Sustainable Construction Policies in EPA Region IV

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Introduction

This Practice Guide is meant for any person interested in promoting sustainable construction; it will be particularly useful for those who are working within the U.S. Environmental Protection Agency's (EPA) Region 4. The Guide is organized into three sections, plus the appendix, and readers can read them in any order or combination. The Guide begins with an overview of the construction industry and its economic and environmental impacts. The second section considers the national and regional contexts for state and sub-state policies; the Obama administration will likely impact this arena and policymakers who can respond swiftly will reap the benefits. The Guide concludes with suggestions for crafting policies and instituting practices. These recommendations are based on a survey of current sustainable construction regulations and practices in the EPA Region 4. Detailed case studies of the policies and practices of governmental, private, and educational sectors of Kentucky, North Carolina, Tennessee, Florida, and Georgia are included in the appendix. All information is current through 2008 and, because rapid change is expected in this area, the CEPM hopes to provide updates as often as possible.

Section 1

This section presents a snapshot introduction to the construction industry, the principles of and trends in sustainable construction, and the environmental and economic aspects of industry practices.

Overview of the construction sector

The economic importance of the construction industry is felt in both good and bad times. The Pew Center's report, *Towards a Climate-Friendly Built Environment*, places the year 2000 value of the construction industry at $1.3 trillion, or 13.2 percent of the national gross domestic product (GDP). Of this total, the value of renovations to the existing housing stock was $265 billion while the value of new construction was $562 billion.[1] The April 2008 release of the Bureau of Economic Analysis advance statistics on GDP by industry, which describe real GDP growth and inflation by industry, showed a construction industry decline of 12.1 percent in 2007 and 6 percent in 2006.[2] One reason for the recent contraction is that the industry is particularly sensitive to changes to the market for new housing. As the Pew Center's figures for year 2000 indicate, new construction accounted for approximately half of the total value of the industry; this is particularly impressive given that new construction adds only 2-3 percent of the existing housing stock annually.[3] In other words, changes to the economic value of new housing construction reverberate through a number of subsectors of the economy. This is a good lesson to bear in mind for the remainder of this guide since it helps to explain the slow evolution of new and innovative approaches to building.

Understanding the reluctance to promote and adopt sustainable construction policies and practices provides context for evaluating the rate and quality of progress to date and is key to generating momentum and confidence by ensuring that the right solutions to the right problems

[1] Brown, 2005 (p. 22)
[2] Bureau of Economic Analysis, 2008
[3] Brown, 2005 (p. 22)

are addressed by new policies. For example, as much as the public sector works can serve this agenda by creating demand and modeling behaviors and results, Barry Zalph cautions against assuming away the disincentives created by tight scheduling and budget constraints often required by public funding sources such as the Housing and Urban Development Hope VI grant.[4]

The Development Center for Appropriate Technology (DCAT) published a 2002 survey-based study of the perceived and actual barriers presented by building codes to the mainstreaming of sustainable practices and materials. Available on the DCAT website, *Breaking Down Barriers: Challenges and Solutions to Code Approval of Green Building* addresses particular challenges such as the decreased innovation and development that results from the prescriptive, rather than performance-based, approach common to building codes.[5] The report also considers the larger challenge posed by long-standing misconceptions of the public health dangers posed by built structures and the human tendency to embrace and act on a perception of relative risk that is not grounded in empirically-based, probabilistic analysis. In the authors' words:

> The historical lack of awareness and concern about the generalized risks from the often pollution-intensive, energy-intensive, and/or resource-intensive ways of building which are included and fully accepted in existing codes has meant that concerns about environmental impacts and sustainability have played minimal roles in establishing building code requirements or setting the levels of acceptable risk. Thus, in many cases, the codes have ignored significant health and safety issues such as indoor air quality, the toxicity of materials and chemicals used in building (e.g., asbestos, lead, and formaldehyde), or the impacts on non-renewable resources or global climate change.[6]

In short, the authors conclude that the challenges to the standardization of sustainable construction are simultaneously technical, political, and conceptual. Nevertheless, these are not insurmountable obstacles, as evidenced by the retooling of a number of conventional construction processes, the growth of a highly-visible knowledge community that employs a demonstrative approach to new technologies where possible, and the use of new data to encourage a conceptual shift in public health risk perception.

