

REGEN: toward a tool for regenerative thinking

Phaedra Svec¹, Robert Berkebile¹ and Joel Ann Todd²

¹BNIM, 106 W. 14th Street, Suite 200, Kansas City, MO 64105, US
E-mails: psvec@bnim.com and BBerkebile@bnim.com

²Independent consultant, Cabin John, MD, US
E-mail: joeltodd@cpcug.org

To facilitate the practice of regenerative design and development, the US Green Building Council (USGBC) and a core team envisioned a forum, a repository of information and a framework that are capable of stimulating dialogue among a diversity of practitioners and decision-makers with different disciplinary backgrounds and viewpoints. The REGEN tool is a work in progress and intended to support any regenerative design and development process, particularly in the early planning and design stages, with new questions and new types of information organized into a web of interconnection. It is intentionally neither a rating system nor a universal definition of regenerative design. Instead, it is a systems-based model of making connections at and between systemic levels, issue level and strategic level, thereby allowing the discovery of synergies, and encouraging a dialogue about place and quality of life for all life. The conceptual development of the REGEN tool is presented along with thoughts for its realization. The regenerative design process has the potential to change worldviews in a constructive way when it brings together new types of information, examples of process, and a perspective that is systems based, place based and oriented on positive outcomes.

Keywords: design tool, ecosystem services, living building, net-zero impact, quality of life, regenerative design, resilience, sustainable design

Afin de faciliter la pratique de la conception régénératrice et du développement régénérateur, le US Green Building Council (USGBC – Conseil américain du bâtiment durable) et une équipe de base ont envisagé un forum, un dépôt d'informations et un cadre qui ont la capacité de stimuler le dialogue entre une diversité de praticiens et de décisionnaires appartenant à des champs disciplinaires et ayant des points de vue différents. L'outil REGEN est un travail en cours qui est destiné à soutenir tout processus de conception régénératrice et de développement régénérateur, en particulier dans les premières phases de planification et de conception, les questions nouvelles et les nouveaux types d'informations étant organisés sous forme d'une toile d'interconnexion. Ce n'est intentionnellement ni un système de notation, ni une définition universelle de la conception régénératrice. Il s'agit plutôt d'un modèle basé sur un système, visant à établir des connexions aux niveaux systémiques, au niveau des problèmes et au niveau stratégique, et entre ces niveaux, permettant ainsi la découverte de synergies et incitant à un dialogue portant sur le lieu et la qualité de vie pour toute vie. Le développement conceptuel de l'outil REGEN est présenté, ainsi que des réflexions en vue de sa réalisation. Le processus de conception régénératrice est potentiellement capable de changer les visions du monde d'une manière constructive lorsqu'il réunit ensemble les nouveaux types d'informations, des exemples de processus et une perspective qui est basée sur les systèmes, adaptée au milieu et orientée vers des résultats positifs.

Mots clés: outil de conception, services écosystémiques, bâtiment vivant, impact net zéro, qualité de vie, conception régénératrice, résilience, conception durable

Introduction

Regenerative design, regenerative development, regenerative thinking and regenerative approach are concepts that are increasingly heard in the professions related to community planning and the built environment. While there is no general consensus on definitions for these evolving terms, Cole (2012) shares some simple and helpful distinctions between ‘green’, ‘sustainable’ and ‘regenerative’, characterizing them as doing less harm, doing no harm and doing some good, respectively.

This paper presents work to date on the conceptual underpinnings of a tool that is intended (1) to facilitate dialogue on key elements of regenerative practice among leaders in policy, research, practice and local communities; and (2) to inspire and support practitioners¹ and community leaders² who want to learn about and engage in regenerative design and development. The project was sponsored by the US Green Building Council (USGBC) as part of its mission to define:

buildings and communities that will sustain the health and vitality of all life within a generation.
(USGBC, 2010)

This project was a first step in exploring how the USGBC could participate most effectively in transformation of practice toward regenerative design and development, complimenting the LEED³ tool with other approaches. As this exploration continues, and a tool emerges, it is anticipated that the concept could evolve and change as a result of robust dialogue about its content and potential uses.

Background and context

The past two decades have seen tremendous growth in the green building field and progress in transforming the markets that support the built environment. Today, one-third of all new non-residential construction in the US is ‘green’, representing a US\$54 billion market opportunity. Within five years these numbers are expected to triple (McGraw Hill Construction, 2011). As the field has grown in number of practitioners and certified projects around the world, it has also evolved and is now moving beyond merely implementing strategies that do less harm toward approaches that do some good. Du Plessis (2012) describes this evolution in thinking leading to regenerative thinking. What began as a focus on energy efficiency and materials, evolving into various measurement and rating systems (*i.e.* LEED, BREEAM,⁴ CASBEE,⁵ SBTool,⁶ Green Star,⁷ SBAT,⁸ DGNB⁹ etc.) has now become, for some, an approach based on systems thinking and consideration of all of life.

Pioneers in the field are undertaking a shift of mindset and worldview toward regenerative thinking that Macy and Brown (1998) called the ‘Great Turning’. It is a shift that will change the trend of depleted resources and life potential, to an Earth Community model in which healthy children, families, communities, and natural systems are the true measure of prosperity and security (Korten, 2006).

One of the early touchstones in this evolution in thinking in the US took place from 1993 to 2000 in the design process for Montana State University’s EPICenter (Williams *et al.*, 2000). A diverse team of design firms, consultants, advisors and industry partners explored the concept of net-zero environmental impact and set goals aimed at sustaining the place, reaching some measurable level of net-zero impact while simultaneously improving the local economy and quality of life. The EPICenter¹⁰ was described as a ‘living building’ that reduced or mitigated all of its known impacts (Williams *et al.*, 2000). In addition to the living building concept, the project led to technical reports, new products, and ripple effects through many disciplines from green chemistry and fume hood design to ecological waste water treatment advances and beyond. Many of the early founders of the USGBC were involved in the EPICenter project and influenced by its ripple effect.

The living building concept was further articulated when The David and Lucile Packard Foundation set a goal for their new headquarters building to find the greatest positive impact that was also a replicable business decision. They found that the highest level of sustainability, defined then by the ‘living building’ level, would provide the most positive impacts for the least total cost of ownership (BNIM *et al.*, 2002). From these early explorations, the living building concept evolved to become the Living Building Challenge,¹¹ a rating system attempting to measure net-zero impact and move the building industry further on the spectrum of doing less harm to doing no harm.

Janine Benyus, of the Biomimicry Guild and Institute and an early supporter of the EPICenter project, proposed Biomimicry Principles or ‘Laws of Nature’ (Benyus, 1997) that continue to inspire innovations in design process by connecting biologists and ecologists to project teams and uncovering the unseen genius of ecosystems and their services within the biome. Biomimetic processes are one way designers are working toward regenerative design.

