Metropolitan Washington Council of Governments

BUILT ENVIRONMENT AND ENERGY ADVISORY COMMITTEE (BEEAC)

Meeting Summary: June 21, 2018

BEEAC Members IN Attendance:
Gina Mathias, Takoma Park (Chair)
Bill Eger, City of Alexandria
Ellen Eggerton, City of Alexandria
Lisa Goldberg, City of Alexandria
Jenn Hatch, DOEE
Dawn Hawkins-Nixon, Prince George's County (*)
Da-Wei Huang, MWAA
Joan Kelsch, Arlington County
Luisa Robles, City of Greenbelt
Erica Shingara, City of Rockville (*)
Tim Stevens, City of Falls Church, Sierra Club
Kate Walker, City of Falls Church
Edward Yim, DOEE
Khoi Tran, City of Alexandria
William Marsh, Fairfax County (*)

Additional Attendees:
Erin Beddingfield, Institute for Market Transformation
Marshall Duer-Balkind, District Department of the Environment
Roger Frechette, Interface Engineering
Holly Lennihan, Hickok Cole
Thomas Little, Arlington County
Greg Miller, Georgetown University
Hannah Wynne, City of Alexandria
Amberli Young, Institute for Market Transformation
Steve Offutt, N/A

COG Staff:
Leah Boggs, COG DEP
Jeff King, COG DEP
Sunil Kumar, COG DEP
Amanda Campbell, COG DEP
Tim Masters, COG DEP

(*) Indicates participation by phone

1. Call to Order and Introductions

Gina Mathias, City of Takoma Park, BEEAC Chair

Chair Gina Mathias called the meeting to order and attendees introduced themselves in person and by phone.

2. Approval of April 19, 2018 Meeting Summary

Gina Mathias, City of Takoma Park, BEEAC Chair

The meeting summary was approved by committee members.

3. COG Updates/Announcements

COG Staff

Leah Boggs, COG

- Solar Technologies Tour – rescheduled for tomorrow.

Amanda Campbell, COG

- Climate and Energy Leadership Award – nominations open until June 29. Three categories: nongovernmental, nonprofit, and governmental/educational institutions and organizations.
- What We Can Do (WWCD) workshop scheduled for after BEEAC meeting, 12:30 to 14:00. WWCD aims to put together a list of measures that can be taken/implemented to improve air quality in the region. BEEAC members invited to provide input.

Jeff King, COG

- Maia Davis is gauging interest in a training of ICLEI's Drivers of Change tool. Many BEEAC members expressed interest.
- Smart Region – COG has previously contemplated the idea of branding the metropolitan Washington region a "Smart Region". Now, the Board of Trade is launching new smart region initiative and forming a new workgroup.

4. Jurisdiction Updates and Peer Exchange Roundtable

BEEAC Committee Members

Jurisdictional updates, including challenges and/or opportunities related to high performance building strategies such as net zero design:

Gina Mathias, City of Takoma Park –

- The City of Takoma Park is a small city with many older buildings. There's not much opportunity for new buildings, but retrofitting existing buildings would be a focus of reducing resource use.
- One development project – the Junction – this is not net zero, which is not even an option that is on the table. Something that would help would be if the county dictated down to the smaller cities in Montgomery County, as the cities don't have a lot of zoning or permitting authority. The City can provide a wishlist or guidelines to developers, but not any mandates or codes.
- There is a new community solar initiative in the City through Neighborhood Sun.
- Renewable energy goals of 25% of residents with clean energy is ongoing and they will have statistics on this next week.

Lisa Goldberg, City of Alexandria –

- Funding for high performance buildings is an issue. Things are improving through education outreach and funding incentives. The city government and the city's school operate separately, which is a challenge because the city cannot get involved with their operations and so this limits funding opportunities and incentives.

- *Ellen Eggerton* – The City is creating a virtual tour of their sustainability features to help educate the public. The City is also redoing their website in an effort to show the public the sustainability features of the City. They have done this for their stormwater facilities (City of Takoma Park also did this), and they are working on adding more information.
- *Khoi Tran* – Updating the City's green building policy is a focus for the local government. One of the challenges is getting a firm grip on increase costs for going from LEED Silver to Net Zero Energy (NZE) buildings or LEED Platinum.

Edward Yim, DOEE –

- Very often contractors do not see the point, and mentality/attitude becomes a huge limiting factor. DC has a green building mandate and they are trying to phase in NZE elements into this code. A code that is "NZE ready" will be coming sooner, while a more specific NZE code will be implemented in the next code cycle (likely 2020).
- Another opportunity is to showcase pilot projects and demonstration projects to show people the value of having NZE buildings.

