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R-TRAC
Meeting # 12
Topic: Draft Code Proposal Review
Wednesday December 1, 2010, 3 – 5:30 pm

PARTICIPANTS IN ATTENDANCE

Utilities Green Building Team

Amanda Sutton – Green Building Program Coordinator
Doug Swartz - Green Building Program Manager - Energy Services Engineer
Felix Lee – Green Building Code Project Manager
Kim DeVoe - Energy Services Specialist

Facilitator

Susanne Durkin-Schindler

R-TRAC Members

Company	Representative
Aspen Construction	Gil Paben
Highcraft Builders	Gordon Winner
Aspen Homes of Colorado	Rob Sabin
Dana McBride Custom Homes	Dana McBride
The Group Real Estate	James Mitchell
The Atmosphere Conservancy	Alex Blackmer
Crown Jade Design and Engineering, Inc.	Mark Benjamin
Vignette Studio	Terence Hoaglund
Armstead Construction	Jeff Schneider
Merten Design Studio	Rob Ross

Building Officials

Jurisdiction	Representative
Larimer County	Tom Garton
Safe Built	Russ Weber
City of Fort Collins	Mike Gebo

Members of the Public

Alan Cram

Shelly Kawamura - Institute for the Built Environment

Updates

Staff has been presenting information to Boards and Commissions to collect comments and suggestions to pass along to Council.

Upcoming Meetings and Events:

- December 1, 2010 - Electric Board
- December 2, 2010 - Affordable Housing Board
- December 3, - AIS
- Dec 6 - Water Board
- Dec 10 - Chamber of Commerce Legislative Affairs
- Dec 14 - City Council WS
- March 1st and 22nd - City Council 1st and 2nd Readings

Committee members are welcome to continue to provide input and comments to staff or directly to City Council.

Residential Building Code Amendment Proposal

Several updates have been made to the residential green amendment proposal at-a-glance. However, the fundamentals have not changed. The green building practice summaries continue to be developed for each practice outlined in the proposal. Those summaries can be viewed on the green building program website (fcgov.com/gbp). The draft summaries have helped staff develop the proposals and benefit cost analysis. The Brendle Group has been leading the cost and benefit analysis research for the proposals. Staff has been working to develop and understand all of the pieces that need to be in place prior to the effective date of the code. The Green building team has been working closely with the building department and an estimate of resource needs will be presented to council.

The measure that was pushing for more efficient air handler unit motors was removed from the list due to federal preemption laws which state that jurisdictions cannot require stricter energy standards than those that are required at the national level. This item will be required as a subset of the whole house ventilation requirement but there are other options for builders who do not wish to satisfy that requirement.

The safer combustion appliances for new construction requirement is still on the list but some of the details have changed. Instead of prohibiting the installation of atmospherically combusting appliances, the requirement would state that they would need to be isolated from the rest of the home. The mechanical room would have to be insulated and sealed to decouple it from the rest of the house. The combustion air duct to the outside is still required. Testing would be required to confirm that the room would be separate and not affected by pressure changes in the home. Another option would be to have safer combustion appliances. Another option would be to allow power vented water heaters that have an outside air supply.

Committee Comments

- Why would the mechanical room need to be separately insulated? The sealing of the room is more important that insulating it.

- This is something that is done by builders. If you bring in outside combustion air then it needs to be insulated.

- Could the mechanical system be installed in the garage and not have to do anything else to protect it?

- If the units are in an unconditioned space the efficiency may be affected.

- High efficiency units produce an acidic condensate. That needs to be regulated to reduce problems with concrete deterioration or other hazards.

Low VOC Materials

Staff is continuing to develop the information around the use of low VOC materials in the construction of the home. Research has shown that low VOC products are widely available but there continues to be discussion about the cost differential between low VOC and conventional products.

It has been difficult to find information on low VOC use in the residential setting. Studies focused around hospitals have shown a high cost impact but when those numbers were shown to the C-TRAC the committee disagreed with the implication that low VOC materials cost substantially more than conventional materials. This is an important issue because the tighter we build our homes the more important it is to help reduce the toxins in the home. The code would be written to allow a 15% deviation for materials.

Committee Comments

- The cost differential for paints and sealants can be minimal but low VOC cabinetry and wood products can have a much higher cost.

- Some of the things that clients bring into the home are more damaging than what the builder puts into the house. Is it worth it for the City to regulate this?

- We cannot control what is brought into the home, but we can control the built in components.

- Residential environments with high indoor air quality are difficult because people do not want us to regulate what they bring into their home. Designers and builders and the City can do what they can up to a point.

- Indoor air quality is an issue that is growing in popularity. There has even been talk of federal legislature to set standards for VOC content. If you implement this now, you will be ahead of the game.

- Many certification programs exist. Many refer to the California standards.

- Could the building be flushed out similar to Commercial buildings?

- This is an important line item because it helps reduce exposure to harmful substances.

- The performance of these products can vary depending on the products. As manufactures are starting to develop low VOC products they are thinking about performance.

- Could there be a potential liability for builders?

- The enforcement could be tricky for this requirement. How would the City confirm that low VOC products were used?

- The City would designate that low VOC products must be used and then the contractor would need to submit that information.

