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Roundtable: Sustainability in the Urban Context

Is urbanism the key to a sustainable future?

David Mayernik Ltd., David T. Mayernik

Sustainability is largely understood in the popular imagination as a technological problem needing technological solutions. For a city to become sustainable, however, requires a fundamentally sustainable approach to its layout – which, if not inherently sustainable, will always require more and more onerous interventions to ameliorate – and to the stuff of which it is made. Anything less is a short-term fix, a band-aid on a mortal wound. To achieve real, meaningful urban sustainability requires hardheaded courage to reconsider the last half-century and more of unrestrained growth, coupled with an acknowledgement that we have not only built cities too big to survive, but have simultaneously disconnected them from a sustaining natural landscape.

What would a truly sustainable city look like? It would be built in a region furnished with the resources – water, power, etc. – to sustain itself, and within a climate zone capable of ensuring human survival (for example, not in a desert); it would have a prescribed limit to control sprawl and encourage contact with the surrounding landscape; it would afford walkable neighborhoods (meaning most daily services available within a five- to ten-minute walk) with walkable buildings (or, no more than five or six stories tall); it would therefore have a relative population limit, a function of its prescribed area and the floor area available in its residential buildings; its buildings would be built of sustainable, durable, natural materials (in other words, masonry bearing wall construction); it would have a public transportation network to connect neighborhoods to facilitate access to citywide services and places of work; and its proximity (that is, walkable from the city edge) natural landscape would provide a substantial portion of its sustenance.



Florence, looking northwest across the Arno River from the Piazzale Michelangelo. While the city expanded its industrial and residential quarters in the 19th and 20th centuries east and west along the river (in the former case for access to water-generated power), it mostly preserved the green character of the hills to the south and north, many of which still shelter privately-owned, productive (olives and grapes in particular) agricultural estates. Photo: David T. Mayernik

The Renaissance treatise writer Leon Battista Alberti, and many others before and after him, would have recognized these parameters, since before modern industrial technology virtually all cities were built in accord with these constraints. Having trusted over the last half-century and more that we can continually supersede any sort of natural limits with more and more advanced technologies (while paradoxically refusing to invest in infrastructure), we are now confronted by the inconvenient fact that our unwieldy human environment can not be sustained on increasingly limited resources.

Do such places exist? Florence, Italy, comes to mind; not perfect by any stretch of the imagination, but "close enough for government work," as my father used to say. How did they do it? Well, they mostly did the good parts before the last century, but during the last century they made some hard choices about where and how to build that preserved some (not nearly all) of their sustainable urban and rural environment: a rare demonstration of political will, I would argue, that came from the compelling beauty of what they inherited, a beauty that commands respect. Beauty is the single most intangible aspect of a sustainable city that makes all the challenges worthwhile.

What would this mean for our existing American cities, almost all of which violate some if not most of these sensible constraints? Hard choices that no doubt few have the political will to make: a regional strategy for creating multiple sustainable cities instead of unsustainable megalopolises; a long term plan to return part of the urban edge to natural landscape; a moratorium on new buildings taller than six floors; and mandates for sustainable masonry bearing wall construction.

Eventually, with courage and political will, some cities could return to something like sustainability, or places wherein sustainability would be possible. But without a fundamental, broad and sustained look at what is needed for sustainable cities, we'll be left with futile, feel-good initiatives like rainwater collecting on 35-story condominium buildings. Sustainable cities require first and foremost sustainable layouts and physical form; and, if they are beautiful, we will want to sustain them.

David M. Schwarz Architects, Inc., Gregory M. Hoss

By its nature, a densely built urban context is a relatively sustainable form of development. This is true in two significant aspects. First, successful urban development clearly reduces the

environmental impact on a per person basis over any other known development model. The creation of dense, walkable environments allows live-work-play scenarios that maximize efficiencies while minimizing our impact on the earth's resources. Both aspects are critical in making development more sustainable; in order to increase efficiencies and reduce environmental harm, we must reduce the amount of time people spend in their automobiles, whether they are commuting, taking kids to soccer practice or shopping.



