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**C-TRAC  
 Meeting # 7**

**Topic: IgCC Chapter 6 - Energy Efficiency & Chapter 7 - Water Efficiency  
 Wednesday August 4, 2010, 3 – 5:30 pm**

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**PARTICIPANTS IN ATTENDANCE**

**Utilities Green Building Team**

Amanda Sutton – Green Building Program Coordinator  
 Felix Lee – Green Building Code Project Manager  
 Gary Schroeder – Energy Services Engineer – Commercial GB Code Review  
 John Phelan - Energy Services Manager

**Facilitator**

Susanne Durkin-Schindler

**C-TRAC Members**

<b>Company</b>	<b>Representative</b>
Aller Lingle Massey Architects PC	Brad Massey
Architecture West	Steve Steinbicker
Beaudin-Ganze Consulting Engineers	Corey Rhodes
Bella Energy	Rick Coen
BHA Design	Angela Milewski
Dohn Construction	Doug Dohn
Fisher Architecture	Greg Fisher
Institute for the Built Environment	Josie Plaut

**Building Officials**

<b>Jurisdiction</b>	<b>Representative</b>
City of Longmont	Chris Allison
City of Fort Collins	Russell Hovland

## ***Key Points:***

### ***Review and Updates - Gary Schroeder***

At the July 21<sup>st</sup> meeting the committee discussed occupancy controls in hotel guest rooms and renewable energy requirements. Several ideas came out of the discussion and staff is working on compiling more information to help generate specific requirements for those topics. Staff will return to the group for feedback after these requirements have been specified.

### ***Energy Efficiency Part II - Gary Schroeder***

#### **608.4 - Snow Melt Systems**

The IgCC requires that snow melt systems are powered by either on-site renewables or heat recovery systems. Hydronic systems are required to have at least 25% of energy provided by renewable/heat recovery sources, electric systems require 50%. Exclusions for this requirement include hospitals and emergency service providers.

Currently, the number of snow melt systems being installed is minimal. However, this could have a big impact on projects where these systems are installed.

#### **Committee Comments:**

- These systems are useful for businesses with covered drive through/parking areas that do not get a lot of sun (banks, drive up pharmacy, etc).
- It is important that snow melt systems have controls that are effective and user friendly. The IECC 2009 does have requirements for controls for snow melt systems.
- The small snow melt systems are so prone to failure in our climate and soil types that they are not widely used.
- Tie the solar requirement into the total energy use for the building. The times when the snow melt system is needed does not coincide with solar energy availability and having a system installed specifically for a snow melt system may not make sense.
- The City of Aspen requires the applicant installing a snow melt system to pay into a fund for renewable energy projects. That is something that could be applied in Fort Collins as well.
- It doesn't seem like this is a high-priority requirement in the Fort Collins area. The controls are required in the IECC. To require renewables for

these systems it is a high cost item that may not achieve the desired results.

- Some buildings have used reclaimed heat from refrigeration systems to heat the snow melt systems. These systems make the most sense for supermarkets.
- Heat recovery may be difficult to put into code, but it could work to say that heat recovery could be used for snow melt systems. This would especially apply to super markets.

Committee and staff agree that renewables should not be required for snow melt, but if a heat recovery option is available it should be used over other sources. The controls requirements are already covered in the IECC and that is the most important component for snow melt systems.

### **608.6 - Waste Water Energy Recovery System**

The IgCC requires a waste water heat recovery system to preheat all incoming water used by a minimum of 10 degrees Fahrenheit. This is required for restaurants, banquet halls, laundries, group homes, hotels, hospitals, nursing homes, health clubs, and spas. An exception exists for single story buildings.

#### **Committee Comments:**

- There are residential systems that are designed to capture the heat from water going down the drain. These systems consist of a copper coil that is wrapped around the drain pipe to capture heat.
- CSU installed one of these systems at Academic Village on one shower facility as a demonstration project. It was intended to be implemented throughout the building, but the price of copper was limiting. In addition, the building was not initially designed for this system so it would not have been effective.
- This may make more sense for centralized systems in restaurants and athletic clubs. Efforts could be focused on these areas.
- The single level buildings are exempt because all of the piping is underground and would need to be brought above grade for this system to work.
- This is an energy efficiency option in LEED. However, it is not a requirement. The builder gets to choose how to reach the energy efficiency goal.

- This is something that could be included in the code as an option for builders who need to increase energy efficiency. This would provide multiple choices for builders who need to meet additional energy requirements.
- The IgCC uses this approach in the water chapter as it relates to indoor fountains, etc. If you install a fountain you need to do something to ensure that it is energy and water efficient. If you do something "bad" then do something to offset that.
- It may not be the right time to implement this measure, but as energy costs go up that waste heat recovery will become more valuable.