Meanwhile, other thinkers over the past 20 years started defining ‘regenerative design’ in their projects and publications as well. The Regenes Group has been a leader in evolving and articulating a regenerative design and development paradigm and putting it into practice (Mang and Reed, 2012):

Regenesis approaches this challenge by conducting an Integral Assessment and developing ‘the Story of Place’ as the context for the design and development process. A story is a coherent organization of information and the relationships and connections between discreet pieces of information and different types of information. These are related in a way that reveals a holistic, understandable picture. In every place the geological, natural, and human history and culture interweave to create a unique nature of place. The story helps us to understand this nature through understanding the development of a place both throughout time and in relation to the human and natural landscape in which it is embedded.

(Regenesis, 2011)

The US architectural firm Perkins+Will and the University of British Columbia are also developing a framework to define regenerative thinking. The Perkins+Will framework sets human needs, interactions and resource flows separate from but within the constraints and opportunities of ecological function. It sets forth quality-of-life goals such as enhancing human health, enhancing social vibrancy, enhancing cultural vitality, strengthening the economy, and supporting ecological and habitat production and function. It tracks material, energy and water flow from nature, through human systems and back into nature (Cole *et al.*, 2012).

At the same time that this evolution in thinking is taking place, the USGBC recognizes that while LEED has evolved in terms of content, rigour and scope, and will continue to evolve, it is unlikely that all of the qualities of regenerative design and development can be addressed most effectively within the rating system model (Zimmerman and Kibert, 2007). The USGBC and its volunteer experts have been considering how LEED could work with other tools and processes to inspire the change in worldview and practice envisioned by regenerative approaches. This dialogue has inspired the USGBC’s initiation of the REGEN project.

Friedman (2008) states that:

in a world that is getting hot, flat, and crowded, the task of creating the tools, systems, energy sources, and ethics that will allow the planet to grow in cleaner and more sustainable ways is going to be the biggest challenge of our lifetime. But this challenge is actually an opportunity . . .
(pp. 5–6)

The USGBC is focusing on new tools that might advance the industry to the next level of impact and influence, not by replacing rating systems, but by

helping them to evolve and surrounding them with new tools and resources that facilitate and inspire a shift in mindset and practice.

The REGEN concept

Overview

The REGEN concept was developed in response to the current state of the field as a part of USGBC’s exploration of potential paths for stimulating market transformation toward regenerative thinking. Its purpose is to move adoption of regenerative approaches forward by providing a forum and framework to stimulate dialogue among thought leaders and practitioners, and a repository and tool for gathering, organizing, and using information in ways that support regenerative approaches and processes. It is a work in progress, with some aspects of the concept developed more completely than others.

The REGEN tool concept is intended to be a web-based, data-rich and values-based framework to guide dialogue and help professionals in their practice of regenerative design and development. This includes architects and community planners, but also community leaders. It is not intended to ‘teach’ regenerative thinking to those new to the concept, but it is designed to be accessible to them, including new professionals and community members, to introduce them to regenerative concepts and examples, to inspire them to participate in regenerative processes, and to provide information to enable them to develop a fuller understanding of their community and project. The tool concept complements an integrated design process in which teams are comprised of many disciplines and perspectives working closely together to innovate and create appropriate solutions. These processes enable the potential to explore, discuss, formulate and test goals, strategies and outcomes rapidly and comprehensively (Dodgson *et al.*, 2005). The use of ‘innovation technologies’ (such as the REGEN tool) and other techniques that increase the ready availability of crucial information allows groups of people to engage in an integrated process that provides a basis for creating regenerative changes whilst reducing risks and the possibility of failure.

As a first step in this project, the core team (listed in Acknowledgements) scanned the current literature and conference proceedings for similar tools and found very little published data. The literature review included a few project case studies throughout the world that presented innovative projects with elements of regenerative thinking and practice. For example, the Regenesis case studies outline a process that is tailored specifically to each place and each project (Regenesis, 2011). The biophilic and biomimetic case study published by Terrapin Bright Green shows a project that

compares the health of historical ecosystems services with the current state and adjusts the design case to improve the current state (Browning *et al.*, 2010). Similarly, the Lloyd Crossing Urban Design Plan in Oregon sets up predevelopment metrics and compares those with historical (and future) conditions for criteria such as carbon and water balance, solar utilization, tree cover, and habitat (Mithun Architects, 2011). Hoxie *et al.* (2012) describe an approach using a collaborative dialogue of discovery as well as social media techniques to extract stories unique to each place and essential for these communities to regenerate vitality from within. These and many other practitioners around the world are beginning to develop a philosophy and process to guide this work and stress that the approach seems to be specific to place. Each of these practitioners acknowledges that they are only at the beginning of understanding the wider implications of where regenerative design could lead.

The literature review also found some framework tools that began to expand the categories of sustainable design closer to regenerative and graphically to represent performance in a different way than the scorecard visuals allow. For example, the SPear¹² graphic and assessment framework allows for a quick visual comparison between design scenarios (McGregor & Roberts, 2011). Likewise, DGNB offers a framework and graphic that allows for visual assessment of multiple impact categories (Ecological Quality, Economic Quality, Social Quality, Technical Quality, Quality of Process and separately the Quality of Location) (DGNB International, 2010). The visualization tool called the Noisette Rose uses a rose-shaped diagram to show the attainment of the project's social, economic and environmental goals (BNIM, 2004). Yet none of these visualization tools defines regenerative design, nor do the tools show the connections between important issues. Supporting or defining regenerative design was not the stated propose of any of these tools.

Several existing frameworks held aspects of regenerative design and when seen together helped to form a more comprehensive view. The One Planet Living framework (BioRegional, 2011), the Living Building Challenge framework (International Living Future Institute (ILFI), 2010) and the Biomimicry Laws of Nature (Benyus, 1997) all address aspects of regenerative design and together start to reveal the whole.

At the completion of the literature review period, the team had found resources that could be very useful to a regenerative project, but nothing comprehensive that answers the purpose of guiding dialogue around key elements of regenerative practice. These resources did not effectively link information that could support a regenerative approach. There were common characteristics and traits between case study projects, but each had its own unique emphasis and

process, and little that tied the individual experiences together. There was, in general, little published about regenerative design and development tools.

Therefore, the REGEN tool concept was intended to address the gap in information and integration of information. It was designed around the specific aspects of regenerative thinking that are different from conventional practice. Although leaders in the field of regenerative design and development use somewhat different definitions of 'regenerative' the core team found several elements that are consistent and distinguish this work from other practice. Regenerative practices contain these elements:

- A different *perspective* or mindset that is systems-based, place-based and positive-outcome oriented. For example, the systems-based perspective leads to approaches that consider entire watersheds, as they currently exist and as they have existed through history, not just on-site water balance. This is not limited to ecological systems, but also includes social and economic systems. Regenerative approaches recognize the uniqueness of place¹³ – each place has its own story and understanding that story is key. Further, regenerative approaches are intended to discover how a project can make a contribution to the whole and be a positive participant in its place.
- The use of different *processes*, that are based on a collaborative dialogue of discovery, reveal the cultural, economic, constructed and ecological stories of a place in a way that has not been told before.¹⁴ A regenerative practice engages participants from the place over a longer period of time and reconnects them with some of the often unrepresented participants in a community system such as the watershed, native plants, food systems, the unemployed, or the transportation infrastructure for goods and services. This collaborative process may include new voices than are typically heard on design teams such as artists, biologists, sociologists or economists. The collaborate dialogue of discovery can help a group of individuals experience firsthand the intense power of community connection, the visceral experience that comes not from the data, but from experiencing something in common. Once this connection has been made and shared within a community it is possible for them to sustain it long after the practitioner is gone.¹⁵
- The gathering and use of different sets of *information* are broader in scope and content than data usually gathered for project planning and design. For example, information about regional ecology, geology, chemistry, and diversity of life forms (including human) might be available for a place throughout the land's history.