Built on a former brownfield site, (the Union Pacific rail yard adjacent to downtown Las Vegas), the Smith Center is being designed, detailed and constructed as a 200-year-plus building and is striving for LEED Silver Certification. It will be the first LEED-certified civic building of its kind in the U.S. Photo: Pentagon Studios, courtesy of David M. Schwarz Architects

Second, the creation of a quality urban context – one that is vibrant and exciting yet comfortable and secure – tends to make it more likely that these places will survive for many generations. If sustainability is to be measured, it must not only look at the upfront use of materials and the day to day utilization of resources and energy, but it must also consider the long-term impact of "survivability," i.e., the impact of planning and designing buildings and environments that survive intact from generation to generation. I suspect that when all is said and done, the greatest contribution a building or place can make to sustainability is not in its selection of materials or its energy usage, but in

its longevity. The energy required to plan, design, construct, operate and then demolish a building on a 20-30 year cycle is inherently non-sustainable. Timeless architecture, built well, is generally embraced by its community and is much more likely to survive for use by many generations.

Genuinely sustainable environments require architects, developers, planners and politicians to think more holistically and in longer timeframes than is happening in much of the current conversation about sustainability. Sure, state-of-the-art solutions regarding sustainable construction techniques, thoughtful selection of natural materials, use of local materials and sophisticated engineering solutions for energy consumption are necessary to reduce our impact on the environment.

However, we should also remember that the more basic tenets of good design and quality construction are, in and of themselves, often imbued with sustainable characteristics and tend to have much longer lasting environmental impacts: taking into account the orientation of a building on a site; creating facades with deeper openings, awnings, canopies or brise-soleil to control natural light and heat gain; operable windows for natural ventilation; proper design and detailing of exterior walls that prevent water infiltration and corrosion; flexible and sensible interior plan layouts that allow for future reconfiguration; and most importantly, as stated above, creating buildings and places that people embrace. The construction industry has thousands of years of experience trying to make buildings work well; we should carefully study, emulate and improve upon those successes.

One of the most significant things our generation can do to make sustainable urban environments is to educate our children about the built environment. We do a terrible job in the United States educating our kids about the built environment and its effects on us. If more people understood the benefits of good design and quality construction, there would be a much higher expectation in general about the built environment and those responsible for allocating monies (politicians, developers and institutions), those responsible for designing (architects and engineers), and those responsible for constructing them (contractors) would be held to that expectation. There has been a groundswell of media coverage about sustainability in the last few years. The key now is to transition this awareness into a more genuine and long-term study and understanding of the issues. Sustainability must be more than a series of trendy catch phrases; it must involve a continuous commitment and a more thorough understanding in order to have a significant and lasting impact in the urban context.

Duany Plater-Zyberk & Company, Galina Tachieva

For more than two decades the work of our firm, Duany Plater-Zyberk & Company (DPZ), has gained renown as a counter-proposal to suburban sprawl. While recognized for an emphasis on place making and for outperforming conventional suburbia, DPZ's urbanism is less known for advancing the principles and techniques of sustainable planning. Beginning with Seaside in the early '80s, DPZ employed green practices long before they were required by legislation or were fashionable in the media, including light infrastructure and innovative storm water-management. More complex environmental projects eventually followed – regional plans, urban infill and suburban redevelopments.

Recently, another tier of work has evolved that offers a more explicit range of advanced environmental tools. Operating within the urban-to-rural transect, these projects have generated a menu of measures that address energy and water conservation, as well as coding techniques for successful implementation. In the spirit of this pursuit of sustainability and acknowledging the current economic, social and environmental challenges, the office has been pursuing several initiatives, among



which sprawl repair perhaps stands out as one of the most urgent, and is the subject of our new publication, *The Sprawl Repair Manual*.

Sprawl is a dysfunctional form of urbanism. It is a broken pattern that needs to be fixed. While it has been the prevalent growth model in this country for the past half a century, it is in fact the least sustainable and the least affordable. As walkable, interconnected communities achieve greater acceptance and momentum, auto-dominated, discontinuous sprawl is beginning to lose value. Nonetheless, this vast amount of development, investment and



The pair of aerials demonstrates the transformation of a conventional strip shopping center into a mixed-use, pedestrian-friendly town center that will serve the surrounding suburban communities. The existing big boxes and drive-through restaurants are embedded in fine-grain fabric of urban blocks, centered on a new square. Drawings: Eusebio Azcue and Chris Ritter, DPZ

expenditure of energy – however misguided – is already in the ground and cannot simply be abandoned or entirely demolished. In this era of recycling and repurposing, it is all the more imperative that architects, planners, urban designers, developers and municipalities need to engage in the repair and retrofit of sprawl into complete and healthy human environments.

