

Green Building Standards - Discussion of Options and Staff Recommendation

Background and Findings

This document summarizes options for consideration by the Board of County Commissioners (BCC) in order to implement the residential and commercial green building policies in the Sustainable Growth Management Plan (SGMP). Public input from four public meetings held throughout the County as well as from one meeting of the Green Building Focus Group is incorporated into this discussion. Options are presented, staff research and knowledge of development and implementation of green building standards is utilized to arrive at a suggested course of action.

A separate document includes a more comprehensive listing of the public comments received to date.

NOTE: While obviously a component of “green building”, water conservation will be considered in another Concept Decision Point.

Green Building Summary

Like many terms, “green building” is interpreted differently depending on the context. The United States Green Building Council (USGBC) interprets green building to include a whole host of “environment friendly” considerations including not only energy and water conservation but the use of non-toxic building materials and/or building materials made with recycled content, recycling of construction debris, alternative modes of transportation (e.g. bike racks and shower facilities for commercial buildings), proximity to mass transit, etc. While the SGMP recognizes the merits of all aspects of “green building”, it tends to primarily focus on energy (energy efficiency and renewable energy) and water conservation concerns. Energy efficiency standards, in particular, have a substantive benefit in reducing a home’s or commercial building’s electric and natural gas (or other energy heating source such as propane, wood or wood pellets) utility costs. As roof-top solar and other renewable energy technologies costs continue to decline over time and as energy utility rates continue to rise, renewable energy standards and incentives will have a similar “pay back” benefit.

Existing State Code and its Relationship to County Policies Regarding Green Building

For New Mexico counties without “home rule” authority, relevant building codes are adopted by the New Mexico Construction Industries Commission and inspected and enforced by the NM Construction Industries Division (CID.) In general, the County may adopt code measures, including green building code measures, that are more stringent than what New Mexico has adopted, but there is an issue regarding the extent to which those measures will actually be inspected and enforced by CID. The County currently does not conduct building inspections and does not perform code enforcement functions.

Building Construction Permit and Enforcement Program

The green building policies adopted by the BCC in the SGMP suggest that the County adopt energy efficiency and other green building regulations that go beyond what the Construction Industries Commission has adopted, if practicable. If the County were to establish green building standards, it would need to either establish its own building code permit and enforcement program or otherwise identify a mechanism for ensuring compliance with the adopted standard. One option is to determine the extent to which the County

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could enter into a JPA with the City of Santa Fe to have the City's code enforcement personnel enforce and inspect in the County as well. This would likely only be viable if the County adopted green building standards that are identical to or very similar to the City's.

Third Party Verification

Another option is for the County to adopt a performance standard that is very simple to implement because it requires an authoritative verification of building energy performance by an independent, qualified third party. With such a standard, the accredited professional does all of the necessary plan review and onsite inspection work to verify that the energy performance standard is being met. A number of jurisdictions use this approach because it does not add administrative burden to the approving or enforcement entity. For this approach to be most effective, it would require that CID agree to withhold the Certificate of Occupancy pending the County's receipt from the qualified professional that the building meets the standard. County staff is engaged in discussions with CID regarding CID's willingness/capability to work with the County on such an approach.

New Mexico's State Energy Conservation Code

The Construction Industries Commission revised the residential and commercial building energy codes in 2010. The Commission not only revised the energy code from the 2006 "International Energy Conservation Code" (IECC) to the 2009 IECC, but adopted selected "beyond code" energy efficiency measures as well. The 2009 IECC was modified in places to accommodate special climate or building-related considerations specific to New Mexico, resulting in the "NM Energy Conservation Code." Updating the code from the 2006 to the 2009 IECC resulted in an average energy savings of 7-10% for residential buildings. The "beyond code" measures adopted by Construction Industries Commission resulted in a cumulative savings of approximately 20.9% for residential and 17.5% for commercial construction over the 2006 code. Note that energy efficiency savings estimates utilize certain assumptions and methodologies that are subjective, to a certain extent.

