

**From:** [Amy Musser](#)  
**Subject:** Upcoming residential energy items at code hearings  
**Date:** Saturday, December 5, 2020 9:58:13 AM

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I'm writing to members of the NC code council to urge you not to pass two proposals that are on the upcoming agenda. As a member of the NC building performance association, and a mechanical engineer and home energy rater who works in-depth with these specific residential energy code topics, I believe that both of these proposals touch on issues that the code council could take up, but that both are also deeply flawed. The timeline for these proposals has been very compressed, and I am concerned that the code council is about to make a rushed decision that won't benefit homeowners or builders in the state.

*Proposal on spray foam in unvented attics:*

The first proposal of concern is the combination of items B-6, 7, 15, 20, and 21. The goal of this package of proposals is to allow a lower R-value for spray foam used in unvented attics than would be used for fiberglass or cellulose insulation in a vented attic assembly. I have actually worked with hundreds of homes that have spray foam attics, and I do generally support builders using a lower R-value with spray foam. However, I don't think this is the right proposal to accomplish that. Builders currently have several options that allow them to do this, including the UA equivalent (REScheck) or Section 405. The primary reasons that spray foam can function better at a lower R-value are that (a) it tends to result in a more airtight home, (b) it often brings ductwork and HVAC into conditioned space, and (c) it tends to be installed better than some other insulation types. All of these things are fully accounted for by using Section 405. I do agree that section 405 can be difficult for builders to use since a licensed design professional is required, but I think the better way to accomplish this is to open section 405 up to HERS raters, rather than to abandon the need for tradeoffs altogether.

My second objection to this proposal is that the R-values are too low. Spray foam installation is by nature uneven. If the code is going to require R-20 in most of the state, the low spots in insulation are likely to be as low as R-15. This opens up risk of condensation and uneven attic temperature and possibly humidity. Using open cell foam, this is only 5.4 inches - not enough to cover most structural members, creating a lot of thermal bypass. I think it also opens up the likelihood of low-quality out of state suppliers coming to NC and doing very light spray jobs, which is something we already sometimes see. Code officials are not probing multiple locations in attics to discover every low spot.

I do think the proposal tries to do something that the code council needs to look at, which is to specify a minimum R-value for air-impermeable insulation when it is combined with an air permeable insulation in an unvented assembly. This is something that is in the newer IECC codes and that hasn't been adopted by NC, but can lead to serious moisture problems. I have seen homes where too little (or no) impermeable insulation has been used in an unvented assembly and moisture problems developed. I do, however, think that this can be added to the code without reducing the R-value required.

*Proposal for ERI with no backstop:*

In my opinion, this proposal is even more seriously flawed than the previous one. And being a certified HERS rater who would potentially gain business from this if it passed, my opposition should be all the more meaningful.

The primary problem with this proposal is that it removes ALL backstops from the ERI pathway. The ERI pathway, was developed in the I-codes with a robust backstop for a number of reasons. I do agree that the backstops in the current code are more aggressive than they need to be. It looks like the ERI and backstops were taken from the I-code without modification, but since the rest of our energy code was modified, the backstops are actually just as strict as our code, causing it not to be used. However, the answer to this isn't just getting rid of the backstops entirely. I would welcome the code council working on the backstops to make the ERI more usable.

The energy modeling that produces the ERI can sometimes do weird things if you have unrealistic inputs, so I do not trust having no lower bounds for what builders can use. Buildings can also behave unpredictably if they have very imbalanced insulation. Particularly in a climate like NC, if you go very low on an R-value for a particular part of the building assembly, you increase the risk of moisture problems substantially. The energy code has been thoughtfully constructed with a lot of minimum requirements over many years. Removing all backstops is unnecessary and dangerous. I think that sometimes builders want more freedom to do things, but they don't always

realize that they just might get enough freedom to hang themselves. This could ultimately wind up being bad for builders if they ended up with a glut of warranty claims.

I can tell you unequivocally that the times when I've had clients who would have taken advantage of this pathway are all cases where the code has stopped someone from doing something VERY stupid. I've seen people wanting to use bubble wrap for insulation in walls and single-pane homemade windows. People come up with some crazy ideas. If one part of the building envelope gets very bad, you can't always make up for it with other parts. Particularly from a moisture perspective, a single very poor building envelope component can wreak havoc on the entire home.

Thank you,  
Amy Musser

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