Energy Code Meeting
September 10, 2020

SDCI Staff
Merria Norris, Micah Chappell, Jenifer Gilliland, Duane Jonlin, Shailesh Desai

General Public
Lisa Espinosa, Brain, Harpreet Sandhu, Jeremy McClanathan, Buddy, Nick Rollins, Luis Martinez, Adam Neujebauer, Bill Babbitt, Chris Falcetti, carolinetr, James, R, Steve Bader, Jess Harris, Katy Beth Smith, Tanvi Dhar, Ben Gezon, Bonnie Frye Hemphill, Dani Gardner, Aaron Whitlatch , Andi Burnham- Rushing, Cam Iseri, Charlie Gronek Seneca, Daniel S. Hamilton-PE, David Park, Doug Edwards, Elizabeth Joyce- ARUP, Eric Vander Mey-Rushing, Greg Gilda, Hyunwoo Lim, James, Dan Luddy, Jared Landsman, Jess Harris, John Kearns, John Lee, John Putre, Julie Banerjee, khokhaj, Kjell Anderson, Lachlan, Laurel Schandelmier, Jillian.Coday, Lucie Huang, Luis Masartinez, Lyle-AEI, Val, Mary Hamann, Matt Quigley, Michael Baranik, Michael Bigelow, Michael Thomson, Michele Wang, mikef, Mugdha Mokoshi, Nathan Miller-Rushing, OB360, R, Reed Rushing, Remington Husted, Robby Oylear, mikeg, Sandra Mallory, Scott Spielman, Sergio Sadaba, Steve Bader, Tom Cole, Todd Kuhn, Tommy Ruggles, Zach Stevens, Amarpreet Sethi, Callan Mcleod, Casey Dilloway, Henry Odum-Ecotope, Kathleen Petrie, Kris Forck,

The meeting agenda covered proposed amendments to C406 Additional Efficiency Credits and C407 energy modeling.

Agenda: C406 Efficiency Credits

1. C406.1. Increase C406 credit requirements to 8 (from 6) credits
2. Table C406.1. Reduce to two credits for “basic” R-2 DOAS (double dipping)
3. Table C406.1. Disallow C406.1. Disallow C4096 credits for fossil-fired equipment
4. C406.2. Eliminate credit for low-energy spaces with radiant heat.
5. C406.5. Use straight 0.25 W/sf requirement instead of annual PV production.
6. C406.8 & C406.9 Modify HPWH credits to coordinate with R-1 & R-2 requirements in C404.2.3.
7. C406.12. Eliminate C406 credit C406 credit for commercial kitchen equipment.

Agenda: C407 Modeling

1. Table C407.3(2). Require BPF (building performance factor) 10% below WA Appendix G modeling values.
2. Table C401.3.1. Base TPP (Target Performance Path) targets on Appendix G BPF values, instead of a set list of values.
3. C407.3.1. Prohibit envelope heat loss greater than allowed by prescriptive code.

Duane Jonlin began the meeting by reviewing the intention and guiding principles of Seattle code development.

- Build great envelope
- Eliminate combustion
- Use electricity wisely

- Generate power

The C406 credits slides were reviewed and the following input from participants was received:

C406 Efficiency Package Credits

Disallow C406 credits for fossil fuel-fired equipment

Nathan Miller, Rushing- Seems like we need some language clean-up to not reference 90% of total building area, but instead area being considered w/in occupancy type? You can break apart the c406 calculation into chunks of the building into occupancy type. If you broke apart R2 occupancies from the retail because it is a mix-use building you need 90% of your space within that category to meet this requirement to get the points within this calculation. The concept is to be able to break up your building into multiple chunks as long as the area weighted eight points are achieved.

Duane – Every part of the building needs to get its credits. They could potentially get different credits for each area, so the area-weighted credits for the whole building (where all areas of the building were under the same permit) would have to equal the full 8 credits.

Laurel Schandelmier- I think an informative note with a sample area-weighted average calculation for C406 credits would be really helpful. Especially with R-2 dwelling units vs common space, low energy (garages), etc. That could get very confusing and supplying a sample calc showing how that calc is done would be helpful.

Duane – Yes, this would be helpful. Please create an example and send it to me.

Eliminate credit for low-energy spaces w/radiant heat

Aaron Whitlatch- Table C406.1 footnote d does not align with the code's definition of R-2 occupancy types. Aren't corridors already counted as R-2 area along with dwelling units?