- The City keeps focusing on the builder. It should be the responsibility of the contractor that installs or applies the particular product.

- This section is going to limit the choices of the owners and will force builders to deal with imperfections that may occur with the use of low VOC products.

- The City should worry more about educating the homeowners and less about the VOCs during installation. If off-gassing happens so fast that it will not affect the homeowners then it should be taken off the list. The proposed list is very long; staff should consider focusing on the products that off-gas for a long time and will immediately affect the homeowner.

- ENERGY STAR has an indoor air plus program that offers a comprehensive list that is based on real life choices.

- Prefabricated cabinetry is one of the highest emitters of VOCs and formaldehyde.

- The testing that is done for the low VOC materials is done under ASTM standards. Home application has many variables that can affect how the product will perform.

- Testing can be done but it would require the involvement of labs and extensive testing equipment.

- Education is a big piece of this. This is something that needs to be done up front at the design phase so they understand why it is important and start to buy into it.

- Carpet padding is a high emitter - probably more so than carpeting.

- How will this impact remodels and additions?

- The federal government does not currently control the substances that are shipped into the U.S.

Benefits and Costs Analysis Update

The Brendle Group has been assisting staff with the Benefits and Cost summary that is being developed. Staff is trying to develop the balance between the costs and benefits. This will affect the individual buying the home, the building sector, and the community/ecosystem. Staff is working on understanding the individual costs associated with each green building practice and the proposal at a whole. The cost will most likely be higher initially and then decrease over time as the market catches up. The building sector would need to invest in training initially and then things would get easier over time. Community costs include all of the things that need to be done before the code is implemented and the day to day costs of enforcing the code.

Individual benefits include savings on utility bills and maintenance costs. The operations savings are easier to capture than durability benefits. Staff thinks that better built buildings are going to have an increased values down the road as the market starts to recognize the benefits. Green building has the potential to have increased economic benefits such as job creation and increased specialty training. In addition, market transformations will take place as contractors are asking for "green" products from suppliers and manufacturers. Fort Collins was voted one of the best places to live. That is something that we continue to take pride in and increased building standards will help to keep Fort Collins a leader.

Cost and benefit analysis is not a simple thing to boil down. Both qualitative and quantitative benefits and costs exist. The staff team has been working on the bottom up costs and benefits in the practice summaries. Benefits are evaluated using a triple bottom line analysis. A minimally code compliant building was used as a baseline and the cost in implementing the code amendments was added. It is difficult to find the real starting point for this analysis because some of the common building practices in Fort Collins are already above code. Staff is working closely with the Brendle Group and the Building department to find the most realistic costs and benefits. Council

directed staff to develop green codes, not codes that are guaranteed to have a short payback period.

The Brendle Group has been working on developing a top down costs and benefits analysis using local and national studies. The three things that the Brendle Group tried to put numbers to were building valuation, occupant health, and environmental (carbon impact) piece. The initial results of this analysis were that the costs and benefits were relatively level.

Committee Comments

- Houses tend to be sold based on emotion of the buyer. The comfort, indoor air quality, and sound control are some of the aspects that sell a home. Energy savings probably ranks lowest on the list for most buyers. It can be a selling point if they are educated about it. It can be an easy thing to sell.

- If you are paying more for energy efficiency when you buy the home the then homeowner won't really start saving money until the investment pays for itself.

- In general, people are willing to pay more for a new home if that is what they want.

- One thing that should be in the proposal for City Council is resource needs for outreach and education about the new green code amendments. If we are going to do this, then we need to tell people about it.

Building Department Resource Needs

The building department reviewed the code proposal and tried to estimate the amount of time that it would add to the development review process, inspections, and administration. Each practice in the proposal was reviewed and an estimated number of minutes that it would add to the current process was assigned. Plan review time was increased by 30% and the inspection time was increased by 65%. The residential and commercial proposals combined would require the addition of one full-time inspector and one half-time plan reviewer. This information will be passed along to Council with the code proposals.

Committee Comments

- Is the City going to increase fees to help pay for the increased resources? If the City picks up the fees, either they are going to raise taxes or decrease services.

- New inspections would not need to be added, they would just take longer.

- The time and fees associated with re-inspections for some builders needs to be taken into account. There will be builders that just don't get it.

- Education and Training is important for the implementation of this code.
- If third party verification could be done for some of these items could those documents be handed off in lieu of an inspection from the City?

Appendix A

Presentations

Residential Green Amendments Update

R-TRAC Meeting
12/1/2010

Upcoming Dates

- Dec 1: Electric Board
- Dec 2: Affordable Housing Board
- Dec 3: Agenda Item Summary
- Dec 6: Water Board
- Dec 10: Chamber of Commerce Legislative Affairs
- Dec 14: City Council Work Session

2011

- Mid-Feb: Agenda Item Summary
- Mar 1, 15: City Council 1st + 2nd Readings

Residential Code Green Building Amendments

Proposal Package At-a-Glance (PDF 54KB)

In-depth descriptions of each individual practice in the package:

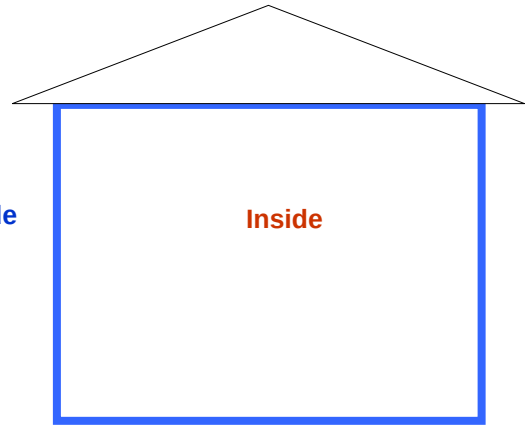
- Construction waste recycling (PDF 21KB)
- Windows, skylights, doors: installation (PDF 24KB)
- Building envelope: thermal specifications for electric-heat homes (PDF 27KB)
- Basement windows: thermal specifications (PDF 20KB)
- Air sealing: tight construction (PDF 33KB)
- Insulation: installation (PDF 26KB)
- Heating and cooling systems: design (PDF 25KB)
- Heating, Ventilation and Air-Conditioning (HVAC) systems: commissioning (PDF 31.2KB)
- Water-efficient fixtures (PDF 22KB)
- Safer combustion appliances: new construction
- Safer combustion appliances: existing buildings (PDF 27KB)
- Low-Volatile Organic Compound (VOC) materials (PDF 28KB)
- Whole-house ventilation (PDF 26KB)
- Exterior lighting: fixture design (PDF 19KB)
- Building owner education (PDF 20KB)

www.fcgov.com/gbp

Building Code Green Amendments

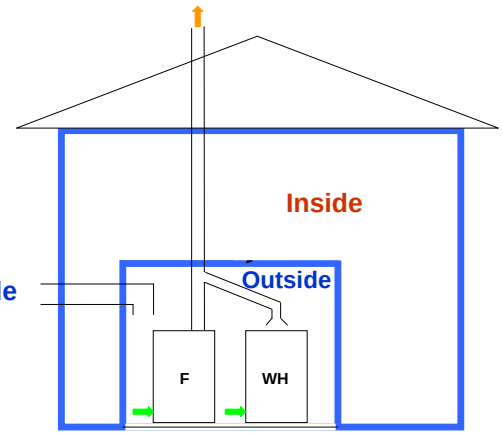
Safer Combustion - NC

Building envelope



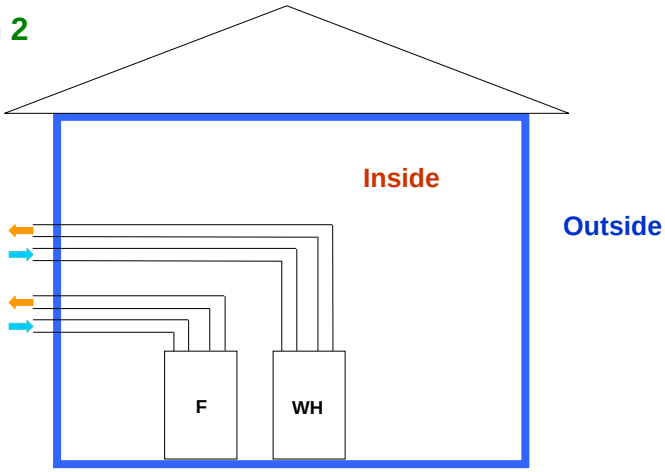
Safer Combustion - NC

Option 1



Safer Combustion - NC

Option 2



Safer Combustion - NC

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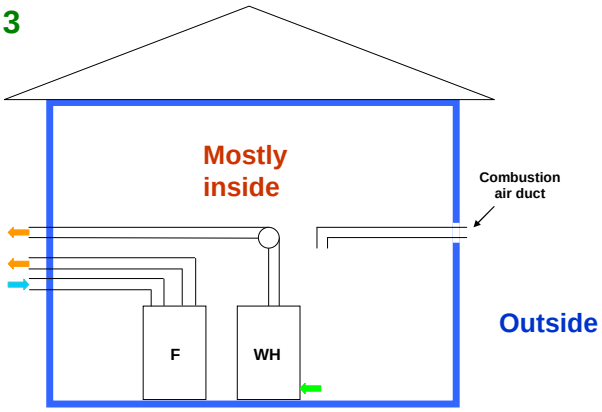

Low-VOC Materials

- Sealants and adhesives
- Resilient flooring
- Carpeting
- Paints, stains, varnishes, other site-applied finishes
- Structural wood panels, hardwood plywood, particle board, fiber board
- Pre-fabricated cabinetry
- Insulation

