

RIDGWAY COMPREHENSIVE PLAN

**PRESCRIPTIVE ENERGY CODE
AND GREEN BUILDING STANDARD
PROGRAM FOR RESIDENTIAL
AND COMMERCIAL CONSTRUCTION**

Town of Ridgway
FINAL: April 7, 2010

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I. INTRODUCTION AND PURPOSE

There are a number of state, federal, and local regulations and/or resources that manage and facilitate energy and water conservation, green building, and alternative energy initiatives. The Town of Ridgway Prescriptive Energy Code and Green Building Standard provides a single resource for owners, builders, contractors, designers, architects, and others living, working and developing in the Town of Ridgway.

The Prescriptive Energy Code summarizes key requirements of the adopted 2006 International Energy Code (IECC), and identifies additional, cost-effective opportunities for energy conservation in residential development. Similarly, the Green Building Standard summarizes key requirements of the 2006 IECC, incorporating additional, cost-effective opportunities for developing healthy residences. Amendments to some fenestration, insulation and mechanical system requirements for commercial building requirements in the 2006 IECC are also presented. Finally, volunteer strategies, resources, and incentives for existing and new structures are identified and will be updated as appropriate over time.

II. BACKGROUND INFORMATION

There are a number of local, state, and federal energy conservation and alternative energy initiatives. In addition, some significant regional collaboration and community outreach efforts have been initiated this past year to address these issues. Below are brief summaries of some of these initiatives.

2007 Energy Independence and Security Act

In 2007, the federal Energy Independence and Security Act became an “omnibus energy policy law... to increase energy efficiency and the availability of renewable energy” in the United States.¹ The law is intended “To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes.”² Key provisions include energy efficiency standards for incandescent and fluorescent lamps, a target for lighting efficiency, and efficiency standards for appliances.

2007 Colorado Climate Action Plan

Also in 2007, Governor Bill Ritter revealed the Colorado Climate Action Plan to address global warming. The Plan “...sets out measures that we in our state can adopt to reduce emissions of greenhouse gases by 20 percent by 2020, and makes a shared commitment with other states and nations to even deeper emissions cuts by 2050...[and] pushes energy efficiency measures that will reduce demand for electrical energy and lower utility bills; builds on the state’s recently expanded Renewable Portfolio Standard and looks for ways to develop our renewable energy supplies even

¹ Sissine, Fred. CRS Report for Congress: Energy Independence and Security Act of 2007: A Summary of Major Provisions. December 21, 2007. http://energy.senate.gov/public_files/RL342941.pdf

² 110th Congress of the United States. Energy Independence and Security Act of 2007. January 4, 2007. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h6enr.txt.pdf

further; includes an ambitious goal for making cars and trucks run more cleanly and efficiently while saving consumers money at the pump; and provides an exciting new opportunity for rural Colorado by creating economic incentives for major utilities and industries to pay farmers and ranchers to sequester more carbon in the soil.”³

2008 Town of Ridgway Adoption of the 2006 International Energy Conservation Code

Through the passage of House Bill 1146 in 2007, the State of Colorado “calls for all jurisdictions that have a building code to adopt a minimum energy code standard effective July 1, 2008. Adoption of energy codes for buildings by Colorado jurisdictions can contribute to approximately 16% of the needed emissions reductions proposed in Governor Ritter’s 2007 Climate Action Plan”.⁴ Subsequently, the Town adopted the 2006 IECC in the summer of 2008, and is currently operating under and enforcing this version.

In 2008, the GEO commissioned a survey of jurisdictions statewide “to better understand the types of code assistance desired.”⁵ Of 174 responses, 139 (80%) indicated they are enforcing a residential energy code, and 98 (57%) indicated they are using the 2006 IECC. More than half of the respondents indicated they adopted their current residential energy code in 2008 (pg. 7). Similar figures are reported for commercial energy codes (p. 10).

2009 State of Colorado House Bill 1149

In May 2009, House Bill 1149 “requires builders of single family homes to offer solar as a standard feature to all prospective homebuyers. Builders are required to give the buyer the option to either have a photovoltaic (PV) system or a solar water heating system installed on their new home, or to have all the necessary wiring and/or plumbing installed so that they can easily add a solar system at a later date. The builder must also provide the buyer with a list, maintained by the Governor's Energy Office, of every solar installer in the area, so the buyer can obtain expert help in determining if their home's location is suitable for solar and what the estimated cost savings would be.”⁶ The effective date for implementation of this bill is August 5, 2009.

2009 Town of Ridgway Community Survey Results

In the fall of 2009, the Town issued a community survey, receiving 416 responses. Preliminary results reveal the following:

An overwhelming 93% of respondents feel the Town should work with neighboring jurisdictions on sustainability issues. Only 4% (13 respondents) disagree with this.