### **Air Side Heat Recovery.**

This is found in ASHRAE 189.1. If above 5000 cfm and greater than 70% outside air then the building must have a heat recovery system. The IECC 2009 includes the ASHRAE 189.1 language. This is something that appears to be covered in existing code.

### **609.4 - Exterior Lighting Controls**

The IgCC requires that a time switch is used to reduce exterior lighting by at least 30% within 2 hours after the facility closes. The other requirement is that all exterior landscape and sign lighting goes off 1 hour after the facility closes.

ASHRAE requires that outdoor lighting is automatically controlled and decreases by a minimum of 50% within 1 hour after the building closes and ½ hour after sunrise.

This would apply to all new construction and major remodels. Exclusions exist for hospitals and jails.

### **Committee Comments:**

- Shutting down illuminated signs could be controversial. Many businesses use that as a form of advertising.
- The Zoning Department is responsible for the signs and lighting. Need to make sure they are on board.
- Shutting down signage may not create a substantial energy savings. The parking lot lighting could have a huge impact.
- Need to keep the sign requirements separate from the building code and needs to be applicable to the entire City.
- Most signs are on a timer so the retailer can control when the sign is turned on and off.

- LED retrofits are becoming more popular. This may be an education/incentive opportunity.
- Parking lots could be reduced by 30-50% after the business closes.
- This is also an educational issue. There is a public perception that exists that more light means safety.
- What would it take to implement this across the board? At what level? Don't want to penalize new establishments.
- If we were to require this across the board it may be difficult for existing buildings to re-circuit their exterior lighting. Don't want to create additional, substantial costs to businesses. Re-circuiting may not be necessary in all cases since wireless ballasts are now available.
- Substantial rebates are currently available for updating parking lot lighting.
- This may be more effective if phased in over time to give businesses time to readjust.
- This could be a rate structure issue where exterior lighting is separately metered on the smart grid and charged a higher rate. Or a higher structure for the midnight to 6 A.M. time frame.
- The ICC exterior lighting requires a photo sensor on lighting that is not designated "dusk to dawn" lighting. The ICC also limits outdoor lighting to 1.5 watts per sq. foot of parking lot area.
- Concerns about push-back from businesses from requiring certain wattage per square foot could be addressed by saying that the business must be 20% more efficient than the IECC. This could be easily done for exterior lighting. Currently, most of the projects done in Fort Collins are already at or exceeding the levels designated in the IECC.

There was general agreement among the committee that a requirement to reduce parking lot lighting by 50% during the night (hours to be determined) is reasonable.

## **Water Conservation - Felix Lee**

*See appendix A for staff presentation*

The City already has a water conservation plan in place to reduce water use to 140 gallons per capita per day by 2020. The City is also a WaterSense partner. This is a label developed by the EPA and is the water equivalent to ENERGY STAR. WaterSense applies to fixtures and the maximum amount of water flow acceptable for each type of fixture. Staff is recommending that we adopt a regulation that requires fixtures that meet set flow rate requirements.

*Note: A large portion of the IgCC is not applicable here due to state and federal regulations. These sections include gray water, reclaimed water, and collected rain water.*

### **Committee Comments:**

- There are three flow rates that are required in the IgCC but not WaterSense: Kitchen and bar sink faucets and drinking fountains. It seems strange to have a flow rate requirement on those items.
- This would depend on the application. If filling up a bar sink to wash and disinfect dishes, it is going to be filling up to the same volume, but will take more time.
- The flow rate would make a big difference in sinks that are used for pre-rinsing and washing. This requirement would need to be defined by use.
- The flow rate on drinking fountains seems unnecessary.
- Showerheads commonly have a flow rate of 2.5 gallons/minute. If the flow rate was to be reduced to 1.1 or 1.5 gallons/minute the user would notice a big difference. 1.5 or 1.75 gallons/minute would be realistic. Many of the major manufacturers and retailers have fixtures available that would meet this requirement.
- When determining the maximum gallons per flush for toilets the grams per flush needs to be considered as well. Research has been done on different types of toilets that compare them by gallons per flush and grams per flush. Numerous options exist for toilets that are water efficient and have high grams per flush rating.
- In addition to requiring that toilets be 1.28 gallons per flush, the City should require a minimum of 800 grams per flush.
- Waterless urinals have been installed in several buildings and then taken out due to maintenance issues. These fixtures are difficult and expensive

to maintain. The 0.5 gallon per flush standard could be easily implemented.