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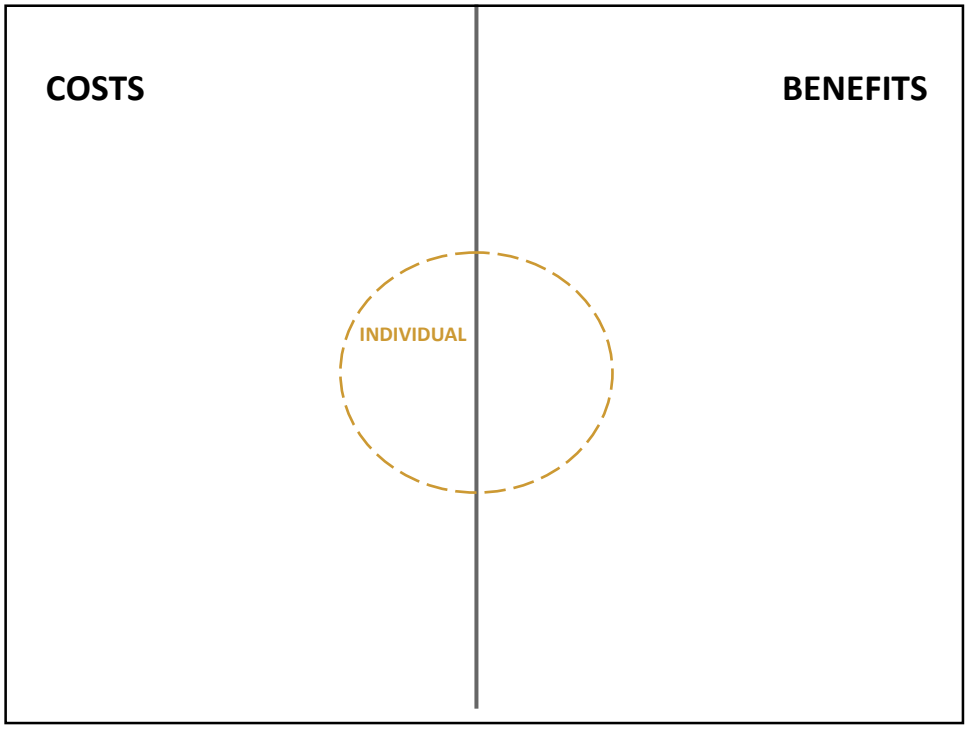
- Structural wood panels, hardwood plywood, particle board, fiber board
- Pre-fabricated cabinetry
- Insulation

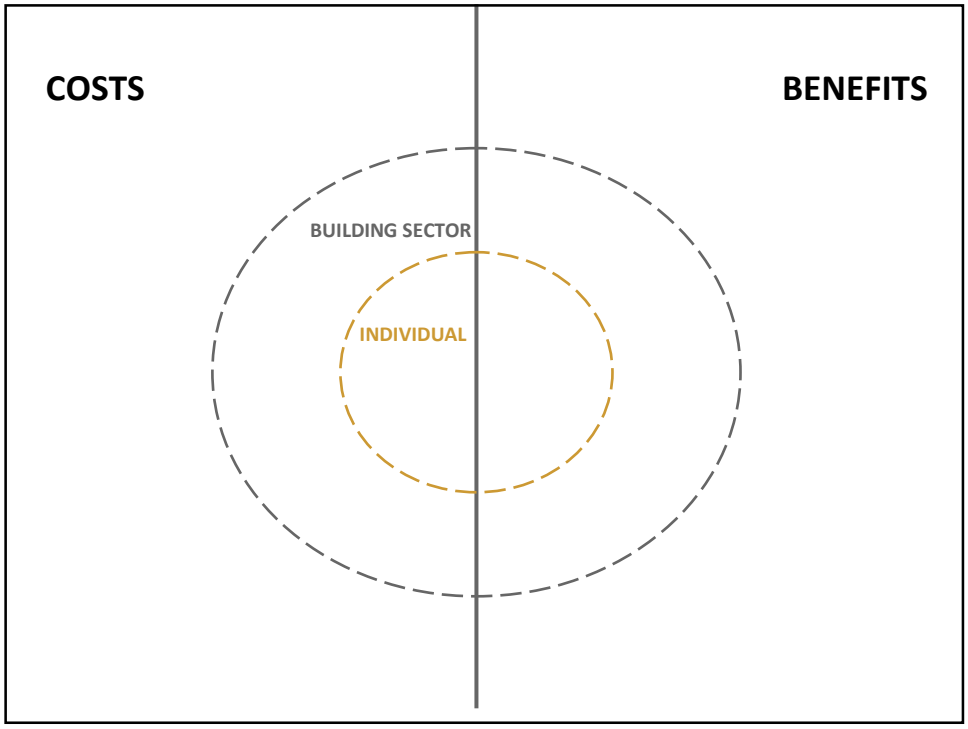
Availability?

Cost increment?