Of 137 comments for other environmental policies or programs, the following are the most prevalent themes, in order of the magnitude of responses:

Water: conservation, quality, management, protection

³ Ritter Jr, Bill. Colorado Climate Action Plan: A Strategy to Address Global Warming. November 2007.

http://www.colorado.gov/energy/in/uploaded_pdf/ColoradoClimateActionPlan_001.pdf

⁴ Governor’s Energy Office (GEO). Energy Codes. Retrieved February 12, 2010 from the GEO website:

<http://www.colorado.gov/energy/index.php?/residential/category/codes-standards/>

⁵ Governor’s Energy Office. Colorado Building and Energy Codes Survey Results. July 2009.

⁶ Database of State Incentives for Renewables and Energy Efficiency

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CO36R&re=1&ee=1

Dust mitigation, use of Magnesium Chloride, and hard-surfacing streets
Alternative energy and energy conservation
Recycling (*appears to be primarily Ouray County residents*)
River protection
Code enforcement
Lighting/dark skies, and weeds/toxic chemical usage

Enhancement and protection of the river corridor, preservation of dark-skies, curbside recycling and planting of public trees are perceived as the most successful efforts of the Town. The community composting and water conservation efforts are perceived to need the most work. Responses from the varied groups appear to track similarly.

There appears to be significant support for a variety of water conservation efforts with 83% of the respondents supporting provisions for conservation devices and education. Restructuring of rates and mandatory restrictions received majority support (57% and 53% respectively), although a representative number of respondents do not support these measures (37% and 41%, respectively). 78% disagree with the idea of doing nothing about water conservation. Responses track across populations regardless of residency in the Town or County, although Ouray County respondents are closely divided on implementing mandatory watering restrictions.

A significant number (86%, 290 respondents) indicated they would take advantage of energy conservation programs or incentives if they were reasonable and available. Responses track well across Town and non-Town residents.

2009 Regional Collaboration Efforts on Energy Conservation

In 2009, the Town of Ridgway joined a regional effort with the City of Ouray, Ouray County, the Towns of Mountain Village, Norwood, and Telluride, San Miguel County, Source Gas, and San Miguel Power Association in an application to the Governor's Energy Office for Energy Efficiency and Conservation Block Grant resources to fund a Regional Sustainability Coordinator for our 2-county region. In 2009, the Town of Mountain Village and San Miguel County adopted a Prescriptive Energy Code and Green Building Standard with the assistance of The New Community Coalition. The Town of Ridgway Committee used this Code and Standard as a baseline for developing a Code and Standard to optimally suit the Town, which is appended to this report.

III. GOALS

1. Facilitate construction of efficient, and healthy new structures without substantial increases in investment costs, and considering future savings
2. Encourage sustainable solutions that reduce consumption of non-renewable fuels
3. Be pro-active in conforming with state and federal mandates requiring energy code adoptions in 2008

4. Provide educational material and resources for energy efficiency and green building objectives that are too expensive to require now but may result in cost savings or resource conservation down the line
5. Offer resources and incentives for energy conservation and green building opportunities for both existing and new structures

IV. COMMITTEE MEETINGS

A committee of diverse industry professionals, elected and appointed officials, and town staff developed the energy performance code, green building standards, and volunteer incentive program. The committee includes: Doug Macfarlane, Scott Bridger, Rani Guram, Ellen Hunter, Rick Weaver, Tom McKenney, Bill Behan and Jen Coates. The committee met twice in December 2009 to review the adopted code and standard from San Miguel County and Mountain Village and to incorporate and adopt modifications suited to the environment and community of Ridgway. The goals identified above were used to guide the process. In particular, the Committee focused on effective improvements to energy conservation and green building that would result in a net payback to the owner and/or limited investment cost with significant energy savings.

V. ACTION PLAN

1. Adopt Prescriptive Energy Code and Green Building Standard for New Homes and Commercial Structures
2. Adopt Volunteer Program Goals and Incentives for new and existing structures
3. Amend commercial construction requirements in 2006 IECC
4. Provide community education and outreach tools including contractor/designer training on Prescriptive Energy Code and Green Building Standard, and development of online resources on the Town of Ridgway website
5. Update building permit application and packages
6. Provide “one-stop-shop” resource information for new and existing residential and commercial structures on alternative energy, energy and water conservation, and green building standards.

VI. ATTACHMENTS

- A. Prescriptive Energy Code and Green Building Standard
- B. Amendment to 2006 IECC Commercial Requirements
- C. Strategies and Incentives
- D. Volatile Organic Compounds Awareness Sheet

APPENDIX A
Prescriptive Energy Code and Green Building Standard

The Prescriptive Energy Code & Green Building Standard requirements for Town of Ridgway construction are listed below. This code applies to all new residential construction built under the 2006 International Residential Code, including residential additions and renovations. This Code and Standard is in addition to the residential construction requirements defined in the 2006 International Energy Conservation Code (IECC), as adopted by the Town of Ridgway. All commercial construction is subject to the requirements in the 2006 IECC, as amended, and adopted by the Town of Ridgway.

Shaded requirements are existing, unchanged requirements of the adopted International Energy Conservation Code.

