

Q&A from June 28, 2022 Builder Forum Series | Part 9 Upper Steps + TOL Step Code Updates

Presented by the Township of Langley (TOL) and Dallas Hordichuk (DH) (Bernhardt Contracting)

Q: How was this decision made to move into Step Code 4 so quickly ?

TOL: The Township is a leader in energy and emissions related policy and had adopted Step Code for residential buildings in 2019. Included in its adoption were plans to adopt the Upper Steps in upcoming years. The data we track has noted industry has been doing well with Step Code compliance where 32% of all BP applications that were subject to the Step Code, exceeded Step Code requirements by achieving one or more Steps above the requirement. Step 3 has been required in the Township since January 2021 in GHG DP Areas and this increase in Step Code requirements comes after two years of progress.

Through consultation with the Province, there is a proposed plan to update the BCBC baseline minimum energy requirements to be similar to the targets of Step 3 of the Step Code, in the upcoming 2022 BCBC. Therefore, aligned with the Township's Climate Action Strategy, and maintaining our position as a leader in energy efficiency, we are proposing requiring compliance with Step 4 for Part 9 buildings as to be above the baseline minimum of the BCBC.

The presentation of the Draft Step Code framework is an opportunity for consultation and seeks the input from our communities to share their thoughts. All feedback received will be reviewed and considered to help shape our framework.

Q: We know we will move to Step 4, did the traders have any training for prepare coming Step 4? From material to installation.

TOL: Step Code has been required by the Township since 2019. The Township has been providing free training workshops since 2018 to support Step Code implementation. The workshops provided training and resources to support industry to adapt design and construction practices so they can meet the technical requirements of Step Code from a variety of priorities such as improving the building envelope, different mechanical system strategies, how to implement an airtight air barrier and more. Furthermore, various external training resources have been released, from BC Housing, ZEBX, other municipalities and more.

We encourage all stakeholders to take advantage of the many resources available out there, including attending all Builder Forum Series workshops and going online to our webpage, tol.ca/qblearn to watch prior, recorded, workshops.

Q: Will most houses today built to Step 3 meet Step 4 if the air changes were down to 1.5?

DH: It's tough to say, every house is different and has different requirements. Please see the [webinar recording](#) at 28:45 to see the response during the webinar.

Q: What is Net Zero certification ?

DH: A certification process set up to prepare houses for on site renewables to offset emissions. The as modeled house will show a 0 GJ/year rating, however, how the homeowner operates that house may vary the result.

- Q: But we don't know what electricity will cost 25 years from now, so how can we know this?
- TOL: From the aspect of overall design and construction, it is a good practice to focus on reducing energy demand outright, balancing a number of priorities; the primary intent of the Step Code is to reduce demand, similar to Passive House. In this case, the occupant is *insulated* from fluctuating or unknown utility costs.
- DH: We don't, but we do know that the cost of combustible material for heating/cooling/DHW will also rise. The point is that electricity in its form now in BC has a much more sustainable footprint than other forms of energy in housing.
- Q: How would hybrid heat pump hot water heater compared to an electric hot water tank with a heat recover device?
- DH: Tough to say without modeling. Each house in each climate zone has different requirements. There are many combinations and pathways forward that we can use to hit our energy targets. We now look at structures as a system as opposed to individual components and the modeling software can predict how the combinations perform relative to each other.
- Q: With all appliances now being electric, do you know what the average electrical service size for single family houses?
- DH: This is a question for an engineer/electrician. See 56:00 of the [webinar recording](#) for the response during the webinar.
- Q: Has your firm been tracking in-service energy usage for these buildings? If so, how accurate have modelled MEUIs been when compared to homeowner's energy bills?
- DH: We have and they do not correlate well. The purpose of MEUI is to create a standard for energy use per square meter of floor area as opposed to energy prediction as each homeowner will operate their home differently.
- Q: Has it been smooth for homeowners to adopt HRVs/ERVs from your experience (compared to if they were previously living in an old house)? Do they ever shut them off due to noise? Are they changing filters enough?
- DH: Yes, it has been an easy adoption. We advise them not to turn them off. The biggest complaint we get is that the homeowners figure that the machines are not on because they can't hear them operating.
- Q: Should EAs be promoting more external air barriers? Why do more builders not use the plywood as an air barrier and tape up the joints then tape the Tyvek?
- DH: I think yes, but each person has different experiences with this. Exterior air barriers are good when standard building science principles are applied for vapor diffusion and we do not create a vapor trap. There is a bit of a learning curve to installing them, but we see them perform much better especially when coupled with simplified building geometry.

