

Sustainable Building Code

Progress Report to P&Z Commission

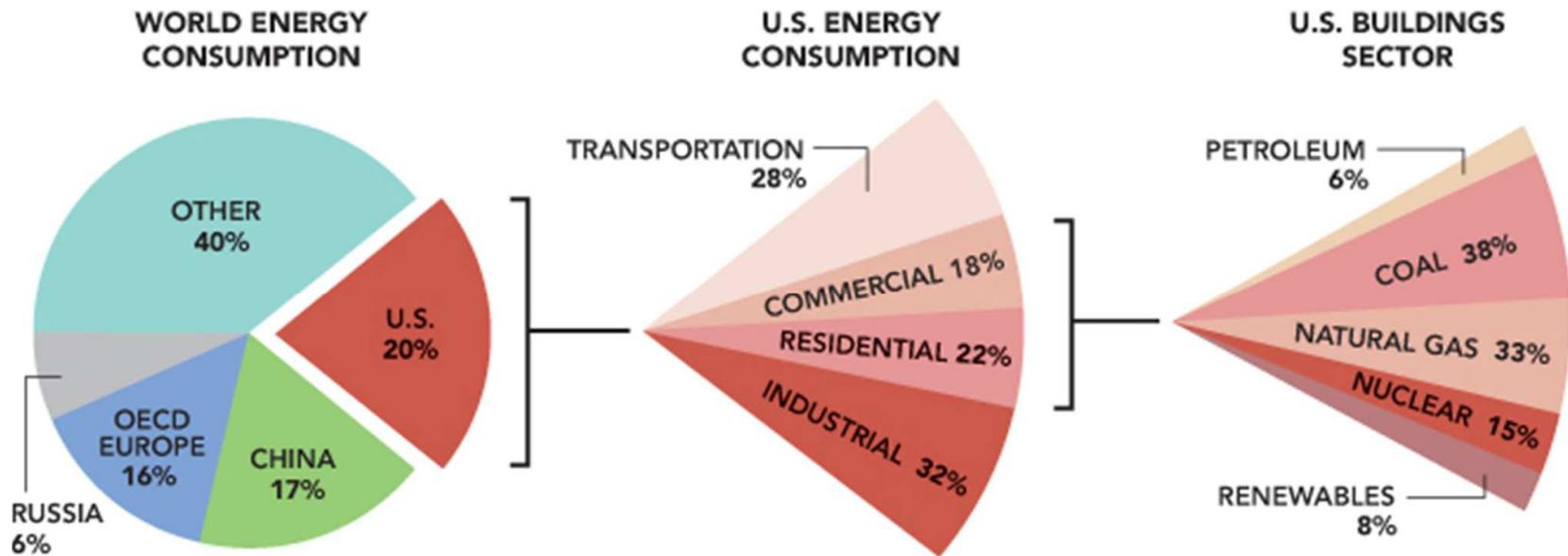
September 14, 2011