As an alternative to the Prescriptive Energy Code, if a building 5000 square feet or less in area is ENERGY STAR® certified with a HERS® rating of 80 or less, it complies with the Performance Path to the 2006 IECC and is thus exempt from the Prescriptive Energy Code checklist. If a building 5000 square feet or less in area is LEED® Silver certified, or Built Green® and achieves a HERS® rating of 80, or other equivalent green building code, then it will be exempt from both the Prescriptive Energy Code and the Green Building Standard and will receive expedited status through the permitting process.

All pre-fabricated manufactured homes (alternative, modular, HUD, etc.) must be ENERGY STAR® certified.

Alternative methodologies to the items in this code are encouraged, if they meet the high performance requirements outlined by this code. Submit proof of performance to Building Department with plans in order to obtain approval.

PRESCRIPTIVE ENERGY CODE

ITEM	Insulation Value	Total Value
FRAME WALLS AND RIM JOIST (LOG HOMES REQUIRE ENERGY ANALYSIS) ¹	R 21	R 24
WINDOW IN FRAME WALLS AND BASEMENT	Low-E double glazed ²	
WALL WINDOWS TO FLOOR AREA	18% ³	
DOORS IN FRAME WALLS AND BASEMENT	R 2.86 ⁴	
CEILINGS OR RAFTERS	R 49 ⁵	
AIR INFILTRATION	Prescriptive Air Sealing ⁶	
WALLS TO GARAGE OR UNHEATED BUFFER SPACES	R 19	R 21
HEATED GARAGES ⁷	Same as home	
HEATED BASEMENT AREAS (WALLS)	R 19	
BASEMENT WINDOW TO FLOOR AREA	10% max ⁸	
FLOORS OVER UNHEATED SPACES	R 30 ⁹	
FLOORS OVER UNVENTED SPACES WITH INSULATED WALLS	None	
CRAWL SPACE WALLS (UNVENTED)	R 21 ¹⁰	

CANTILEVER FLOORS	R 38	R 40
SLABS IN HEATED AREAS (EXCEPT GARAGES)	R 10 ¹¹	
HEAT IN THE SLAB / SLAB EDGES WITH HEAT IN THE SLAB	R 10/ R15 ¹²	
EXPOSED SLAB EDGES	R 7.5- R 10 ¹³	
SLABS IN UNHEATED AREAS	0	
WINDOWS (FEDERAL TAX CREDITS MAY BE AVAILABLE FOR <.30)	U-factor: .35 max	
SKYLIGHTS	U-factor: .60 max	

SPACE HEATING SYSTEM PERFORMANCE	
Gas furnaces (rebates may be available for $\geq 92\%$ AFUE)	$\geq 90\%$ AFUE
Gas boiler (Including snow-melt boilers) (rebates may be available)	$\geq 90\%$ AFUE
Dedicated snow-melt systems	$\geq 90\%$ AFUE

DUCTS: Inside envelope, outside conditioned space	R 5 ¹⁴
Outside building envelope	R 8 ¹⁵

WOOD-BURNING FIREPLACES/STOVES	Tight fitting enclosures ¹⁶
GAS LOG SETS IN MASONRY FIREPLACES	Tight fitting doors with outside combustion air or automatic flue damper as approved by Building Dept.

WATER HEATER PERFORMANCE	
Gas (rebates may be available for 62+Tank EF and 82+ tankless EF)	.60 energy factor
Electric	.93 energy factor
HOT WATER HEATER PIPING	Heat traps ¹⁷

SETBACK THERMOSTAT (programmable)	Required (except for in-floor heat)
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AIR CONDITIONING	15.0 SEER
AIR SOURCE HEAT PUMPS	14.0 SEER
GROUND HEAT PUMPS	11.5 SEER

NOTES:

The R-values given above are the total R-values. The R-values of different materials are added together including air films, air spaces and building materials. The R-value is reduced by the effects of thermal bridging through framing. For instance, unless special methods or rigid insulation sheathing are used, the R-value for walls must be decreased due to thermal bridging. Multiply the R-value of ceilings at the depth of the framing members by .94 and the wall by .87.

¹ An energy rating is required of all log structures. HERS rating must be 80 or lower as required in the Green Building Standards for home size.

² All windows must demonstrate a 0.35 maximum U-value (including glass in doors). All skylights must demonstrate a U-factor of 0.60 (2001 NFRC rated at 20 degrees) or 0.45 (RES97 rated at 90 degrees). All windows must have a high quality thermal isolation break between the inside and outside frames. Passive solar designs are included in this item. A high Solar Heat Gain Coefficient (SHGC) is available in combination with Low-E glazing from several window manufactures that will accommodate almost all passive solar designs.

³ Allowable percentage of window area measured by rough opening sizes. R-value for windows is a combination of glass, frame and spacer certified by the National Fenestration Research Council (NFRC). All windows must provide an air leakage maximum rate of 0.3 cfm per square foot of window area. Replacement windows shall meet the same criteria as the aforementioned.

Exception 1. A structure is exempt from the 18% maximum requirement if it can be effectively demonstrated to the Town by the home owner, builder, or design professional that due consideration has been given to the basics of passive solar design such as thermal mass, ventilation, orientation, and shading.

⁴ Opaque doors only.