The Sprawl Repair methodology provides a practical approach for incrementally transforming the typical elements of sprawl, those single-use pods connected by only a limited number of arterial roads, into pockets of accessible, mixed-use neighborhoods and town centers along transit corridors. By means of various step-by-step procedures for re-balancing and urbanization, Sprawl Repair can assist suburbia in gradually becoming more sustainable, economical, as well as energy- and resource-efficient. It offers a means to transform single-use, car-dependent agglomerations into healthy communities that are more balanced, complex and pedestrian-friendly, and that can accommodate a diversity of uses, income levels, building types, modes of transportation and civic spaces. Sprawl Repair offers not only urban design tools but also the ability to work within regulatory frameworks and to implement through financial and permitting incentives.

Suburban sprawl happened neither accidentally nor organically. While not purposely conceived as malevolent growth, sprawl is a result of human intention. Sprawl has been consciously designed, regulated and incentivized by private and public interests. The patterns of freeways, relentless asphalt, cul-de-sac subdivisions, malls and office parks evolved from specific planning practices not concerned with climate change, volatile fuel costs, or economic and environmental sustainability.

It was premised on the continued dominance of the automobile as the principal mode of transportation. Sprawl is central to greenhouse gas emissions, air pollution, water, energy and land waste, as well as serious social and health problems such as the loss of community, alienation and even obesity. While its unrestrained expansion appears to have ended, the detrimental effects of sprawl will be felt for generations. The Sprawl Repair method provides a toolkit with which to take immediate action to help mend a damaged built environment, and at a lesser cost than conventional suburban expansion.

The manual we are currently working on collects the best practices for Sprawl Repair synthesized from scores of built projects, with proven results for creating more walkable and environmentally responsible human settlements. The methodology illustrated in this book identifies the deficiencies, determines the best remedial techniques for those deficiencies, establishes the outcome for the repair, and makes recommendations for regulatory and economic incentives. In addition to detailed steps for the transformation of individual sprawl typologies, the manual advocates for an incremental approach to improving incoherent places and regions rather than only offering instantaneous and wholesale solutions.

Sprawl Repair is a progression of surgical but nevertheless substantial interventions. Comprehensive analyses of location, connectivity and the economic viability of existing structures and surrounding fabric assist in first identifying the problems and deficiencies, and then facilitating the listing of the possible actions, from minor improvements to dramatic makeovers.

The transformation of sprawl needs to envision a transitional period where a variety of changes, whether small or large, are all welcomed. The ultimate goal is to encourage any and every decision that results in the creation of compact, complete, transit-ready neighborhoods and urban cores. It is the strengthening of these nodes that will permit the sprawling suburbs to be restructured and become reenergized. Therefore, this manual operates at all scales – regional, community, block and building, and even addresses the retrofit of too-wide, traffic-choked thoroughfares and leftover open spaces that today define what is so frustratingly wrong, unsightly, and wasteful about our suburban landscape.

Hanbury Evans Wright Viattas + Company, Gregory L. Rutledge

The urban context offers a diverse palette on which to practice sustainable planning and design. Intentional reuse of historic structures found in urban cores is not only environmentally sustainable, but it also nourishes the social context and evolution of our cities. Infill, rather than sprawl, helps reduce reliance on the automobile and increases opportunities for mass transit. A growing realization of the impact of buildings on the environment – equating to nearly half of all greenhouse gas emissions in the United States – combined with the consequences of poor community planning, have caused positive shifts in architectural design philosophy and practice.