The history of the performance of constructed systems in a place will be available. Information about trade, industry, employment, services and innovation in a region might be available. A better understanding of the social constructs that impact community and lifestyle will be desired. Where there are gaps in information about a place they will be revealed so that they can be addressed. Regenerative approaches view the community and the place itself as key sources of information, not simply databases and published information.

The REGEN concept has been designed to provide resources that support the application of these interconnected regenerative elements in practice and to inspire practitioners and communities to believe that it is possible to create a project that is a positive force in its community. It has been designed to respond to the following key question, posed by the project team:

How can a tool foster a more informed dialogue about place that will shift the consciousness of the community and result in a collective will to work for the benefit of all life?

To address this question, the REGEN concept comprises three components:

- a *framework* that encourages systems thinking, the establishment of positive goals, and collaborative dialogue; links specific strategies to the whole; and shows the interconnectedness of individual strategies
- place-based *resources*: data and other information for use by project teams
- examples of *projects* that have incorporated the elements of regenerative thinking

The REGEN concept does not:

- propose a strict, universal definition of regenerative design or development
- propose a specific process for carrying out regenerative projects

The following sections present the three components of the REGEN concept: framework, place-based resources and project case studies.

REGEN Concept Framework

Regenerative work requires a mindset that is systems-based, place-based and positive-outcome oriented, but how can that be brought into a tool that could

engage practitioners and communities? The team identified and explored existing approaches to systems thinking and linking the built environment to systems.

As a starting place, the team looked to a framework that has helped to shape recent versions of LEED. For the 2009 version, the USGBC weighted importance of each credit using the TRACI impact categories¹⁶ including issues such as global warming, ozone depletion, water usage, eutrophication, acidification, resource depletion, ozone depletion, smog formation, habitat alteration, ecotoxicity, human health (cancer and non-cancer), and adding indoor environmental quality. In its revision of LEED for 2012, the USGBC decided to change its focus from measuring harm and destruction of life support systems to measuring ‘what we want LEED projects to be good at’ (Owens, 2011). The new framework of impact categories for LEED 2012, which has been applied to all rating systems for buildings, commercial interiors, and neighbourhood development, is provided in Table 1.

The team considered the framework of the International Living Futures Institute’s Living Building Challenge to broaden the list of issues. They are shown in Table 2.

The team also studied BioRegional’s The One Planet Living framework, which focuses on quality of life and lifestyle issues more than other frameworks and also focuses mainly on positive outcomes. The ten principles are shown in Table 3 (BioRegional, 2011).

The team was also inspired by biomimicry principles. These principles are shown in Table 4. The statement ‘Life creates the conditions that are conducive to life’ (Benyus, 1997) is central to regenerative thinking. By studying examples of how these principles had been applied to biomimetic design projects, the team began to glimpse how a framework could influence process by posing new questions.

Table 1 LEED 2012 Impact Categories

<ul style="list-style-type: none"> • Reverse contribution to climate change • Enhance human health and well-being • Protect and restore water resources • Protect, enhance, and restore biodiversity and ecosystems services • Promote sustainable and regenerative material resource cycles • Build a greener economy • Enhance community: social equity, environmental justice, and quality of life
--

Table 2 The Living Building Challenge Imperatives

Site	Materials
Limits to Growth	Biophilia
Urban Agriculture	Red List
Habitat Exchange	Embodied Carbon Footprint
Car Free Living	Responsible Industry
Water	Appropriate Sourcing
Net Zero Water	Conservation + Reuse
Ecological Water Flow	Equity
	Human Scale + Humane Places
Energy	Democracy + Social Justice
Net Zero Energy	Rights to Nature
Health	Beauty
Civilized Environment	Beauty + Spirit
Healthy Air	Inspiration + Education

In uncovering the ecological story of place, project teams could also make decisions based on better information about the genius and function of natural systems.

The REGEN Concept Framework made partial use of each of these frameworks and was designed to respond to the above-mentioned question that provides a foundation for the tool. To support informed dialogue about place, the REGEN concept should:

- pull a team graphically between a focus on details and a focus at the larger system level, keeping a conversation active at both scales
- meet a group or individual where they have the most interest and guide them to the new things that connect to what they care about most
- pull from or add to open-source data revealing information about place that might otherwise take years to procure then save it for the next team in that region

Table 3 One Planet Living Principles

Zero carbon	Sustainable water
Zero waste	Natural habitats and wildlife
Sustainable transport	Culture and heritage
Local and sustainable materials	Equity and fair trade
Local and sustainable food	Health and happiness

Table 4 Laws of Nature or Principle of Biomimicry (Benyus, 1997)

1. Nature runs on sunlight
2. Nature uses only the energy it needs
3. Nature fits form to function
4. Nature recycles everything
5. Nature rewards cooperation
6. Nature banks on diversity
7. Nature demands local expertise
8. Nature curbs excesses from within
9. Nature taps the power of limits