⁵ R-value of 38 is allowed if energy heel trusses are used and insulation extends over top plates. The same applies to a rafter system if the system allows insulation with an R-value of 38 to extend over top plates. Energy heels on all roof trusses: 12" min. when using fiberglass or cellulose, 7" min. when spray foam is applied. Recessed light fixtures must be "Air-Tight" I.C. rated.

⁶ All exterior joints in the building envelope shall be caulked, gasketed, weather-stripped, or otherwise sealed in an approved manner. For the performance approach a home must achieve a HERS rating of 80, or lower as required in the Green Building Standards for home size.

⁷ All heated garages shall be constructed to the same requirements as the home.

⁸ Allowable percentage of window area measured by rough opening sizes. R-value for windows is a combination of glass, frame and spacer certified by the National Fenestration Research Council (NFRC). If window area is > 10% then the window must provide a U value of 0.30 or lower. Basement windows with >10% glazing area to exterior wall area must provide a U value of 0.30 or lower. All windows must provide an air leakage maximum rate of 0.3 cfm per square foot of window area. Replacement windows shall meet the same criteria as the aforementioned.

⁹ Water lines must be protected from freezing. Except floors over insulated basements.

¹⁰ Must be unvented areas with a tight fitting ground vapor barrier and constructed as conditioned space.

¹¹ Heated Slabs: Entire under slab area must be insulated to R-10. The slab edge perimeter must be protected with insulation to R-15. Exterior heated slabs require a minimum of R-5 below slab and at all edges.

¹² Heated Slabs: Entire under slab area must be insulated to R-10. The slab edge perimeter must be protected with insulation to R-15. Exterior heated slabs require a minimum of R-5 below slab and at all edges.

¹³ Foundation insulation and slab insulation where required shall cover all slab edges.

¹⁴ Joints of duct systems shall be made substantially airtight by means of approved tapes, mastics, gasketing or other approved closure systems complying with Section M1601.3.3 of the IRC.

¹⁵ Joints of duct systems shall be made substantially airtight by means of approved tapes, mastics, gasketing or other approved closure systems complying with Section M1601.3.3 of the IRC.

¹⁶ All wood-burning fireplaces and wood stoves must have outside combustion air with tight fitting doors and shall be designed not to require indoor combustion air. Wood stoves must be EPA certified or listed as an exempt device.

¹⁷ Vertical risers shall have a heat trap on both the inlet and outlet of the water heater. Heat traps not required with recirculation systems. Recirculation pumps shall be provided with timers and a manual on/off switch.

GREEN BUILDING STANDARD

In addition to the previously listed energy requirements all new construction must implement the following standards:

- ⇒ Exterior air-infiltration barrier
- ⇒ Foam sill sealer beneath sill plates
- ⇒ Energy heels on all roof trusses (12" min. when using fiberglass or cellulose, 7" min. when spray foam is applied)
- ⇒ Timers or motion sensors are required for bath and laundry exhaust fans
- ⇒ Formaldehyde-free insulation
- ⇒ Carbon monoxide (hard-wired) detectors required near the door between the residence and the garage (if there is an attached garage) and near the mechanical room. Must be installed per manufacturer's recommendations
- ⇒ Insulating blankets required for hot water heaters unless the storage tank already has a high R-value (at least R-24). Insulating blankets should be R-11 minimum. (rebate may be available)
- ⇒ No hot air ducts allowed in exterior walls unless a minimum of R-10 insulation is installed on the exterior side of the duct. The insulation must be installed in an air tight manner
- ⇒ Attached garages must be isolated from the dwelling with extensive air-sealing practices
- ⇒ Insulated headers, min R-10, wherever possible. Steel headers must be provided with insulation on both the exterior & interior sides of the steel
- ⇒ All hot water re-circulation systems must be provided with a timer or an aquastat and manual on/off switch. Piping must be insulated (1/2" thick wall foam insulation minimum or equivalent)
- ⇒ Hot water piping in unconditioned spaces requires R-6 insulation (boilers and domestic water)
- ⇒ Minimum 30 year roof material
- ⇒ Return air ducts are required (panned framing cavities are prohibited)
- ⇒ Range hoods are required and must be ducted to exterior, unless allowed an exemption by the building department under certain design conditions
- ⇒ Class C or F fly ash concrete must be used in all cement mixes for all concrete, excluding garages and exterior uses.
- ⇒ Paper covered gypsum board must be raised 1/2 inch above concrete slabs.
- ⇒ 3 stud exterior corners must be capable of being insulated
- ⇒ Ladder-backed framing or alternate must be at all partition wall connections
- ⇒ Exterior walls of fireplaces shall comply with minimum wall R-value, R-21
- ⇒ All bath or shower rooms shall have an exhaust fan ducted to outside
- ⇒ Skylight shafts and knee walls must be air sealed and insulated to the same level as the exterior walls. Insulation on attic knee walls of skylight shafts shall be encapsulated on all 6 sides of the enclosure
- ⇒ Insulate under and around bathtubs must be to prescriptive code requirements.
- ⇒ Openings to unconditioned space must be fully sealed
- ⇒ Crawlspace wall insulation must be permanently attached to the walls. Exposed earth in crawlspaces must be covered with continuous vapor retarder with overlapping joints taped or sealed with mastic
- ⇒ Windows & Doors: Caulking, gasketing, adhesive flashing tape, foam sealant, or weather-stripping must be installed forming a complete air barrier
- ⇒ Band/rim joists must be insulated and air sealed
- ⇒ Recessed light fixtures must be "Air-Tight" I.C. rated in all building envelope ceilings. 4" minimum depth of insulation must be maintained between the light fixture and exterior sheathing. Recessed light fixtures are strongly recommended to be "Air-Tight" I.C. rated for interior ceilings to improve air quality and to reduce airflow through the building envelope