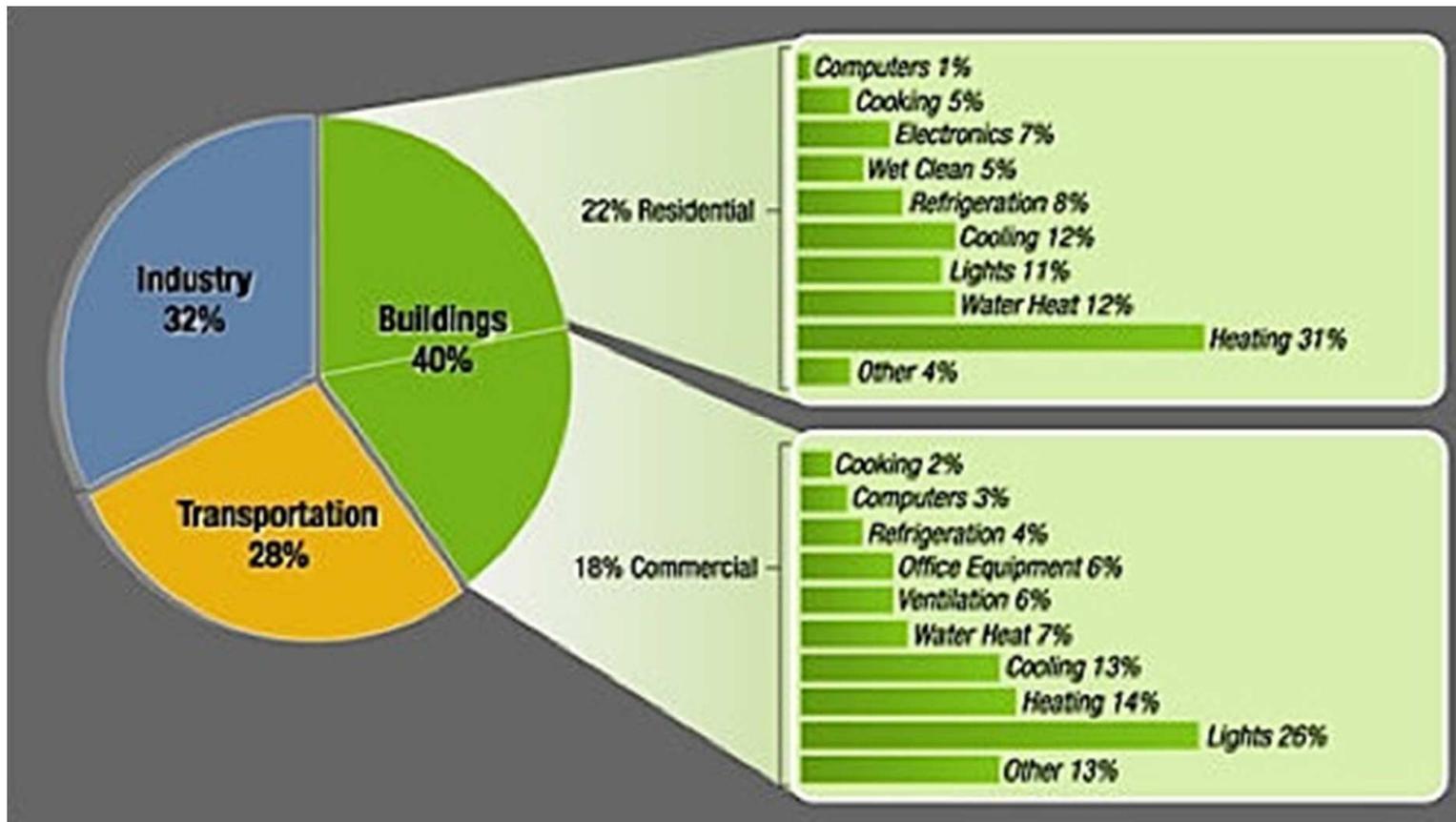
Solar Street Lamp, Town Square, Ketchum

City's Goal, 2010: Adopt a Green Construction Code