Cities actually have a lot to learn from college campuses, which have taken the lead in adopting green practices. Viewed in an urban context, campuses have significant historic cores with cherished buildings that have outlived useful lives but are worth preserving or adapting, as well as residential zones, academic zones, business parks and transportation issues. As a practice



College campuses can be viewed in an urban context, as evidenced by this example from Clemson University, a Hanbury Evans Wright Vlattas + Company project. In a bold move, Clemson moved its sororities and fraternities to the historic campus core by renovating 1930s-era barracks designed by Rudolph E. Lee. The buildings resonate with alumni and the school's early military history, but they were no longer "marketable" to today's students. Original buildings were renovated rather than demolished, and two new buildings were sensitively inserted into the quad. Now home to 444 students, the new Greek community achieved a LEED Silver rating. Photo: Jim Roof

that works primarily in campus environments, we have helped colleges and universities achieve sustainability goals through planning and design.

For example, Clemson University was awarded a LEED Silver for the renovation of an historic residential quad. The University of Vermont earned LEED Gold for a new residential project, which actively addresses the issues of energy efficiency, through siting, design, durability, resource impacts and indoor air quality. A green roof provides residents with a private courtyard with mountain views, a hydrological spine channels storm-water runoff to a filtering wetland, and energy use is measured and monitored by students. Rice University recently opened two new residential colleges that hope to

achieve platinum or gold LEED ratings. This is no longer the exception, but the rule.

Sustainability in the urban context encompasses far more than retrofitting historic structures for new uses, managing energy use and incorporating "green" materials in buildings. It is also about transportation, infrastructure and growth. Again, college campuses are setting a great example. Many are in the midst of updating master plans to make more efficient use of land holdings, including infill strategies. All of the master plans we work on include plans to make campuses more friendly to the pedestrian and bicyclist. Automobiles are moved to campus edges and mass transit solutions, in partnership with local communities, are often part of the equation. Colleges and universities are enlisting plans for the preservation of their historic buildings; renovations and adaptive use, rather than replacement buildings, are on the rise in campus settings.

The same can happen in our cities. Local zoning ordinances governing historic structures in designated districts focus primarily on maintaining the aesthetics of the district and its character-defining features such as materials, fenestration, building massing, height restrictions and secondary structures. Obtaining approval for adapting technology such as solar panels to historic structures can be difficult. However, sustainable technologies are evolving daily, putting more tools at our disposal.

An urban example is our headquarters office, located in an historic building in the heart of downtown Norfolk, VA, in the Chesapeake Bay Watershed. This presents both a tremendous opportunity and a responsibility to be conscientious about the quantity and quality of storm-water runoff. With Friends of the Norfolk Environment, Inc., a not-for-profit volunteer organization that supports the environmental education program of the Norfolk Environmental Commission, our firm pursued a Chesapeake Bay Watershed Grant and, in 2004, replaced our built-up roof with a green-roof system. Beyond reducing the impact of impervious cover in the watershed, this roof has had educational, political and professional benefits. As architects, we learned firsthand about retrofitting a 110-year-old building's roof system.

The process, from design through construction, was documented with photographs and has been used for educational presentations for the AIA, school groups and others interested in the concept. Our roof is highly visible from adjacent high-rise structures and, as the first green roof in our downtown, has sparked an enormous amount of curiosity and serves as a physical example that this "green" technology is viable in our community and in an urban setting, and also demonstrates the effectiveness of retrofitting traditional roofs with green systems.

Our roof, which was installed on Earth Day, signaled a blossoming environmental awareness and urban renaissance for this old seaport. New urban housing options allow people, including many colleagues, to forsake the suburban commute to enjoy the convenience of living, working and playing without a car. In approximately one year, Norfolk's new light rail line will open, with a downtown station just a block away from our office door. It is heartening to see.

Sustainable strategies in the urban or campus context, whether on a large or small scale, must be holistic responses. It's so obvious, so logical. What took us so long?

New Urban Guild, Stephen A. Mouzon

The subject of this roundtable, "Sustainability in the Urban Context," will someday be seen in the same light as the phrase "Human Life Extended by Breathing." In other words, "How could it be any other way?" Any discussion of "green building" is meaningless unless the building is built in a sustainable place, because if inhabiting it means you have to drive everywhere, the building's carbon footprint is nearly meaningless.