- ⇒ Recessed step lights are not permitted in exterior building walls, except where fully encased in stone or concrete, or with sufficient remaining wall insulation to maintain the required wall R-value
- ⇒ A functioning passive or active radon mitigation system shall be installed in all new structures
- ⇒ Zero-Low VOC finishes (paint, flooring, cabinetry, etc.) are strongly encouraged. VOC Homeowner awareness sheet must be signed by the Homeowner and included in sale of home documents
- ⇒ Ground Snowmelt System Requirements:
 1. Snow-melt areas must not exceed 1000 sq. ft. Increase is allowed for demonstrated genuine safety issues or if the structure achieves a 50 or less HERS rating, 30% more free snow-melt area is allowed. Requests for greater than 1000 sq. ft. of snow melt may be considered at the discretion of the Building Official if energy used for the system comes from on-site renewable energy sources
 2. Electric snowmelt is not permitted
 3. Snowmelt systems must include both moisture and temperature sensors to control snowmelt operation
 4. Idling snowmelt systems are not permitted
 5. Under the slab insulation of at least R-10 is required
- ⇒ Out door Spa and Pool Requirements:
 1. Outdoor spas must be fully insulated enclosures with tight fitting covers insulated to at least R-12.
 2. A readily accessible on-off switch mounted on the outside of the heater, that allows shutting off the heater without adjusting the thermostat setting, is required for all heated outdoor spas and pools.
 3. Pools shall have directional inlets that adequately mix the pool water
- ⇒ An insulated cover (minimum R-6) must be installed on all indoor pools and spas
- ⇒ Space heating and cooling system/equipment shall be sized according to heating and cooling loads calculated using the latest versions of ACCA Manuals J and S, ASHRAE 2001 Handbook of Fundamentals, or an equivalent computation procedure. Applicable also to additions and renovations where new HVAC equipment is installed
- ⇒ Duct system is sized, designed, and installed according to ACCA manual D or equivalent
- ⇒ Ducts are sealed with UL 181 tape, low-toxic mastic (FDA, USDA, & EPA-approved), gaskets, or an approved system as required by the IRC (Section M1601.3.1) or IMC (Section 603.9) to reduce leakage
- ⇒ Ducts external to conditioned airspace (i.e. through crawlspace or attics) must have insulation R-8 or greater
- ⇒ All furnace ducts must be air tight and sealed with commercial grade mastic and fiberglass mesh. Ducts are to be sealed substantially airtight with tapes (not duct tape) mastics or gasketing. Fiberglass ducts that expose fibers to the air stream are not permitted
- ⇒ Multi-boiler systems must be provided with a staging device and outdoor reset
- ⇒ Programmable digital thermostats required (Source Gas rebate may be available)
- ⇒ Windows must demonstrate 0.3 cfm per sq.ft. maximum allowable air leakage
- ⇒ Note: Tight home construction requires a source of ventilation air supply; ANSI/ASHRAE Standard 62.2 – 2007 (“Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings”) is the national ventilation standard. It is highly recommended that an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) be installed to in all residences.

Residences that are 3000 - 5000 sq.ft. must comply with all aforementioned standards plus the following:

- ⇒ Heating appliances must be 92% efficient or greater
- ⇒ Heating duct leakage test required; leakage outside of conditioned space must not exceed 5% of design flow, within conditioned space 10% is allowed
- ⇒ Engineered framing products instead of dimensioned solid lumber for floor framing, rafters and headers that are larger than 2x8 material
- ⇒ Oriented strand board for wall sheathing

- ⇒ 25% of the exterior walls must be provided with non-wood siding material, unless the wood is recycled or sustainably harvested
- ⇒ Note: Tight home construction requires a source of ventilation air supply; ANSI/ASHRAE Standard 62.2 – 2007 (“Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings”) is the national ventilation standard. It is highly recommended that an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) be installed to in all residences.

