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Title of Paper: **A Needs Based Approach to the Urban Design and Planning Process**

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Abstract

Sustainability within the built environment is both a function of design and how its community responds to that design. We have numerous tools explaining 'how' to design 'green' communities, however we struggle to 'green' the residents that eventually inhabit them. If a community is to help move society towards sustainability, it must not only be sustainable by design but must promote sustainable mental models and nurture sustainable behaviour. Working with the design process is one of the most upstream confluences in tackling issues of systems thinking, strategy towards sustainability and ensuring there is both collaboration within the project team and participation with broader stakeholders.

'Needs Based Design' (NBD) is a new approach to urban design, based on an understanding of fundamental human needs and creating spaces that eliminate or minimise barriers to people satisfying their needs. Based on a five-level model for decision making in complex systems, NBD takes a whole-systems approach to urban design and development. Adapted from a systems-thinking framework for sustainability, also referred to as The Natural Step Framework, the NBD framework and method have been created as a simple generic model that can be understood, adopted and carried out by designers, developers, planners, government and community groups.

NBD can be used to explain and understand complex systems. It uses scientifically-based principles for a definition of sustainability and basic human needs, as a basis for a shared vision and language for making decisions. With a common understanding of complex issues project teams and community stakeholders have the potential to use this framework to work collaboratively to apply systems understanding, visioning and backcasting from principles. NBD outlines a theoretical process and a set of tools for collaborative decision making in complex systems to reach a vision of a community that behaves sustainably to help move society towards sustainability.

Introduction

Society continues to increase its understanding of the various ways we are impacting natural and social systems. However, our understanding of these systems has also made us aware of the complexity and interaction between and within them, and the scale of the solutions needed to

bring about a sustainable society. It is the understanding of these interactions and a means for making strategic decisions towards solutions that are highlighted in the following paper. 'Needs Based Design' (NBD) is an approach to urban design, based on an understanding of fundamental human needs and how to create spaces that eliminate or minimise barriers to people satisfying their needs. It outlines a theoretical process and a set of tools for decision making in complex systems to reach a vision of a community that behaves sustainably to help move society towards sustainability.

There is increasing awareness. The current reality of planning and design techniques, and auditing tools are doing a great job to ensure that designers and developers are being 'less bad' and moving towards neutralising their impacts on the natural environment. However, these tools work primarily on 'greening' materials and technologies and only focus on 'check-box' solutions to simple problems. There are currently few tools that work with the harder complex problems that require project teams to look at the way we work and live together. Research identified three gaps in the urban design and planning process. As discussed in more detail below, they are: 1) A weak application of systems thinking, 2) minimal means to consider social fabric, cohesion and sustainable behaviour of residents and 3) a clear structure for collaborative planning in complex systems.

The aim of the research was a new application of The Framework for Strategic Sustainable Development (FSSD) to create a practical and effective means for filling these gaps. The FSSD was used as an analysis tool for the current reality of 'green' urban design and planning, and as a basis for creating the new proposed process NBD. Undertaken as part of a master thesis research, NBD has been created as a total package – an approach to establish the overarching concepts on which the research was based, a framework for planning and decision-making in complex systems and a method (or tool) for the practical implementation of the approach and framework of NBD for the creation of projects that can inspire a move towards a sustainable society.

The Framework for Strategic Sustainable Development
The Framework for Strategic Sustainable Development (FSSD), widely known as The Natural Step Framework, was initiated by Swedish cancer specialist Dr. Karl-Henrik Robèrt in the late 1980's. This framework is based on scientific consensus facilitated by The Natural Step, a non-government organisation, in collaboration with a network of scientists and business (Holmberg and Robèrt 2000). The FSSD encourages dialogue, consensus-building and incremental change to create the conditions necessary for significant transition towards sustainability. (Ny *et al.* 2006; Broman et al. 2000).

