CASE STUDY: ASHRAE STANDARD 189.1 GREEN BUILDING CODE

1. THE POLICY

ASHRAE Standard 189.1, "Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings," is currently being developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) along with the Illuminating Engineering Society of North America (IESNA) and the U.S. Green Building Council (USGBC). A complete draft of the standard was first made available for public review in May 2007 and again in March 2008. In October 2008, the ASHRAE Standards Committee voted to disband the current ASHRAE 189.1 project committee. Although ASHRAE indicted to previous project committee members that they hope to revive the project shortly, a date for its final publication is as yet unknown. Although the Second Public Review Draft of Standard 189.1 can be used for reference, it is unlikely that Seattle would be able to reference a completed version of Standard 189.1 in the near future.

The standard was developed for inclusion into building codes across the US, in addition to a wider audience including cities, developers, corporations and institutions who wish to set green building design standards for their construction projects. The standard is designed to provide minimum guidelines for green building practices, including minimum requirements for the design of sustainable buildings to balance environmental responsibility, resource efficiency, occupant comfort and well-being, and community sensitivity. It is intended that the growing number of cities, states and organizations which use a green building rating system will adopt Standard 189.1 as a baseline for sustainable design. Although not a green building rating system, the standard addresses the five key areas of green building as addressed by the LEED® green building rating system, often with options of prescriptive or performance based routes to prove compliance:

Sustainable Sites
Mandatory provisions include consideration of site selection, site development, heat island mitigation and light pollution reduction.

Water Use Efficiency
Mandatory provisions include site water use reduction, building water use reduction and water metering.

Energy Efficiency
Energy systems within a building must be designed to comply with the mandatory Energy Efficiency provisions, including the use of on-site renewable energy systems with a peak generating capacity of at least 1% of the electrical service load of the building and the provision for energy metering.

The Building's Impact on the Atmosphere, Materials and Resources
Compliance is demonstrated by diverting a minimum of 50% of non hazardous construction and demolition debris from landfill, and providing easily accessible areas dedicated to the recycling of non hazardous materials. In addition, either the prescriptive (reduced-impact materials to either have 10% recycled content, be 15% regionally processed or be 5% bio-based) or performance based compliance route (life cycle assessment of 10 different atmosphere, materials and resource factors, of which at least two must show an improvement) must be followed.

Indoor Environmental Quality
Requirements for indoor environmental quality include: indoor air quality, environmental tobacco smoke control, outdoor air delivery monitoring, thermal comfort, building entrances, acoustic control, daylighting, and low emitting materials.

Additional Requirements
Additional requirements within the code relate to building commissioning, building acceptance testing, measurement and verification, energy use reporting, durability, transportation management, erosion and sediment control, construction, and indoor air quality during construction.

2. ENERGY EFFICIENCY POTENTIAL

2.1. Policy Uptake

The standard has been developed to provide guidelines for green building practices and is not yet mandatory in any jurisdiction. It is expected that a number of cities, states and organizations which use a green building rating

system will adopt Standard 189.1 as a baseline for sustainable design. Policy uptake within any jurisdiction would depend on the requirements placed by that area on complying with the standard; however, in most cases it is expected that compliance with some or all of the code would be mandatory for all new construction projects.

2.2. Energy Savings Potential

Standard 189.1 does not mandate any specific requirements for absolute or relative energy improvement. Therefore the energy savings potential of compliance with the standard is difficult to predict, as the standard does not easily allow for specific energy performance targets to be mandated. The level of energy savings achieved is dependent on the type of building, its architecture, construction and HVAC systems. Analysis has been conducted by the National Renewable Energy Laboratory (NREL) on a study of 17 building types, which saw improvements in energy efficiency of between 10% and 40% (with an average of 25%) for Standard 189.1 compliant buildings, compared to the Standard 90.1-2004 compliant equivalent.

3. COST OF IMPLEMENTATION

3.1. Program Cost

The cost to a city or organization to implement Standard 189.1 is largely dependent on the changes and amendments which must be made to the code in order to implement the standard within a jurisdiction's existing building code. Since the standard itself was developed by a team of individuals operating on a largely voluntary basis, development costs are unavailable. As the standard is yet to be released in its final form, data is not yet available for the cost of implementing or enforcing the policy. However, anecdotal opinion was provided by officials at the Standard 189.1 Project Committee.