Duane – The dwelling units themselves have different code requirements from other areas. We're not giving the full credit for DOAS in dwelling units because that is double dipping. The common areas can take full credit. Please send comments regarding the language.

Straight 0.25 W/sf for renewable credit—See comment from Eric Vander Mey below

Eliminate Commercial Kitchen Credit

Charlie Gronech- How does an office TI meets the eight-point requirement? Concerned that if a building does not do any of these measures then an office IT really does not have a path forward to achieve the required eight credits.

Duane – If you set up central HVAC system and comply with one of the higher-level credits then when you extend that system out into the office area or retail space then you get credit for that system. It was not worded clearly in the State code. It is up to the design team to make sure there is a viable path for the tenant spaces to be able to comply with the 8-credit requirement, or they could have unleasable spaces.

Eric Vander Mey- Rushing- A core shell office building could achieve four credits during their core shell phase and could achieve four more credits during their TI phase for a total of eight credits to meet the requirements. Assume they are not doing any tradeoffs. Rushing is working on some language that we will send over to you.

Duane – If you have high efficiency water heating in your office or something that is not appliable to the tenant spaces themselves would not count. IF you do solar improvements, envelope improvements, or a base HVAC system that is extended out into the tenant spaces then they will count towards the 8-credit total.

Eric Vander Mey- Rushing- C406.5 - Is SDCI open to a 1/3 of 0.25 w/sf for 1 credit and 2/3 of 0.25 w/sf for 2 credits option all occupancies get 3 credits for this measure? If so, Rushing will submit code language for this.

Duane – This sounds reasonable.

Adam – JRS- Can you follow up on previous conversations with C406 or revised C406.11 for reduced envelope leakage and also changes to C402.5; there were previous conversations about formalizing a "PV penalty." Now that C406.11 and the base C402.5 have a must-pass target, could we formalize some language in the code so that if they test the building at the end of the project and exceeded that the test standard, rather then having to fix it or find a new C406 credit, they could add some additional PV on the roof to offset the additional energy costs from that excess leakage? Since C402 has the same teeth would that also apply in the off chance that you can not meet that .4 under the new code?
Duane – We will not put that into the code language but into a Director's rule that will describe that process separately, since it is a procedural issue that may need to be modified further along. If you are basing your C406 points on having higher efficiency, then a building envelope leaking too much air when it gets tested, we would find some way around so we would try to find an equivalent to calculate how much energy is being lost by not having proper air tightness and make up for that with some other idea. Usually when a building is complete and all the systems are in and tested, your only option is to add some solar. The 0.4 max leakage rate is a serious requirement. The target is 0.25 and we are allowing a "grace period" up to 0.4. If it is not 0.4, then the contractor has to fix something so that it passes or arrange for some other option with SDCI.

Micah Chappell to everyone- Just wanted to mention, further language changes need to be complete within the next 4 weeks.

Elizabeth Joyce, ARUP- Regarding the TI question, there is also the situation in which the C&S is permitted under 2015 code, but the TI is under the 2018 code. This is unclear in our current reading of the code.
Duane – For buildings that are built under the 2015 code, the clock starts running when they get their certificate of occupancy and for eighteen months you can apply for a permit for TI spaces under the current 2015 code. That usually accommodates all the tenant spaces, but the exception is when we run into a recession and those spaces are not occupied right away. Typically after the eighteen months, the new space has to meet the new code, so we will need to renegotiate something for situations where there might not be a realistic path for an office floor under the old code to meet the new 8-credit standard.

Eric Vander Mey- Rushing- There is a state building code council opinion on this question also. In the transition from 2015 to 2018, if you have the core shell components that are applicable then they would continue to be appliable. I will do some research.
Duane – As we will certainly run into these situations over the next few years, we will not try to cover every potential situation upfront with a formal rule. We will take each situation into consideration individually and will ensure we are getting reasonable energy efficiency out of it somehow.

Kjell Anderson- Could Table C406.1 have a footnote for those credits that carry forward for the C+S to the initial TI, then stating that others do not carry forward?

Jess Harris- Just an FYI, for Priority Green Expedited we are proposing a prescriptive approach using C406. An additional 6 credits so a total of 14.
Andi Burnham, Rushing- Jess - Same for Green Building Standard?
Jess Harris- We are not proposing an energy efficiency requirement for the green building standard. Just what you will need to do to achieve the certification under LEED, Built Green, etc. And your buildings will need to be all electric. We will be doing separate outreach on what we are proposing. Priority Green Expedited will be harder to meet in comparison to the Green Building Standard. We will be requiring all the buildings to be all electric so whatever the energy code proposes you would have to go the extra mile to use the incentive.