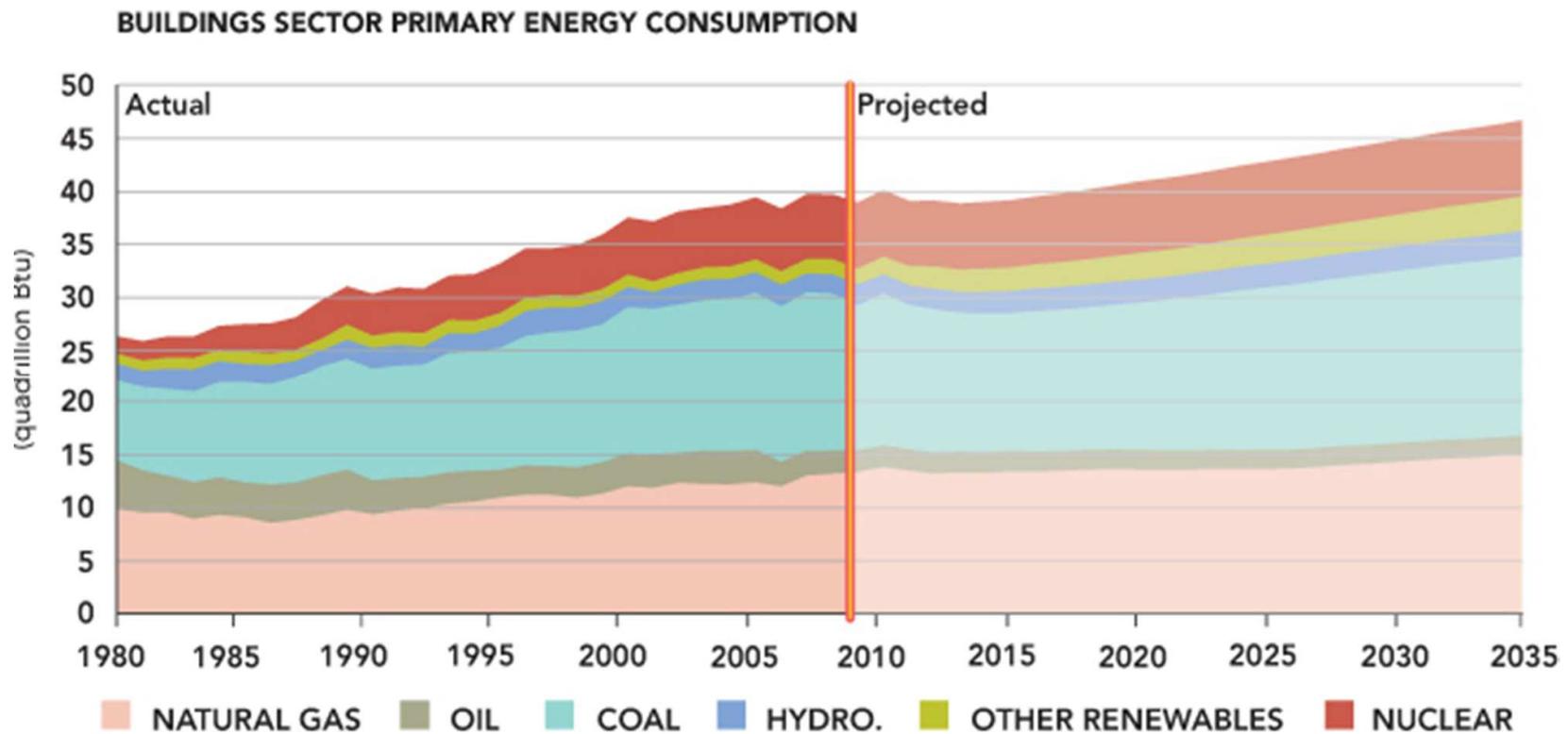
Why reduce energy use in buildings?



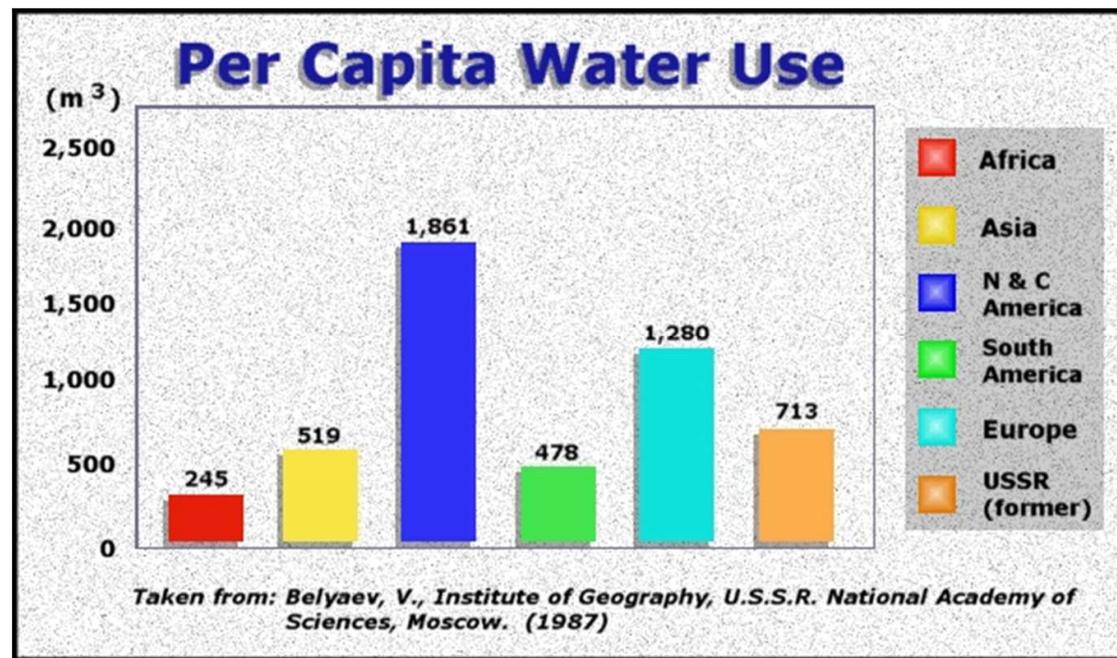
How is energy used in buildings?