One significant area of progress has been in the development of pragmatic and user-friendly ratings systems. The environmental value of adjustments in design and construction can now be evaluated using a number of rating systems (see the following section for a brief commentary on existing programs). What is interesting to note about the ratings systems is that they give particular weight to use-phase energy consumption. This bias mirrors the slant of public policy and reflects the relative environmental importance of emissions associated with non-renewable energy use. The Pew Center report states that:

> The building sector is the largest consumer of energy in the United States. The nation's 106 million households, 4.6 million commercial buildings, and 15.5 trillion square feet of industrial building floorspace consumed approximately 40.3 quadrillion Btu (quads) of energy in 2002, or about 41 percent of the U.S. total; most of this energy is consumed by residential buildings (20.9 quads), somewhat less by commercial buildings (17.4 quads),

[4] Zalph, "High Profile at Low Cost" (p. 8)
[5] Eisenberg, 2002
[6] Ibid, (pp. 2-3)

> and the remainder is consumed by industrial buildings (2.0 quads). Energy consumption is directly tied to GHG emissions - every quad of energy consumed in the building sector results in approximately 40 MMTC emissions (and costs almost $8 billion in 2001$).[7]

Ed Mazria, writing for Architecture 2030, uses U.S. Energy Information Administration (EIA) data to support the assertion that buildings consume 67 percent of all power-plant generated electricity and that the building sector is responsible for 48 percent of all nationally-sourced GHG emissions.[8] The Pew Center report further notes that the EIA expects that greenhouse gas (GHG) emissions from the building sector, which have increased 2 percent annually since 1990, will continue to trend upwards at an annual rate of 1.4 percent through 2025.[9] In addition to contributing 38 percent of the national carbon dioxide emissions, the building sector is also the source of 47 percent of sulfur dioxide and 23 percent of nitrogen oxides, in addition to lead, fine particulates, carbon monoxide, and volatile organic compounds (VOCs).[10] Reduction of any of these so-called "collateral pollutants," and particularly of carbon dioxide, will support efforts to reduce GHGs.

These statistics gain policy relevance in the Pew Center report's statement that, "if the potential for CO2 reduction is judged by the amount of energy used, then the greatest potential among residential users lies with single-family residences."[11] This argument is developed by first considering that space and water heating, space cooling, and lighting systems together account for 65 percent of the energy consumption in residential buildings while space heating and cooling, lighting, and the operation of office equipment collectively claim 50 percent of energy used in commercial buildings. Combine these usage statistics with the fact that 73 percent of the total energy usage by the residential building stock is accounted for by single family homes which constitute only 59 percent of that stock. Taken together, these statistics show that energy efficiency is a logical priority within the larger agenda of sustainable construction.

While this rationale might serve to explain the particular emphasis in buildings ratings systems on aspects of energy efficiency, it does not shield these systems entirely from criticism. It is clear that, if vocal critics have any influence, the systems will continue to evolve to include increased consideration of construction's impacts on other environmental media (such as stormwater pollution and soil erosion) and of such cradle-to-grave issues as materials procurement and recycling of demolition debris.

Environmental impacts and policy dimensions

The connection between construction practices and standards and a range of environmental quality issues is increasingly recognized. New trends in environmental accounting lean heavily towards life-cycle assessment that accounts not only for the use (energy consumption) phase of a building but also for the impacts of the pre-construction (design and siting) and construction phases. The increasingly common position that buildings, like transportation modes, should be

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[7] Brown, 2005 (p. 20)
[8] Architecture2030, 2009
[9] Brown, 2005 (p. 19)
[10] Ibid, (p. 19)
[11] Ibid, (p. 22)

subjected to a cradle-to-grave analyses that address the impacts of their many uses is backed by emergent data that reveals the relative environmental impacts of the various phases.

