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POLICY AT GLANCE

The University as an Agent of Change for Sustainability

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Sustainability is a growing priority for universities all over the world. Many universities are developing strong operational sustainability goals and targets, and giving increasing emphasis to teaching and research on sustainability issues. Yet few have committed at the corporate level to integrating academic and operational sustainability in the context of treating their campus as a living laboratory of sustainable practice, research, and teaching.

The University of British Columbia (UBC) is a Canadian university that has committed to addressing the challenges of sustainability with an integrated perspective and in innovative ways. In this paper, we will explore how UBC is applying its intellectual, financial and physical resources to be an agent of positive change, both within its own organization and in the various communities of which it is part.

Patterns of Change and the Role of Agents

Transformational change occurs within the context of larger socio-technical systems. These systems represent complex arrangements of actors, institutions, and technologies that are organized to fulfill specific societal functions such as transportation, agriculture, and energy.

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PH4-93/2011E-PDF | 978-1-100-19167-6

In recent years, a theory called the multi-level perspective (MLP) has been developed to explain historical patterns of transformative changes in large socio-technical systems (Geels & Schot, 2007; Loorbach, 2007). The MLP consists of three hierarchical levels: the landscape, the regime, and the niche.

At the centre of the theory is the socio-technical regime; it represents the dominant way that a particular societal function is delivered. Large-scale, centrally generated electricity from hydroelectric, thermal and nuclear sources is an example of a dominant energy regime.

A level above the regime is the landscape. The landscape represents the broad arrangement of societal norms that form our collective expectations of what each societal function is and how it should be delivered.

A level below the regime is the niche. Like the regime, the niche aims to fulfill a particular societal function, but the niche represents an alternative way of delivering the societal function to the existing regime. District energy (decentralized, locally generated and used energy) is one example of an alternative niche that is attempting to fulfill the same societal function as the dominant energy regime, but in a significantly different manner.

Transformative change in this multi-level system is driven by significant shocks at the landscape level (for example, an environmental scare, disruptive technology, or changing social values) . This landscape shock destabilizes societal expectations about how a regime should deliver a particular societal function. This questioning of the regime begins a public search and debate about a more appropriate way to fulfill the desired societal function. Niches, which by their definition provide alternatives to the status quo, play an active role in this search and debate. It is often from niches that key elements of the new regime emerge.

If this is the general pattern of transformative change, how can we influence it? In looking at the governance of a transition toward sustainability, Grin (2010) argues that three types of agency must exist in order to see a transition through: the agency to change structures (what the MLP calls regimes), the agency to pursue novel practices (what the MLP calls niches), and the agency to link novel practices to structures.

The University as a Multi-level Agent of Change

Universities are well positioned to act across all three of Grin's (2010) categories of agency.

The agency to change structures. As owners and operators of their campuses, universities undertake their own land-use planning and often have their own utilities. This means they have considerable potential to change their physical structures and institutions through designing, building and operating their energy, water and waste-handling systems.

The task of transforming these structures towards sustainability is made more straightforward by the fact that universities are normally single owner-occupiers of these facilities. Because of this relationship, they are committed to the long-term functioning of their facilities. It also means that they operate in a much simpler institutional environment than local governments that operate similar facilities and systems but service a far more disparate set of interests and end users.

The agency to pursue novel practices. Universities have a mandate to teach and undertake research and to do so with a built-in supply of students and researchers. While other large public organizations, government agencies or businesses may have departments devoted to experimentation and research, pursuing novel practices is a core function of universities.

What is more, because many campuses operate at the scale of small towns or cities, there exists a ready-made opportunity to experiment with and practice sustainability in an integrated way and at a scale of interest to cities and companies around the world. Scaling the notion of experimentation up to the level of the university as a living laboratory, therefore, is an extension of what universities already do and at a scale at which they already operate.