Grounded in systems thinking, the FSSD is based on a generic five level framework for planning within complex systems (Robèrt *et al.* 2002; Robèrt. 2000). It is designed to aid teams in choosing appropriate tools (level 5), to take deliberate actions (level 4), by applying strategic guidelines (level 3), to help advance towards success (level 2), within interconnected and complex systems (level 1). A holistic understanding of the system is paramount to arrive at success. There are two core concepts that make the FSSD unique. The first is within the 'Success' level of the framework whereby success is defined within the system by four Sustainability Principles (SPs). The SPs provide a complete, fundamentally-based and scientific

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understanding of how we, as humans, are currently eliminating our own potential to move towards sustainability.

Second, at the 'Strategic Guidelines' level we find the concept of 'backcasting' - a planning procedure by which a successful outcome, or vision of success, is imagined in the future, followed by the question: "what do we need to do today to reach a successful outcome?" During this study, the FSSD provided many functions. It was used as a planning tool for the research, as an analysis tool of current 'green approaches' and finally as a model process on which to base NBD - an approach, a framework, and a method.

Research methodology
In an attempt to increase overall efficiency and reduce resource use the research was focused on providing solutions at the most 'upstream' point of the project. The design and planning process was identified as the most effective means for implementing sustainability.

The research was undertaken in four parts.
1. An understanding of the current approach to 'green' design and planning.
2. The development of a proposed desired approach that aims to better inform sustainable urban development – the focal point of this research.
3. The testing of both approaches; and
4. A comparison between the two approaches to highlight the gap, or creative tension, existing between them.

A creative testing process was important as it was recognised early in the research that 'real time' was impractical based on time constraints. It was decided that testing and analysis could be undertaken via experienced experts in the field as a point of reference. Collaborators and interviewees totalled 29 experts from 5 countries covering various backgrounds and experience. Early inspiration for the overarching methods used in this research came from the work undertaken by Ny *et al.* (2007) on 'Templates for Sustainable Product Development'.

The Current reality of a 'green' urban design and planning process
Using 'green' design and planning as a baseline, three main shortfalls were identified in the current way things are done. These need to be addressed if our hopes to build sustainable communities are to be truly realised. Current approaches:
1. Lack a systems perspective. They often address sustainability from a limited and mechanistic perspective of the objects on the site only, neglecting a comprehensive collaborative whole systems view including all its parts and people.
2. Lack the sufficient means to consider the social aspects of sustainability. Although social 'well-being' and the notion of 'creating community' are commonly referred to by green designers and developers, limited insight into how to fulfil these considerations by the design team's own participatory restrictions, often over-rides the ability to address them.
3. Lack structure and a shared language for working together. Green design uses checklists and standards that quantify pieces of the whole that can constrain creative solutions. These tools and processes for planning and designing a project are not founded on strategic planning as they do not provide a framework for strengthening collaboration. Confusion between the use of strategies and tools is also common, as tools like LEED®

green building standards and other rating systems are used to define the strategy for the process. Lack of a workable definition for sustainability and a shared vision (definition of success) also attribute to limited collaboration therefore focus and direction of a project are rarely shared between the project participants.

Proposed NBD to fill the three current failings

NBD is a systems-thinking approach that provides design, development and planning teams with a common language, strategy and method for designing, constructing and maintaining the physical and social infrastructure of communities. Needs Based Design plants and nurtures the seed of individual and community change for the growth of a sustainable society. Continuing with business as usual and the same thinking that has contributed to the unsustainable mess that we are in is simply dangerous. Furthermore, sustainability is more than just a design problem and we must explore new approaches that move beyond the creation of better 'things' and focus on the needs of individuals within healthy and flourishing natural and social communities.

NBD fills the gaps identified in the current reality and tackles the challenge of designing for sustainability. It:
1. Uses systems thinking. The larger context that the project participates in is considered first and the project is designed to support and contribute to ecological and socio-cultural systems.
2. Provides a way to deal with complex social issues by focusing on the needs of individuals both in the project team and throughout the community at large. The needs of individuals are considered by addressing human needs at a fundamental level.
3. Uses a structured and robust framework and shared language to spur and advance dialogue about how to move forward together.