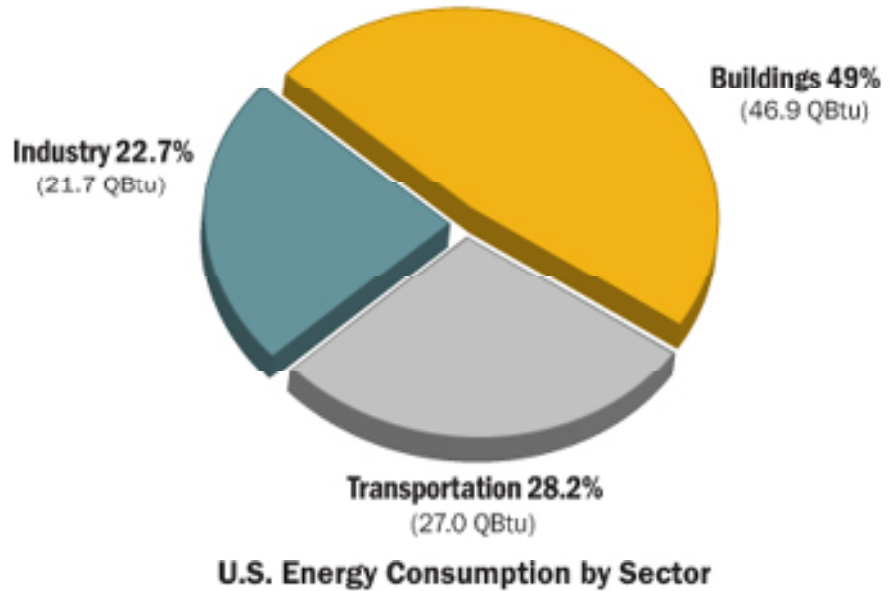
It's important to clarify, however, that with a change in gubernatorial administration and, therefore, Construction Industries Commission membership, the new Commission rescinded the "beyond code" measures in June of this year. That action is currently being legally challenged. Thus, presently, the NM Energy Conservation Code includes only the 2009 IECC.

Building Efficiency and Affordability

Building affordability has generally meant keeping the upfront price of the home or commercial structure as low as possible, with little consideration given to the energy demands and therefore costs associated with heating, cooling, lighting and other activities that consume energy in a building. According to the U.S. Energy Information Administration (EIA), and shown in the diagram below, the building sector consumes nearly half (49%) of all energy produced in the United States.

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In the days of cheap energy, such a limited interpretation of affordability was understandable. But energy utility rates are on the rise. For example, residential electricity rates have increased more than 25% over the past decade in New Mexico. NM Gas Co. has a 13% natural gas rate increase proposal currently before the NM Public Regulation Commission.



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Data Source: U.S. Energy Information Administration (2009)

A comprehensive, financially smart view of building

affordability should include the combined monthly mortgage and energy utility bill payments. Most consumers don't write a check for the cost of a building. They finance it over 30 years. So the initial purchase price of the home or commercial building is not as relevant to the concept of "affordability" as the combined monthly loan payment and energy utility expenditures. Indeed, high heating and/or cooling costs have contributed significantly to home foreclosures in some instances.

Some energy efficiency measures increase the costs of constructing of building, albeit minimally in most instances. Some may argue that requiring additional energy efficiency measures in residential buildings "prices people out of homes". But if carefully analyzed and selected, energy efficient code requirements will reduce the combined monthly mortgage and energy utility bill payments. The slight increase in the cost of the home (and, therefore, the monthly mortgage payment) that the additional energy efficiency requirements create is more than off-set by the reduction in monthly energy utility costs.

For example, in the case of the "beyond code" energy efficiency measures adopted by the NM Construction Industries Commission last year, an engineering cost analysis concluded that the efficiency measures increased the monthly mortgage payment for a home by \$15/month but reduced the energy utility bill payments by \$29/month – for a net benefit of \$14/month. Thus the homeowner is better off financially from the first month of home ownership with a more energy efficient home. With this concept of home affordability, requiring cost-effective, energy efficiency standards in new buildings can be a benefit to both the homebuyer and homebuilder. Homes and commercial buildings are built to last for 60-70 years; therefore, it is reasonable to consider future energy costs when determining the cost-effectiveness of various energy efficiency measures.