The agency to link novel practices to structures. As public or not-for-profit educational institutions, universities have a mandate and responsibility to contribute to solving societal problems such as sustainability. Furthermore, universities are increasingly being asked to be more accountable to the communities within which they exist and to demonstrate contributions to significant societal problems and issues (Kelly, 2009).

There exists, therefore, both a formal and informal imperative for universities to link their integrated research and learnings with actors operating in other societal systems such as local government, energy, agriculture, water management, housing and public health. In addition to sharing these more technical and institutional elements, universities, through their students and researchers, also act as a key source of current and emerging expertise in sustainability and community-scale sustainable systems.

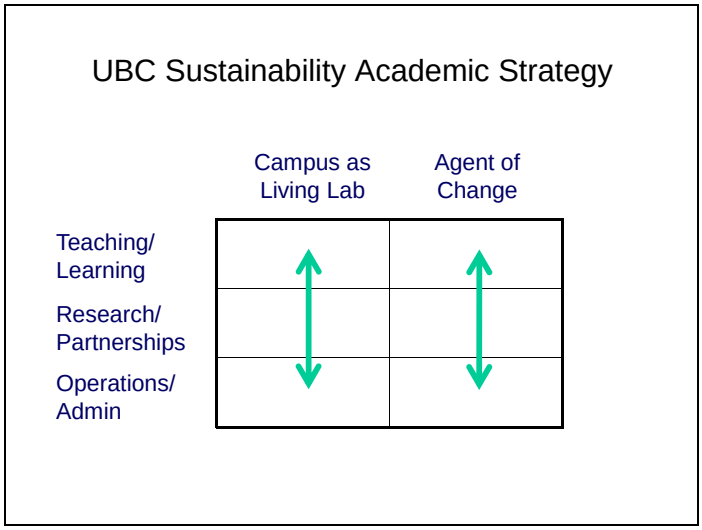
The flow of sustainability-related technologies, institutions and expertise, however, is not one way. With every new structural change toward sustainability pursued by a university, collaboration with external experts and government officials and the use of existing technologies will be critical to its success. Such constructive interactions create opportunities to develop and strengthen mutual learnings, trust, and respect – the cornerstones of a transdisciplinary sustainability network.

How UBC is Seizing This Opportunity

In the spring of 2009, The University of British Columbia (UBC) initiated a process to create a Sustainability Academic Strategy (SAS) that integrates operational and academic sustainability at the University (www.sas.ubc.ca).

In response to the SAS, in January 2010, UBC President Stephen Toope announced the establishment of the UBC Sustainability Initiative (USI). As a strategic management group, the USI

integrates operational and academic sustainability across UBC's Vancouver campus under two cross-cutting themes: campus as a living laboratory of sustainability and university as agent of change in the community.



On the Campus as a Living Laboratory front, UBC is making what are intended to be transformational changes to teaching and learning, research and partnerships and operational sustainability. As just one example, the University has made a commitment to reduce its Greenhouse Gas emissions by 33 percent from 2007 levels by 2015, 67 percent by 2020, and 100 percent by 2050. Campus floor space, meanwhile, is expected to grow by 35 percent by 2030. To meet these targets, UBC is developing a sustainable energy system that will integrate aggressive energy efficiency, a renewable energy-based district heating system, and off-site renewable technologies.

All operational changes required to reach these targets are seen as teaching and research opportunities. In this way, UBC acts as a test-bed for advanced sustainability practice, teaching and research. For example, on the teaching front, UBC plans to create pathways so that every student at UBC can add sustainability to their curriculum. The eventual goal is for every student to have the opportunity to minor in sustainability, no matter the program in which they are enrolled.

On the Agent of Change front, as a corporate entity, UBC is committed to working with various partners from the public, private and non-governmental sectors to help implement sustainability in their community as well as on campus. To that effect, UBC has signed Memorandums of Understanding (MOU) with BC Hydro and the City of Vancouver and is in discussions with several large private sector organizations and NGOs.