The NBD Approach

NBD understands there to be two components of a team's approach to a project that are indispensable to arrive at a successful outcome of a sustainable community: 1) a principle based definition of success framed by systems thinking - working from the 'outside-in' and 2) maintaining a people-centered perspective based on an understanding of fundamental human needs.

NBD is grounded in systems thinking which challenges us to view *things* with respect to how they fit within the structures and constraints of the larger *whole*. NBD asks design teams to first gain an understanding of the principles on which these larger systems function and then, and only then pursue design features that allow individuals to fully and actively participate in those larger communities. There is a clear vision of what a sustainable community looks like and a understanding of the socio-ecological conditions that allows this state to continue. In this way, the NBD approach can be characterised as one that is 'outside-in'. It recognises that all projects exist within society and the biosphere (which ultimately allow for the project's existence) and can participate in those systems in either a positive or negative manner.

Secondly, NBD is about people. As explained by Manfred Max-Neef (1991), a Chilean economist and creator of the theory of Fundamental Human Needs, "development is about people, rather than objects". Understanding the basics of what individuals need to foster sustainable

behaviours create a foundation upon which all other decisions can be made. As part of the approach to NBD, the core design team is asked to understand and make collaborative decisions based on the concept of fundamental human needs.

Fundamental human needs are universal. They are the same for all people for all time. But their satisfiers – the ways to fulfil them – are not. They differ and change between both culture and circumstance, and are most influenced by societal norms and forces. NBD uses the same non-hierarchical set of needs that Manfred Max-Neef defines as fundamental: subsistence, protection, freedom, affection, creativity, idleness, participation, identity and understanding.

The term "needs" in this work has a dual purpose. It addresses both the fundamental human needs of individuals within the community (including the project team) and the needs of a sustainable global society, both now and in the future as defined below by the Brundtland Commission. In their broadest sense, development and human needs are components of the same equation. "The best development process will be that which allows the greatest improvement in people's quality of life" (Max-Neef 1991). The challenge is two-fold - first, to come up with elements that best support people's continual efforts to meet their own needs, and secondly, to remove both physical and societal barriers that inhibit these same needs from being met.

The NBD Framework
The NBD Framework builds on the strengths of the FSSD to apply the NBD Approach to the urban design and planning process within a five level framework as follows:
System (Level 1): NBD considers a project to exist within society within the biosphere – both the biosphere and social systems set the boundaries within which the project can function.

Success (Level 2): Success in the design and development of a NBD project will afford individuals the opportunity to consistently and abundantly realise the fulfilment of their needs within a sustainable community. A project built on a co-created vision for success has a firm platform from which project teams and the larger community can create a shared understanding of both the 'what' and 'who' of the place that the project will participate in. NBD uses The Natural Step Socio-Ecological Principles (SPs) below help define success.
The ultimate objectives for moving towards sustainability are to eliminate our contribution to…
> 1. … systematic increases in concentrations of substances from the Earth's crust.
> 2. … systematic increases in concentrations of substances produced by society.
> 3. … systematic physical degradation of nature.
> 4. … conditions that systematically undermine people's capacity to meet their needs.(Holmberg et al. 1996, Ny et al. 2006) Note: the sustainability principles are shown here in 'operational' format.

Strategic Guidelines (Level 3): Strategic guidelines are the essential concepts that project participants must use to achieve a successful outcome. NBD uses 'backcasting', 'meaningful participation' and 'prioritisation questions' to strategically move projects forward. As a result of these guidelines a strategy towards sustainability is created.