The generation of new data on the environmental impact of buildings specifically and of construction generally is being used to craft recommendations for investment in new technology and development of new, more comprehensive policy. One clear example of this data and its applications is found in the Pew Center's report of a known 2 percent annual increase in GHG emissions from the building sector since 1990 and a predicted increase of 1.4 percent annually in CO2 emissions from residential and commercial sub-sectors.[12] The report acknowledges the advances made in increasing the energy efficiency of buildings since the 1970s; however, the authors of the report warn that the expected expansion of the built environment (which will likely amount to an increase of 70 percent of the present "stock" during the coming three decades alone) means that the spread of currently-existing technologies and policies and the continued development of emergent technologies and policies are necessary but not sufficient responses.[13] The Pew Center report is an interesting place to begin this review since it points to the value of bolstering current and emergent technologies with policies that provide legal, political, and financial support.

The need for parallel development of technological and policy solutions is a common theme running through the many documents and topics covered on "knowledge community" websites such as that of the American Institute of Architects (AIA).[14] In other words, the new data is being used to support claims that the environmental impact of the construction sector is not determined primarily by the sufficiency of current technology or by consumer preference for inefficient products. Replacing these narrow understandings is a more complex view of the built environment in its totality and a particular attention to the ways in which public policies can influence spatial efficiencies in land use, innovation in product design, and creation of performance standards.

Policy makers are making progress in developing sustainable construction policies and programs. The EPA promotes an approach to construction known as the Whole Building Design (WBD). The techniques and technologies of the WBD approach are described on a comprehensive website (http://www.wbdg.org/design/greenspec.php) maintained by the EPA. The WBD is a governmental response to private sector programs such as the US Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System or the Building Security Council's (BSC) Building Rating System (see below).[15] The LEED system was also the model used by the US Army Corp of Engineers (USACE) in developing its Sustainable Project Rating Tool (SPiRiT). USACE adapted LEED to fit its particular needs: SpiRit retains five of the six original LEED categories (Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality) but replaces the sixth (Innovation and Design) with the three new categories (Facility Delivery Process, Current Mission, and Future Mission) that are more specific to the Corp's function and potential impacts. As explained by USACE architect Russell Uyeno:

[12] Ibid
[13] Ibid (p. 15)
[14] American Institute of Architects, "The Committee on the Environment"
[15] Prowler, 2008

> Facility Delivery Process: The intent is to have the Project Delivery Team deliver a facility that optimizes tradeoffs among sustainability, first costs, life cycle costs, and mission requirements.
>
> Current Mission: The intent is to assure the delivery process enhances efficient operation and maintenance of the facility and provide a high quality functional, healthy, and safe work environment to promote soldier and workforce productivity and retention.
>
> Future Mission: The intent is to recognize how soon the facility should be expected to adapt to a different use and design for flexibility.[16]

The Army originally intended to use SPiRiT ratings exclusively; however, Rosenfeld notes that this approach was abandoned when changing standards made updates to SPiRiT too resource intensive and Army officials recognized the inefficiency of duplicating the work of the U.S. Green Building Council (USGBC). Instead, the Army adopted a policy requiring SPiRiT Gold certification for all Army Family Housing and LEED Silver certification is required for all other Army facilities.[17]

Notwithstanding these and other efforts by specific governmental agencies to promote internal and external standardization, private sector programs are, by far, more established than their public sector equivalents. LEED is one of the best-known approaches to sustainable building; as of March 2008, the USGBC had granted LEED certification to 622 projects nationwide.[18] It incorporates concerns for not only the use-phase environmental implications of a structure but also the preparatory siting and impact analysis decisions, the choice of materials, and the impact of the physical disturbance caused by the construction process itself.[19] The Green Globes system is a relative newcomer, created in Canada in 1996 and brought under the ownership and management of Green Building Initiative (GBI) in the U.S. in 2004. In a section of its website entitle "Why Green Globes is Better," the benefits touted include an online, questionnaire format that helps to reduce costs and maximize flexibility.[20] The Pew Center report lists two additional ratings systems that do not appear to be popular in Region 4 states: The National Homebuilders Association Research Center' Model Green Home Building Guidelines and the Minnesota Sustainable Design Guide by the University of Minnesota.[21]