This concept is conveyed by example in the following table:

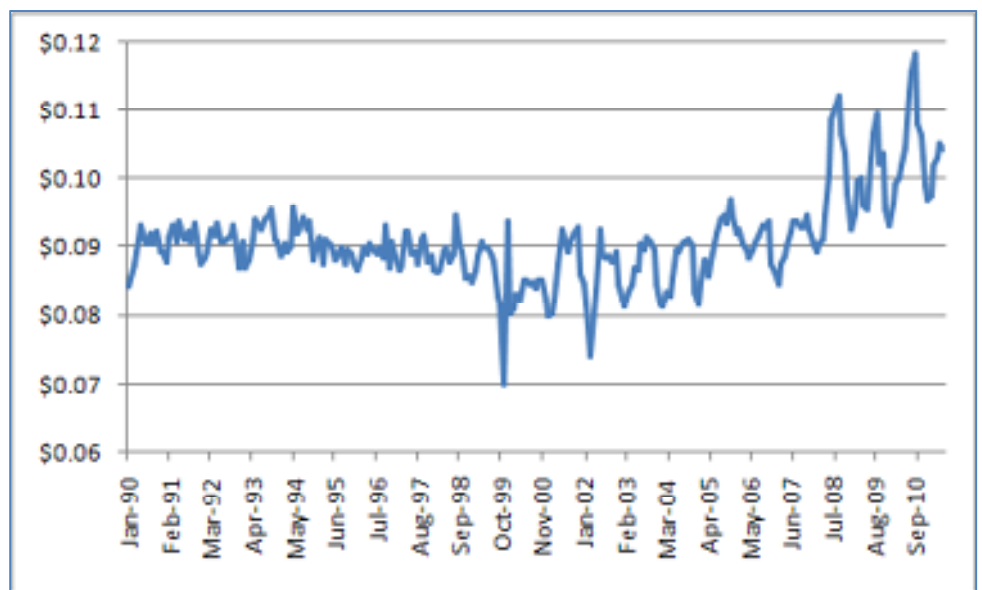
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Requiring Additional Energy Efficiency Measures → Example of the Impact on a Home's Affordability

	<u>Standard State Code (2009 IECC)</u>	<u>County Building Code w/Enhanced EE Standards</u>
<u>Sales Price of Home</u>	\$200,000	\$204,000 (2% cost premium)
<hr/>		
<u>Monthly Mortgage Payment (30 years at 4.5% interest)</u>	\$1,013	\$1,034
<u>Monthly Electric Bill</u>	\$75	\$50
<u>Monthly Natural Gas Bill</u>	\$90	\$60
<u>Total Monthly Payments (Affordability)</u>	<u>\$1178</u>	<u>\$1144</u>
<u>Net Monthly Savings</u>		<u>\$34</u>

The “net monthly savings” will *increase* as electric and natural gas rates increase over time. The trend of increasing costs is clear from the graphic below. The unit cost of electricity for residential customers in New Mexico is shown below (dollars per kWh) for New Mexico since 1990. The data is from the US Energy Information Administration.

Some public comment received in the past months expressed concern that, monthly affordability notwithstanding, increasing the price of the home will prevent some families from being able to buy a home because of loan qualification realities. For instance, from the table above, if a prospective homebuyer can only qualify for a \$200,000 loan, he/she wouldn't be able to afford the \$204,000 home with additional County-required energy efficiency measures. From a very narrow perspective, this conclusion is valid.



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But the “real world reality” is somewhat different from that perspective. It’s not that increased energy efficiency measures will prevent some individuals from being able to buy a home at all, but that they will need to buy a slightly smaller home in order to be able to buy a home of a given price (and therefore loan amount.) For every \$1000 increase in home costs associated with additional energy efficiency requirements, the buyer would need to buy a home that’s 8 sq. ft. smaller (assuming a \$120/sq.ft. construction costs.)

Furthermore, some mortgage lenders have adopted “energy efficient mortgages” that look at the combined monthly mortgage and energy utility bill payments when determining what a prospective homeowner will qualify for.

It’s important to note that all existing building codes (fire, structural, mechanical, energy, etc.) increase the price of a home or commercial building of a given size from what the building would cost if there were no building codes at all. But most consumers accept the added costs to ensure that buildings are safe (from fire, electrocution, structural collapse, etc.), that they don’t use a ridiculous amount of energy, and can withstand reasonable climatic and weather events.