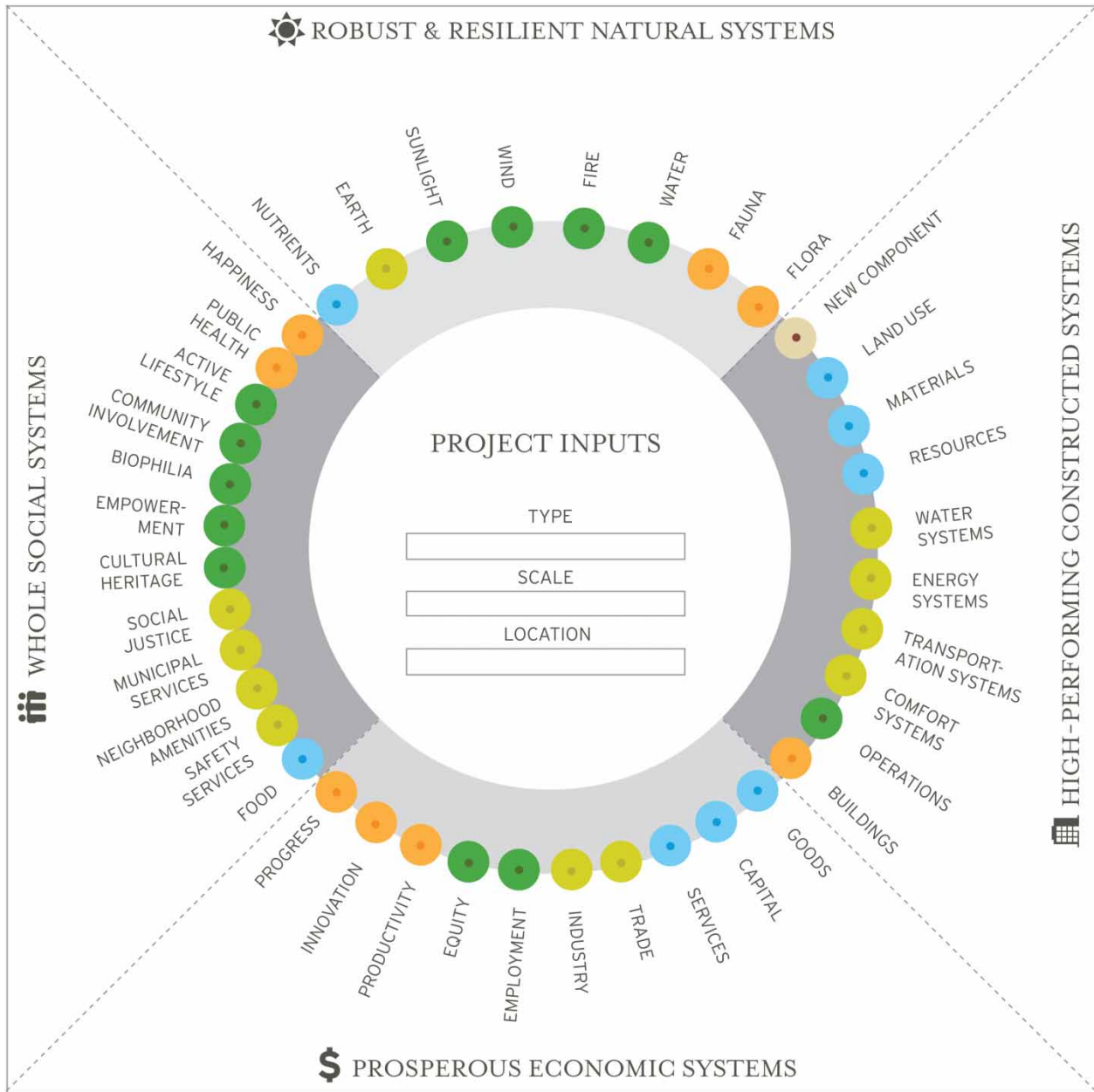
- invite participants and data from disciplines that do not typically interact with the building and planning industry
- provide helpful resources to the experienced practitioner and yet invite the novice to explore and discover
- pose new questions and introduce new variables into the conversation

To shift consciousness and foster collective will to work for the benefit of all life the REGEN concept should:

- include humans graphically and conceptually with (not separate from) other ‘fauna’ and among the systems of life
- focus on a broad definition of quality of life for all life
- make connections and show synergies between the things that give life meaning and vitality and the things that support function
- focus on positive (motivating) outcomes
- encourage participants to focus on what they want to bring into being rather than on catastrophes to avoid
- prove what is possible by sharing example strategies and processes from similar projects that have gone before

The framework (Figure 1) developed for the REGEN concept is composed of nested systems:

- at the broadest level, components of life are organized into four quadrants: robust and resilient *natural* systems, high-performing *constructed* systems, prosperous *economic* systems and whole *social* systems



© 2011 USGBC

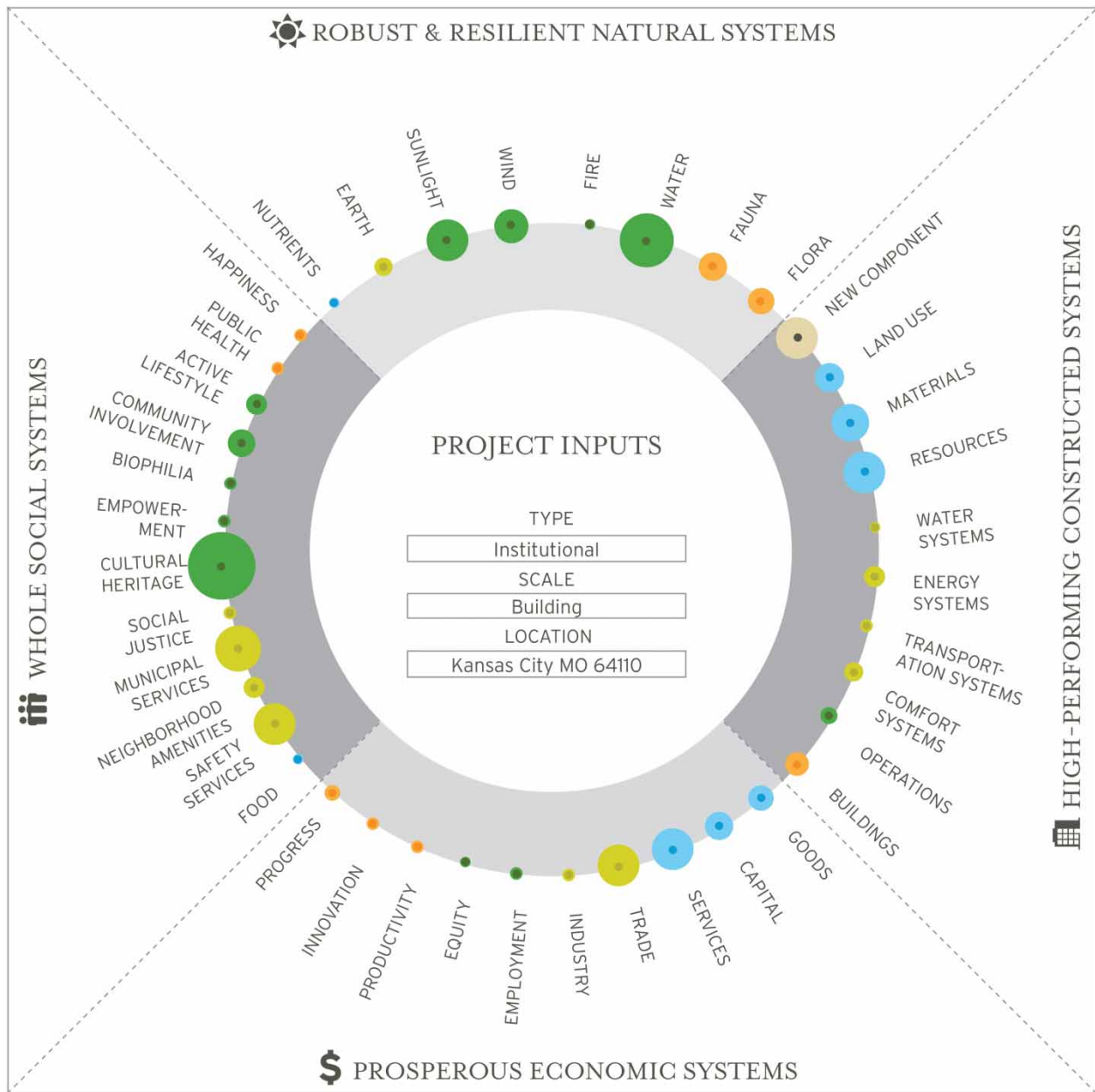
Figure 1 REGEN Concept Framework

- at the next level, *components* of life include water, flora, fauna, energy systems, transportation systems, capital, employment, food, social justice, public health etc.; there are 40 components shown, but of course the circle is meant to be expanded or contracted if the components themselves evolve over time and through dialogue

The concept envisions that a project team can input basic information about their project type, scale and

location and the tool will instantly populate with everything that is known within the tool about that place and its current state of health. Figure 2 shows the changes in the tool when place and project data are entered.