Q: I am of the understanding that spray foam does meet the characteristics of an air barrier 2lb closed cell products?

DH: It does but it has other issues. It does not expand and contract at the same rate as wood. We see spray foam fail as an air barrier regularly.

Q: How does cooling load come into this?

DH: This has been noted as an issue in the modeling and is currently being worked on. At the moment cooling loads are not considered.

Q: What have you seen for assemblies to insulate box joists?

DH:

1. Batts with exterior air barriers
2. Batts with detailed poly air barriers
3. (worst performing one) Spray foam

Q: Lots of power outages. Interesting all this electrical heating which many owners not wanting.

TOL: Outages will impact most modern homes equally if they are heated by natural gas or electric systems as modern gas burners have electric ignitions; a value addition of very high performance homes is that they are able to handle environmental temperature swings better as high performance envelopes lose much less heat than non-high performance envelopes.

DH: I think this addressed the issue with all electric systems for heating during power outages. As we design homes to be more efficient by adding insulation and tightening up our building envelope, they will retain heat much longer. Combustion systems no longer have pilot lights, they also require electricity to operate. The exception is luxury loads such as gas fireplaces which may have a battery back up built into them, however, the loads are not currently regulated under building code. It will be more difficult to use them at the higher ends of Step Code due to the air tightness requirements. A chimney is a direct vent to the outside and the units are not sealed.

Q: Have you seen or used solar shingles?

DH: No, too expensive. Panels are much cheaper, modular and accessible.

Q: Any thoughts on through-wall heat pumps like the Innova 2.0?

DH: Haven't seen any installed yet. See [webinar recording](#) at 1:31:00 for response during the webinar.

Q: What do you do with spray foam in renos/landfill??

DH: Put it in the landfill unfortunately, along with all of the material it touches. This is why we should be focusing on low carbon building assemblies as opposed to quick fixes like spray foam.

- Q: What do you recommend in basements if you suggest no spray foam and to move away from plastics like ICF ? I have had to tear out batt-insulated walls in basements that fail.
- DH: Plastics below grade are unavoidable at the moment. Designing away these issues and using framed pony walls if possible where we can recover material and use low embodied carbon construction assemblies is preferable.
- Q: How you deal to avoid red tag materials in the Passive House?
- DH: This was Living Building Challenge. It was quite difficult and took a tremendous amount of diligence.
- Q: Thanks for the presentation, just a question, I missed a bit of the beginning, will this be available online?
- TOL: [All previous Builder Forum Series slides, recordings, and Q&As can be found at tol.ca/gblearn.](http://tol.ca/gblearn)
- Q: Any thoughts on why the most common ACH number I see on Step 3 houses is 2.5? Is this because it was higher and they are running around caulking things at mid construction testing?
- DH: This is likely due to an assumed ACH of 2.5 or better so the EAs are assuming the worst-case scenario in order to give the builder some breathing room. If this is on the final compliance form then the EA hasn't filled out the form properly if the ACH result was different than the requirement.
- Q: Do you have an opinion on exterior shutters? EnerGuide does not recognize their value.
- DH: They are great, if used properly. EnerGuide does not consider them as they require intervention by the homeowner to use. Building code cannot predict homeowner intervention.
- Q: The one fatal flaw in all of this is the future owner - if they open windows and doors and leave them open, this is all for nothing. We need smart informed owners
- TOL: Occupant behaviour is definitely an important factor to energy performance; however, the modeling methodologies that help model a home to a certain Step are standardized and contribute to an, overall, average reduction in energy consumption over a municipality/province. This way, two homes' energy performance can be easily compared regardless of who eventually lives there. That being said, you are right and occupants can benefit from training on how to ensure their home is running as efficiently as possible.
- DH: Agreed, this is the responsibility of all levels of professionals from Architects, Engineers, Builders, EAs Building Code Officials, and beyond. We are the experts in the field and as such we should be sharing our knowledge with the homeowners.