Residences greater than 5,000 sq.ft. must comply with all the aforementioned standards, plus the following:

- ⇒ Buildings must achieve a HERS rating of 70 or less by a certified Home Energy Rater
- ⇒ Mechanically engineered space heating, cooling and ventilating systems are required
- ⇒ Blower door tests must demonstrate less than 0.35 air changes per hour (ACH)
- ⇒ Note: ANSI/ASHRAE Standard 62.2 – 2007 (“Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings”) is the national ventilation standard. It is required that the mechanical engineer design a mechanical ventilation system, i.e., Heat Recovery Ventilation (HRV) or Energy Recovery Ventilation (ERV) unless the mechanical design professional justifies the exclusion of the whole house ventilation system
- ⇒ Direct vent, on-demand or side-arm water heaters required
- ⇒ Engineered wall studs (not dimensioned solid lumber) or solid lumber from a certified sustainable forest required; certification must be from the Forest Stewardship Council or Certified Forest Products Council
- ⇒ It is strongly recommended that 100% of the home’s electricity use must be provided for with renewable energy, either produced on-site or purchased through a Green Power production program. The Building Department will track the owner’s participation in the program on a yearly basis. Creative alternative options will be considered by the Building Department.

APPENDIX B
Amendments to the 2006 IECC Commercial Requirements

All buildings built under the IBC shall be considered commercial. All commercial buildings will comply with the adopted International Energy Conservation Code, as amended.

Amend TABLE 502.2(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES, Walls Above Grade, Wood framed and other, CLIMATE ZONE 6, to read R-21.

Amend TABLE 502.2(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES, Walls Above Grade, Metal framed, CLIMATE ZONE 6, to read R-13 +R-5 ci¹.

Amend TABLE 502.2(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES, Walls Below Grade, Below grade wall, CLIMATE ZONE 6, to read R-15.

Amend TABLE 502.2(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES, Walls, Above Grade, Mass, CLIMATE ZONE 6, to read R-15.

Amend TABLE 502.2(1) BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES, Roofs, Attic and other, CLIMATE ZONE 6, to read R-38.

Amend Table 503.2.3(4) WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS, WARM AIR DUCT FURNACES AND UNIT HEATERS, MINIMUM EFFICIENCY REQUIREMENTS, MINIMUM EFFICIENCY to read 90% AFUE (where applicable).

Amend TABLE 503.2.3(5) BOILERS, GAS- AND OIL-FIRED, MINIMUM EFFICIENCY REQUIREMENTS, MINIMUM EFFICIENCY to read 90% AFUE (where applicable).

APPENDIX C
Volunteer Resources, Strategies and Incentives
Green Building, Energy Conservation/ Alternative Energy, Water Conservation, Income-Eligible

The following green building, alternative energy and water conservation strategies, and income-eligible opportunities are provided for the benefit of those wishing to pursue additional approaches not required for construction in the Town of Ridgway. The information below will be updated as frequently as possible and necessary by the Planning and Building Department. We encourage and welcome your input to keep this resource current and practical. Local and regional service providers and businesses are available on the Town website at <http://www.town.ridgway.co.us>

For the more ambitious, the United States Green Building Council (USGBC) has a veritable warehouse of information accessible online at: <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=76#12>

Green Building

Category	STRATEGY	RESOURCES/ ADDITIONAL INFORMATION	APPLICABILITY
Resource	Site selection and building orientation (active/passive solar orientation, preserve trees and natural vegetation, natural site drainage, etc.)	Integrated whole building design techniques and technologies: http://www.wbdg.org/design/site_potential.php Local architects and designers	New Homes
Resource	Construction material recycling and waste reduction to approach zero waste goals.	Regional re-sale stores Local farms/ranches (drywall waste as soil amendment) Use of engineered and recycled lumber (barns, outbuildings, etc.)	New and Existing Homes
Resource	Use of products with a high percentage of recycled content and renewable materials	Decking, insulation, flooring, paint, roofing, fiberboard, landscaping materials, bamboo, cork, recycled wood products, etc. US EPA CPG program for use of recycled products: http://www.epa.gov/waste/conserve/tools/cpg/products/index.htm	New and Existing Homes
Resource	Healthy Interior (indoor air quality)	No/Low Volatile Organic Compounds (paints, flooring, cabinetry, sealants, oils, adhesives, etc.); Regional paint retailers	New and Existing Homes
Resource	Utilize local labor and materials	target <100 miles	New and Existing Homes
Resource	Radon Testing	EPA: http://www.epa.gov/radon/pubs/citguide.html Free test kits available at Town Hall: (970) 626-5308 ext. 16	New and Existing Homes
Resource	Recycling	Appliances - http://www.aceee.org/Consumerguide/disposal.htm Other recycle resources to be included here	Existing Homes