We would have a prescriptive energy efficiency requirement to have priority green would be six additional credits under C406 but for the green building standard there would not be an extra energy efficiency requirement; it would just be whatever is needed to achieve the goal to get the green building certification, such as Built Green 4-star.

Duane – We will have you (Jess Harris) talk specifically about how the incentive zoning programs will work as part of the September 24th meeting.

Laurel Schandelmier- Is this interpretation correct- covered parking garages are low-energy spaces per C402.1.1. So, they require 4 C406 credits, using the "All Other" column. Since they are unconditioned spaces, there is no HVAC or DHW. Really the only applicable category is lighting. The 20% lighting reduction per C406.3.2 is essentially the only pathway to compliance?
Eric Vander Mey- The State code, yes, that has been interrupted an enclosed parking garages would be required to comply and would get three credits at the State level. The ample of the credits would be PV and lighting and you could achieve less in that category. Seattle may want to clarify the code.
Duane – Any building does need to achieve these credits, so lighting and solar tend to be your available options for garages and that is why we cut the required credits for spaces like this in half, to 4 points rather than 8.
Eric Vander Mey- Rushing- WSBCC Opinions on 2018 WSEC:
https://www.sbcc.wa.gov/sites/default/files/2020-06/20_05_wsec.pdf, Q&A #20

Andi Burnham, Rushing- But would not if an open garage?
Robby Oylear- What I heard seems to indicate C406 is required for parking garages/unconditioned spaces.
Duane – right, parking garages and unheated warehouse are the typical applications at some storage facilities. Lighting and solar.
Eric Vander Mey – Rushing: At the State level open parking garages are included but not the upper deck. (The top deck of a garage is a roof.)
Jenifer Gilliland- If it is either an enclosed or unenclosed parking garage then it applies.

Energy Modeling
WA – Modeling: Appendix G & Carbon Metric

C407 TBP – Total Building Performance

TPP – Target Performance Path
Andi Burnham, Rushing- In 90.1 savings calculations, the BPF is applied to regulated energy only. Is SEC planning to lean on the 90.1 definitions of regulated vs. unregulated uses?
Duane – No, we're only referencing Appendix G out of 90.1, not the whole standard. We are complying with Appendix G rules with the exception that we are defining it as a carbon metric.

Baseline Glazing Percentages (Table G3.1(c) & G3.1.1-1, Appendix G
Laurel Schandelmier- For a mixed-use building, is the allowable glazing ratio calculated as an area-weighted average? Or is the Target UA calc performed individually for each building type?
Duane – Mixed-Use building. If you have one floor of retail and eight floors of residential would we evaluate each of those percentages separately, or would allow some area-weighting? We will discuss in-house and get back to you.

Andi Burnham, Rushing- For UA allowable calcs, is the WWR an allowance (where you can take credit for glazing < the allowable %)? Or a ceiling for the proposed WWR for the purposes of the UA compliance?

Duane – For UA (U-factor X area) our rules have not changed: it is the ceiling. For the appendix G modeling it is a baseline and you would get credit for using less glazing and penalized for using more, at least for those use types that are listed.
Andi Burnham, Rushing- So do you need to utilize the Low-U exception for spaces that allow 40%? or the straight C402.4 performance?
Duane – For energy modeling, my inclination is to reference only the U-values in the table.

Eric Vander Mey- Rushing- C407.3.1 does not clearly indicate which fenestration u-factors from C402.
Is the intent for SEC that regardless of window to wall ratio of the overall building that the glazing u-factors for the Allowable UA come from Table C402.4, or-?
Is the intent for SEC that based on the window to wall ratio of the overall building do the respective glazing u-factors come from Table 402.4, Section 402.4.1.1.1, and/or Section 402.4.1.1.2?
Duane – There is no other source of U-factors, so they come from C402. Send me language. Seattle code energy modeling cannot be used to make the UA worse than prescriptive.

Nathan Miller, Rushing: hold on, follow up on glazing %. Key Seattle verbiage added to C403.7.3.1 the limits on substandard building envelopes. Allowable total UA shall be that shown in ASHRAE Table G3.1.1-1, that is the table that had all that other glazing percentages. We will send you some clarification language.
Duane- This point out a bust in the system that we need to resolve. The direction I am going is, if you are dong energy modeling you would use appendix G percentages as your baseline and if you are doing a prescriptive path building UA calc then you would use thirty or forty percent.