On the one hand, competition might generate more innovation, reduce costs, and allow for customization of environmental controls; on the other hand, the proliferation of standardization programs is problematic in the extent to which the lack of standardization hinders the further development of a larger market for the needed skills and materials. The process of developing appropriate policies and technologies is the focus of a growing number of advocacy and

[16] Uyeno, "Army's Sustainable Project rating Tool: SPiRiT"
[17] Rosenfeld, 2008
[18] Green, 2006
[19] Public Technology, 1996
[20] Green Globes, "Why Green Globes is Better"
[21] Brown, 2005 (p. 24)

professional organizations. These groups compile needed data, educate their membership, and lobby public officials.

Economic aspects

An Energy Efficient Mortgage (EEM) expands the borrowing capacity of the purchaser of an energy efficient house on the principle that savings gained through energy efficiency can be applied in support of a larger mortgage payment. The amount of expected operating savings is estimated using a Home Energy Rating System (HERS) report that rates energy efficient design factors on a scale of 1-100.

The U.S. Department of Housing and Urban Development (HUD) offers an EEM that is secured through its Federal Housing Administration (FHA) and available nationwide.[22] The FHA EEM can be paired with the complimentary 203(k) FHA Home Rehabilitation Loan, a financing option for property acquisition and improvement. The Federal Citizen Information Center (FCIC) website also notes the availability of the Veterans Affairs EEM, a nationwide option for certain persons associated with the military that is intended to assist with improvements to existing homes; and EEMs through Fannie Mae and Freddie Mac that are designed to adjust the income-debt ratio requirements.[23]

Private, commercial banks are adjusting their policies to account for the environmental dimension of building construction, siting, and design.[24] Despite the existence of organizations like Environmental Bankers Association, this trend seems rather loosely evolving in that there does not appear to be a comprehensive, industry-wide approach; on the other hand, there are an increasing number of individual institutions that are adopting a rather diverse array of approaches in recognition of the influence exercised through financing practices on bank clients' behaviors.[25] The variety of approaches is interesting: some institutions are simply becoming more active in structuring and financing environmentally-beneficial construction projects[26]; others now offer equity credits for sustainable design of structures and rate adjustments for siting decisions and mitigation actions related to the contamination levels of a given site.[27] Still others are broadly incorporating sustainability principles, including green building, into their lending policies; the ShoreBank Pacific, for example, lists Conservation/Environment (a category covering Energy, Materials/Resources, and Land and Water Capacity) as one of the three pillars of its triple-bottom line approach to the evaluation of potential loans.[28] Banks are also direct investors, as exemplified by the recent decision by WellsFargo to double its investment in green structures to more than $2 million.[29]

Several issue-specific funding sources are available. The area of brownfields re-development is a clear example of the recent mushrooming of programs that approach construction practices in an issue-specific manner. Brownfields re-use is largely a question of siting. Decisions regarding

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[22] U.S. Department of Housing and Urban Affairs, 2005
[23] Pacific Gas and Electric Company, 1996
[24] Pratt, 2002
[25] Environmental Bankers Association, 2009
[26] Bank of America, 2008, "Milpitas Unified School District Partners With Chevron and Bank of America"
[27] Bank of America, 2008, "Bank of America Provides Old War Plant"
[28] ShoreBank Pacific, "Putting Principles into Actions"
[29] GreenerBuildings, 2008

location of development are critical to the environmental impact of a construction project since the question of location translates to decisions regarding the development and maintenance of large-scale and public infrastructure, orders preferences for modes of transportation, and influences the pattern of future siting decisions.[30] (The economic and environmental benefits of brownfields re-development have been presented in other practice guides produced by the Center for Environmental Policy and Management; these guides are available under the heading "Brownfields" on the Center's website at http://cepm.louisville.edu/publications/publications.htm.)