What is the future of energy use in buildings?



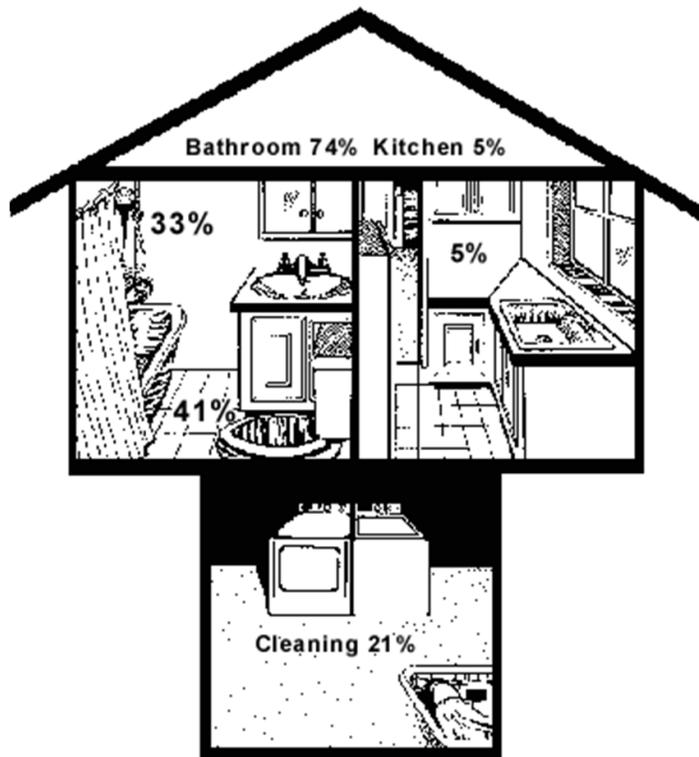
World Water Use



Source: How we Use Water in These United States, EPA, 2004

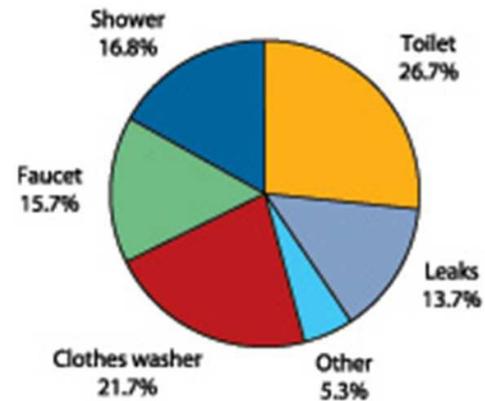
Residential Water Use

Less 1% of the worlds water is potable, which is used in buildings for:



Typical breakdown of interior water use.

How Much Water Do We Use?



Source: American Water Works Association Research Foundation, "Residential End Uses of Water," 1999

Source: How we Use Water in These United States, EPA, 2004

Goals of Green Code:



Mt. Baldy, Ketchum

- **Conserve energy**
- **Conserve water**
- **Conserve resources**
- **Preserve clean water**
- **Preserve our pristine mountain environment**
- **Preserve our quality of life**
- **Provide healthy indoor environment**

What is “sustainable building”?



