



EcoDistricts: Think Outside the Building

Ensuring that one building is ecofriendly is no small feat, but what about those progressive campuses that are thinking on the neighborhood scale? The answer lies in EcoDistricts—hear from experts who are honing the concept.

JR Fulton: What is an EcoDistrict, and why would I want one for my campus?

Clark Brockman: EcoDistricts are about taking the idea behind green buildings and scaling up to move toward high-performance neighborhoods. An Eco-District leverages the idea that different systems—for example, energy and water systems—actually optimize at different scales and different boundaries, and many times those optimal scales are larger than an individual building; that is the basic premise.

And it follows that university campuses will be early adopters in this, partly because they have control of their land and their buildings as compared to an existing neighborhood with multiple owners.

Bert Gregory: The EcoDistrict Initiative in Portland and other initiatives around the United States often have broader goals than just preserving physical resources. EcoDistricts may have human well-being, for instance, as a key goal. So as we move into the future, I think we will find more complex circumstances associated with EcoDistricts and that terminology, which could have a major influence on campus life.

JR Fulton: Community and individual behavior changes are integral to a fully functioning EcoDistrict. How do these factors complement or leverage the physical systems in the success of an Eco-District implementation process?

Naomi Cole: In Portland, when we talk about Eco-Districts and their components we focus on three main project areas—buildings, infrastructure, and people, meaning choices and human behavior. Let me illustrate this with an example. With the pro-

posed design of the Oregon Sustainability Center on Portland State University’s campus, the design team, architects, and engineers have determined that they could get to a goal of net zero energy through about 70 percent efficiency of building systems, façade, and renewable energy, but that the remaining 30 percent has to come through occupant behavior. This really demonstrates the importance of having human behavior as a part of a strategy for getting to building-scale, district-scale, and city-scale goals around energy performance.

Clark Brockman: I will tweak those numbers just a little bit. We are thinking that we can get, without occupant engagement, 60 to 65 percent better than Oregon code. But, we are going to need to start to get buildings to the 75 or 80 percent better-than-code range for them to be near-zero or net zero buildings; that is where occupant engagement comes in.

Naomi Cole: Also, it’s important to differentiate between the behavior changes that are necessary at the individual scale, which we’ve been discussing, and those that are necessary at the community scale. It is the social constructs, like policy, governance, and finance, that are the major challenges and require a shift in the behavior of cities and communities in order to support EcoDistrict development at the neighborhood, and ultimately, city scale.

If you think about something like district energy, for example, we know that the technologies exist, but one of the major challenges—particularly in the United States where there is not a lot of precedent for it—is organizing property owners and convening stakeholder interests around a potential district energy site, and then also around a city creating a desirable policy framework for a district energy system to exist. Those are the behavior changes on a community scale that we know are critical to shifting to the type of strategies and performance that we want to see.

Clark Brockman: Something I would add, especially on university campuses, is that they have a much more captive audience in terms of popula-

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EcoDistricts may have human well-being as a key goal.

— Bert Gregory



JR Fulton



For a net zero EcoDistrict, you must look beyond your boundaries.

— Albert Bicol

tion. Universities are really well positioned to imagine EcoDistricts and begin to integrate them more quickly than other types of neighborhoods.

JR Fulton: What would I need to understand about my campus to optimize planning for an EcoDistrict?

Albert Bicol: I think there are three major categories here. Number one, and most important, is reducing demand of resource flow and energy flow. You can actually lay out roads; you can orientate buildings so there is reduced demand in energy sources.

The next step is what we call a resource balance—looking at things to recycle—not only materials, but water and energy as well. When we say resources, that is everything—energy, water, and even garbage and sewage is a resource. Everyone turns a blind eye to all the garbage, but at this scale—as is the case in Sweden where they recycle most of their garbage—it is possible to see it in a larger resource flow sense.

The other aspect that is very important to implement in an EcoDistrict is financial. What we are finding now are partners joining design teams and development teams—large corporations that provide financing and maintain large infrastructure systems. This is the future of EcoDistricts.

JR Fulton: I know a few of you have been involved in the early organization planning for EcoDistricts. How do you optimize planning opportunities?