But today's dominant sustainability discussions are far more restrictive than merely omitting the urban half of the equation. Most focus on a very narrow band of sustainability issues known as "Gizmo Green," which is the proposition that sustainability can be achieved with better gizmos and better materials. Gizmo Green is a part of the equation, but only a very small part.

The phrase "green building" will someday be seen as a truism, as it would also have been viewed before the Thermostat Age. Originally, places and buildings had no choice but to be green, otherwise people simply couldn't live there. They would starve, freeze to death, die of heat strokes, or be eaten by wild animals. Building sustainably was a life or death proposition. Today, even the word "sustainability" has been muddied by the marketers, who are attempting to turn it into the cool new way to sell their products. But in reality, it should mean what it has always meant: keeping things going in a healthy way long into an uncertain future. This is the

proposition of a set of ideas known as the Original Green (www.originalgreen.org).

What forms a sustainable place? First, it must be a nourishable place, because if you can't eat and drink there, you can't live there. Nourishing places are those where you can look out onto the fields and the waters from which much of your nourishment comes. This matters because it's not at all clear that the industrial food chain will be viable as oil declines, nor that we'll be able to get food, industrial or not, to our tables from thousands of miles away. Today, much of the food on your plate needs a passport to get there.

Next, a place must be accessible in a variety of ways, especially the self-propelled varieties, walking and biking, because no matter how high the price of gas rises, nothing short of grievous injury will take away your ability to walk. Those are the only certain means of transportation in an uncertain future.

A place must also be serviceable, so that you can get the daily services of life within walking distance. But the people serving you those services must also be able to afford to live nearby. The most serviceable places allow everyone to "make a living where you're living" because in an uncertain future, the prognosis for long commutes is especially dim.

Finally, a place must be securable against some fearful future that we hope never comes, because if people fear too much for their own safety, that of their families, and of their possessions, they'll simply go somewhere else. Securability means having the ability, without closing streets or neighborhoods, to "circle the wagons" and make private spaces more secure. Any casual walk through European cities reveals that the American freestanding house exposed on all sides is an historical anomaly. Countless great cities and towns have a continuous street face of buildings, with a securable alley or lane.

A sustainable building must first be lovable, because if it cannot be loved, it will not last. The carbon footprint of a building is completely irrelevant once its parts have been carted off to the landfill. A building focused only on being "of our time" is by definition most quickly "outdated" tomorrow, and likely unlovable, too.

If a building is lovable, then it needs to be durable so that it can endure. Our ancestors once built for the ages. Why not us? The question, "did they leave that building site better than they found it" doesn't mean much if "they" never leave an enduring building.

A lovable, durable building also needs to be flexible so that it can house many functions over the centuries. A building that lasts for a thousand years may house the programmed function for five percent of its life or less, making the program one of the most overrated premises in architecture. We should focus instead on building a good building, useful for many things.

A lovable, durable, flexible building that's an energy hog is really bad, because you can't get rid of it! Buildings must also be frugal with energy and resources, and preserve the health of the environment around them and the inhabitants within them. Gizmo Green is a small part of frugality, but not the first part. Rather, we should do the natural things first, then bridge the gap with efficient equipment.

Some believe that the Original Green is nothing more than old towns, old buildings and old conditions, and few today want to live a medieval life. The truth, however, is more advanced than that: Think of a craftsman, his or her tools, and the artifacts that are created. The Original Green is the intelligence of the craftsman; living traditions are the tools, and the artifacts are the towns and buildings. Because the Original Green has always focused on what works best for a particular region's conditions, climate and culture, and because living traditions allow the Original Green to connect to the people, not just the specialists, it has always produced the most up-to-date artifacts. In other words, it produces the most sustainably modern architecture. It is time to reawaken it now.

Urban Design Associates, Rob Robinson

The notion of moving our practice towards what we call "the next generation" of urban environments involves notions of sustainable design at many different levels. Within the urban context, it is about creating a bridge from the past to the future through careful consideration of climate, urban systems, connectivity, social and cultural influences in the context of inherited fabric, and scale of place.

At the most basic level, it is about using resources wisely and in ways that foster a sense of community and local identity. As urban designers, we must consider the deep well of issues and opportunities that promote smarter and more humane urbanism capable of change over a long period of time.