Note that in Figure 1, circles representing components are all the same size. When information about a place is available in the system, as in Figure 2, the size of the circle can change to indicate the health of that component in that place (a larger circle indicates a robust



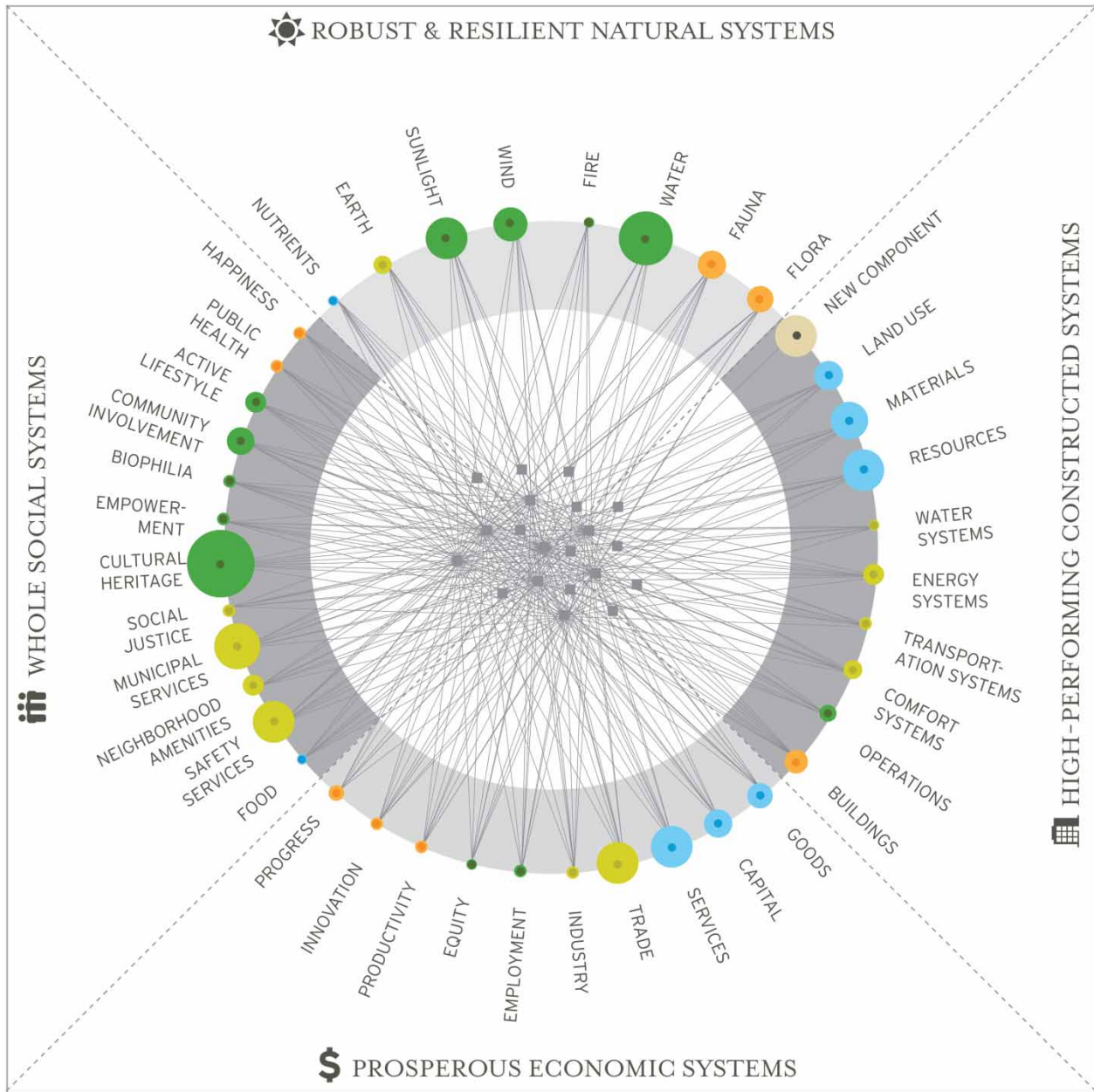
© 2011 USGBC

Figure 2 REGEN Concept Framework reflecting place-based information

health and the smaller circle indicates imperilled health). In this way, a place-based dialogue can begin among community leaders and decision-makers. This view could stimulate dialogue about the data that are or are not available for the region and also whether those findings coincide with the perceptions of the community, local experts and the experience of the project team in that place. This is of critical importance since on-the-ground research and the experience of being in a place are crucial and provide rich information that can elaborate on, help explain, or

perhaps even contradict the data in the system. Dialogue around this information leads to a much richer story of the place.

The dialogue can continue to consider potential combinations of strategies that might be most appropriate in that place to enhance the components toward a greater state of health. In the centre of the circle in Figure 3 the small dots represent strategies that can be taken to impact the components. The strategies are connected to components forming a web.