Another growing area of specialty financing links land and water use policies by targeting (re)development that is designed to manage wastewater on-site. Such designs are collectively referred to as a "Green Infrastructure" application of Low Impact Development (LID) principles.[31] This approach follows from the 1987 Congressional amendment to the Clean Water Act (CWA) which established the Non-point Source Management Program (Section 319).[32] Under Section 319, sub-federal governmental entities can leverage grant funding to promote on-site management of wastewater, including runoff. The Clean Water State Revolving Fund is intended to support similar objectives but is made available to both non-governmental entities and local governments.[33] State-specific information, including newly announced initiatives, interest rates, and administrative contacts, is accessible through the EPA's Regional and State Contacts Page.[34] Other relevant EPA resources, including its database of financial and technical information[35] and a financing comparison tool,[36] are useful for private and governmental entities alike.

Section 2

This section focuses on the federal and regional contexts, with an eye to identifying existing funding and policy issues as well as brief commentary concerning the emergence of a more formal and uniform approach to sustainable construction.

The evolving national context

Most governmental efforts to address the environmental impact of the building sector, and particularly those at the federal level, have focused on the emissions associated with a building's use phase. The result has been a growing collection of energy-efficiency legislation and incentive provisions designed to curb or mitigate those emissions that result from operation and occupancy activities. This formal policymaking was largely spurred by the requirements of the Clean Air Act, a federal legal framework. In contrast, non-use phases of the building cycle generate environmental concerns that have traditionally been within the jurisdiction of the local government that administers land use codes and establishes guidelines for municipal waste

[30] Cunningham, 2006
[31] Environmental Protection Agency, 2009, "Low Impact Development"
[32] Ibid, "Green Infrastructure Funding Opportunities"
[33] Ibid, "Clean Water State Revolving Fund"
[34] Ibid, "State Contacts"
[35] Idib, "Watershed Funding"
[36] Ibid, "Financing Alternatives Comparison Tool"

disposal practices.[37] The locality-specific nature of the resulting legislation in conjunction with the tendency to scatter both authority and responsibility throughout local regulatory agencies frustrates attempts to summarize the implications for construction and design processes. Furthermore, industry standards (for safety ratings of building materials, for example) add yet another layer of controls that, while not addressed here for reasons of space and topical focus, have a decided influence on the practices and principles of sustainable construction.

It is probable that the complex layering of legislation, regulation, and professional codes and standards will continue to be the norm as the notion of sustainable construction expands to include new concerns. Already, increased attention to construction and demolition phases of the building life cycle and to the design of buildings and infrastructure has forced piecemeal changes to policies addressing land use (impervious cover ratios, etc.), materials (procurement), processes (disposal), and transparency and oversight (standardization and certification). One such development is the affirmation by the Ninth Circuit Appellate Court of the U.S. District Court for the Central District of California interpretation of the statutory responsibility of the EPA under the CWA to properly regulate the construction sector as a point source contributor by developing effluent limitations guidelines and new source performance standards for pollution discharges. The Van Ness Feldman Law Firm writes that "proposed regulation would regulate storm water runoff during all stages of construction and would affect home builders and developers of commercial and industrial land." This decision strengthens the federal responsibility for limiting the permissible levels of effluents that can result from construction and demolition activities as well as from structural designs that encourage the deposition of pollutants into waterways through, for example, excessive runoff.[38] Such developments set the stage for increasing federal interest in construction-related environmental impacts and for an increasing complexity of the regulatory environment surrounding such issues. It is unfortunate, given the needs of the emerging policy, services, and products markets for sustainable construction, that standardization and streamlining are valued yet rare characteristics of public policy.