Urban Design Associates, in collaboration with The Prince's Foundation for the Built Environment, conducted an Enquiry by Design process to study the expansion of Ellon with national builder Scotia Homes. This public participatory process has produced a plan that calls for both restoring the historic core of Ellon and building new neighborhoods as extensions of, and support for, the existing town. The physical form and character of the new areas will draw lessons from the great traditions of Scottish town building, especially those of Aberdeenshire. UDA is now working with Scotia Builders to design detailed building

It all matters: the orientation of streets and buildings; climatic response through building form and expression; sun exposure and wind patterns relative to public spaces; walking distances; pedestrian and bike networks that link people to the city; public spaces and neighborhoods; mixed-use patterns that bring amenities; services and goods within easy reach to create 24 hour environments – all of these aspects make up the fundamental building blocks of a sustainable place. There is certainly a fascination with the latest and greatest technological gear. Architects are especially vulnerable to the current "cutting edge." I think there is a genome sequence

types and implement phases of the plan. The new High Street, shown here, will serve as the central spine of the new development. Drawing: courtesy of Urban Design Associates



Designed by UDA, the Ni Village in Spotsylvania County, VA addresses the needs of a regional population increasingly strained by the demands of long commutes and rising fuel costs. It will offer an integrated living and working environment that affords more quality time for friends, family and personal fulfillment. The 323-acre village will incorporate 950 housing units, local neighborhood commercial shops, a higher education center devoted to green technologies, as well as a network of running and biking trails through 150 acres of preserved natural habitat. Drawing: courtesy of Urban Design Associates

embedded in us that encourages us to try every new method and material. We are experimental as a lot. If the recent past is any indication, the scorecard is pretty shaky. However, investment in new urban infrastructure that supports high quality urban environments is intensive and complicated, yet essential to accommodate growth, promote resource conservation and repair environmental damage.

In this country we are faced with aging and inefficient systems that must be replaced with more sustainable methods, equipment and materials in order to maintain and enhance the viability of urbanization. Outdated sanitary and storm systems, electrical and communications infrastructure, transportation facilities and transit systems, energy production and distribution, waste removal and processing limit the viability and livability of our towns and cities.

Backbone infrastructure should be the focus of public investment with goals of increased efficiency, reduced environmental impacts and long-term adaptability. This is essential if we are to realize competitive advantages of urban locations. We are far behind most of the developed world in our reinvestment policies and priorities. The fact that we can't implement a legitimate mass transit system that could replace much of the carbon intensive air and auto travel is but one example.

But it isn't all about the plumbing and the wiring. We want our urbanism to be loved and admired as well as meaningful and supportive. Without this, it doesn't matter how efficient the geothermal power plant is. Most of the "detail" issues in thinking about green urbanism, such as green roofs, green streets, energy alternatives, storm water management, zero carbon emissions, etc. are all part of a desire to address the thoughtless investments that ignore environmental imperatives to repair, conserve and enhance our resources. This desire is by nature inclusive, not exclusive.

The role of designers is to help craft thoughtful responses and facilitate broad discussion within communities to establish principles, aspirations, goals and important physical and social outcomes. It is a constant balance to bridge the past with the future. The restoration of good, well-built buildings, parks and infrastructure that can be adapted to new uses and new contexts remains at the top of the list for achieving sustainable urbanism. Adding to cities, towns and neighborhoods in ways that support local businesses, quality of life, connectivity and healthy living is an imperative.

The long view always seems to serve us best as we adapt to changing patterns and technologies. The fundamentals of making livable, sustainable cities and towns with humane public spaces and interesting architecture and landscapes that reflect local patterns should help us incorporate emerging methods and systems that make sense in the context of a specific place. Over the past decade, the progressive thinking about building performance and efficiency has tended to focus on the parts and pieces as materials, methods, and mechanical and electrical systems that are introduced and specified in projects at every scale. This period of inventive and focused research and development creates the opportunity for great strides forward in the way we all think about resources.

"Built to last" has been a mantra for architects and urban designers forever, with all too few examples to point to. Rethinking the building process, use of materials, environmental outcomes, local sourcing, adaptability and the basic land use and infrastructure patterns presents a critical moment for preservationists, policy makers, urban planners and designers to articulate a series of principles that guide the decisions to build, restore and conserve.