Naomi Cole: The critical question when planning a university EcoDistrict is, what kind of relationship does a university or institution have with its neighborhoods? Something that is inherent in our Portland pilot is the assumption that an EcoDistrict is more than one property owner, one building, or one institution. So it is critical to ask if the neighbors and adjacent property owners are interested in potential co-investing or sharing resources because of the proximity and where resources naturally want to flow.

Bert Gregory: Oftentimes campuses can be insular in their nature, and once you go outside your campus boundaries, the control issue becomes more complex, and that is where relationships and partnerships need to be formed.

For an academic institution, the pedagogical aspects of the process as well as results can be quite powerful.

Clark Brockman: We have been doing EcoDistrict planning at two different universities, and one of the things that we have found is that even today, many

universities are still planning their campuses where much of the housing is located in one part of the campus, and much of the classroom and academic areas are in distinct and different parts. Yet, if you start to do resource flow and demand management analysis, you will find that a classroom office building tends to peak on its water and energy use almost exactly opposite from a dorm or a housing building. If you were to start to make housing and classroom offices proximate to each other, you can actually start to reduce system size because you can have smaller total systems managing the needs of multiple buildings.

One of the interesting data points we've found is that just one dormitory's morning water use generates enough grey water to be reused by four different classroom office buildings over the course of a day, if they were nearby. So there are huge planning implications for universities to start to re-imagine how their campus works and, to Bert's point, it turns out that the movement in current pedagogy is to have living and learning centers located more closely together, so this could really help with those goals as well.

JR Fulton: What are some other good examples of EcoDistrict projects?

Bert Gregory: In the higher education campus realm, the Mithun team has recently completed two sustainability plans that are EcoDistrict-like for the Ohio State University system, and for Seattle University's campus. At Seattle University, their primary focus areas are: energy, greenhouse gas, water, ecological systems, human well-being, and economics. At Ohio State, their plan organized around education, research, outreach, energy, carbon, transportation, water, food purchasing, and waste. It is not unusual for a campus EcoDistrict to start to be developed as an institution works toward defining their climate action plan or as an integrated part of a long-range master plan. These campus EcoDistrict plans must evolve around the existing and projected context, support the unique mission of the university, advance student living and learning and faculty research, and be grounded in economics.

Other campus-like areas that involve substantial areas of land that are in control by a single entity would be Peter Busby's wonderful Dockside Green, a large piece of property with integrated energy and water systems along with very robust environmental and social goals. Other examples around the globe are places such as Masdar, Abu Dhabi; Xintian in China; government-owned facilities like Southeast Falls Creek in Vancouver or the Lok Ma Chau Loop in Hong Kong.

A variation on the single-owner public realm example would be the State Center project in Baltimore, where the land is owned by the state, the streets by the city, and the buildings by private development entities. Examples of mixed property ownership with multiple stakeholders include the EcoDistrict Initiative in Portland and the Green Impact Zone in Kansas City, sponsored by their regional council of governments.

All are very different examples with unique governance and financial opportunities and challenges, very much like each university campus, or each neighborhood we live in. However, within all that diversity, they often all have common goals.

Naomi Cole: Many of the precedent EcoDistrict projects that we reference are developed on either brown-field or green-field sites—with essentially all new development from the ground, new infrastructure, new buildings, and new people that can achieve higher performance goals. Many of the examples of green neighborhoods that we point to, like Dockside Green, Vancouver Olympic Village, and Western Harbor, all fit this model of all new development.

It is a very different set of challenges when working in existing neighborhoods, which is the focus of Portland's EcoDistrict Initiative. There are a few other projects around the country, like the Kansas City Green Impact Zone, the Seattle 2030 District, and Denver's Living City Block, that are similar in that they focus on achieving sustainability in existing neighborhoods. The project types and strategies look very different when working with existing infrastructure, buildings, and dynamics of people that are already living and working in a community.

JR Fulton: What do you see as the biggest impediments and barriers to implementing an EcoDistrict in an existing neighborhood?

Naomi Cole: The first is neighborhood governance, and this question of how we knit together multiple property owners and interests around shared goals. This can be particularly tricky when you are dealing with property owners ranging from residents, renters, to businesses, developers, and institutions. We're suggesting that there's value in creating a new entity, whether it is a new organization or a partnership between existing organizations, to create a shared EcoDistrict vision, make decisions, and potentially invest money and have the legal authority to act on behalf of the neighborhood.