In the end, order may well come from above as President Obama's administration begins to flesh out the policy needed to realize his campaign proposals. One prominent campaign promise was to create jobs through heavy invest in green infrastructure construction and energy generation. While this strategy does not directly benefit all sections of the industry evenly (neglecting residential construction, for example), it suggests that sustainable construction in general will be made more affordable through the impact of federal investment on demand and supply balances of specialty labor and product markets. Mirroring the tack preferred by states and localities, Obama's suggested approach focuses on public buildings policies by 1) supporting state and municipal efforts with matching funds for efficiency retrofits and with expanded federal grants for LEED-certified public projects and for revision or adoption of building codes, and 2) setting completion dates for energy efficiency targets (including carbon neutrality for all new federal buildings by 2025 and all new public buildings by 2030) and spelling out corresponding reduction schedules. This strategy has gained the support of the USGBC which, in November of

[37] Natural Resources Defense Council, 1999
[38] Iani, et al., 2008

2008, presented President-elect Obama with an agenda highlighting the sustainable construction of buildings.[39]

Regional energy providers and consumers

The most established policies and programs in the area of sustainable building is most certainly the use phase of a structure and, more specifically, the associated energy consumption. The source and amount of electricity consumed are key factors in the overall environmental impact of a building. Additionally, renewable portfolio requirements have placed this aspect of sustainable construction on the agenda of state and local governments; the proliferation of enabling policies and programs in this area is the topic of another CEPM Practice Guides (see *PG#20: Energy Efficiency as a Public Priority* and *PG#21: Financing Energy Efficiency Improvements*).

While the energy source and usage patterns associated with a given building design is an important consideration in sustainable construction, there are equally significant yet more subtle ways in which energy provision impacts sustainable construction and design. One of these is the negative effect of an available low-cost energy supply on the incentive to engage with sustainable construction practices or policies. As Barry Zalph notes, "In regions with low utility costs, green building advocates face even more difficulty convincing the building community to try innovative methods."[40]

The majority of the supply available to Region 4 states is derived from traditional sources. The Tennessee Valley Authority (TVA) is the principal energy producer in Region 4 and the largest public energy supplier in the country. Its service area spans "80,000 square miles in the southeastern United States, including almost all of Tennessee and parts of Mississippi, Kentucky, Alabama, Georgia, North Carolina, and Virginia."[41] The TVA's customer base includes 158 local power distributors, 54 large industries, and eight federal agencies.

The majority of TVA energy production is supported by its 11 coal-fired plants, some of which are also fitted with combustion turbines that burn natural gas or fuel oil. The TVA also operates three nuclear plants, 29 hydroelectric dams (that are supported by a total of 12 dams), and one pumped-storage plant. In April 2000, the TVA began to offer renewable-source (solar, wind, and methane) power through a growing network of local distributors.[42] The total renewable power generation for the period of December 2007 until February 2008 was 26,702,962 kilowatt hours. Its Green Power Switch program currently claims 12,297 residential and 521 business customers.[43]

According to its website, the TVA's environmental management policies address land use issues, the hydrologic health of the Tennessee River, and impacts on air quality. It claims ozone-season emissions reductions of nitrogen oxide (NO_x) of 81 percent since 1995 and of sulfur dioxide (SO_2) by 80 percent since 1977; these reductions have been achieved, respectively, through the use of selective catalytic reduction (SCR) equipment in 60 percent and of scrubbers in 30 percent

[39] Adams, 2008
[40] Zalph, "High Profile at Low Cost"
[41] Tennessee Valley Authority, "Frequently Asked Questions"
[42] Ibid, "Green power Distributors"
[43] Ibid, "The Switch Is On"

of its coal-fired capacity. The TVA projects a total investment of $5.8 billion in these and other modifications to its coal-fired plants by 2010.

What are the benefits and costs of regionally coordinated policies and markets? It seems that innovative energy options have been slow to spread between the Region 4 states. For example, metering, which allows utility customers who are also energy generators to sell any excess production to local utilities at retail value, is only available state-wide in Kentucky, North Carolina, Florida, and Georgia. (Specific size limits and contract terms of these states' individual systems are available through the DSIRE and North Carolina Solar Center websites.) In another example of state-centric policymaking, Florida is the only Region 4 state with an environmental disclosure policy. The purpose of such policies is to improve the availability of consumer information about the fuel sources and mixes used by local utilities and, secondarily, about the expected emissions associated with the consumption of electricity.[44] Florida's full (i.e. mandatory) disclosure rule, which has been in effect since 1999, requires all "investor-owned electric utilities to provide information on their fuel mix to customers on a quarterly basis."[45]

