



Air Infiltration

The prescriptive pathway has been adjusted to award 2 points for 1 nACH of air infiltration. This approach is consistent with the current distribution of points and incentivizes owners to have blower door testing performed, which provides data to the City and encourages further air sealing efforts by the owner.

ECM Motors / Modulating Units

ECM motors: The savings associated with an ECM motor varies depending on the efficiency of the motor that is being replaced and the efficiency of the ECM motor itself.

The prescriptive pathway could be adjusted to award 5 points for ECM motors. However, this approach is liberal, in that it represents a best case scenario for the CO₂ reduction associated with an ECM motor. For the purposes of this best case scenario, we assumed that 700 kWh/year could be saved by replacing a very inefficient blower motor (1,000 kWh/year) with an efficient ECM motor (300 kWh/year).

In practice, installing an ECM motor in an existing home that has a poorly installed duct system may yield significantly less electricity savings. In such cases, the static pressure of a poorly installed duct system may cancel out some or all of the energy savings associated with ECM motors. In these worst case scenarios, 0 to 2 points would be justified under the prescriptive pathway.

As a mid-ground approach, we recommend awarding 3 points under the prescriptive pathway for ECM motors. Under this approach, we assumed about a 300 kWh/year savings based on a 700 kWh/year motor being replaced with a 300 kWh/year ECM motor.

Modulating Furnaces/Boilers

While modulating furnaces/boilers can increase comfort and prolong equipment life, the ability to modulate alone doesn't necessarily make a unit more efficient than a properly sized non-modulating furnace/boiler. Modulating furnaces tend to incorporate ECM motors, so these units will already receive "bonus" points in that category. Any incremental efficiency increase beyond those attributable to the ECM motor aren't large enough to warrant additional points under the prescriptive pathway (these modulating units also tend to be high-efficiency, so they are already awarded more points).

Lighting

Planning Board asked staff to address several questions that impact the prescriptive pathway lighting category.

From a health and safety perspective, there were recommendations that LED lighting or encapsulated CFLs receive more credit on the prescriptive pathway due to mercury considerations. Changing the prescriptive pathway to favor encapsulated CFLs or LED lighting would create a divergence between the prescriptive and performance pathways, since RESNET HERS ratings account only for the percentage of lighting that qualifies as high efficacy lighting¹.

From an energy efficiency perspective, high efficacy LEDs are only slightly more efficient than CFLs, so additional points are not justified. As a general approach to the lighting category, it is our recommendation that the lighting category be changed from CFL/LED to award points for all high efficacy lighting. High efficacy lighting should be defined in terms of lumens per watt (at least 40 lumens per watt) as it is currently defined under the City of Boulder's Green Points program.

In addition to expressing a desire to award more points for LED lighting, Planning Board asked that staff research awarding points for solar tubes and natural daylighting techniques. It is our recommendation that solar tubes/light tunnels be included in the definition of high efficacy lighting for the purposes of the prescriptive pathway and be given credit by counting each one as a light fixture in the calculation of the percent high efficacy lighting. For homes employing advanced daylighting strategies beyond solar tubes, we recommend that the City award points to each case in its discretion under the innovation category.

Solar

Solar Thermal

¹ Likewise, differentiating between permanently installed CFL-only fixtures and CFL bulbs would create a divergence between the prescriptive and performance pathways, since HERS ratings do not differentiate between high efficacy fixtures and high efficacy bulbs.

The prescriptive pathway has been revised to provide more standardization and flexibility for the awarding of points for solar thermal.

Solar PV

Planning Board expressed concern regarding a PV-only compliance pathway. To address these concerns, our recommendation would be to require some minimal level of energy efficiency before awarding points in the solar PV category. To determine the threshold of points that should be required, we assumed a hypothetical home that met minimal envelope efficiency standards and found that the home earned 70 prescriptive pathway points.² In order to give credit for the investment in solar PV and to align with staff's recommendation for phasing option 2b, we would recommend requiring a minimum of 50 prescriptive points before awarding points for solar PV.

Solar Gardens

In the event that future legislation allows that an interest in a solar garden be attached to a home through net-metering, the prescriptive pathway should treat them as comparable to other solar PV.

Power Purchase Agreements

On the one hand, it makes sense to treat the installation of solar PV under a power purchase agreement the same as rooftop solar on the prescriptive pathway. On the other hand, a power purchase agreement may more closely resemble a carbon offset or the purchase of Windsource power from Xcel Energy. However, given the carbon emission reduction associated with the installation of solar power and the economies of power purchase agreements, we recommend giving comparable credit under the solar PV category for properties with leased solar.

Slab/Floor/Foundation

The slab/floor/foundation category has been revised to create more equity in the prescriptive pathway between slab-on-grade construction and homes with crawlspaces. To accommodate for these changes, the "wall" insulation category was adjusted (so we don't overweight the envelope and also to account for the extra points for no air conditioning), rather than reweighting the entire pathway.