Benefits + Costs


COSTS
BENEFITS


COSTS
BENEFITS
INDIVIDUAL


COSTS
BENEFITS
BUILDING SECTOR
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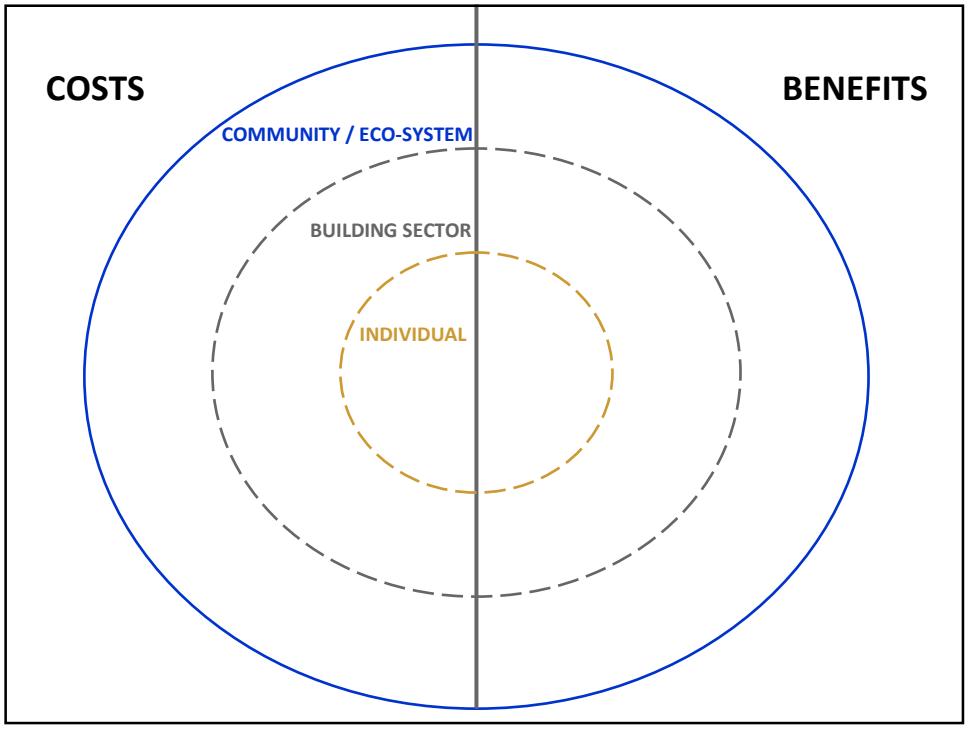
COSTS
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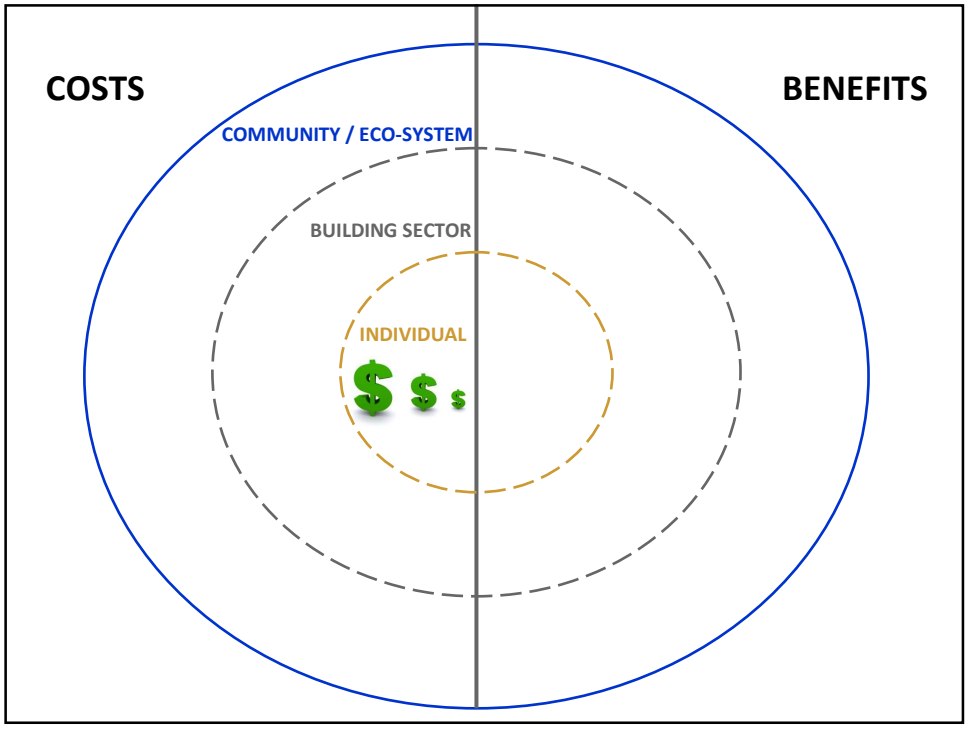
BUILDING SECTOR
