10 steps to make an eco-district

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How can the millions of dollars that are being invested in new development demonstrate the best thinking in sustainability? Can we create a true eco-district that exemplifies how cities need to grow in the 21st Century? And if the answer is yes, can we afford it?

Making the buildings green is a good start. Whether with LEED Gold or LEED Platinum or the Living Building Challenge, great green buildings can get the ball rolling. But there is a bigger possibility when we are looking at multiple buildings and new infrastructure to serve those buildings. That opens significant opportunities for transformative district scale sustainability. With forethought a true eco-district can emerge. All of this development can be leveraged to create a truly transformative sustainability play. Even better, when we think at the district scale, this advanced level of sustainability can be the same or less expensive than business as usual.

However, having this good intention doesn’t guarantee that we will be successful. We must set the right goals for the new developments, hire the right consultants who understand this new approach, and get the right contractors who know how to work in an innovation environment.

The following ten steps are how we can make sure that we create an eco-district that works.

**STEP 1. Require green buildings – either LEED Gold or LEED Platinum or Living Building Challenge.** In the Pacific Northwest LEED Gold has become a de facto standard. Both Platinum and Living Building Challenge typically have a cost premium although that could change in the future. This may be minimized, however, if an eco-district supplies the buildings.

**STEP 2. Balance uses between those that need heat and those that need cooling.** Residential users need hot water for bathing, washing, and for thermal comfort. Office and retail, however, typically need some year-round cooling. If we can balance the residential demand with the office and retail demand, the two systems can augment and offset each other and radically reduce the need for new energy. (Of course, we must take the market realities into account, as well. The idea is to try and optimize demand for real estate with demand for energy as much as possible for the district benefit.)

**STEP 3. Create thermal loops.** A single pipe running at about 73 degrees F is how we balance demand between uses and buildings. Each building taps into the pipe with a heat pump. This heat pump either cools or heats the building as needed. The “waste” heat of cooling goes into the thermal pipe loop. This operationalizes Step 2. However, in very cold or very hot conditions all buildings may need heating or cooling at the same time. This is when the solar hot water, geo-exchange, and sewer heat recovery come into play. They can all be tapped to provide cooling services or extra heat to keep that thermal loop at the perfect 73 degrees. This system then shifts
the vast majority of heating and cooling loads into a totally renewable resource with all of the thermal energy coming from on the site itself. In areas where large regional sewer conveyance lines are near, the sewer heat recovery option is very attractive.

**STEP 4. Create water loops.** By reclaiming Class A water onsite with membrane bioreactors, we can reduce water use by 50% and wastewater discharges by 70%. The reclaimed water flushes the toilets and irrigates the landscapes. This approach sounds even better when we look at the price. Our study at Yesler Terrace indicated that this alternative costs less in year one than simply paying sewer and water rates in King County. That means that the payments to cover the added costs for the system are outweighed by the savings we get from consuming less water and sewer services.

**STEP 5. Park smart.** By consolidating parking between day users and evening users, we can lower the number of stalls needed. That can save costs for expensive constructed parking costs under buildings. Consolidated parking can also use smart systems, where the access and billing are electronically controlled. This concept can get supercharged if we add in car sharing. We can put in an all-electric mini-fleet that serves the various occupants in each building. The fleet can be shared by both office and residential users. It will reduce again the number of parking spaces required such that the savings more than offsets the cost to provide the fleet. Private capital can be raised to own and maintain the fleet for use with a modest hourly or standby rate. This has the effect of reducing the needs for vehicles which increases the ability of renters to afford higher rents because they have more money in pocket by not having to own and maintain a vehicle. All-electric cars mean that the air quality is much healthier in the district and water quality is improved for the same reason. The entire district will have a much reduced greenhouse gas footprint that can have economic value once the cap and trade legislation is passed. And it creates resilience. If the grid goes down, the car batteries can be tapped to run essential services in the buildings. The resilient buildings in the resilient district are still up and running. During emergencies and during times of peak load on energy utilities, this strategy makes the entire district more resilient and more sustainable.