Air Conditioning

Planning Board was divided on the issue of the proper point allocation for properties with no air conditioning. On one hand, homes that have no air conditioning consume much less energy than homes that install energy efficient air conditioning. Under this reasoning, maximum points should be awarded in the cooling category for homes with no air conditioning. However, on the other hand, in properties without

² We assumed the following: at least R-13 in walls (25); at least double metal windows (4); R-19 attic insulation (24); 1.0 nACH (2); uninsulated slab (0); leaky ducts (4); insulate accessible ducts (6); no points required in heating/DHW category; 50% CFLs (4 points); no cooling points (0); no refrigeration points (0); programmable thermostat (1)

air conditioning tenants are likely to install window-unit air conditioners which are very inefficient (SEER 10) and consume large amounts of electricity. In practice, if a property needs the “no air conditioning” prescriptive points in order to qualify under the SmartRegs prescriptive pathway, it is likely that the home has minimum levels of insulation, causing the home to be hotter in the summer, thus increasing the likelihood that tenants will install air conditioning. The current point allocation for cooling is intended to strike a balance between awarding no points and awarding the most points for homes with no air conditioning. We recommend that the current point allocation for cooling remain the same. From a policy perspective, a safeguard could be added by requiring landlords to include a “no window unit air conditioning” provision in a lease.

Multi-Family: Is it easier to comply with a HERS 120 than single-family?

We are investigating this further, but our initial results have not justified a recommendation to change the current requirements for multi-family.

Baseboard / Radiant Heating:

Homes that have radiant heating receive 17 points in the duct leakage category and 7 points in the duct location category, in addition to mechanical equipment points based on the boiler efficiency. A note has been added to the prescriptive pathway “Duct Leakage” category for clarification.

Incentives for Early Adoption:

While early adoption is desirable, our recommendation is that the incentive does not come from inside the prescriptive pathway (by awarding bonus points), unless the phasing option is adjusted to require more than 50 points in the first rental cycle. Given the minimal level of efficiency represented by 50 prescriptive pathway points, it is likely that many rental properties will meet this threshold without making any efficiency improvements. Giving incentive points to early adopters lowers this initial threshold even further and could create a loophole that would allow most properties to comply during the first rental cycle with no efficiency improvements.

In addition, incentivizing with points inside the prescriptive pathway creates a fundamental divergence between the prescriptive and performance pathways. In order to keep the performance and prescriptive pathways roughly aligned, it is our recommendation that incentives come from outside the prescriptive pathway.

The City could provide financial incentive by discounting the cost of rental license renewal for early compliance. In addition, the Two Techs and a Truck program should be structured to provide incentives for landlords to become early adopters by providing subsidized audits/testing and rebates for improvements. Further, if the City leveraged the volume of the Two Techs program to receive bulk, discounted pricing on improvement measures, this benefit could be passed on to landlords as an incentive for early adoption.

Multi-family Sampling:

For multi-family buildings, a sampling protocol should be provided for the prescriptive and performance pathways. This would decrease the financial burden associated with having audits and performance testing performed on each unit in a complex and would allow owners to invest this money in improvements instead. For example, the City of Boulder could require that 30% of the units in a multi-family building show compliance through a HERS rating or that 30% of the units receive prescriptive pathway verification. For the sampling protocol to apply, the landlord must give reasonable assurances that the specifications for each unit are substantially similar and the inspector should randomly select the units for auditing/testing.

Testing the Prescriptive Pathway in “Worst Case” Homes

Ken Regelson suggested that we ask the landlord association to find five (or three) outlier, worst case properties to see how they fare under the prescriptive pathway. Our recommendation would be to reach out to the landlord's association and pursue this approach. This would engage the landlords and provide insight on the application of the prescriptive pathway to worst case scenarios and perhaps illuminate areas of hardship where exceptions are warranted.

EPA Lead Paint Rules

Window replacement: The EPA lead paint rules apply to window replacement no matter how much area is disturbed and it appears that the cost impact of the rules will be high. For example, we spoke with the local window company that performed the window replacement on the Spanish Towers property regarding the impact of the new regulations. The window company estimated that the new rules would have raised the cost of that project from \$475 per opening for installation to \$750-\$800 per opening for installation. In general, while they expect that the cost impact of the new rules on window replacement will decrease a bit over time, it is likely that the EPA rules will cause a 35-50% cost increase on replacement window installation.

Insulation: There will likely be little to no impact on the cost of “drill and fill insulation” due to the EPA's new lead paint rules. The EPA's lead paint rules don't apply unless the contractor disturbs six square feet of wall area per room (the equivalent of 275 2” holes in one room). We spoke with a local insulation company regarding the impact of the new rules on drill and fill insulation and insulation retrofits and they didn't believe there would be any impact since it is unlikely that the rules would ever apply to this type of work.

Other: With the exception of insulation, there are no other categories on the list that would disturb interior wall area. It is possible that a landlord would trigger the regulations by adding exterior insulation, but this is not a common compliance option, as there are other alternatives under the prescriptive pathway that are less invasive.