LEEDGold Home,
Ketchum

It is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

Where are we in the Process?

- Set goal
- Create team of stakeholders
- Research existing codes and standards
- Research financial impacts (ongoing)
- Make recommendations
- Get City and public input
 - Have experts come to teach courses and answer questions
 - Conduct public workshops for community input
- Refine, based on input
- Repeat, until final product
- Adopt
 - Voluntary, mandatory, somewhere in between, incentivized? What works best for the community?
- Implement

Solar Panels, Warm Springs Road, Ketchum



Other Codes & Standards Considered:



LEEDGold Home, Ketchum

- Hailey's
- Blaine County's
- LEED NC&D
- LEED Home
- ASHRAE 189.1
- Energy Star
- CALGreen
- Aspen's
- Boulder's

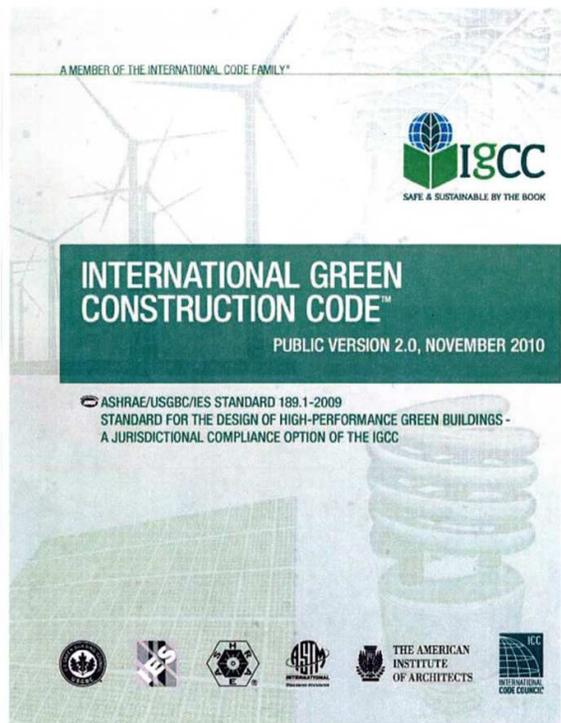
Addressing community's concerns.

We looked for a code that addressed the following issues:

- Flexible – many choices to reach compliance goal
- Multiple compliance paths – prescriptive, performance, LEED, NGBS...
- Low cost to designer, builder and owner
- Provide options to 3rd party verifiers
- Developed by respected industry organizations – AIA, NAHB, ICC, ANSI, ASHRAE, USBBC
- Reflects Ketchum's building standards and best practices
- Is compatible with Blaine County and Hailey's codes

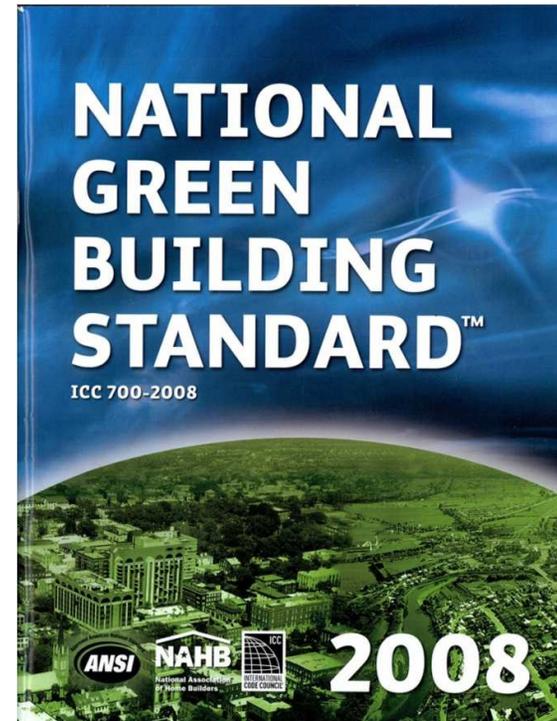
Jan. 2011 Recommendation:

Commercial



**International Green
Construction Code
(IgCC)**

Residential



**National Green
Building Standard
(NGBS)**

Reasons to use these Codes:

IGCC

- Developed by ICC in conjunction w/ AIA, ASHRAE, ANSI, USGBC, IES
- Developed to integrate with other ICC codes
- ICC back up – commentary, technical assistance
- AIA will support with contracts

- Has performance and prescriptive path options
- Endorsed by US Conference of Mayors, June 2010
- Flexible - can modify to fit Ketchum's needs
- Choices – many ways to get to goal

NGBS

- Developed by NAHB in conjunction with ICC and ANSI
- Reflects construction practices commonly seen in Ketchum
- Like IRC, developed for the mainstream builder



Types of Construction: NGBS



Projects like Proposed Washington Place Affordable Housing, as well as single family residences, would comply with NGBS.

- Residential Only
- Including residential portions of mixed-use
- Subdivisions
- New Construction
- Multi-Unit Buildings
- Additions
- Renovations
 - post 1980 – Green Building Path
 - pre 1980 – Green Remodel Path

Jurisdictional Flexibility:

NGBS

COMPLIANCE METHOD

303 - GREEN BUILDINGS

303.1 Green buildings. The threshold points required for the environmental performance levels for a green building shall be in accordance with Table 303. To qualify for one of these performance levels, all of the following shall be satisfied:

- (1) The threshold number of points, in accordance with Table 303, shall be achieved as prescribed in Categories 1 through 6. The lowest level achieved in any category shall determine the overall performance level achieved for the building.
- (2) In addition to the threshold number of points in each category, all mandatory provisions of each category shall be implemented.
- (3) In addition to Section 701, either Section 702 (Performance Path) or Section 703 (Prescriptive Path) shall be used to establish the threshold performance level under Category 3 (Energy Efficiency).
- (4) In addition to the threshold number of points prescribed in Categories 1 through 6, the additional points prescribed in Category 7 shall be achieved from any of the categories. Where deemed appropriate by the Adopting Entity, additional points from Category 7 may be assigned to another category (or categories) to increase the threshold points required for that category (or categories). Points shall not be reduced by the Adopting Entity in any of the six other categories.

**Table 303
Threshold Point Ratings for Green Buildings**

Green Building Categories			Performance Level Points ^{(1) (2)}			
			BRONZE	SILVER	GOLD	EMERALD
1.	Chapter 5	Lot Design, Preparation, and Development	39	66	93	119
2.	Chapter 6	Resource Efficiency	45	79	113	146
3.	Chapter 7	Energy Efficiency	30	60	100	120
4.	Chapter 8	Water Efficiency	14	26	41	60
5.	Chapter 9	Indoor Environmental Quality	36	65	100	140
6.	Chapter 10	Operation, Maintenance, and Building Owner Education	8	10	11	12
7.		Additional Points from any category	50	100	100	100
Total Points:			222	406	558	697

(1) In addition to the threshold number of points in each category, all mandatory provisions of each category shall be implemented.

(2) For dwelling units greater than 4,000 square feet (372 m²), the number of points in Category 7 (Additional Points from any category) shall be increased in accordance with Section 601.1. The "Total Points" shall be increased by the same number of points.

What does NGBS Address?



Xeriscaped Garden, Ketchum

- Land Use & Development
- Resource Efficiency
- Energy Efficiency
- Water Efficiency
- Indoor Environmental Quality
- Operations and Maintenance

Example Project:

Chapter	Required Points	Claimed Points	Additional Claimed Points Above Gold	Point Shortfall	Mandatory Status
Chapter 5: Lot Design, Preparation, and Development	93	111	18		Not Applicable
Chapter 6: Resource Efficiency	113	114	1		Met
Chapter 7: Energy Efficiency	100	151	51		Met
Chapter 8: Water Efficiency	41	53	12		Met
Chapter 9: Indoor Environmental Quality	100	136	36		Met
Chapter 10: Operation, Maintenance, and Building Owner Education	11	12	1		Met
SECTION TOTALS	458	577	119	0	
Additional Points Above Gold	100	--	119	0	
TOTAL POINTS	558	577	--	0	

