Sustainable Management of Existing Building

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Management of the existing building stock is not for the faint at heart. It is a topic both extremely important, and extremely troublesome.

Its importance can hardly be overstated. The stock we have on the ground today – about a billion buildings world wide - represents approximately two thirds (~66%) of the buildings that will exist 30 years from now, after accounting for turnover and population growth. The next 30 years will be a difficult period for our world civilization. Not only will population numbers peak, but so will fossil fuel consumption. Ecologies at all scales will be pushed to the brink. We cannot survive this difficult period without major improvements to the performance of the existing building stock, and without adapting the stock to meet changing environments and lifestyles.

Of course over this time period the stock will transform regardless. It is a moving target. In the ten minutes you may spend reading this issue paper about 160 buildings will be replaced, and another 200 new buildings added to the world's total. Each of these new buildings becomes part of the stock management challenge, once occupied and exposed to changing conditions. Thirty years about half of these additional new buildings will have already undergone major refurbishment. The process never ends, because, as Stewart Brand says "Nobody builds a building, they just start one"[1]. Renovation and refurbishment is a major economic activity that in developed countries far exceeds the value of new construction. In the 10 minutes spent reading this paper, about 800 buildings will have been substantially refurbished, worldwide. And these rates will likely increase, in response to the accelerating pace of technological change. There will be no sustainability until we learn to properly manage this mutable, and growing stock of existing buildings.

Managing the existing stock is a troublesome topic because it overlaps with so many others, and because the diversity of players and complexity of decision-making frustrates anyone looking for tidy solutions. Almost every issue paper in this conference makes direct reference to the existing stock. Managing the stock means weaving together these separate strands of knowledge. It is about renewing the fabric of our built environment while preserving and enhancing health, comfort, beauty, efficiency and prosperity. If we are to manage this process, we must learn to intervene wisely, using the most effective policy tools to manage the many players. Owners, tenants, contractors, suppliers, maintenance personnel, designers, inspectors, tax assessors, and realtors are all part of the problem, or part of the solution. Policies must coordinate this 'cast of thousands', while addressing environmental performance, urban context, stakeholder concerns, assessment tools and so on. The faint of heart need not apply.

Issues

At least five key issues can be addressed within this session, each of which is outlined below. In all cases it is expected that solutions will be highly sensitive to regional variations. The existing stock is largely a product of local technologies, local environment and local culture. Managing the stock further emphasizes the importance

[1] Brand, Stewart "**How Buildings Learn: What Happens After They're Built"** Viking-Penguin, 1994

of local context, since solutions must conform to the structure of the political economy and its institutions. Exploring successes and failures across diverse regions is thus an opportunity for tremendous learning and insight.

1. *What policy tools are likely to be most effective?*
Because of the diffuse nature of the refurbishment industry, and the incremental pace of change, no 'silver bullet' policy is likely. Instead, successful management requires a coordinated effort by a range of authorities using a broad set of policy tools, including education and awareness campaigns, regulation and enforcement, R&D, market reform and financial instruments. Generally the most successful campaigns to transform stock have relied upon a community-based or nation-wide 'branding' strategy, with support from utilities and industry associations. Focus has been given to intervening at key leverage points in the system, such as change of building ownership, conversion of HVAC systems, renovation approvals, and procurement. A web of incentives and disincentives may be needed, especially when 'small' players on an infrequent basis make so many key decisions. The timing of interventions appears to be especially important. Often the only economic strategy for improving performance is to 'piggy-back' the desired improvements when major changes are occurring regardless. For example, at the same time the roof is being replaced, policies must encourage adding insulation, or a solar panel, or a ventilation stack, since the incremental cost is relatively small. The challenge will all such approaches is coordinating the many policy instruments and enactors, and sustaining the policies over the longterm. Is it reasonable to assume that an effective policy solution is ever likely to be possible?

2. Are new forms of governance and decision-making necessary for managing building stocks?
The complexity of the existing building stock, and the urgent need to manage the transformation of the stock, suggests that a more collaborative and transdisciplinary approach may be warranted. Collaboration means that organizations concerned with the existing stock (and there are many) sit together on a regular basis and examine how they can coordinate their policies, each using their mandate and resources to further common goals. A transdisciplinary approach means that experts work together, across disciplinary boundaries, and that their work is informed by local wisdom, and supportive of local action. A key element of collaborative and transdisciplinary approaches is the participation by citizens in the decision-making processes of administrative bodies. Although the process of involving the public can be painful, the benefits appear to be substantial. Public participation improves the quality of the stock management plans - clarifying the most appropriate goals, targets and strategies. Public participation also contributes to a greater degree of public acceptance and enthusiasm for new policies. Buildings are an integral part of community life and individual wealth. It is difficult to imagine major longterm policy interventions without more participatory and collaborative approaches. Does experience suggest otherwise? What other approaches might serve to better manage this complex sector?