The second is around financing. I think that the challenge and opportunity here is about how you aggregate funds at a district scale to create a pool of resources to do district sustainability improvements. So we have examples like business improvement districts, which are tax-assessed strategies that actually

create pool funding at a district scale, and there are emerging ideas in this area as well.

Policy is also a major challenge, and that is largely because public bureaus tend to be pretty autonomous, and EcoDistricts are inherently more integrated, so there is not a lot of precedent for planning bureaus, water bureaus, or environmental service bureaus to co-invest and be more strategic in their planning so that you are getting more bang for your buck. When you are tearing up the street to put in a green street or a light rail, you can also lay the pipe work and the infrastructure for a district energy or district water system. So that is where the policy side comes in.

The last major challenge we've identified is around assessment and the lack of assessment tools in the industry that a neighborhood or a city could use to make informed planning decisions. You have many end-game rating systems, like LEED for Neighborhood Development, to rate end performance, but there is a need for a more defined and more rigorous method from the beginning of an EcoDistrict, or this concept of a sustainable neighborhood, to take a district or a city through a series of questions such as: What are the community priorities? What are the city priorities? What does the data tell you about what systems are most appropriate for that neighborhood?

Bert Gregory: I would agree. I think that the passion of people is for that vision. There is no doubt about it. They are just starting on a new campus implementation strategy for Chatham University in Pittsburgh for their Eden Hill campus, and they have set incredibly high goals for their campus, and it is all to support their vision and their students. They aim to have a campus that people will interact with and learn from and recognize that the values of the campus are expressing the values of the institution.

Naomi Cole: The next stage of EcoDistricts is cities. We've started with a significantly improved understanding of green buildings. We're now starting to explore neighborhoods. And the next step, we hope, is understanding what it takes to become a sustainable city. I think part of the reason that we are focused on neighborhoods is that we are struggling with urban sustainability issues that are really addressed at a city or metropolitan scale. The future will hopefully be a citywide sustainability solution.

Clark Brockman: As I look to the future, I see performance metrics playing a growing and dominant role in design, and how different it will be when we start having EcoDistricts—and campuses, in particular—measuring and designing to actually perform at specific levels instead of rating systems that simply use models to predict their performance.



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— Clark Brockman

Dialing that in more closely, we are going to have metrics around carbon. We are eventually going to move into a carbon-constrained world, and there will be prices attached to that. Once we get that working, we might move into a world where ecosystem services of a variety of types, maybe including water systems as well, get monetized. So I think EcoDistricts will start to leverage these alternative financing systems.

Bert Gregory: I think all of us recognize that no matter what systems, protocol, or technology we put in place, it essentially comes down to the individual and human responsibility—behavior and action. That is such a huge aspect of all of this that is equally, and in some regards, almost more important than, the technology.

I will give you an example. A net zero affordable housing community designed by Mithun where everything is working perfectly to have a net zero community, but at the end of the day, they have not quite reached that goal. The goal is not being met because the community is not yet working together to reach that particular goal. Some individuals are using two to three times the energy predicted, others two to three times less. But the only way they are going to reach that goal as a group is to form a common bond as a community. So human behavior and

human nature are the huge challenges for us all to achieve these heroic ambitions. A campus working together as a community can be very powerful, and needed to achieve EcoDistrict ambitions.

Clark Brockman: To that end, I think universities should see EcoDistricts as an opportunity for successful public-private partnerships. It is a great chance for them to reach out to the cities they are in, but there are also public-private partnerships with corporations. I know large companies like Intel, IBM, and Cisco are pouring a tremendous amount of energy into this space right now and would be looking for research partnerships. I think universities will find that if they dive into EcoDistricts with some vigor and commitment, they will have a competitive advantage and a massive research opportunity in front of them.

Naomi Cole: In these early days of the concept, EcoDistricts are generating as many questions as they are answers, and so we are being intentionally more coordinated about posing key questions and reaching out to the right faculty, regionally and around the country, that have an interest in helping us explore solutions.

Also, we hold an annual conference every year, the EcoDistrict Summit, addressing many of these issues.

EcoDistrict Summit

The Portland Sustainability Institute hosts an annual conference on the topic of EcoDistricts. More information available at <http://www.ecodistrictsummit.com/>