INDIVIDUAL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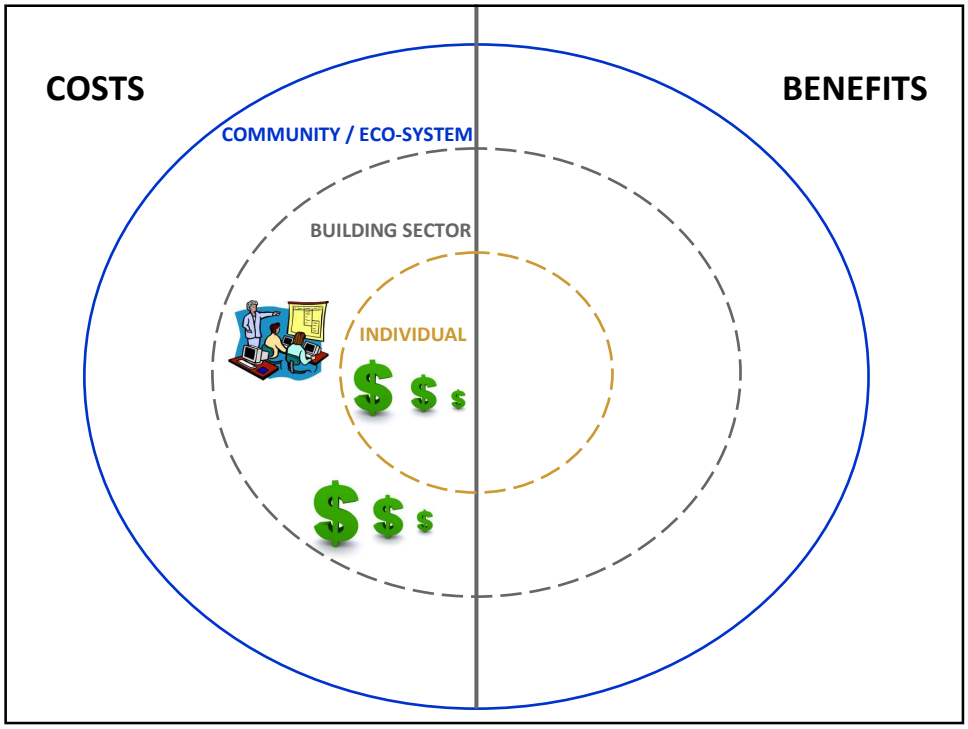
BUILDING SECTOR
INDIVIDUAL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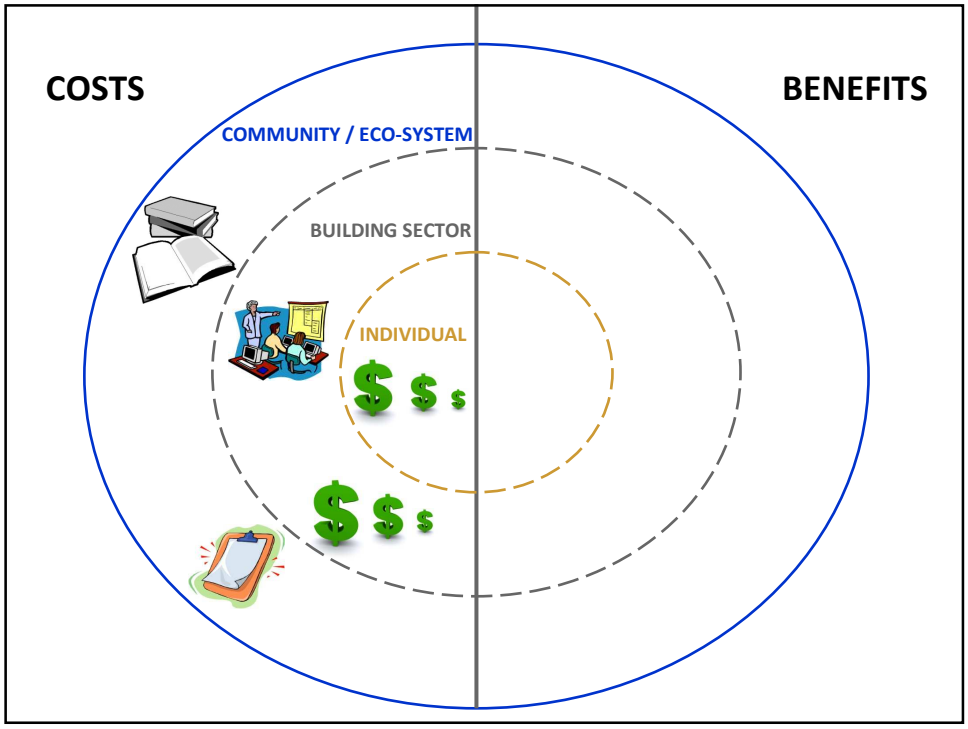
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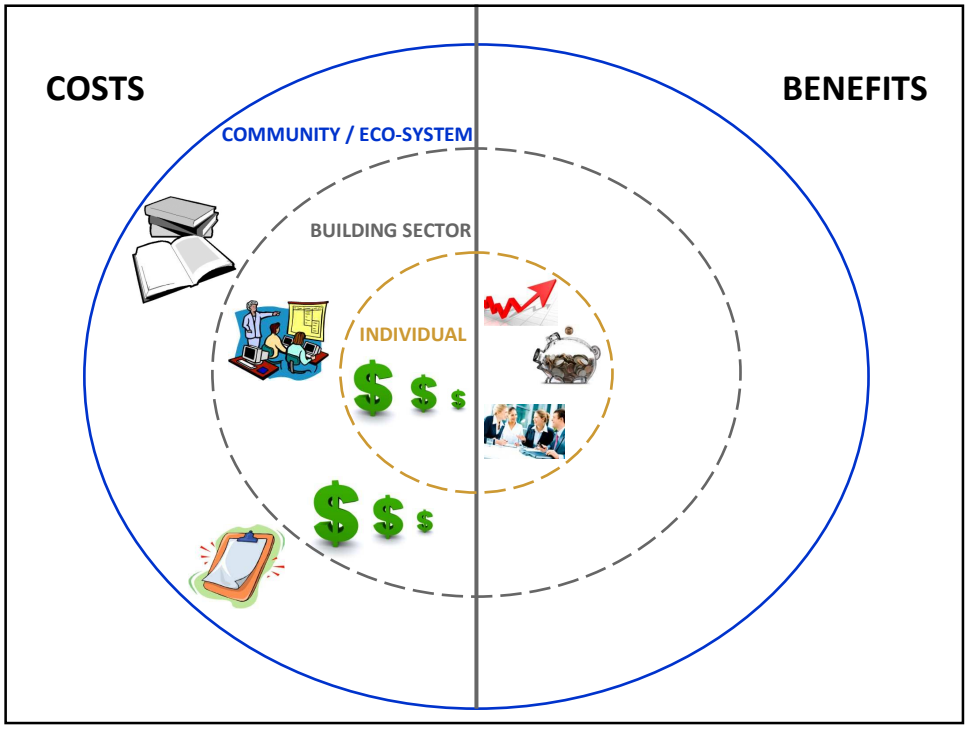