These MOUs commit UBC and their partners to identifying areas of common interest in the pursuit of sustainability, and working together to implement sustainability policies and practices in both jurisdictions. For example, both the BC Hydro and City of Vancouver MOUs identify integrated energy systems as an area of interest. With BC Hydro, UBC is developing a large

continuous optimization program. With the City, UBC is providing grad students to work with the City's Greenest City 2020 teams, and will be using city supplied wood waste to help power the University's new biomass gasification plant.

The Centre for Interactive Research in Sustainability

UBC's new Centre for Interactive Research in Sustainability (CIRS), currently under construction and scheduled to open November 2011, encapsulates the systemic approach that UBC is taking with sustainability.

Designed to be the most innovative high performance building in North America, the CIRS building will be net positive in energy, water quality, operational carbon and structural carbon – at a 5 percent construction cost premium relative to the standard for BC public sector buildings. Adding a 58,000 square foot building to the UBC campus will actually reduce UBC's energy use and carbon emissions, improve the quality of water flowing through the site, and sequester more carbon in its wood structure than is emitted during construction and demolition of the building.

The building will live almost entirely off the biogeochemical flows on its site: 100 percent rainwater harvesting; on-site treatment of all liquid waste; solar energy for all hot water and some of the buildings' electricity; significant use of natural ventilation; geo-exchange systems for cooling and heating; waste heat recovery from a neighbouring building; and a wood structure.

In addition to its technical merits, CIRS will demonstrate leading edge research and sustainable design, products, systems, and decision-making in three ways:

- Throughout its lifetime, the building will be a state-of-the-art "living laboratory", which will allow researchers and building industry partners to undertake research on, and assessment of, current and future sustainable building systems and technologies, including the behavioural interface with building inhabitants. The building has been designed in a modular way so that new systems and technologies can be added in a 'plug-and-play' fashion over time.
- Advanced visualization, simulation, and community engagement technologies and processes will support research on new approaches to interacting with citizens in exploring sustainable lifestyles.
- Partners from the private, public and NGO sectors will share the research facility, working with CIRS researchers to identify areas in which this region has a competitive edge in sustainable technologies and services and helping to implement these on the ground, as a springboard to the export market.

Conclusion

Universities have long been recognized as appropriate sites for the exploration and provision of solutions to some of society's most complex problems. Through research, teaching, and applied learning, universities contribute to the betterment of society.

UBC's pursuit of the campus as a living laboratory concept is essentially an extension of the tried and tested model of a university. The critical difference between the traditional model and today's pursuits is that instead of research, teaching, and applied learning taking place within discrete laboratories that operate within well-defined disciplinary boundaries, they will now take place at the community-scale, and across traditional academic and trans-disciplinary boundaries. Because the transition toward sustainability is a deeply integrated community-level challenge, it is not only appropriate but imperative for universities to address sustainability in such an integrated and community oriented manner.

In addition, universities have considerable agency to influence a broader transition toward sustainability, as demonstrated by UBC's Sustainability Academic Strategy and its Centre for Interactive Research in Sustainability. Within the mandate of post-secondary institutions, the potential is great – to evaluate the technological and economic feasibility of novel sustainable practices; to use the opportunity of such operational practices to educate students in the social, economic and environmental dimensions of sustainable design and operations; and to undertake leading edge research on sustainability.

Further, with their single-owner institutional environments, universities have significant powers to change their structures. Since many universities operate at a scale that is comparable to a small city, these structural changes are not inconsequential in terms of their direct social and biophysical impacts.

Finally, by leveraging their agency to pursue novel practices through teaching, research, and operations – and applying these to campus-scale structural change – universities can become living laboratories of sustainability in ways that allow them to link these practices to communities in their region and around the world. This includes the opportunity for substantial partnerships with private, public and NGO sector partners to explore how sustainability innovations pioneered at universities can be scaled-up and supported by appropriate policy, to meet the larger needs of society.

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