One reason for the slow spread of energy-related policies and programs might be that energy generation and provision is an area that is amenable to the benefits of monopoly. However, this is not true for other markets attached to the sustainable construction industry, such as labor or materials supply. One the one hand, the success of regionally-operating businesses, such as EarthCraft, suggests that inter-state policy mismatch is not always an obstacle to market expansion. On the other, the state-specific reviews in the appendix reveal a trend within Region 4 towards what almost seems to be state-by-state specialization, so that product production is concentrated in North Carolina while contractors and builders are centered in a neighboring state. While it may be too early to state that policy mismatch is undermining the development of sustainable construction, it is worthwhile to remember that conventional economic theory expects infant industries (or industry niches, like sustainable residential construction) to flourish in environments where coordinated policies facilitate the development of optimal political and market scales. With this is mind, we turn to the activities of states and municipalities.

Section 3

This section briefly presents interesting examples of sustainable construction initiatives in Georgia, Florida, Tennessee, North Carolina, and Kentucky. Within Region 4, these five states have emerged as innovators of sustainable construction practices and policies. While not exhaustive, this section highlights notable efforts in each of three (private, government, and education) sectors. The goal is to provide the advocate and policymaker with examples of existing policies and programs that can be adopted and implemented with relative ease. The case studies in the appendix provide a more in-depth review of the adopted policies, programs and certified projects of each of the five states.

It is very helpful to realize that states and municipalities also have a lot in common. Their strategies are, essentially, tested ways for local government to take meaningful but manageable action; these are the basic elements of a toolbox, a menu of the options most readily available to

[44] Green Power Network, 2008, "Net Metering Policies"
[45] Ibid, "Disclosure Policies"

local governments. Taken together, the policies and programs give a snapshot of the role that local government has played so far in the mainstreaming of sustainable construction. The rest of this section is dedicated to providing an overview of the most popular trends in local government policies and programs.

Trends in local government policies and programs

The profile of the most popular local government approach to mainstreaming sustainable construction includes multiple partnerships, particularly with a proactive education sector; incentive schemes for private developments and mandates for the publicly-funded counterparts; and environmental goals that are centered use-phase concerns such as the reduced consumption of electricity.

Beneficial partnerships have taken different forms in different locations, seemingly in accordance with the strengths of the sectors in each locality. Georgia provides a strong example of powerful public-private partnerships. The state's local governments have invested in mutually beneficial partnerships for projects ranging in focus from large infrastructure to product development. Governments in North Carolina and Tennessee have developed dynamic partnerships with their local educational institutions. Public school demonstration projects have enjoyed broad support, sometimes prompting entire districts to develop a sustainable construction policy. Institutions of higher education have contributed innovative practices and organization of relevant information; in many cases, the university-based centers for policy and practice research have also channeled state and federal funding to the benefit of municipalities.

As mentioned previously, the majority of federal legislation and funding targets use-phase rates of consumption of energy and natural resources; local government policies generally mirror this focus. This means that many localities prefer or even require that a certified project accumulate the majority of its ratings system points for efforts to reduce use-phase resource consumption. One notable exception to this use-phase bias include Georgia's state legislation (House Bill 1125) requiring that at least ten percent of the building materials used in major facility projects are required to harvested, extracted, or manufactured in Georgia.

Differential treatment of public and private construction projects is the most obvious trend in local government involvement in sustainable construction. Region 4 governments have almost uniformly adopted a dual-tract approach, offering incentives for sustainably-constructed private-purpose or privately-funded projects but mandating standards for construction and renovation projects intended for public use or (at least partially) publicly funded. On a more detailed level, governments using this forked policy differ on four points: the definition of minimum sustainability standards; the incentives offered to the private sector; the efforts of some governments to tie sustainable construction to other development goals; and the definition of the scope of application, including ceilings and floors on the project size, funding structure, or intended uses. To elaborate further:

1. Minimum sustainability standards in local government policy are most often tied to an established ratings system such as LEED; the policy specifies a floor (or minimum) ratings standard that must be attained by a given class of project.