Project Scoring Analysis from NAHB Green Scoring Tool: www.nahbgreen.org

Lot Design, Preparation & Development

Standard Local Practices

- **Reuse of an existing building.**
- **Access to mass transit.**
- **A knowledgeable team and mission statement is established.**
- **Conservation of natural resources – tree care, fencing, avoiding compaction.**
- **Minimization of soil disturbance and erosion.**
- **Storm water management plan.**
- **Landscape plan.**
- **Use of native plant species.**
- **Hydrozoning of plant species.**
- **Measures planned that will support wildlife habitat.**
- **Avoidance of environmentally sensitive areas.**
- **On-site supervision during clearing, grading, paving and utility installation.**

Resource Efficiency

Standard Local Practices

- **Advanced framing techniques to optimize material usage.**
- **Optimize dimensional layout (16” or 24” increments).**
- **Stack stories above grade.**
- **Off-site finish of materials.**
- **Minimum 12” roof overhangs.**
- **Drip edge at eaves and gables.**
- **Gutters and downspouts carry water 5 feet from foundation.**
- **Slope earth away from building.**
- **Ice and Watershield at eaves, extending 24” inside exterior wall.**
- **Flashing at doors, windows, roof valleys, decks, chimneys...**
- **Recycling collection in kitchen with aggregation space elsewhere.**
- **Reuse of portions of existing building.**
- **Renewable products – bio-based.**

Energy Efficiency

Standard Local Practices

- UA analysis (Rescheck) 10% better than code, or
- Grade 1 insulation installed.
- Inspection of insulation and air sealing.
- U-0.30 windows instead of U-0.35.
- High efficiency boiler.
- Programmable thermostats.
- Hot water lines insulated.
- 50% of light bulbs are high efficacy. (Required by 2009 IECC.)
- Energy Star washing machine, dishwasher, refrigerator.
- Space heating that does not use air ducts, or
- Insulated ducting when not in conditioned space.
- HVAC contractor and service provider is certified.

Water Efficiency

Standard Local Practices

- **Energy Star washing machine, dishwasher installed.**
- **WaterSense lav faucets installed.**
- **WaterSense toilet installed.**
- **Low-volume irrigation system installed.**
- **Irrigation system design and installed per WaterSense program.**
- **Irrigation system zoned separately for turf and bedding areas.**

Indoor Environmental Quality

Standard Local Practices

- Direct vent boiler installed within conditioned space.
- No fireplace installed, or
- Fireplace installed per standards called out in NGBS.
- Door in common wall between house and garage sealed and gasketed.
- Air barrier installed between garage and conditioned living space.
- Structural plywood and OSB per PS 1 or PS 2. (AC Houston stocks.)
- Carbon monoxide alarm installed.
- Kitchen exhaust fans minimum 100 cfm and ducted to outside.
- Bathroom or laundry fan provided with automatic timer.
- Energy Star exhaust fans installed.
- Radon system installed. (Required by local code.)
- Penetrations are sealed.
- Vapor retarder installed on crawlspace floor, overlapped and taped.

Operations and Maintenance

Standard Local Practices

- **Building owners manual including information on:**
 - Local recycling programs**
 - Local utility renewable energy programs (Idaho Power's Green Tags)**
 - Practices to conserve water and energy**
 - Local public transportation options**
 - Location of safety and control valves in building**
 - Local service providers**
 - Photo record of framing showing utility rough-in**
 - Maintenance checklist**
- **Building owner training on:**
 - HVAC filters**
 - Thermostat operation and programming**
 - Lighting controls**
 - Appliances and settings**
 - Water heater settings**
 - Fan controls**

Use Scoring Tool to Create Designers Report

Designer's Report for National Green Building Certification

Generated by the Green Scoring Tool for the National Green Building Standard, v1.00
Tuesday, September 13, 2011 12:10 PM

Project Name - 410 River Run Project Description - New Construction Scoring Path - Single-Family New Construction Square Footage of Dwelling Unit - 2566
Total points claimed in this Project - 577 Green level achieved for this Project - Gold
Point Minimums for this Project: Bronze: 222 Silver: 406 Gold: 558 Emerald: 697