Energy Conservation/ Alternative Energy

Category	STRATEGY	RESOURCES / ADDITIONAL INFORMATION	APPLICABILITY
Rebate	“Insulate Colorado” provides homeowners with rebates to insulate and air-seal their homes to help reduce energy costs. Rebates are available up to \$500 or 40% of total cost, whichever the lesser (through SMPA), or \$1000 (through Source Gas), or 50% of total cost, whichever the lesser.	Kim Wheels at (970) 728-1340 or energy.tncc@gmail.com or, http://www.newcommunitycoalition.org/ or, http://www.colorado.gov/energy/residential/existing-insulate-co.asp or, http://excessisout.com/sourcegas/ or, <i>Must be a SMPA or Source Gas utility customer</i> The insulation must be installed by an eligible Colorado contractor.	Existing Homes
Rebate	Alternative /renewable energy power systems (<i>solar electric, solar hot water</i>); \$3/watt up to \$4,500	Governor’s Energy Office (GEO), The New Community Coalition (TNCC), SMPA (rebates); <i>Must be a SMPA customer</i> TNCC (970) 728-1340 or energy.tncc@gmail.com Town Hall (sales tax rebates: Municipal Code §6-1-12) contact (970) 626-5308 ext. 11 or pkraft@town.ridgway.co.us	New and Existing Homes
Rebate	Efficiency furnaces, boilers, proper sizing of furnace and boiler; hot water heaters, programmable thermostats, insulation, miscellaneous hot water insulation and infiltration, infrared heating	Source Gas, GEO (rebates) 877-974-7688 or http://excessisout.com/sourcegas/how_we_can_help/reduce_and_rebate <i>Must be a Source Gas customer</i>	New and Existing Homes
Rebate / Resource	Home Energy Audit	Local Energy Auditors available for all homes or, Source Gas 1-888-212-5899, or http://excessisout.com/sourcegas/how_we_can_help/home_energy_evaluation <i>Must be a Source Gas customer for rebate opportunity</i>	Existing Homes
Rebates	Qualified Appliances: ground source heat pumps, water heaters, refrigerators, freezers, washing machines, dishwashers, premium electric motors	SMPA and Tri-State G&T: http://www.smpa.com/EE/rebates.cfm	New and Existing Homes
Federal Tax Credit	ARRA tax credits for energy efficient equipment and building upgrades	Credits are available at 30% of the cost, up to \$1500, in 2009 and 2010 for existing homes on the following: windows, doors, insulation, metal and asphalt roof, HVAC, water heaters (non-solar) and biomass stoves; Credits are available at 30% of the cost with no upper limit for existing homes and new construction through 2016 on the following: geothermal heat pumps, solar panels, solar water heaters, small wind energy systems and 30% of cost up to \$500/.5 kW through 2016 for residential fuel cell and micro-turbine systems http://www.energystar.gov/index.cfm?c=products.pr_tax_credits http://energytaxincentives.org/uploaded_files/Tax_incentive09.pdf	New and Existing Homes

Loan	Manage investment costs of energy efficiency improvements; Potentially increase loan amount and/or decrease interest rates and closing costs by incorporating energy efficiency improvements and decreasing monthly bills	Energy Efficiency and Improvement Mortgages: initial home purchase or refinance http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.energy_efficient_mortgage http://www.hud.gov/offices/hsg/sfh/eem/energy-r.cfm <i>*this resource may or may not be available and remains under exploration</i>	New and Existing Homes
Resource	Energy-efficient appliances, energy audits, sealing your home (walls, roof, windows, floor, insulation), insulation types and efficiencies, energy-efficient lighting, energy conservation tips, heating and cooling efficiency measures	Energy Star appliances, electronics, and lighting: http://www.energystar.gov Governor's Energy Office (GEO): Professional Energy Audits http://www.energysavers.gov/your_home/energy_audits/index.cfm/mytopic=11180 Energy Conservation Checklist http://www.colorado.gov/energy/index.php?/residential/energy-conservation-checklist Heat Loss and Gain http://www.colorado.gov/energy/index.php?/residential/space-heating-cooling Water Heating http://www.colorado.gov/energy/index.php?/residential/water-heating-water-conservation Kill-A-Watt meter to measure energy demand is available at Town Hall	New and Existing Homes
Resource	Smart lighting design that incorporates energy saving measures, such as maximum use of CFLs, LEDs, and dimmer switches.	GEO: http://www.colorado.gov/energy/index.php?/residential/lighting	New and Existing Homes
Resource	Turn everything off when you're not home	Master Manual Control Switch	New and Existing Homes
Resource	Comprehensive Energy Efficient Home (<i>building envelope, insulation, mass, heating/cooling, windows, appliances, lighting, independent testing</i>)	Energy Star for New Homes: http://www.energystar.gov http://smartenergyliving.org/cm/Home_Owners/Factsheets.html TNCC (970) 728-1340 or energy.tncc@gmail.com	New Homes
Resource	Insulate hot water heater and pipes Hang clothes to dry		New and Existing Homes