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BUILDING SECTOR
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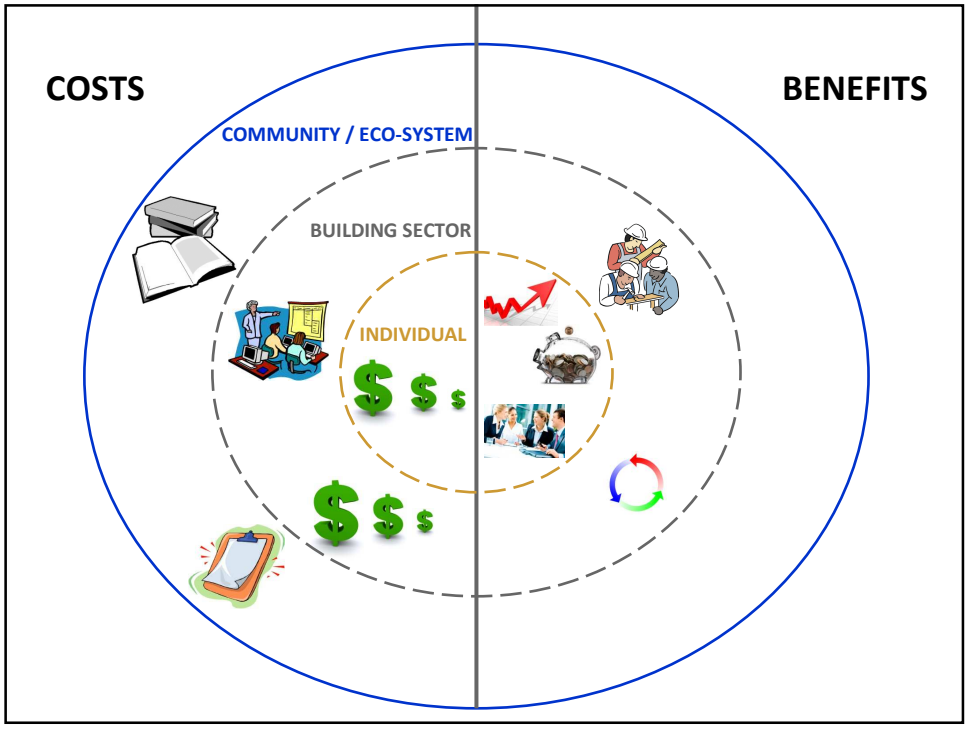
COSTS
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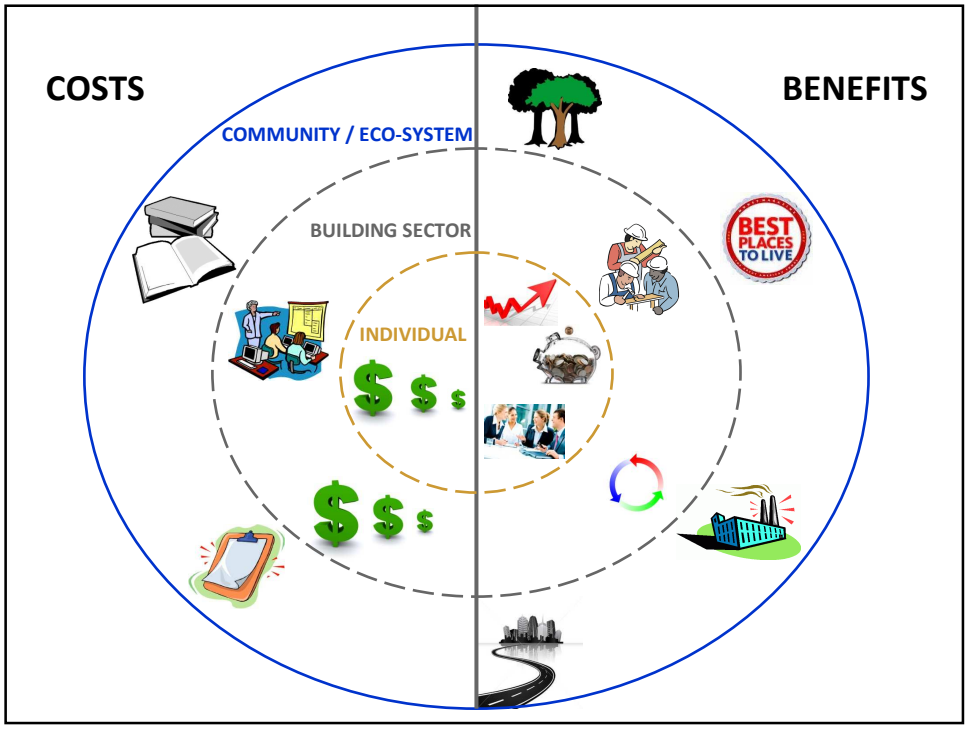
BUILDING SECTOR
INDIVIDUAL