Staff Findings

Based on public input and staff’s assessment of “implementability,” the following findings are offered:

1. Focus should be placed on an “Energy Efficient Building Code” rather than a Green Building Code. One Focus Group member suggested the term “High Performance Building Code” be used. While there was general support for non-energy related green building measures, concern was expressed about the added costs of such measures without the commensurate reduction to energy utility bills associated with energy efficiency measures.
2. Energy efficiency measures should be required that increase building affordability.
3. A “performance-based” standard is preferable to a “prescriptive” standard. A performance-based standard sets an overall energy efficiency target and leaves it to the discretion of the architect/designer and the builder as to how to achieve the target. A prescriptive standard is very rigid and includes a “cook book” of specific measures that must be included.
4. At this time, it is not practical to consider having the County establish its own building code enforcement and inspection staff. Given the complexity and costs involved and the slow building economy at present, it does not make sense to pursue for the primary purpose of enforcing green building standards.
5. It is critical to ensure that any code changes will not result in undue administrative burden for the citizens and staff of the County.

Energy Efficient Building Standards Options - Residential

Option 1: No additional Energy Efficiency Standard above the State Energy Code

Option 1 would not implement a Santa Fe County green building code requirement. The IECC (adopted by the NM Construction Industries Commission as the “NM Energy Conservation Code”) establishes requirements and standards for aspects of a building’s construction that affect energy consumption – generally broken down into

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the “building envelope” (e.g. number, size, type and location of windows and doors, wall, floor and ceiling insulation, etc.) and non-building envelope (e.g. mechanical, electrical, water heating and indoor and outdoor lighting). These codes are prescriptive in nature and there are very specific requirements that must be met. In concert with the Uniform Mechanical Code, the IECC also addresses heating, ventilation and air conditioning (HVAC) standards. The IECC does not address energy consuming items that are not an integral part of the building such as appliances and “plug loads” (e.g. computers, TVs, desk lamps, etc.).

Pros

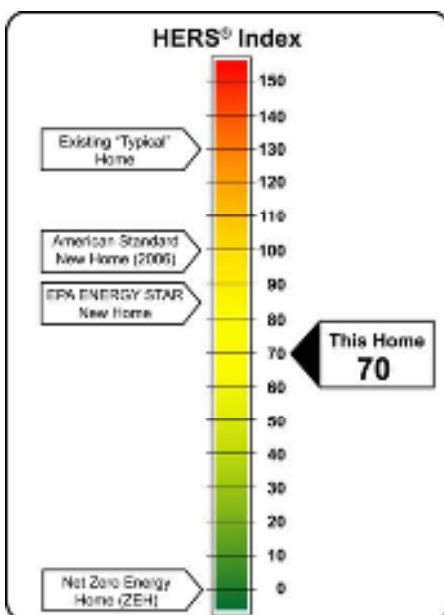
- Easy to implement (i.e. nothing to implement!)
- Keeps the upfront price of the home as low as possible
- Strong support from a segment of the County’s builders

Cons

- Will cause home ownership to be less affordable than if a cost-effective performance-based energy efficiency standard is required
- Does not satisfy the green building policies adopted in the SGMP
- Not consistent with the energy efficiency requirements of buildings built in the City of Santa Fe
- Strong opposition from a segment of the County’s builders

Option 2: Require a Third-Party Verified Home Energy Performance Standard (Staff Recommendation)

Option 2 would establish a system to require that homes are designed and constructed to achieve a standard of energy performance and that qualified independent professionals would verify that the home meets the performance standard. A few paths to achieve the standard would be allowed. This option would require a home be designed and built to achieve a Home Energy Rating of 70 or an equivalent level of energy performance (in BTU/sq. ft.) The existing NMECC equates to a HERS rating of 82 to 85.



The Home Energy Rating System (HERS) index is a national scoring system established by the Residential Energy Services Networks (RESNET.) In this system, a home built to the specifications of the HERS reference home (based on the 2004 International Energy Conservation Code) scores a HERS index of 100, while a net zero energy home (a home that generates on-site all the energy it consumes) scores a HERS index of 0. The lower a home’s HERS index, the more energy efficient it is in comparison to the HERS Reference Home.