Marshall Duer-Balkind, DOEE–

- It's a real challenge getting people to understand why this is important, as many think that LEED is enough and tend not to think beyond this.
- The new codes (89.1 and 90.1) will be released this year for residential and commercial buildings. This code will be NZE ready, and in the next code cycle, true NZE buildings will be introduced. The new commercial code will be about a 17% improvement in energy efficiency compared to current code. There will be an Appendix (Appendix Z), which will provide an optional pathway with guidelines in place for stronger NZE preparedness.
- Challenge – getting enough onsite renewables. PPA/long term contracts are needed. Buying RECs is not the only way forward.
- The green bank in DC is putting this into code language and incentivizing these types of projects.

Jenn Hatch, DOEE –

- Sustainable DC Plan is online in draft form. DOEE is doing another round of public outreach, as well as providing a platform for civic comment.

Da-Wei Huang, MWAA –

- MWAA is looking to commission a new chiller.
- Will be performing summer audits.
- Battery technology is being investigated, but the savings are not enough yet. They are looking into Dominion's energy program.
- Challenge for NZE – passenger growth. Also, they are a nonprofit organization, which has its difficulties when attempting to make improvements.

Luisa Robles, City of Greenbelt –

- As Greenbelt is a small municipality, they don't have zoning authority and very little permitting authority, although Maryland enacted the ICC Act a few years ago.
- A focus for the city will be retrofitting older buildings. For government operations, their goal is to get greater onsite energy, and currently they have an RFP to establish a solar farm in the territory to take advantage of net metering laws.

Joan Kelsch, Arlington County –

- Arlington County is updating their policy to assume NZE building expectations for developers.

- Older buildings are difficult to deal with, especially as there have been recent budget cuts. They are looking for other funding to bring programs to fruition.

Tim Stevens, City of Falls Church/Sierra Club –

- Sierra Club is rolling out a plan to achieve 100% renewable energy, and are encouraging counties to adopt this goal.

Kate Walker, City of Falls Church –

- The City is rebuilding a high school, as well as developing an adjacent 10 acres of land into commercial development. They have been holding panels to discuss green schools and development projects and were able to push for changes in the RFDP to encourage a green building agenda. This has been received with great interest from the community. The RFP for the commercial development went out last week, and the school is in the process of negotiating to select a developer. There was a requirement in the RFP to build the school so that it is NZE-ready, in addition to being LEED Gold certified. COG was able to help secure grant funding for geothermal energy at the site.

William Marsh, Fairfax County –

- Public Works Department is making an assessment to see what can be done to work towards NZE buildings in Fairfax. They see two design components (solar and geothermal) for Fairfax that push efficient buildings to NZE. They are working through a list of constraints. Budget constraints is the main challenge. Other options like virtual PPAs are resolving some of the issues.

Erica Shingara, City of Rockville –

- The city's priority is existing buildings.
- Rockville will be pursuing a different code to Montgomery County's. They have the IDC as well, so it is similar, but with local management. They also will have an alternative to LEED in the code.

Dawn Hawkins-Nixon, Prince George's County –

- The county is in the process of updating their zoning ordinance. The proposals for the update include expanding green building in the county through two approaches - 1) establishing a minimum level of green buildings measures for all developments and the developer would be required to have green building points, 2) incentivise green building above what is required, and establishing incentives for greening operations. Prince George's County will be using a third-party certification system in this regard (Green America Certification). They are looking at other certifications as well, and will be coordinating with Montgomery County and Chamber of Commerce to find certification providers.

4. Taking it to the Next Level: From Net Zero to Net Positive

Holly Lennihan, Hickok Cole

Case Study - AGU building near Dupont Circle in DC. The project is mission driven, as it is for scientists covering climate change. The AGU project focused on both the exterior and the interior. Getting to NZE is the goal. The building was commissioned in the 1990s. It is easier to make the argument for a total refurbishment when the building is this age, as every 20-30 years the systems will usually require replacement. Going to the community early and often to get permissions is an incredibly important part of the process, as having the community on your side is vital to any new

project. The neighbourhood loves this building. There is a PV array, which does not need zoning requirements, as it is considered a penthouse and it does not meet the one to one setback. They did need to apply for a special exemption for this. Some of the zoning requirements can be a burden from a green building perspective, especially with regard to PV arrays on buildings. The RFP process was a contest, which culminated in Hickok Cole and Interface Engineering working together on this project. The team, as well as AGU, believed in the sustainability of the project. AGU wanted to teach the public about their work, and so there is a lot of information around and inside the building for the public to get a better understanding of what they do, as well as information about climate change and other topics that AGU works on. They will be doing tours of the building. While this project was a bit too early for achieving the WELL standard, there are many wellness aspects throughout the building, such as plants on the walls from the lower level to the 5th floor.