Backcasting' (refer to Figure 1.0 below) is a planning procedure where a successful outcome or vision of success is imagined in the future followed by the question: "what do we need to do today to reach a successful outcome?" Backcasting from a principle based definition of success framed by systems thinking allows participants to create their community without constraining themselves by the problems of today - a restriction when forecasting. Potential answers and actions (no matter how creative) are then brainstormed and prioritised using the questions below, so that they can be implemented in a strategic manner.
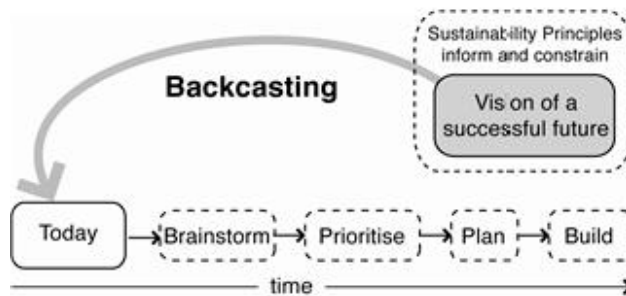

Figure 1.0 *Backcasting from a vision of a successful future, based on socio-ecological principles (SPs).*

'Meaningful participation' is recognised not only as a basic human need, but also as a strategic guideline because of its importance in the process of design and planning. There is a screed of published material that recognises participation is valuable. However a concern is also that broad involvement can open the conversation to personal agendas and values, therefore slowing the process and potentially lowering the level of discourse. For a successful participatory process all participants need to feel they have been heard and understood so the can see the reasoning behind why their suggestions were or were not included in the final product. The use of a common language (principles and needs), creation of a shared vision and good facilitation creates huge potential to optimise chances for success through community by-in and the potential shift in community behavioural change.

The 'prioritisation questions' allow the project to be tackled from a strategic perspective. Project teams must ask themselves the questions below when considering specific actions *(Robèrt et al. 2002; Robèrt 2000)*. The prioritising guidelines of NBD are:
1. Does this measure precede in the right direction with respect to the vision, and therefore all of the SPs?
2. Does this measure provide a stepping-stone (i.e. 'flexible platform') for future improvements towards sustainability?
3. Is this measure likely to produce a sufficient return on investment to further catalyse the process, including ecological, social and economic returns?

Actions (Level 4): The actions level describes the specific actions required to complete the project and how to roll out these actions within the project. These actions have been prioritised through backcasting, from the project vision and scrutinised by the prioritising guidelines. It is important to note that each and every action does not have to comply completely with the SPs, but together must show logical progression towards achieving the goals of success.

Tools (Level 5): The main tool to implement NBD is the IDEA method (detailed in the next section). All other tools are carefully selected to provide capacity, structural and systematic support and integrity to the project. They may include but are not limited to the following: LEED®, BREEM®, Community Based Social Marketing and financial capital.

The NBD Method

The NBD approach and framework are implemented using a new process for urban design and development, the IDEA Method, and consists of the following phases: Intend, Discover, Envision and Act.

Intend. The 'Intend' phase asks, what do we intend to create? And begins with a commitment from the participants that the project will be designed and implemented in a way that will allow for its creators and future occupants to actively, artfully and positively participate in the social and natural systems of the community.

Discover needs and place. IDEA continues with the 'Discover' phase and attempts to answer, what allows life to flourish within us and within this community? A commitment from the team members to fully understand their own needs as individuals, the needs of the community's social networks and the requirements of the surrounding ecological systems is required.

Envision. A shared vision and story of what the project intent is aiming to achieve is the 'Envision' step of the IDEA method. The goal of this step is to solidify what the project participants see as 'success' with reference to the project. All project participants are asked to consider the question, what will we create to contribute to the flourishing of life in this place?

Act. It is only now in the 'Act' phase that focus turns directly to the project itself. The goal is to build from the project's intent and understanding of needs and place to fulfil the project vision to its greatest potential whilst the project participants answer the question, how can we fulfil the project's vision to allow people the opportunity to meet their needs both now and in the future?