This option would require the County to establish a system consistent with the City of Santa Fe Residential Green Building Code and verification, review and/or inspection process. The City of Santa Fe has adopted a HERS requirement of 70 for homes under 3000 sq.ft. Larger homes are required to have a lower (more energy efficient) HERS rating. The Executive Officer of the Santa Fe Area Home Builders Association (SFAHBA) supported developing a standard that was consistent with the

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City's standard in order to avoid a "patchwork" of different standards between building in the County and building in the City. The County's addition of the alternate path will not change the standard of construction but will give additional options for ensuring compliance.

Staff recommends this option because of its focus on energy efficiency (and, therefore, home affordability), simplicity of implementation, and consistency with the City of Santa Fe's standard. As mentioned, nearly all of the design review (of the construction plans) and site inspections are conducted by the independent third party – not by a local government or CID code enforcement staff person. Free software tools are available to assist qualified professionals to verify that the home design will achieve the standard. The opening screen for one of these tools, Home Energy Efficient Design, is shown to the right.



Based upon input from building and building science professionals, staff believes that requiring homes be built to a standard of a HERS rating of 70 or equivalent energy performance will better promote affordability for homeowners. If CID is willing to withhold the Certificate of Occupancy (CO) pending the independent verifier's final inspection confirming that the County standard has been met, enforcing the standard can be assured. If the home's rating does not meet the standard (e.g. it comes in as a HERS of 76), then the builder would need to go back to the home and make improvements that would lower the score.

If CID is unwilling to withhold the CO, the energy performance standard could be maintained but its enforcement would be uncertain, just as currently is the case for the County's existing hot water recirculation and water catchment installation requirements. Verification that the home's design would achieve the performance standard would occur before the County's development review. However, there is not currently a procedure to require verification of proper installation during the mid-construction (of the insulation and mechanical measures) and final energy inspections. If the final energy inspection indicated a rating above the County standard, the County would have no authority to require the needed improvements. However, conceivably if a specific builder consistently built homes that did not meet the standard during the final energy inspection, the County, by ordinance, could consider preventing the builder from building in the County for a certain period of time.

SFAHBA recommended what they called the "HERS 70, plus, plus". The two "pluses" are for: 1) requiring a thermal bypass check list ensuring the integrity of the insulation installation and 2) requiring sufficient mechanical fresh air exchange to ensure maintenance of healthy indoor air quality (as quantified in ASHRAE 62.2.) Staff supports the implementation of a "HERS 70++ or equal".

Pros

- Relatively easy to implement
- Consistent with City standard

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- Promotes home energy efficiency and affordability
- Achieves improved energy efficiency, a most important element of SGMP green building policies
- Easily modified in the future, if desired, with a change in the HERS rating or BTU/sq. ft. number
- Strong support by a segment of the County's builders

Cons

- Building to increase energy performance slightly raises the upfront price of a home (**estimated** from 0.5% to 1.0% of total building cost by local building professionals)
- The cost of the independent third party (\$500 - \$900) is incurred by the builder / homeowner
- Does not achieve all of the SGMP green building policies (recycled content, etc.)
- Strong opposition by a segment of the County's builders

Option 3: Require US Green Building Council LEED Certification

The USGBC's "Leadership in Energy and Environmental Design" (LEED) rating system is nationally recognized as one of the premier green building rating systems. LEED has four levels of increasingly aggressive green building standards: LEED Certified, Silver, Gold, and Platinum. The LEED process provides criteria for rating the environmental performance of construction practices and provides guidelines for documentation that demonstrates conformance; it encourages cost-effective and sustainable building methods, by encouraging conservation of fossil fuels, water and other natural resources, reduction of greenhouse gas emissions, recycling of construction materials reducing solid waste and improving indoor air quality; it includes mandatory green building requirements to ensure that construction waste and deconstruction materials are recycled, reused, or otherwise diverted from landfills, and minimum requirements to ensure that dwellings are constructed in an efficient manner; and it includes provisions intended to provide for joint administration with the processing of building permits for remodeling, adding on, and constructing residential and non-residential structures.

LEED has been criticized in the past for not placing sufficient emphasis on energy efficiency, but more recent editions have improved in this area. A LEED requirement at some level could be implemented in a manner similar to a HERS standard. A LEED accredited professional does virtually all of the verification and inspection work and is responsible for providing documentation.

The additional cost of building to a LEED standard is estimated at less than 3% of total building cost (for the LEED Silver level.)