Roger Frechette, Interface Engineering
Interface Engineering found the AGU building a challenge, as there was no site to work with and the building is five stories. A common misconception is that NZE buildings won't be good to work in, but this is not the case and in many ways, they provide an improvement on productivity and in terms of wellness. The methodology used was focused on Reduction, Reclamation, Absorption, and Generation. The team took a scientific approach and came up with 50 different strategies for achieving NZE, which they wrote white papers for. They then narrowed these down to 22 strategies. What follows are a few highlights of some of these strategies. As there are losses in processes through inverters, this building is now DC powered. There is a "Hy-Phy" wall – Hydroponic Phytoremediation Wall. This controls air streams and keeps the building at a relatively stable temperature. The building has excellent insulation. Dynamic glazing has contributed a great deal to this. The building collects stormwater and it is retreated for use in the building. There is a Radiant Ceiling System. This lowers the ceiling temperature and keeps the space cool. There are very few moving parts to this. Chilled water is circulated via pipes to keep temperatures stable. There is a dedicated outside air unit and then a separate system for the inside of the building, which provides as much as a 30% reduction in energy compared to a mechanical system. The PV array was arranged strategically to maximize the number of panels on the roof. There is a dehumidification system. Decoupling of heating/cooling and humidification systems can provide a quicker way to NZE, along with as tight an envelope as possible. Municipal Heat Exchange was utilized through a DC Water sewer, making this a great asset for heating. This is perhaps one of the most exciting parts of the building, as it is also one of the first of its kind in the country. AGU want data and measurements of the buildings performance, making them a very good building owner, as they want many data points throughout building so that they have information on how building is performing.

Ming Hu, University of Maryland
NZE and net positive buildings are buildings that integrate green technology into the design process. The current status of NZE building nationwide is tracked by the New Building Institute. The Living Building Challenge tracks the status of NZE building projects in the states. In 2008, a report was published documenting the amount of NZE buildings in the country. At the time, there were 408 buildings of this kind. California took the lead in this with 131% growth in the state. The Northeast region experienced 100% growth in that same time. Many of the states in the middle of the country did not adopt building codes and therefore, there was not a lot of growth there. The education sector has the most growth (according to 2008 report) of NZE buildings and this is mostly due to state incentives. More than 65% of k-12 schools are 40 years old or older meaning they need upgrades. Passive design for reducing energy demand is a huge factor in this equation, as well as onsite energy generation. These are not as ambiguous now compared to 10 years ago. NZE is "near zero energy" in Europe. In Europe, they do not define types of energy in codes, which makes it more flexible for

developers. The differences between a NZE building and a net positive energy (NPE) building come down to two different strategies. A systematic approach versus a energy offset approach. The building may still may be connected to the grid for the energy offset strategy. Case Study: Rochester Institute of Technology – 88,000 gross square foot, four stories, with radiant cooling and heating systems, smart glass/dynamic glass, four wind turbines. Some unique aspects: phosphoric acid fuel cell, PV array, geothermal wells, EV charging stations (two-way power), wind turbines, battery storage, 1500 sensors for energy monitoring. The building, itself, is a research project of the NSF and NY Department of Energy funding. It is a microgrid testbed and fuel cells are also utilized at the site.

Discussion:

- In both cases, AGU site energy use intensity (EUI) is 11-13kBTU for AGU (sewer heater gave a huge boost). For EUI Rochester IoT, the EUI in the winter time is 42kBTU, and in the summer time it is 20kBTU.
- AGU - What happens if sensors fail? Is there a replacement program? - No replacement program. The company that provides those has a good track record for this.
- Can the sewer exchange system be replicated? At the moment, this is a research endeavour. No one would do this for economic payback reasons, everyone is going to ask about cost. All aspects interconnect to reduce energy. Competitive developers make it difficult. VRF tech has become widespread here, after taking off in Europe 15 years ago. The same is likely to happen with these types of technologies.
- Air systems to radiant systems, is this transition happening? Not yet, it makes sense though, and it should move that way (it is in other areas).
- DC building grid system - solar supply curve? Not being followed right now, but battery storage is revolutionizing anyway. Phase change materials to shift load to make sure building isn't peaking at the same time.
- Combined sewer system - is there an effort to gauge how sewer system is working? Is the system ready for wider adoption? DC water is working on a similar system. For the AGU building, a large segment of the cost was in the protection of an old (1890s) pipe. It may take some time before wider adoption occurs.
- AGU blog.

5. Adjournment

Gina Mathias, BEEAC Chair

Chair Gina Mathias adjourned the meeting.

All meeting materials can be found on the MWCOG website or by clicking the link -
https://www.mwcog.org/events/2018/6/21/built-environment-and-energy-advisory-committee-beeac/
The next CEEPC meeting is July 25.
The next BEEAC meeting is September 20.