Where cities have comprehensive existing green building codes and building standards, work must be undertaken to integrate the standards outlined in Standard 189.1 with those already in existence, which is likely to increase implementation costs. Enforcement costs are likely to be lower as much of the existing building standards compliance infrastructure may be in place to oversee the requirements of the standard. Conversely, where no comprehensive standards already exist, implementation costs are likely to be lower as fewer amendments will need to be made to existing standards and to Standard 189.1. In this scenario, enforcement costs will be higher, as new infrastructure will need to be implemented to oversee compliance.

3.2. Cost to the Developer

As the standard has not yet been released in its final form, costs to the developers for achieving code compliance are currently unknown. Some research has been conducted which indicates that compliance with the standard is approximately equivalent to achieving LEED "Certified" certification; however, there is contradictory evidence as to the actual increase in costs this is likely to bring about. It would not be unreasonable to expect building costs to increase by between 1% and 2%.

4. ADMINISTRATIVE FEASIBILITY

4.1. Administering Agency

The standard has been developed jointly by ASHRAE, USGBC and IESNA and is designed to provide minimum guidelines for green building practices. Implementation of the code would fall under the requirements of existing local building standards authorities and enforcement of the code by local building departments.

4.2. Ease of Initiation

The ease of initiation of the code, as with program costs, is dependent on the extent to which high performance building standards and green building codes are already implemented. In a city like Seattle, with comprehensive existing building codes and green building standards, amendments will have to be made to the existing building codes or to Standard 189.1, to insure that contradictory or differing building standards are not introduced,. As an example, amendments may have to be made to Standard 189.1 to ensure that its "Water Use Efficiency" requirements are in line with the plumbing requirements of existing code. Once implemented, however, enforcement of the code is likely to be much easier, as compliance with the code will be overseen by the existing building department.

4.3. Educational Outreach Requirements

A number of presentations have been conducted by USGBC, AHSRAE and IESNA as development of the code has progressed. In addition, a number of presentations on the code have been given at several national construction industry conferences.

Officials involved in the writing of the code expect significant education and outreach requirements to be provided by each jurisdiction following adoption of the standard. ASHRAE is currently developing a training package on the overarching requirements of Standard 189.1, which is expected to be offered to authorities and organizations implementing the standard. Though current outreach costs are unknown, they are likely to be in the order of tens of thousands of dollars. The Standard 189.1 Project Committee expects that jurisdictions adopting the standard will also need to deliver targeted training for those impacted by each requirement of the code.

5. STAKEHOLDER IMPACTS

5.1. Acceptability to Interest Groups

A host of interest groups are involved in the development of Standard 189.1, to insure that the standard meets the sustainable, economic and practical requirements of stakeholders when released. This notwithstanding, local stakeholder involvement will be required in order for it to be successfully implemented at the local level.

As the standard has yet to be released in its final form (and therefore been implemented by any jurisdiction) historical data regarding its acceptability to local interest groups is unknown. It is expected that developers and builders would be impacted through required changes to their building practices, with increased costs incurred through the cost of building Standard 189.1 compliant buildings. Conversely, it is expected that the standard would have a positive impact on sustainability consultants and designers, as well as those involved in the supply of green building products and process as the implementation of Standard 189.1 in any local jurisdiction would help to catalyze a wholesale move towards green building.

Officials on the Standard 189.1 Project Committee were conscious that an undue burden should not be placed on developers. Therefore, there was a concerted effort to ensure that the requirements of the standard are both technically and economically feasible for the building community, with current technologies and design and build practices.

According to Jim Logan at Jim Logan Architects in Boulder, Colorado, where the standard is currently being considered for implementation, the majority of the building community, while resistant to the perceived building development increases that the implementation of such a code may bring, recognize that the move towards green building is an inevitable step, particularly if this is mandated by forthcoming future federal legislation. As such, he believes that there is excitement to learn how to design code compliant buildings.

6. REFERENCES

John Hogan, Chair of Standard 189.1 Project Committee, Senior Energy Code Analyst for Seattle

Jim Logan, Jim Logan Architects, Boulder, Colorado