Pros

- LEED is a comprehensive approach to green building that would satisfy most of the green building policies in the SGMP
- LEED is an established third-party verified process that is in place in a number of other communities



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Cons

- LEED requires a more involved and complex (integrated) building design and construction process
- LEED mandates the involvement of a LEED accredited during all steps of project development
- LEED certification requires significant documentation and the associated administrative cost
- LEED adds cost to the home that don't generate a corresponding reduction to home ownership costs
- Strong opposition from a segment of the County's builders

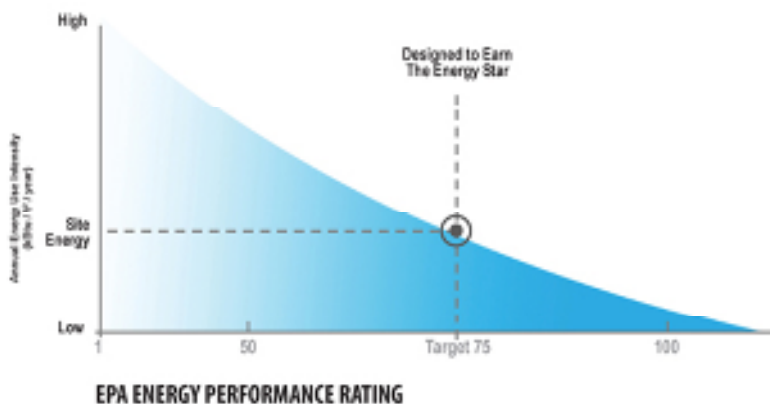
Energy Efficient Building Standards Options – Commercial

Option 1: No additional EE Standard Above the NM Energy Conservation Code

Pros and Cons: essentially the same as for residential.

Option 2: Require Commercial Buildings to be “Designed to Earn the EPA Energy Star Certification”

As the name suggests, ENERGY STAR is solely about efficient energy usage. To qualify for ENERGY STAR, a building must earn a 75 or higher on EPA's 1-100 energy performance scale, indicating that the facility performs better than at least 75% of similar buildings nationwide. [EPA's energy performance rating](#) is generated by using “[Target Finder](#)”, a no-cost online tool that enables architects and building owners to set energy targets and receive an EPA energy performance score for projects during the design process. Projects that earn a score of 75 or higher are eligible for [Designed to Earn the ENERGY STAR](#) certification. Target Finder compares the project's estimated energy use to actual energy use of similar buildings and provides a relative energy performance rating compared to buildings of a similar type.



The architect is required to submit the necessary documents to the EPA (actually its contractor) in order to receive the Designed to Earn the Energy Star certification. The certification is not the same as the building actually achieving the Energy Star label. The Energy Star label is only obtained after an occupied building's energy usage has been satisfactorily documented for a year. Therefore, requiring a commercial building to obtain the Energy Star label is not practical given that it occurs well “after the fact” of building construction.

Pros:

- Focuses exclusively on energy efficiency.

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- Likely to have a positive impact on a commercial building's affordability. County Staff is attempting to locate cost-benefit data, if available.

Cons:

- Does not address other green building elements in the SGMP.

Option 3: Adopt the International Green Construction Code

The 2012 International Green Construction Code will be enacted by the International Code Council in November of this year. The City of Santa Fe has been working with a commercial code stakeholder group with an eye toward adopting the 2012 IGCC once it is finalized. The IGCC is relatively new but is already being adopted by a number of state and local jurisdictions throughout the country including Florida, North Carolina, Oregon, and Scottsdale, AZ.

As the name implies, the IGCC is a comprehensive green building code, intended to be implemented as a mandatory code, like other mandatory codes. It is not a green building rating system, nor is it limited to energy efficiency measures. The IGCC addresses the wise use of natural resources, materials, energy and water and the preservation of indoor air quality. It provides for both performance and prescriptive options.

Staff contact with the ICC indicates that a cost analysis on the IGCC has not yet been conducted.

If the County were to adopt the IGCC it would likely require an agreement with the City of Santa Fe to implement (inspection and enforcement). Direction is requested from the BCC as to whether there's an interest in pursuing a Joint Powers Agreement with the City for building design review, inspection and enforcement services at this time.

Pros:

- Is a comprehensive approach to green building, incorporating virtually all of the green building policies adopted in the SGMP.

Cons:

- Cost impacts are not known.