While some localities only recognize LEED certification, others allow project rating and certification under any established systems. Florida's state legislation is an extreme example of the latter, explicitly recognizing certification under LEED, Green Globes, Florida Building Coalition, or any other established ratings system.

Localities can also target specific environmental concerns by defining the allowed makeup of points towards project certification. Though not yet a widespread practice, some localities have tailored their legislation to capture a particular environmental benefit by requiring or favoring projects that largely derive certification points from a particular design category. For example, the "Green Permit" ordinance in Nashville, Tennessee promotes water conservation design while requirements for municipal projects in Athens-Clarke County, Georgia emphasize indoor air quality.

2. The bundle of incentives made available to the private sector varies by locality. The most common incentives include:

    Fast-track permitting or plan review
    Reduction of building permits fees
    Cash or rebates
    Density bonuses (Floor-to-Area Ratio)
    Property tax abatement
    Certificate or award

    Many localities tie the level of the offered incentive to the level of project certification obtained. For example, Tampa, Florida offers a building permit fee rebate of between 20 and 80 percent, depending on LEED certification level. Mecklenburg, North Carolina has a scaled permit fee rebate system that grants 10 percent reductions for LEED Certified, 15 percent for LEED Silver, 20 percent for LEED Gold, and 25 percent for LEED Platinum.

3. Local governments link sustainable construction regulations to larger development goals. For example, the Planning Commission of Nashville, Tennessee created an incentive system that encourages a certain type of development in designated areas. The system allows Central Business District construction projects to take advantage of an increase in the Floor Area Ration (FAR) from 15 to 17 for LEED Silver certification and a FAR cap of 19 for LEED Gold certification, while SoBro Neighborhood construction projects are eligible for a FAR increase from five to seven for LEED Silver certification and a FAR cap of nine for LEED Gold certification. Germantown, Tennessee offers a one-floor density bonus for LEED-certified private construction in certain designated "Smart Growth Zones" (T4, T5, and T6).

4. Localities write limits of applicability into sustainable construction legislation. The three most popular bases for defining applicability are size, funding, and

intended use of a project. Localities specify applicability (of requirements) and eligibility (for incentives) using one or some combination of these three areas.

One common approach is to define applicability in terms of the size of the project by establishing ceilings and floors, or square footage maximum/minimum cutoff points. For example, Chamblee, Georgia requires certification for all public construction, regardless of size, but limits the application of this requirement to commercial construction projects of more than 20,000 square feet. Georgia's Athens-Clarke County uses absolute square footage of the project to specify applicability for new construction but percentage of total building area to define applicability for renovation projects.

Project funding is another popular basis for limiting applicability. Some localities focus on the source of the funding, mandating best-practice standards for publicly-funded projects while setting less stringent (or entirely voluntary) standards for privately-funded projects. Atlanta, Georgia requires LEED Silver certification for city-funded projects costing at least two million dollars and having at least 5,000 square feet of area.

It is also common to exempt projects whose expected payback term is considered unreasonable. Tybee Island, Georgia requires LEED-Silver certification for all new (occupied) buildings, except where the payback term is likely to exceed five years; in this case, the exemption is not wholesale since the city staff will recommend an alternate - and presumably more affordable - level of certification for projects that would be unduly burdened by the pursuit of LEED-Silver certification.

A third strategy is to tie requirements or incentive eligibility to intended use; this can be defined according to intended occupancy type, whether the intended occupants come from the private or public sectors, and whether the space is air-conditioned. Georgia's Athens-Clarke County requires LEED certification, with priority given to credits for indoor air quality, for construction of municipal buildings having more than 5,000 sq ft of air-conditioned space intended for occupancy.

Conclusion

In summary, there is a great deal of control and flexibility available at the local level. Localities can realize projects in collaboration with other sectors of the local economy, can promote the development of a shared (perhaps regional) market for sustainable construction products and services, and can tailor sustainable construction legislation to meet local needs and conditions. Legislation trends are emerging across localities, yielding useful performance data, lowering the barriers to implementation, and demonstrating that sustainable construction legislation can be designed to complement and advance particular environmental, social, and economic goals.

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