Discussion

Results from testing with expert panellists have shown that NBD could potentially be a very influential tool in a range of situations for a variety of groups and stakeholders. NBD supports broad meaningful participation in the creation of the community vision. However because of the lack of practical application some held reservations. There were four additional areas that were highlighted as important considerations within projects. The question of how to develop a community for unknown residents, how to effect behaviour change within a new built environment, the regional relationship that community creates and the potential for NBD business case. NBD has the potential to support many of these areas both through outlining a strategic process and the potential to create strong community fabric during the urban design and planning process.

New development with unknown residents. Two types of participation have been identified by Benaim *et al.* (2008). 'Involvement' is the personal connection with the surrounding communities to ensure that minimal or no barriers to fulfilling basic human needs, whilst 'inclusion' is a method of creating participatory groups of potential residents. Because basic human needs are the

same everywhere anyone can design for them, however what is different is the 'place' of the development, and cultures that will be living there that will likely employ different satisfiers to these needs.

Needs and behaviour. Broad community engagement allows dialogue on sustainability and needs to dissipate into broad circles. It may even encourage the behaviour change necessary in residents to enable the community to function in a sustainable manner on a continual basis. NBD cannot claim that the use of an effective, holistic, and well structured process may lead to the needed shift. But it can claim to provide the space to begin the necessary dialogue and transition. Among other points, interviewees stressed that:

- Addressing the values of participants at a fundamental level is important to get beyond the notion of personal values and agendas. Personal agendas often hamper dialogue on needs within any process where broad participation is the norm;
- Long-term perspectives discussing needs that reflect the greater sustainability intent of the community will largely support behaviour change;
- Understanding the meaning behind and the way to use project features is important in encouraging sustainable behaviours within built spaces; and
- Processes that have proven to be most successful address the roles that behaviour and social implications play within the functioning of the community itself. Especially supportive is that diverse participation within those processes has been found to encourage the exhibition of continued sustainable behaviour. (Taylor & Allen 2007)

NBD encourages all the above, and acts to remove barriers to the fulfillment of human needs. Two points should be addressed here.

Regional development. A project's connection to regional sustainability efforts is necessary and natural. Near consensus agreement through active research suggests that it would be much easier to implement sustainability strategies in projects if supporting regional plans and policies were already in place. NBD can be implemented at the regional level in much the same way it is used at the project level. By aligning approaches and visions between projects and regional governing bodies, the chances of success increase significantly. As seen in figure 2.0 below, efforts at the regional level can guide sound decision-making while an inclusive project-level process can help spur sustainability at the regional level. The positive feedback loop becomes apparent. Similar to project level NBD, all regional sectors and civic and public groups could also take part in planning session to co-create the regional vision and the necessary actions that comply with it (Haraldsson 2008). As such, a regional master plan could be developed. A grassroots movement amongst developers in a region has potential to help advance the sustainability effort of a region by creating momentum from the bottom-up.

Figure 2.0 *Regional Development diagram*

Business case. There is strong anecdotal evidence that suggests that the frameworks, tools and techniques in this introduction can help mitigate risk and deliver many benefits for communities and clients, including solid financial returns. Furthermore, there are many case studies showing that green and regenerative projects have been done at costs comparable to conventional projects. Excellent and smart designs can be delivered on budget, no matter how 'green' they are - to insist otherwise cripples creativity from the start. The show will, and must, go on – the bigger issue is deciding which acts make up the performance.

Conclusion

As the population increases and the use of potential available resources decline we are starting to understand the need for not only sustainable design and planning but the fundamental importance of design according to the needs of the people who will inhibit the community. The process itself should also syngistically satisfy people's need for participation, creativity and identity. In order to engage people in a meaningful way and co-create basic design principles for a project, a framework that incorporates a systems perspective and a robust definition of overall socio-ecological principles can be helpful. It is important to differentiate between fundamental human needs and the ways we satisfy those needs in order to ensure that the final design of the built environment does not create or reinforce barriers to people's capacity to meet their needs.

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