Water Conservation

Category	STRATEGY	RESOURCES / ADDITIONAL INFORMATION	APPLICABILITY
Free	Decrease water consumption in existing faucets and showers	Town Hall – Free aerators and shower heads <i>*this is a recommendation only and may or may not be available</i>	Existing Homes
Rebate	Encourage installation or retrofit with water conservation devices	Town Hall – rebates for installation of efficient toilets (1.28 gpf; larger rebate for dual flush at 1.6/.8 gpf); \$25-\$150); faucets, shower heads (\$ or see above), dish washers (\$25-\$50), clothes washers (\$50 -\$150) <i>*this is a recommendation only and may or may not be available</i>	New and Existing Homes
Resource	Standard low-flow vs. dual-flush toilets; Energy-saving & water-conserving low-flow water fixtures (shower heads, faucets, etc.)		New and Existing Homes
Resource	Xeriscape/ Low-water landscaping	Rainwater harvesting; high-desert vegetation; vegetated swales and depressions; pervious paving materials; Keep in mind, the more water you use, the more you may be paying http://xeriscape.sustainableresources.com/ http://xeriscape.org/	New and Existing Homes
Resource	Water Heating and Conservation Tips <i>“Toilets are by far the main source of water use in the home, accounting for nearly 30 percent of an average home's indoor water consumption.” Replacing old toilets can save 11 gallons per toilet each day. – EPA WaterSense</i>	GEO: http://www.colorado.gov/energy/index.php?/residential/water-heating-water-conservation EPA: http://www.epa.gov/watersense/	New and Existing Homes

Income-Eligible Opportunities

Category	STRATEGY	RESOURCES/ ADDITIONAL INFORMATION	APPLICABILITY
Free Services	Improve the energy efficiency of all residential structures for low-income households; Provide energy upgrades to income-qualified homes to help keep energy costs low	Weatherization Assistance Program (Income qualifications and details) http://www.housingresourceswc.org/weatherization.html Housing Resources of Western Colorado Phone: (970) 241-2871 <i>available for owner and renter households</i>	Existing Homes
Resource	Assistance with registration for Low-Income Energy Assistance Program (LEAP) and utility bill assistance; Registration with LEAP provides other opportunities such as free home weatherization services through the Governor’s Energy Office	Ouray County Social Services http://ouraycountyco.gov/social.html 177 Sherman Street, # 104 Ridgway, CO 81432 Phone: 970.626.2299 Fax: 970.626.9911 LEAP Registration (for Energy Assistance): 970.369.5446	New and Existing Homes

APPENDIX E
Volatile Organic Compounds Awareness Sheet



COMMUNITY DEVELOPMENT DEPARTMENT
Volatile Organic Compounds Awareness Sheet

Homeowners:

The Town of Ridgway Community Development Department, working with The New Community Coalition, have enclosed for your review information regarding various building products that may help to improve indoor air quality.

At this time The Town of Ridgway is not requiring the use of these products and is only intending to offer the homeowners information to allow you to make an informed decision regarding the building products used in your project.

If you should have any questions, please feel free to contact us at (970.626.5308 x16)

Respectfully,

Bill Behan

Building Official

PO Box 10, 201 North Railroad Street, Ridgway, CO 81432
970.626.5308 x15, x16 Fax: 970.626.3962 www.town.ridgway.co.us

Dear Homeowner,

The Town of Ridgway Green Building Code was enacted to improve both energy efficiency and indoor air quality. The average adult spends 90% of their time indoors, so it is important that the quality of our indoor environment is at its best. Indoor air quality is a critical component of occupant health, comfort, and performance. The green building code addresses the major indoor air quality concerns, but is limited in its restriction of toxic chemicals that pose a risk to your health and are harmful to the environment. The purpose of this form is to inform you about common pollutants and give you the opportunity to avoid the introduction of these chemicals into your home.

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation (irritation of the eyes and eyelids), nose and throat discomfort, headache, allergic skin reaction, dyspnea (shortness of breath caused in this case by irritation of the upper airways to the lungs), declines in serum cholinesterase levels (certain [enzymes](#) (acetylcholinesterase and pseudocholinesterase) that help the nervous system work properly), nausea, emesis (vomiting), epistaxis (bleeding from one or both nostrils, frequent swallowing, sensation of fluid in the back of the nose and throat), fatigue, and dizziness. The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect.¹

Formaldehyde is a common VOC and an important industrial chemical used to make other chemicals, building materials, and household products. When present in the air at levels above 0.1 ppm (parts in a million parts of air), it can cause watery eyes, burning sensations in the eyes, nose and throat, nausea, coughing, chest tightness, wheezing, skin rashes, and allergic reactions. It also has been observed to cause cancer in scientific studies using laboratory animal and may cause cancer in humans.²

The following products are highly recommended in order to reduce the levels of toxins in your home. Review the following items with your architect or builder to assure that your new residence will provide the type of indoor air quality that you desire:

- Low VOC adhesives and sealants

- Ceramic tile installed with low toxic adhesives and plasticizer-free grout

- Water-based urethane finishes on wood floors

- Water-based lacquer finishes on wood floors

- Non-toxic, low VOC paints, coatings, and finishes

- Composite wood kitchen and bath vanities with low or zero formaldehyde levels

- No fiberglass in conditioned spaces

- No vinyl sheet flooring or vinyl composition tile (natural linoleum is an excellent, inexpensive alternative)

- Low-VOC and/or recycled floor covering materials including carpeting, cork, bamboo, etc.

For more information on residential air quality contact the Consumer Product Safety Commission and Environmental Protection Agency CPSC document #450 at the following website: <http://www.cpsc.gov/cpsc/pub/pubs/450.html#Look6>

¹ <http://www.epa.gov/iaq/voc.html>

² Consumer Product Safety Commission