COSTS
BENEFITS
COMMUNITY / ECO-SYSTEM
BUILDING SECTOR
INDIVIDUAL
BEST PLACES TO LIVE

Benefits + Costs

- Quantitative . . . Qualitative
- Bottom-up . . . Top-down
- Starting point?
- Code-compliance point?
- Data sources
- Ranges
- Prototype

Prototype

- 1600 sf ranch over full basement
  (3,200 sf conditioned floor area)
- $250K
- Mortgage: 30 yr, 6% ➔ $1,500 P+I payment
- Annual utility usage and costs

Natural gas	900	therms	$843
Electricity	10,304	kWh	$790
Water	114,972	gallons	$422
Wastewater	80,400	gallons	$409

$2,464 (~20% = fixed charges)

Ranges

Range	Owner Initial Cost
Very Low	$0 - $50
Low	$50 - $200
Med	$200-$500
Med High	$500 - $1,000
High	$1,000 - $2,000
Very High	> $2,000

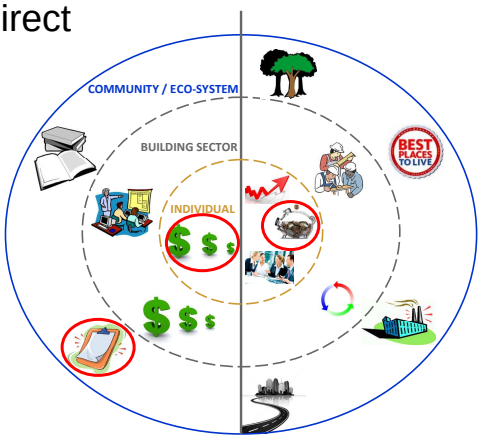
Range	Owner Annual Savings/Costs
Very Low	$0 - $10
Low	$10 - $20
Med	$20 - $50
Med High	$50 - $100
High	$100 - $150
Very High	>150

Results: Bottom-up

Preliminary

Owner / quantifiable / direct

Enforcement direct



Only part of the story!

Results: Bottom-up

	Annual utility savings ($/yr)		
Range	Savings	Increased costs	Net Savings
Low End	$160	$100	**$60**
Average	$255	$125	**$130**
High End	$350	$150	**$200**
Range	$160 - $350	$100 - $150	**$60 - $200**
%	6% - 13%	4% - 6%	**2% - 7%**

Results: Bottom-up

	Increased initial cost and mortgage payment		
Range	Initial Cost Increase	Monthly Mortgage Cost Increase	Annual Mortgage Cost Increase
Low End	**$3,200**	$19	$230
Average	**$4,775**	$29	$344
High End	**$6,350**	$38	$457
Range	**$3,000 - $6,500**	**$19 - $38**	**$225 - $450**
%	**1% - 3%**		

Results: Bottom-up

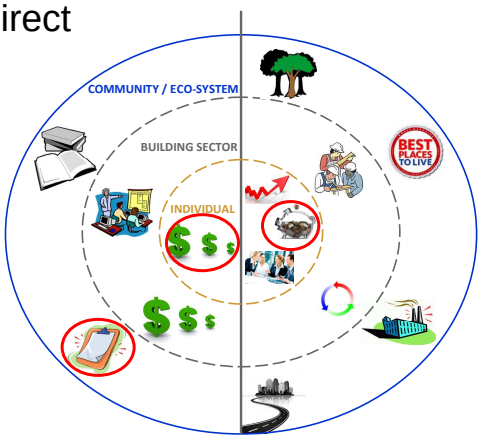
RESIDENTIAL
Proposed Revised Time Estimates
Plan Review, Building Inspections, & Administration

Including Green Building Amendments (Base package, no options)

Plan Review	Field Inspection	Administrative
Current Practice Totals 6.0 to 8.0 hrs/new SF Home --- Green Practices Totals 1.58 to 2.75 hrs/new SF Home --- Current + Green Totals 7.6 to 10.8 hrs/new SF Home Approximately 30% Increase	Current Practice Totals 3.08 to 5.25 hrs/new SF Home --- Green Practices Totals 1.91 to 3.16 hrs/new SF Home --- Current + Green Totals 5.0 to 8.4 hrs./new SF Home Approximately 65% Increase	Current Practice Totals 2.0 hrs/new SF Home --- Green Practices Totals 1.0 hrs./new SF Home --- Current + Green Totals 3.0 hrs./new SF Home Approximately 50% Increase

Results: Bottom-up

Preliminary
Owner / quantifiable / direct
Enforcement direct



Only part of the story!

Results: Top-Down