Voith & Mactavish Architects, LLP, John H. Cluver

Sustainability can have many definitions, but one of the most straightforward is the ability to meet our current needs without compromising the ability of future generations to meet theirs. "Green design" and preservation are concepts that often are considered independently and, not infrequently, in opposition to each other, but the reality is that they share many common goals and features, particularly when they are focused on the issue of good urbanism and true sustainability. In a vibrant urban environment, sustainability can be supported by a combination of preservation, traditional design practices, and innovative ideas and technologies. Success is achieved when all of these are employed simultaneously, allowing no one aspect to take precedence at the expense of the others.

Most of our urban environments were founded before the 20th century, and built with traditional planning and construction principles with levels of energy use that are a fraction of those employed today. Today these urban environments offer wonderful opportunities to effectively leverage the embodied energy found in their existing large investments in infrastructure and building stock. At the most basic level, reusing an existing urban building takes advantage of the utility services, roads, and transit systems that have already been built. It also maintains the pedestrian scale and reduces dependence on private cars for everyday commuting and chores, further conserving resources.

Regardless of its age, style, or condition, these factors provide an urban building with an inherent sustainability advantage over new and/or greenfield construction. This can apply even

to buildings of the "recent past." While they may lack some of the sustainable or aesthetic qualities of our older buildings, they do possess significant embodied energy and the potential for simple efficiency improvements. While some may have been built in a manner that cannot be easily upgraded, or do not contribute to their context, others have the ability to be sustainably renovated to continue, or even improve, their role in the urban environment.



Too often, the general perception is that sustainability is achieved solely through the use of green materials and innovative technologies. New materials and innovative technologies definitely have a role to play in improving the energy efficiency and sustainability of our cities, in both new and old buildings; for example, geothermal wells can be discretely installed under paved

areas to provide efficient heating and cooling; green roofs can reduce summer heat gain in and around buildings, while also reducing the rate of stormwater discharge during heavy rains; and daylight sensors can be combined with dimmable light fixtures and motorized shades to automatically control light and heat levels within a building. However, our historic buildings typically were built with durable, maintainable materials that can be repaired and renewed with less energy than new construction and, once restored, have the potential to outlast new buildings as well.

Despite the caricature of the "drafty old building," traditionally-built old structures can be more efficient than their more modern counterparts (a GSA study in 1999 found that their historic building stock averaged 27% lower utility costs than their non-historic buildings). Old buildings were constructed before air conditioning, forced-air heating, and tungsten-filament light bulbs, and they needed to provide function and comfort by working with the natural environment, rather than consuming energy-intensive utilities. Traditional building practices such as higher ceilings for deep light penetration, thick-wall construction for durability and thermal inertia, deep-set windows and window surrounds for summertime solar shading, and natural ventilation – all were forms of leveraging limited energy resources to maximum benefit that could continue to be used today.

Simple, cost-effective improvements such as boiler upgrades, programmable thermostats, occupancy sensors on lights, attic insulation, solar reflective flat roofs, window weather-stripping, storm windows, and window shades all can improve on existing features to provide significant energy savings, with much less cost (in dollars and energy) than new construction. Upgrades such as these to an existing building can reduce its energy consumption by 50%, without relying on expensive technologies that have payback periods extending into multiple decades.

New technologies, when considered holistically within the context of an existing building and its environment, can be integrated in a way that best uses the inherent benefits of each. Regardless of building age and style, preservation, traditional design practices, and innovative design ideas can work together to create an efficient whole and to create and maintain a sustainable urban environment.

Existing buildings, be they less than 20 years old, more than 200, or somewhere in between, represent a high level of embodied energy and need to play a central role in a sustainable urban context. Traditional building practices and innovative technologies can be combined as part of an holistic renovation program to promote true sustainability. Voith & Mactavish Architects designed the renovation of the former ASTM Headquarters in Philadelphia for reuse as part of the Moore College of Art and Design, reusing a well-constructed building so that it would accommodate a new function while being more energy efficient and more responsive to its urban context. Photo: Tom Bernard Photography