3. How do we collect data systematically, and make information accessible?
A 'systems' approach appears to be required for proper management of buildings, although few examples exist. A systems approach means that the flow of information on a building is standardized and sequenced in ways that ensure each player has the right information in the appropriate form and at the right time. At present, most existing buildings remain an enigma to the policy makers. Aside from valuation data used for

property taxes, most countries, cities and towns know almost nothing about the performance of the stock, how it is constructed or operated. Even tax assessment data is frequently inaccessible. Privatization of utilities is compounding the problem of access to key information. However as we systemize and attempt to manage the decision-making process, the collection and dissemination of information will be a critical element of the management solution. Both bottom-up and top-down information systems are required to effectively predict the consequences of alternative policies. Utilities, tax assessors, census takers, contractors, inspectors and realtors may all need to give and receive data in this new 'information marketplace'. Web-based reporting offers new ways to support such a system, allowing different levels of access to information on every building, and allowing the quantity and quality of information to increase over time. It may be possible to maintain all documentation about particular building in a "buildings book" or web page, bringing together building permit documentation, inspection documentation, maintenance plans, and data about operation including utility bills. Benchmarks, reference buildings and case studies can help both experts and non-experts interpret the performance indicators on any particular building. Best practices and negative examples can be linked, and used to augment the information available. Is such a vision achievable? What can be learned from recent experience?

4. What is the potential for auditing existing buildings, and organizing the whole process of refurbishment?
The last ten years have witnessed significant advancements in the tools and services available for inspecting and auditing buildings, assessing their performance and preparing site-specific investment plans. Some of the biggest obstacles, like the difficulty of collecting data for calculations and presenting results to a non-technical audience, have been largely overcome. Energy audits, for example, can now generate trustworthy and detailed assessments on-site in less than two hours, with benchmarks and recommendations that are highly readable. Field tests and assessments can be completed pre and post retrofit, for quality assurance. In some cases the assessment tools give consideration to life cycle emissions and costs, providing a (very crude) degree of LCA. In a very few cases the results from audits are already being accessed through the web, and used by installation contractors directly as part of their follow-up sales and service. Such successes point to the tremendous potential that exists for integrating on-site information programs into building stock management, and moving beyond the superficial and often wasteful one-size-fits-all programs that are now used to manage the stock. Ideally the refurbishment and maintenance of building stocks will evolve into an organized process, driven by assessment tools, in a similar fashion to the new building sector. Retrofit strategies will balance competing goals, and attempt to optimize benefits for everyone concerned. Incorporating the LCA perspective can help to ensure that refurbishment strategies do not lead to unnecessary costs over the longterm. For example, new design rules can enable easy exchange of elements with shorter service-life, and make the refurbished building more flexible and adaptable in the face of changing commodity prices and new technologies. Is it reasonable to envision such an organized and informed approach to managing the stock? What can be learned from past experience?

5. *Lastly, and perhaps most importantly, how can we align the transformation of existing building stock with longterm goals for community sustainability?*
At present there is very little integration between refurbishment strategies for individual buildings - or groups of buildings - and plans for sustainable community development.

Refurbishment processes typically focus only on technical issues, or on satisfying internal constraints such as initial costs. Opportunities for significant community-wide benefits are ignored. For example, by conserving energy, material and water, the stock management can substantially improve community economic development – circulating money within the community (instead of importing resources like energy), creating jobs, and generally making the entire economy more resilient and competitive. Improving the performance of the stock is also a way to achieve other community goals such as livability, safety, affordability and cultural diversity. Better use of existing buildings helps to reduce sprawl and congestion, homelessness and infrastructure costs. A number of cities around the world provide outstanding examples of how local policies can be used to transform existing buildings, and capture the potential for positive change. And yet today the large majority of towns and cities remain uninvolved, except to enforce minimum requirements as part of the hit-and-miss process of permitting and inspections. In the future, should more municipalities and neighbourhood councils become champions for stock management? Can they lead campaigns, and inform and motivate all the players? Can they expand sustainable community plans to include specific strategies for refurbishment of the entire building stock?