<u>Limits on sub-standard envelope</u>
<u>Open Forum</u>
Charlie: This is going to make the UA calculations be really critical and my concern is inconsistency in calculation methodology and application. There are a lot of assemblies that are calculated in a lot of different ways and it all gets accepted. I am concerned on how it all will play out.
Duane – If you have some examples of situations where something can be calculated in several different ways, can you please send this to me. This would work well to use one of our online tips to pin down the UA calculation and how we would handle special situations.

Aaron Whitlatch: For C407 compliance, with regards to the UA allowance requirement, can you claim a higher WWR allowance for either optimized daylighting or high-performance fenestration? (typically, this would bring the WWR allowance from 30% to 40%, but where does that leave us if we reference ASHRAE 90.1 WWRs?)
Duane – There are typically only two building types that ever ask for more than 30% glazing- high-rise office and high-rise residential. I have seen as high as 70% for those types of buildings, but no other building types really have problems meeting the lower glazing limits. If you are following the energy modeling path, you have to use the appendix G method and it does not include those special set asides for day light area.

Mary Hamann- To Charlie's point, maybe create a tip sheet with a building diagram of all of the assembly conditions to be accounted for, e.g. parking garage columns penetrating floor insulation.

Laurel Schandelmier- Is Seattle going to be using online forms for the UA calc similar to the WSEC forms? or Seattle-specific excel forms? I could see the UA calc for TBP specifically getting very complicated and not sure how that will be dealt with on the forms.
Duane – The excel forms are being retired completely and I have to check into the budget to see if they can create the online forms for Seattle requirements. In any case will have something available for you on the

website that has the correct values. PNNL expects to have those online resources available by the end of the year.

Robby Oylear- If I heard correctly, Duane is leaning towards requiring buildings complying with C407 to use the WWR% per Appendix G in the UA calculation. It seems like it would be simpler to just refer projects to the base code language for UA compliance (which defaults to 30% WRR) rather than try to craft new language telling projects to use an alternate WWR% from Appendix G. This also penalizes any project that is going for C407 compliance where the target in Appendix G is <30% (hospital, schools, etc.).
Duane – No, that is not correct. But maybe I did not word it correctly. I will make sure I get that fixed in the wording so that when you are doing the energy modeling use the same base line UA that is in the appendix G.

Aaron Whitlatch- ASHRAE 90.1 App. G requires that the standard reference design (baseline) building be simulated 4 times, with 90, 180, 270-degree rotations. Will this be required for the 2018 SEC?
Duane – We are not proposing any change on how it works other then what has already been mentioned. Do not want to mess with their formula.

Aaron Whitlatch- As a follow-up, the LEED v4.1 Minimum Energy Performance Calculator, which is used in tandem with 90.1 Appendix G, allows for a project to NOT simulate with the additional 3 orientations if the local energy code states otherwise
Duane – Your decision to pursue LEED is your decision. You can send me some information and I can look into that. It is another thing that I can ask the people that wrote the appendix G; what is the purpose of rotating that building.

Dan Luddy- Duane, if C407 is no longer a way to trade off envelope performance, do you anticipate a significant reduction in the use of C407 on new projects?
Duane – It has been the exclusive reason that people have been doing energy modeling for code compliance is to get rid of that perimeter slab edge insulation. However, owners may still want to use modeling to achieve incentive zoning bonuses.

Andi Burnham- Rushing- I'd also like to touch on C412 and PV in the C407 model - there is no PV requirement in 90.1, so any code required PV does get to benefit the proposed model, correct?
Duane – I am not sure, so I will have to look into it.

Zach Stevens- Can the TPP still be used to trade off envelope performance, or does the same rule apply as for C407?
Duane – It also requires the envelope to maintained.

Robby Oylear- RE: Rotating the building. It's less about the labor to perform additional simulations and more about the typical site in downtown Seattle which has very little flexibility in orientation. You'll potentially penalize the performance of a building that has only really one realistic exposure dictated by the site and existing urban infrastructure. The argument for not rotating the building would be that most sites in Seattle are already developed (not greenfields) and do not have much flexibility in orientation.
Duane – That is a really good point. Let's look into this and we will make a decision.

Ben @ FSi: Is PV required if you do the C407 path?
Duane – I will have to look into it. It is a tiny fraction of the overall energy use.