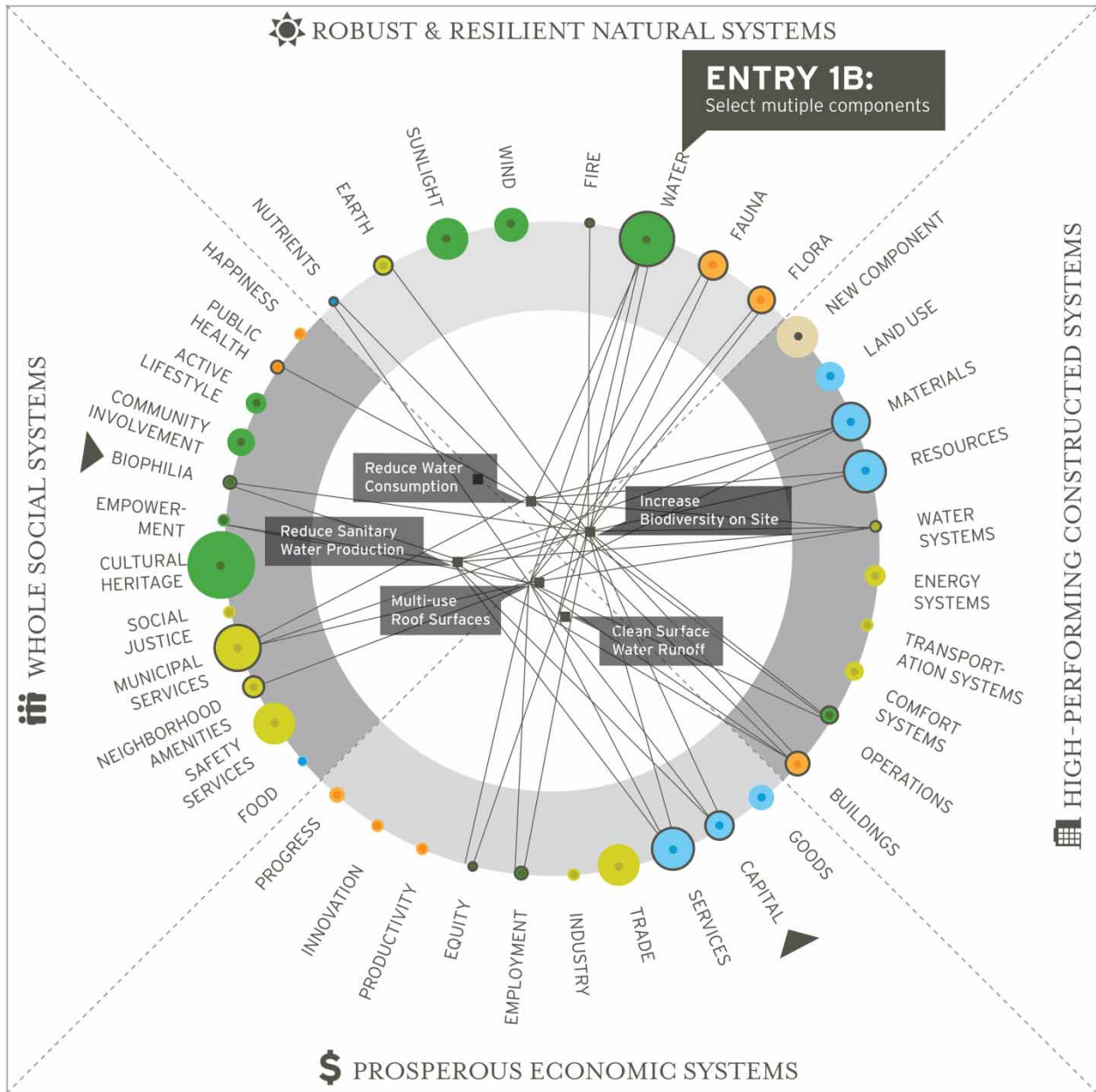
© 2011 USGBC

Figure 3 REGEN concept – the interconnected web of strategies connected to components

Most strategies impact multiple components (as in Figure 4) sometimes positively and sometimes negatively, in a complex web of connections. By entering at one or more components, participants will discover the strategies that are connected to the components. In this way, multiple-benefit strategies can be visually identified and then explored. This presents more opportunity for exploratory dialogue.

The REGEN concept would allow a user to enter at a variety of scales – from the large system-level

scale (the quadrants), from the component-level scale (the circles forming a ring), or from the strategy-level scale (the points within the web). Since the tool is intended to facilitate systems thinking and exploration of the interconnections among actions and their impacts, if a user enters at the strategy level, he or she will be shown the interconnections with other strategies and will also be taken out to the component and system levels to be shown the relationships at those levels. Each community or project team may value some systems, components,



© 2011 USGBC

Figure 4 REGEN concept showing multiple component entry points and connections to multi-benefit strategies

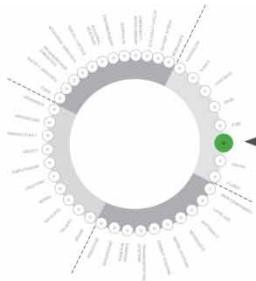
or strategies over others, but in this interconnected web they will never be completely separate from the whole. By pulling on the most compelling strands of the web they will soon discover or remember other things they are connected to. For example, in Figure 4, if a user enters through the components ‘Water’, ‘Capital’ and ‘Biophilia’, he or she will discover strategies that affect all three of those components. Since those strategies are also connected to one another and to other components, these linkages are also shown so the user can understand that the strategy ‘Reduce Water

Consumption’ is connected to ‘Water’ and also to ‘Materials’, ‘Water Systems’, ‘Operations’ etc.

The user could also follow these connections back down from components into the strategies to see if there were other strategies related to materials or nutrients that should be considered.

REGEN concept place-based resources

This proposed framework provides an overall structure for accessing place-based information related to a



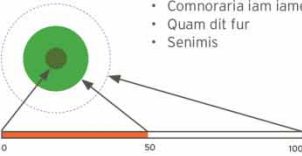
COMPONENT OF LIFE
 Robust & Resilient Natural Systems [CATALYST]

WATER

A liquid that descends from the clouds as rain, forms streams, lakes and seas and is a major constituent of all living matter.

METRICS / INDICATORS (TBD)

- Regional Rainfalls
- Water Quality
- Infiltration Rates
- Inc Modius Aperac
- Valeris enatusterio
- Comnoraria iam iame
- Quam dit fur
- Senimis



DATA SOURCES LINKED

- Watersheds USA
- Infiltration Calculator
- World Water Watch
- Global Water Research
- International Water Institute
- H2O Forum
- Water for the Ages
- Charity Water
- No Back Flow
- Water Environmental Federations
- World Water Organization
- American Water Works Association

STRATEGIES LINKED

- Conserve water use
- Improve water quality on-site
- Improve infiltration rate
- Improve regional watershed quality
- Improve water infrastructure reliability
- Improve building operations
- Increase biodiversity

LEED® CREDITS

- ✗ NC
- ✗ EBOM
- ✗ CI
- ✗ CS
- ✗ Schools
- ✗ Retail
- ✗ Healthcare
- ✗ Homes
- ✗ ND
- ✗ SS
- ✗ WE
- ✗ EA
- ✗ MR
- EQ
- ID



© 2011 USGBC

Figure 5 REGEN concept for linking information resources

system, component or strategy. It is not intended to replace on-site research, but to supplement it and allow the project team to access existing regional data more readily. If a team moves from summary information to more detail about a component, they see (as in Figure 5) more information about that component as well as links to other components, strategies, rating system credits, or case studies that are related to it. A definition of the component and imagery can be provided. This can also be an infinite linking place for open sources of data, and other applications.

If users drill into resources for a strategy, they will find all of the smaller actions or tactics and rating system credits that are related to that strategy. They will discover more detail about the components linked to that strategy and how that strategy may be measured. Participants can access more detailed information about tactics, their definitions, sources of data, product links, case studies, best practices etc. The tool is a holding and linking place for a well of information that will attract people into learning more and perhaps caring about more than they started with.

There can be a pull-down menu of strategies to choose from that works like a rating system check-list, in case that is where a team is already working. If one enters all the strategies on the checklist under consideration, it would be possible to see a view of the impact of that rating level on the whole system. It will also be possible to see the unexplored opportunities in systems that the rating systems do not touch. Over time this could help continually to provide iterative changes to rating systems as well as to the REGEN tool and process.

If a team discovers a new strategy or resource that is specific to a place it can be added and will help continually to expand what is possible for whoever comes next to the tool. Likewise if a botanist, an economist, a social scientist or an urban farmer has collected data about a region that is relevant to the project, it can be linked to the tool and be available for the next project in that region. In this way the system can grow and evolve with more and more data available to support the framework over time. While waiting for early data to be entered, the

framework identifies the areas where information is needed and could guide research funding and initiatives.