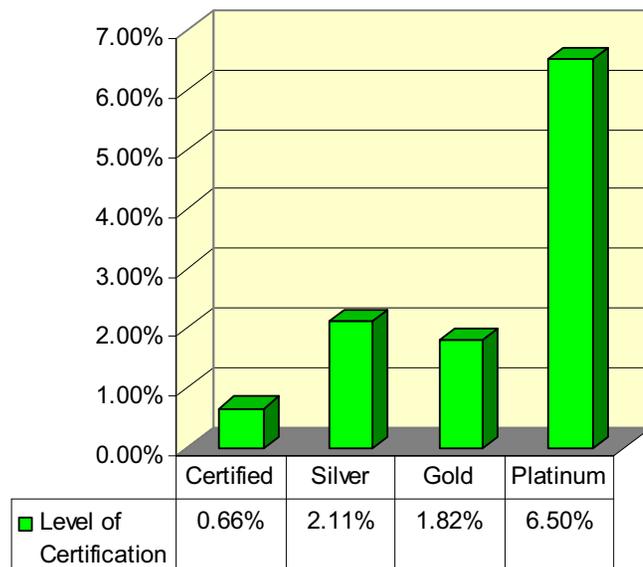
CHAPTER 5 - Lot Design, Preparation, and Development	
Section 501 -Lot Selection	
Practice 501.1 Lot The lot is selected to minimize environmental impact by one or more of the following:	
An infill lot is selected.	
Conditions met	Points Claimed: 4
Documentation Required - None.	

Local Code Comparison

	Ketchum (not yet adopted)	Hailey (voluntary until 2012)	Blaine Co (mandatory)
National Green Building Standard	X	X	X
LEED Home	X	X	X
Prescriptive Path (inspector)	X		<2500 sf
Performance Path – HERS Rating	X	X	X
Rescheck	X		
Site Design	X		
Resource Efficiency	X	X	
Energy Efficiency	X	X	X
Water Efficiency	X	X	
Indoor Environmental Quality	X	X	
Operations & Maintenance	X	X	
Renewable Exterior Mitigation Plan	X	X	X

Savings & Costs

Average Green Cost Premium vs Level of Certification for Offices and Schools



Source: USGBC, Capital E Analysis

- **Energy, water and operational savings can be 4 times any increase in construction cost***
- **Sales price of green certified buildings is higher & they sell faster****
- **Studies indicate that building to an above-code can generally cost 0 – 2% more than conventional construction*****
- **Think about the cost of doing nothing!**

* Kats, Gregory, "Greening America's Schools", 2006

** Kaufman, Ben, "Green Homes Outselling the rest of the Market", Daily Journal of Commerce, February 18, 2010
Tudor Van Hampton, "Green Building Thrives in Shaky Economy", Architectural Record, November 30, 2010, citing McGraw Hill Study

*** Kats, Gregory, "Green Building Costs and Financial Benefits", 2003
Kats, Gregory, "Greening America's Schools", 2006

Green Rating System Cost Comparison

Rating System	Bronze / Certified	Silver	Gold	Emerald/ Platinum
National Green Building Standard	1-2%	3%	7%	16%
LEED-H	3-6%	5-7%	11-13%	17-23%

Source: NAHB Resource Center

Most of the additional cost is in verification and certification through NAHB or LEED. We have propose to eliminate those costs with City verification and certification. City of Longmont building official estimates added review and inspection time ~45 minutes. Since Ketchum already requires design review on so many projects, it could be less here.

What are the Benefits?



Solar Panels, Ketchum

- In the event up-front costs are higher for high performance green buildings, they can be recovered.
- Integrated design lowers ongoing operating costs.
- Better buildings equate to better employee productivity.
- New technologies enhance health and well being
- Healthier buildings can reduce liability.
- Tenants' costs can be significantly reduced.
- Many financial incentive programs are available.
- Using best practices yields more predictable results.*
- Protects our Valley's pristine assets!

* Source: Making the Business Case for High Performance Buildings, USGBC, 2002