Caroline tr- With SEC Appendix E gone, can you talk about energy model reporting requirements for C407 projects?
Duane – I have contacted the people who are putting together the compliance forms for appendix G nationally and they are willing to make a version for the State and for Seattle. I do not know the timing on that but hopefully in the next few months.

Aaron Whitlatch- Follow-up to Andi's question-- C412.1 exception 2 contradicts what Duane responded. PV can only be claimed that goes above and beyond requirements of C412. How it gets applied is not clear.
Duane – Not sure if it contradicts but I will investigate it.

Laurel Schandelmier- TBP is addressed in C412 - the baseline is supposed to incorporate PV. If you don't have PV in the proposed, the baseline BPFs are reduced by 3% (multiplied by 97%). If the proposed exactly matches C412 PV, no change. PV above C412, you can take credit for up to a cap.
Duane – I will have to come back and read this question later and get back to you.

Nathan Miller, Rushing- I don't think the baseline is ever supposed to incorporate PV, that's not a 90.1-2004 requirement

Laurel Schandelmier- Right, the baseline doesn't explicitly represent the energy generated from PV. Only the BPFs are affected.
Duane – The baseline in appendix G represents is how much carbon would this building have emitted if it had been built to that minimum standard and comparing it to how much carbon will be emitted from the building as proposed. There are plenty of things that did not exist in the 2004 ASRAE that do exist now in ASHRAE. It is not about specific measures but rather the overall energy use and carbon emissions.

Aaron Whitlatch- SWITCHING GEARS-- ASHRAE App. G penalizes projects that provide higher ventilation than that required by code, whereas prescriptively projects can overventilated by 150%. Doesn't this introduce penalties for common mechanical design practices? Will chilled beams (which would require additional OA) ever be able to pencil out?
Duane – Not sure if that is accurate if appendix g penalizes but send me an email with that reference and I will look into it.

Laurel Schandelmier- Is there any impetus to allow in-progress/submitted mechanical or electrical permits to substantiate TBP submissions, rather than the requirement for such permits to be approved prior to approval of the TBP report/building permit?
Duane – Yes, the is a problem. We often have separate design-built contractors submitting for the whole electrical package after the building permit has gone through. The modeling reports indicates that it will meet all the high-performance claims that we are modeling. We do not have a system to track this currently. If you have any ideas, please send them to me.

Robby Oylear- It should be okay for Appendix G to have different requirements than base SEC language. The BPF values must account for those differences though - which at this point they probably do not.
Duane – Say your building performance factor for a school is supposed to be .36 and we may be able to accommodate some of the other things in the Seattle code by saying .35 to approximate the same level of energy savings. I am open to any suggestions.

Andi Burnham Rushing- The entirety of Section C404 is referenced as mandatory for C407 and C401.3, Seattle has added significant language about sizing criteria, etc. Is it appropriate for all the new language to apply for all design pathways?
Duane – Yes, but I am open to other examples that should not be treated in this same manner.

Laurel Schandelmier- The BPF for multifamily is not planned to be reduced after 2022 to account for the heat pump heating requirement, correct?
Duane – yes, that is correct.

Holly Townes- The envelope of the building is one of the hardest things to change once the buildings is built. Therefore, I totally support the envelope not being used as a trade off in modeling.

carolinetr- https://www.energycodes.gov/ashrae-standard-901-performance-based-compliance-form

Aaron Whitlatch- Duane-- do you prefer separate email chains for each of the items you have asked us to follow up on? (for your organization).
Duane – Individual will be the best so they can be categorized.

Henry Odum, Ecotope- Back to UA limits in C407: it sounds like if a building goes with C407, it gets a lower glazing allowance than prescriptive path, no matter what else is in the proposed building design -- so that will likely cause most project teams to pursue prescriptive path and meet minimum standards wherever convenient. In general, what do you now see as the reason to model via C407? And do you think that the prescriptive requirements are tight enough to keep MEP design efficient?
Duane – ASHRAE did a good job in this case in picking a reasonable target. It works out well. Except for the two high-rise cases no one had any problems with the glazing area.

Nathan Miller, Rushing- You don't t have to comply with C406 if you go C407 route.
Duane – correct.

Aaron Whitlatch- @Henry, the large office and multifamily WWR allowances to meet the UA requirement under C407 are more generous (40%) than prescriptive (30%).

Jess Harris- We actually want to make it more appealing to not model for green building.