very high standards. Home Energy Rating System (HERS) is an example. This is a new option that was not in the 2009 version.
- A comprehensive "Certificate" is to be posted in the mechanical area. My suggestion is for the County to provide a blank certificate for them to fill out and have it submitted to the Building Department for scanning into permanent record in the County's Building File. Quite a few homes have furnaces in the crawlspace and wouldn't make sense to post thing there. Please see the example of a certificate.
- R-Values have changed, please see the attached comparison.
- Attic hatches are required to be weather stripped and insulated to the same R-value as the attic.
- Blower door tests were an option in 2009 Energy Code, it is mandatory in the 2018 Energy Code. This will take education for some of the builders. We will provide guidance documentation with every permit and add links on our website directing folks to educational webinars/training on the subject provided by the DOE.
- An air barrier is to be installed behind tubs and shower surrounds. Typically, a builder will have to drywall behind the tub or shower before it's set.
- New wood burning fireplaces shall have tight fitting flue dampers or listed and labeled doors made specifically and listed for the fireplace.
- Rooms with fuel burning appliances that must bring in outside combustion air are to be separated from the rest of the home, this is for B-vented appliances. The sealed combustion high efficiency appliances that use PVC would not be affected. Federal standards still allow B-vented appliances.

- Boilers shall have an outdoor setback control that decreases the boiler water temperature based on outdoor temperature. All the new boilers come with this option; the inspectors will have to check to make sure it's installed.
- Building cavities are no longer allowed to be used as supply or return ducts.
- All domestic hot water lines ¾" and over are required to be insulated to R-3. The 2009 Code had no requirements for domestic hot water insulation, only for mechanical systems, aka boilers.
- Whole house ventilation is mandatory because of how airtight the home must be to provide a healthier home. Larger homes typically use ERV's of HRV's. There's an option for exhaust only systems where bath fans on qualifying controls can be utilized. A 3000 sq. ft. home with 2-3 bedrooms will require 60 CFM's.
- Heating equipment is required to be sized to Manual S and Manual J standards or other approved methodology. This is difficult because Garfield County does not require mechanical permits. If the report is required at building permit submittal, it adds a cost to the applicant to find someone to provide the report, as they typically don't know who their mechanical contractor will be yet, approximately $150-$250. A mechanical contractor typically has the supply house perform this function as a free service. It would be something to collect during construction to eliminate the upfront cost.
- It went from 50% of the lighting to be high efficacy to 90%. Shouldn't be an issue if all the lighting is LED.
- Chapter 5 for Existing Buildings has been added. There are sections for additions, alterations, repairs, historic buildings and change of occupancy to a residence. Having clarification is very helpful.

Major Changes from 2009 – 2018 IECC – Commercial Construction

- Added an exemption of small utility type buildings less than 500 square feet.
- Allows thermal properties of dead air spaces to be allowed toward the thermal envelope requirements.
- The windows and skylight allowances have not changed, maximum windows allowed are 30% of the exterior walls and skylights are 3% of the roof. Quite a bit of clarification has been added regarding Daylight Zones, lighting controls are to automatically adjust based on the daylight areas. The code allows 40% of the exterior walls be windows and 5% skylights if daylighting controls are in place.
- The Solar Heat Gain Coefficient (SHGC) for windows is now based on the Orientation of the walls. SHGC measures heat gain directly from sunlight. South, east and west windows are to block more heat that on the north side.
- There is a list of materials that are allowed to be used as Air-Barriers in commercial construction or a Blower Door Test is required. The list is very specific, and the Blower Door Test is typically required because strictly complying to the list is difficult.
- Rooms with fuel burning appliances that must bring in outside combustion air is to be separated from the rest of the building, this is for B-vented appliances. The high efficiency appliances that use PVC would not be affected. Federal standards still allow B-vented appliances.
- Doors to and access openings into shafts, chutes, stairways and elevators lobbies are to be weather stripped.
- An exception has been added allowing an air-curtain to be installed in lieu of a Vestibule.
- Heating spaces over 25,000 sq. ft. or more than one floor is required to be divided into isolation areas with separate controls.
- Airconditioning Equipment efficiencies have been increased. Most changed from 12 SEER to 13 SEER.
- Limitations set for heating and cooling vestibules, heating limited to 60 degrees and cooling limited to 85 degrees.
- When the outdoor air requirements exceed certain thresholds, the outdoor air shall be tempered using an Energy Recovery Ventilation (ERV) system.
- Hotel rooms shall have controls to automatically adjust temperature within 30 minutes of occupants leaving the room or when a room is not rented.
- Fan efficiencies and controls in HVAC Systems are being regulated where it was not in the 2009 Energy Code.
- Refrigeration systems are now regulated. Walk-in coolers, walk-in freezers, and refrigerated warehouse cooler/freezer are examples.
- Duct insulation has increased from R-5 to R-6 if in unconditioned spaces and increased from R-8 to R-12 if ducts are outside the building.

- All domestic hot water piping is to be insulated until it reaches the fixture. The 2009 Energy Code only required the first 8’ of piping leaving the water heater to be insulated.
- Lighting controls are mandatory and reworked to specific areas where occupancy sensors are required. Timed-switch controls are required when occupancy sensors are not required. Daylighted areas are to have automatic lighting controls.
- Upgraded the exterior lighting controls to turn off the lights when there is available daylight.
- Interior lighting is regulated by maximum watts per square foot. The 2018 Energy Code reduced the watts per square foot and the table has added more uses for better clarity. The use of LED technology has made this criterion easier for compliance. Example: Offices went from 1.0 watts per square foot to .79 watts per square foot.
- Exterior lighting now has 14 exceptions while the 2009 Code had 9 exceptions. These wattages per square foot were tightened up as the interior lighting did.
- In multi-family construction, each apartment/condo is required to have an individual electric meter.
- Electric motors and transformers are now regulated for minimum efficiencies.
- There is now a requirement to pick 1 of 8 Additional Efficiency Package Options when using the Prescriptive Path for compliance. A method will have to be decided on prior to submitting for a permit.
    - More efficient HVAC performance.
    - Reduce lighting power density.
    - Enhanced lighting controls.
    - On-site renewable energy.
    - A dedicated outdoor air system.
    - High-efficiency service water heating.
    - Enhanced Building performance.
    - Reduced air infiltration.
- Guidelines have been added when utilizing the Performance Based Compliance method. This is when they model the building to verify compliance.
- A Commissioning Plan is to be submitted and performed by a registered design professional or approved agency. The Plan is to include:
    - A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
    - A listing of the specific equipment, appliances or systems to be tested and a description of the tests to be performed.
    - Functions to be tested including, but not limited to, calibrations and economizer controls.

- Conditions under which the test will be performed.
  Testing shall affirm winter and summer design conditions.
  and full outside air conditions.
- Measurable criteria for performance