REGEN concept project examples

Project case studies are important for two reasons: first, there is no step-by-step cookbook for regenerative work – the best way to learn it is to experience it. Actual experience on a project is best, but is probably not feasible if regenerative thinking is to expand to a large number of practitioners. Case studies provide at least some elements of experiential learning. And second, case studies tell the stories of regenerative projects, demonstrating that they can be done in various settings, what was accomplished, and how it was accomplished. These stories can inspire people to learn more and to begin to change their practices.

Details of the REGEN concept's approach to case studies have not been developed. The case studies could be linked within the component and strategy pages they touch or independently searchable. The case studies should contain descriptions of best practice strategies but perhaps more importantly they should contain stories of project process and approach that will both inspire and inform users. The case studies could be published in a peer reviewed and moderated format and/or a social media driven input could allow for anecdotal comparing of experience.

Challenges, opportunities and potential uses

If the tool becomes an open-access gateway of shared information, then it holds the potential for stimulating the creation of third party applications that draw upon this data and are also linked to it. Interactive games making use of the framework and data would be useful to allow teams to role-play or simulate decisions.

At this stage of development, the use of metrics, indicators, indexes or other devices to measure the impact of strategies and components is fairly weak and unresolved. Over time these could be strengthened to allow teams to quickly model scenarios and prioritize strategies based on impact. Prioritization tools could help teams to focus their efforts and resources on the most catalytic strategies for their region or place. Likewise, tools that allow teams to compare multiple projects across portfolio could be useful and are not a part of the current concept.

The tool could be a repository for stories and itself a story telling tool. It could guide dialogue in large stakeholder groups or simply prepare a team of facilitators

with information that could shape a dialogue relevant to that place. The forty components may be perceived as a bit overwhelming and complex for a large-group, facilitated dialogue. Simpler interfaces and output reports may be required to allow the novice to interact in a meaningful way. It will also be important to address the changing decisions a community may make over time so that they can revisit decisions and evaluate progress.

REGEN could also be an educational tool and resource as more and more searchable data is linked in one location. And, although it is targeted at this point primarily for design and construction practitioners, and community leaders or decision-makers, the concept was not intended to be exclusionary. In fact, the processes and applications could enable community members, scientists from many disciplines, and students to access and use information for other purposes or as a learning tool. While the tool currently has several targeted users, it is anticipated that it will attract many other disciplines who will continue to expand the relevance and usefulness of the tool.

At a very basic level, the REGEN tool could help sustainable design projects using an integrative design approach. If it accomplishes nothing else, showing the connections among strategies and the linkages between strategies and systems has value to those who are new to the concept of integrative design. It might then lead these users toward a system-based or place-based perspective, and an introduction to the ideas of regenerative thinking. The tool might also help practitioners lead their teams and stakeholders in dialogue on integrative approaches.

The REGEN tool is currently at the concept stage. As the tool moves from a concept to a reality, it is likely to undergo changes in response to feedback. The graphics, the language and even the concept are not intended to lock in any particular final outcome. It is likely that the development process will be phased and iterative. As more functionality is layered, it is hoped that the full potential of the concept will manifest and grow beyond what is currently conceived. The first layers seem most critical in establishing the value of the tool and capturing early adopters and users.

Moderating data interactions and keeping data unbiased will be a significant technical challenge for the tool developers. The data well must not become cluttered with 'junk' information. For this reason the tool may always need a champion and a host but this needs to be reconciled with free access and an open-sourced approach to invite broad participation.

Future work

When the initial gateway structure is established, the most critical next step will be to strategically link to essential partners and data that will be immediately useful and compelling. With a few key partners providing data, it will be possible to observe how the tool is initially being used, how it grows, who it attracts and who it is not yet serving. In this way the tool will evolve so that future iterations will make it more useful.

Building the resource base will take time. Initially, information available through USGBC's Green Building Information Gateway (GBIG), and Building Behavior programmes as well as linkages to other existing databases could provide a starting point and a 'proof of concept'. The core team has identified a handful of catalytic partners that could help to populate each quadrant with useful connections right away.¹⁷

Once catalytic partners begin to link location-based data that make the tool compelling, the next step will be to populate data around the circle for at least a handful of strategic locations in different biomes. In this way regions will begin to be served with at least one example to build upon and expand.

Conclusions

The REGEN tool concept is a work in progress. It is conceived to encourage and support a more robust dialogue about regenerative actions and solutions by providing a wealth of data about what has been done and what may be known about a given place. It recognizes that 'place' is central and also that 'place' is complex. It is designed to facilitate processes that focus on place, organize complex information, and enable many disciplines and voices to be heard and to take ownership in the work.

The REGEN concept does not propose a static definition, nor is it a new rating system or level of certification. It is not a destination, but a journey of discovery and a conversation about how a group can reconnect to itself and to place. It could complement existing rating systems by allowing dialogue, reflection and learning, thus providing a unique framework of solutions for specific places and circumstances. The process differs significantly from other rating tools in that it engenders community engagement and can provide a long-term view.

The benefit of the REGEN concept is its potential role as a 'tool for thinking' and making connections rather than a tool for measurement or certification. Over time it has the potential to capture lessons from practice for future use and to inform discussions on the tangible and intangible aspects of projects. It could assist a community trying to regenerate from within and to act for the benefit of all life. It is hoped that this approach will

lead to a more informed dialogue on regenerative design and the understanding of what constitutes 'place'.

It is not possible or appropriate to make a generic list of quantifiable performance targets and strategies that define regenerative design performance since these must be left to the local community and are contingent on the place. Each place (and the community of life connected to it) requires and deserves an opportunity to discover what needs to be regenerated to impact a lasting and continually evolving quality of life in that place. Indeed this process of discovery may be an important way for a community to become sufficiently engaged in the work or committed to the promise of building vitality. The process of regenerative design requires an uncovering of the many aspects of place that can revitalize connections between life's systems. If this experience of discovery is shared in a viral manner, it may be possible to bring about the larger patterns of change in support of life.

Acknowledgements

The REGEN project was sponsored by the US Green Building Council (USGBC). The REGEN concept and project is copyright USGBC and was developed by the core team including: Scot Horst, Chris Pyke, Tonja McCoy and other USGBC staff members; with Joel Ann Todd and Malcolm Lewis as advisors; and Bob Berkebile, Laura Lesniewski, Bradley Nies, Rachel Stroer, Aaron Ross, Stephen Hardy, Marcia Krupich and Beena Ramaswami from BNIM Architects. Brendan Owens, USGBC, and Phaedra Svec, BNIM, are the team leaders, project managers and primary contacts for the ongoing work. Peer reviewers for the early concepts included: Bill Browning, Ray Cole, Greg Norris, Catherine Benoit, Greg Searle, David Orr, Janine Benyus, Paul Hawken and many of the USGBC staff.