- These requirements would apply to remodels and new constructions. It would be difficult to require existing buildings to retrofit bathroom fixtures because it does not require a permit.

*Note: Suggested flow rates can be found in Appendix B.*

### **702.2 - Leakage limits on combination tub/shower valves.**

This section requires tub spout leakage from combination tub/shower valves be no greater than 0.1 gallons per minute.

#### **Committee Comments:**

- These systems should not leak at all when first installed. This is a maintenance issue.
- This is something that needs to be easily enforced. This requirement is an example of the education and training that is going to be needed for the inspectors and the Building Department.
- Toilets and faucets generally have a label that states what the gallons per flush or minute are for that fixture. That should be easy enough to inspect and enforce.

The committee does not agree that this should be included in green building code.

### **702.8 - Efficient hot water distribution system**

This section requires that water in piping between hot water source and hot water outlet is 87 oz. maximum.

#### **Committee Comments:**

- This is talking about the distance between the hot water tank and the hot water outlet. It could be difficult to install this system in all applications.
- The 87 oz. maximum will not be practical for a commercial application. It could apply to commercial kitchens where the hot water heating system is close to the outlet.
- Controlling circulating hot water systems by installing controls that can be automatically or manually shut off is something that can be easily implemented and result in substantial energy savings. This is covered in 504.6 of 2009 IECC.

The committee agrees that this should not be included in code.

### **Water conserving irrigation design**

This section requires the hydrozoning of automatic irrigation systems to water different plant materials such as turfgrass versus shrubs. Landscaping sprinklers not permitted to spray water directly on a building or within 3 ft. of a building.

#### **Committee Comments:**

- Builders are currently required to submit a landscape and irrigation design plan to comply with the Land use Code.
- This is already covered in the land use code. The City just implemented new restrictions for commercial buildings for irrigation efficiency and water conservation.

### **Efficient vehicle wash facilities**

This section requires at least 50% of rinse water be reused for washing. In addition, self-service spray wands are limited to a maximum of 3 gallons per minute.

#### **Committee Comments:**

- Additional technical information is needed to see what the industry standard is. This seems like a good thing to implement if it is not being done already.

### **Potable water restrictions in HVAC systems and equipment**

This requirement would restrict the use of potable water in specific HVAC applications such as once through equipment cooling

#### **Committee Comments:**

- The language for this requirement needs to be clear.
- 703.1 is not something that should be included in the code. It assumes that you have access to gray/raw water and would not make sense for some systems.

The committee agrees that IgCC sections 703.2-703.6 should be included in the code.

### **Water consumption management**

This section requires that measurement devices with remote communication capability be installed to collect water consumption data for domestic water supply to the building. It also requires that potable and



reclaimed water entering the building be monitored or sub metered. Rentals in excess of 50,000 sq. ft. are on separate sub-meters.

**Committee Comments:**

- The 50,000 sq. ft. minimum seems really high. There are not many rental spaces that big. It should be lowered to 10,000 sq. ft. or above must be sub metered.

**Commercial food service operations water use reduction**

This section would require that all dishwashers and ice machines be ENERGY STAR appliances. This section would also require that boilerless/connectionless food steamers use no more than 2.0 gallons per hour.

**Committee Comments:**

- This is something that has been done in several LEED buildings.
- May need additional information from industry professionals to determine if this is a realistic requirement.

***Homework:***

Review Chapter 9: Indoor Environmental Quality in the IgCC.

**NEXT MEETING**

August 18th – C-TRAC Meeting #8:

3-5:30 p.m. City of Fort Collins Streets Facility

## **Appendix A Staff Presentation**

# Water Resource Conservation & Efficiency

C-TRAC Meeting  
August 4, 2010  
Felix Lee



## What we're already doing

### City Fort Collins Water Conservation Plan

- ❖ Reduce water use to 140 gallons per capita-day by 2020

<http://www.fcgov.com/water/conserv-plan.php>



# City Fort Collins WaterSense Partner

<http://www.fcgov.com/water/watersense.php>



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Water Flow Rate and Consumption Comparison						
Fixture	'09 IPC	IgCC	ASHRAE 189.1	LEED 2009	WaterSense	Proposed
Showerhead	2.5 gpm @ 80 psi	2.0 gpm @ 80 psi WaterSense	2.0 gpm		1.5-2.0 gpm	1.5-2.0 gpm
Lavatory faucet – private (hotel/motel guest rooms, hospital)	2.2 gpm @ 60 psi	1.5 gpm @ 60 psi WaterSense		2.2 @ 60 psi	1.5 gpm	1.5 gpm @ 60 psi
Lavatory faucet – public (metered)	0.25 gpc	0.25 gpc	0.25 gpc	0.25 gpc		0.25 gpc
Lavatory faucet – public (nonmetered)	0.5 gpm @ 60 psi	0.5 gpm @ 60 psi	0.5 gpm	0.5 gpm @ 60 psi		0.5 gpm @ 60 psi
Kitchen and bar sink faucets (non-residential)		2.2 gpm @ 60 psi				2.2 gpm @ 60 psi
Urinal	1.0 gpf	0.5 gpf WaterSense or nonwater urinal	0.5 gpf	1.0 gpf	0.5 gpf	0.5 gpf
Water closet stool	1.6 gpf	1.6 gpf	1.28 gpf WaterSense	1.6gpf	1.28 gpf	1.28 gpf
Prerinse Spray Valves (foodservice applications)		1.3 gpm @ 60 psi		≤ 1.6gpm		1.3gpm @ 60 psi
Drinking Fountains (manual)		0.7 gpm @ 60 psi				0.7 gpm @ 60 psi
Drinking fountains (metered)		0.25 gpc				0.25 gpc

Key: g – gallon(s)  
gpm – gallons per minute  
gpf – gallon per flush  
psi – pounds per square inch  
gpc – gallons per cycle

Suggested Commercial High-Value Green Building Code Requirements						
Water Resource Conservation and Efficiency						
FL/29/10						
Green Building Category	Green Building Practice	Description	Intent	Reference	Amend	Administered by?
Water Resource Conservation and Efficiency	Maximum flow rates for reduced water consumption for plumbing fixtures and fittings.	<i>See attached comparative flow rate table.</i>	Reduced building use water consumption.	IgCC 702.1; ASHRAE 189.1 6.3.2.1 WaterSense '09	'09 IPC	Building Services Dept. <i>Verification Utilities?</i>
	Leakage limits on combination tub/shower valves.	Tub spout leakage from combination tub/shower valves not more than 0.1 gpm.	Reduced water consumption.	IgCC 702.2	'09 IPC	Building Services Dept.
	Maximum flow and automatic shutoff on pre-rinse spray heads in food establishments.	Pre-rinse spray head automatic shutoff required with a maximum flow of 1.3 gpm.	Reduced water consumption.	IgCC 702.3	'09 IPC	Building Services Dept.
	Efficient hot water distribution system.	Water in piping between hot water source and hot water outlet is 87 oz. maximum.	Hot water conservation.	IgCC 702.8	'09 IPC	Building Services Dept.
	Water conserving irrigation design.	Hydrozoning of automatic irrigation systems to water different plant materials such as turfgrass versus shrubs required. Landscaping sprinklers not permitted to spray water directly on building or within 3 ft. of a building	Site water use reduction.	ASHRAE 189.1 Section 6.3.1.2	LUC	Development Review
	Controlled landscape sprinklers.	Landscape sprinklers controlled by <i>smart controllers</i> that use evapotranspiration rate <i>ET</i> and weather data to adjust irrigation schedules	Site water use reduction.	ASHRAE 189.1 Section 6.3.1.3	LUC	Development Review

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	Efficient vehicle wash facilities.	At least 50% of rinse water is reused for washing. Self-service spray wands limited to a maximum of 3 gpm.	Water conservation.	IgCC 702.14 702.15 702.16	'09 IPC	Building Services Dept.
	Potable water restrictions in HVAC systems and equipment.	Restricts use of potable water in specific HVAC applications.	Water conservation.	IgCC 703.1 thru 703.6	'09 IPC	Building Services Dept.
	Water consumption management.	Measurement devices with remote communication capability shall be provided to collect water consumption data for domestic supply to the building. Potable and reclaimed water entering the building project—monitored or sub-metered. Rentals in excess of 50,000 sq ft. separate sub-meters.	Water conservation through consumption management.	ASHRAE 189.1 6.3.3.1; IgCC 705.2	'09 IPC	Building Services Dept.
	Commercial Food Service Operations Water Use Reduction.	ENERGY STAR dishwashers; boilerless/connectionless food steamers no more than 2.0 gph; ENERGY STAR air-cooled ice machines.	Potable water conservation	ASHRAE 189.1 6.4.2.2	'09 IPC	Building Services Dept.

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## Next C-TRAC meeting

Wednesday August 18th  
Streets Training Room  
625 9<sup>th</sup> Street  
3 – 5:30 pm

IgCC Chapter 8: Indoor Environmental  
Quality IEQ