**STEP 6. Use landscape for infrastructure services.** Landscapes are more than beautiful, they can also add significantly to the efficiency and operations. We can use vegetated swales and special soils to hold stormwater runoff on the land. This reduces water pollution and adds to the beauty of the landscape. Walkways and parking lots can be designed using porous paving that not only reduces stormwater flows, but reduces ice and snow conditions in the winter. Thoughtful location of shade and evaporation on site can lower cooling costs for office buildings. Studies show that lowering the temperature of intake air into buildings can save energy 10% and higher.

**STEP 7. Create healthy pedestrian environment.** Pedestrians activate our districts and make them safer and livelier. Walking is an excellent method to increase public health. So what is it that attracts people to become pedestrians? A district approach would make sure that nearby services, well-designed public spaces, vegetation, a distinctive mix of uses, and programming of public spaces all work together. We can design areas where different building residents meet and mingle to pick up the mail, to drop off the trash, to get a cup of coffee. This will help to build a community from what might otherwise be co-located strangers. Making spaces for children to play creates opportunities for parents to meet and bond and share resources.

**STEP 8. Use landscape for urban services.** Landscapes can also be used to grow food for local residents and to create habitat for humans and native creatures. For the same costs we can create opportunities within the resilient district for the joy of sharing a day with hummingbirds or watching fruits and vegetables as they grow and ripen. Landscape maintenance can use organic wastes to create compost that make the gardens grow and increase the habitat value. We know from science that there are psychological and social benefits of living a life where plants are part of the everyday experience. The change of the seasons, the passage of time, and the moment by moment changes in the weather are all reflected by the plants and animals.

**STEP 9. Offer healthy mobility choices.** Walking, riding a bike, taking a bus, and riding an electric scooter are transportation choices that can be encouraged at the resilient district. Make it quick and easy to do the right thing. How? Specific bike lanes, covered bike parking, and showers for employees make it quick and easy for employees or residents. Transportation management plans and subsidies for bus fare can add to the effectiveness of alternative transportation

**STEP 10. Use smart economics.** Too often these district options are “value engineered” out of a project without a conscious understanding of how they can work. Some will look at first cost or regulatory burdens and take a pass. However, when we look at the net present value of these options across
the life of the investment we can get a much better picture of where the value lies. The benefits are often spread across the “triple bottom line” of economy, community, and the environment. Because we are applying the economics at the district scale, we can put together packages of services that make sense for different investor types. This then opens up new avenues for finance of projects. Dollars from private capital can flow to the energy loop, the water loop, the electric car loop. These separate financials work at the district scale as it is a perfect mix of distributed services and economy of scale. Public entities, too, may choose to incentivize these strategies because of the environmental advantage. Using net present value comparisons between business-as-usual and these resilient alternatives can demonstrate that the triple bottom line approach of resilient districts makes social, environmental, and economic sense.

Taken together, these ten steps can open up a range of new possibilities for a district that might otherwise be missed on a building by building approach.

Steve Moddemeyer is a Principal at CollinsWoerman and leads the Sustainable Development line of business for the firm. Steve is a thought leader with over 19 years of experience leading governments, planners, architects, land owners, and project teams towards increased sustainability. Steve specializes in creating tools and alternative strategies that lead to resilient infrastructure systems for cities and large developments. He has extensive experience with complex public/private development issues, and development of sustainable strategies for major capital improvement projects. As a consultant, Steve is leading the global program called Cities of the Future for the International Water Association. This has taken him from Stockholm to Singapore, Istanbul to Rio de Janeiro. Steve recently completed the Sustainable District Study for the Yesler Terrace redevelopment in Seattle where his team of technical and economic experts developed cost effective and sustainable district strategies for water, energy, and solid waste.

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