References

- Benyus, J.M. (1997) *Biomimicry*, HarperCollins, New York, NY.
- BioRegional (2011) *The Ten One Plante Living Principles*, One Planet Vision: Tools and Inspiration for a Sustainable Future (available at: <http://www.oneplanetvision.org>) (accessed on 21 May 2011).
- BNIM (2004) *The New American City: City of North Charleston Noisette Community Master Plan*, BNIM, Kansas City, MO.
- BNIM, Hawley Peterson & Snyder Architects, The David and Lucile Packard Foundation (2002) *Sustainability: The David and Lucile Packard Foundations Los Altos Project*, The David and Lucile Packard Foundation, Los Altos, CA.
- Browning, W., Sanderson, E. and Patchette, J. (2010) *Mannahatta & The Mtigwaaki: learning from ecological and indigenous history*, in *Greenbuild Convergence*, US Green Building Council, Chicago, IL, p. 11.
- Cole, R.J. (2012) Transitioning from green to regenerative design. *Building Research & Information*, 40(1), 39–53.
- Cole, R.J., Busby, P., Guenther, R., Briney, L., Blaviesciunaite, A. and Alencar, T. (2012) A regenerative design framework:

- setting new aspirations and initiating new discussions. *Building Research & Information*, 40(1), 95–111.
- DGNB International (2010) *DGVB Certification System Criteria*, DGNB (available at: http://www.dgnb-international.com/international/_fileadmin/PPT_und_PDF/DGNB_System.pdf) (available at: 23 August 2010).
- Dodgson, M., Gann, D.M. and Salter, A. (2005) *Think, Play, Do: Technology, Innovation and Organization*, Oxford University Press, Oxford.
- du Plessis, C. (2012). Towards a regenerative paradigm for the built environment. *Building Research and Information*, 40(1), 7–22.
- Friedman, T.L. (2008) *Hot Flat and Crowded: Why We Need a Green Revolution and How it Can Renew America*, Farr, Straus & Giroux, New York, NY.
- Hoxie, C., Berkebile, R. and Todd, J.A. (2012) Stimulating regenerative design through community dialogue. *Building Research & Information*, 40(1), 65–80.
- International Living Future Institute (ILFI) (2010) *Living Building Challenge 2.0* April, International Living Future Institute (available at: <http://www.bioregional.com/oneplanetliving/what-is-one-planet-living/>) (accessed on 23 August 2011).
- Korten, D.C. (2006) *The Great Turning: From Empire to Earth Community*, Kumarian, Bloomfield, CT and Berrett-Kohler, San Francisco, CA.
- Macy, J. and Brown, M.Y. (1998) *Coming Back to Life: Practices to Reconnect Our Lives, Our World*, New Society, Gabriola Island, BC.
- Mang, P. and Reed, B. (2012) Designing from place: a regenerative framework and methodology. *Building Research and Information*, 40(1), 23–38.
- McGraw Hill Construction (2011) *Green Outlook 2011*, Design and Construction Intelligence, Bedford.
- McGregor, Roberts (2011) *Using SPeAR Assessment Tool in Sustainable Master Planning* (available at: http://www.arup.com/_assets/_download/download129.pdf) (accessed on 23 August 2011).
- Mithun Architects (2011) *Lloyd Crossign Urban Design Plan*, Mithun (available at: http://mithun.com/knowledge/article/sustainable_urban_catalyst/) (accessed on 23 August 2011).
- Owens, B. (2011) LEED 2012 – Next Version of LEED. Presentation at Greenbuild 2011 (7 October 2011), Toronto, Canada (available at: <http://www.greenbuildexpo.org/Speakers/Master-Series/Master-Series-Sessions/SL15.aspx>).
- Regenesis (2011) *Regenesis: More than Green*, Regenesis (available at: <http://www.regenesigroup.com/development.php>) (accessed on 23 August 2011).
- US Green Building Council (USGBC) (2010) *2010 USGBC Annual Report*, USGBC, Washington, DC.
- Williams, K., Berkebile, B., McLennan, J.F., Achelpohl, K. and Svec, P. (2000) *The NIST Report for the MSU EPICenter*, National Institute for Standards and Technology, Washington, DC.
- Zimmerman, A. and Kibert, C. (2007) Informing LEED's next generation with The Natural Step. *Building Research & Information*, 35(6), 681–689.
- ²Community leaders' here refers to any leader or decision-maker from within the community who may be in a position to influence building and planning projects toward a regenerative approach. They may include citizens, investors, political leaders and advocate groups.
- ³US Green Building Council, Leadership in Energy and Environmental Design (LEED) (<http://www.usgbc.org>).
- ⁴BRE Global, BREEAM (<http://www.breeam.org>).
- ⁵Japan Sustainable Building Consortium, CASBEE (<http://www.ibec.or.jp/CASBEE/english/>).
- ⁶International Initiative for a Sustainable Built Environment, SBTool (<http://iisbe.org/sbmethod-2010>).
- ⁷Green Building Council of Australia, Green Star (<http://www.gbca.org.au/green-star/>).
- ⁸Council for Scientific and Industrial Research, SBAT Tool (http://www.csir.co.za/Built_environment/Architectural_sciences/sbat.html).
- ⁹German Sustainable Business Council, DGNB Certificate (<http://www.dgnb.de/en/certification-system/index.php>).
- ¹⁰Education Performance and Innovation Center designed for Montana State University's Bozeman Campus.
- ¹¹The Living Building Challenge was issued by the Cascadia Region Green Building Council and is now overseen by the International Living Future Institute (<https://ilbi.org/>).
- ¹²Sustainable Project Appraisal Routine from ARUP.
- ¹³Rene Dubos, quoted by Regenesis (2011), defines 'place' as follows: 'Spirit of place symbolizes the living ecological relationship between a particular location and the persons who have derived from it and added to it the various aspects of their humanness.'
- ¹⁴This dialogue goes far beyond a charrette, a stakeholder involvement technique often used in green projects.
- ¹⁵Hoxie et al. (2012) share the experience that after the Noisette community had discovered and taken ownership of their vision, they refused to allow a developer to change the plan, arguing in the public meetings, 'This is our plan for our community and we want to see it carried out!'
- ¹⁶The Tools for the Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI) developed by the US Environmental Protection Agency (<http://www.epa.gov/nrmrl/std/sab/traci/>).
- ¹⁷Potential partners might be: Earthster (a life cycle assessment tool to track sustainability impacts throughout a given products supply chain; <http://www.earthster.org>), an open source tool with life cycle and commerce data; BioRegional case studies with lifestyle and behaviour data; the Ask Nature tool with networks of biologists, ecologists and biomimetic designers working around the world to collect and make use of natural systems data (<http://www.asknature.org>); The Clinton Climate Initiatives' C40 City's database and resources for cities with climate initiatives around the world (<http://www.c40cities.org/>); General Service Administration building performance research data (<http://www.gsa.gov/portal/category/100000>); and many more.

Endnotes

¹'Practitioner' here refers to design and construction professionals such as architects, engineers, contractors, planners, consultants and facilitators, who lead project teams through regenerative design processes.

Copyright of Building Research & Information is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.