

CIVIC ECOLOGY A Citizen-Driven Framework for Transforming Suburban Communities

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Abstract

Reshaping suburbia suggests a shift toward mixed use, green buildings, complete streets, densification and transit oriented development... in other words, greener, more efficient forms of suburban "hardware." While these strategies may lead towards greater efficiency, transformative change will require deeper intervention beyond re-forming and efficiency. Suburban areas must be re-imagined as whole communities animated by active citizenship. In this role they become the place for civic engagement around shared prospects for a resilient future.

This paper describes the Civic Ecology framework for sustainable communities and its application for suburban contexts. Civic Ecology is the integrated web of energy, nutrient, resource, financial, information, and cultural flows and interactions that are envisioned, created, and managed by citizens acting for the common good within a geographically-defined community and its city-region. It is a human ecology of place, intimately integrating both natural and social/cultural systems. It is the "software" of community.

The Civic Ecology whole systems framework is designed to foster a new social contract that empowers citizens to participate in the making and 'ownership' of their community's resource flows. This paper details Civic Ecology principles and benefits, and processes for empowering citizens to envision, create, and manage their community's ''software''. Included are examples of communities employing this approach and utilizing an innovative community resource flow mapping tool.

The Civic Ecology framework represents a new paradigm for suburbia, a soft systems urban design that goes beyond more efficient urbanization and toward deep sustainability.

Presentation:

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For questions, comments, or additional information about Civic Ecology, please visit: http://serapdx.com/vision/innovations/civic-ecology/

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The real magic lies not in seeing new landscapes, but in having new eyes.

---Marcel Proust

Introduction

Imagine a sprawling post WWII suburb that has been densified through infill and mixed-use development. It features public spaces and offers enhanced mobility through transit and bicycle connectivity. All energy is still produced outside the control of the community, as is food. Waste is treated at a remote site. While retail and service businesses employ some community members, these establishments are not locally owned or sourced resulting in a low community economic multiplier. A series of public infrastructure projects and private development with some public outreach were the primary implementation strategies for this redevelopment .

Now imagine that same suburb but with its citizens actively engaged in managing community affairs. Many businesses are locally owned, energy is largely generated from local sources, there is a healthy local food economy and citizens are actively engaged in creating, managing and monitoring the community and regional resource systems that nourish and vitalize this place. The resource flows created are the basis from which physical development and green infrastructure have emerged. A Civic-Public-Private Partnership ensured community ownership of the future vision, which has resulted in a much more incremental pace of change.

The point of the exercise is to contrast two aspects of community design: hardware and software. In the first example the community, through the actions of its local government and the private sector, has focused on improving suburban mobility and form by creating better "hardware", the streets, buildings, parks and other physical infrastructure that exemplify current best practices in urban design. The second example takes a "software" approach positing that designing future flows of energy, food, water, waste, money and the local economy will be crucial to the community's resilience. This approach has been citizen-led, its implementation a Civic-Public-Private Partnership enterprise and the resulting hardware built strategically and incrementally around a shared vision of community local resilience.

Obviously, an ideal scenario would integrate the two approaches: robust civic engagement from which emerged a comprehensive web of locally-based resource flows designed to provide the context for catalytic green buildings and a next generation suburban infrastructure or "nature-works" that integrated open spaces, green streets and rooftops with food production, waste management, energy generation and water systems. This next generation suburban public works program would stimulate greater density and mix of uses in support of enhanced regional mobility, a vibrant local economy, healthy social capital and enhanced resilience.



Figure 1. *This thought experiment suggests a simple equation: Software + Hardware = Sustainable Community.*

In this paper I explore the software variable of the equation and propose a holistic approach, called *Civic Ecology*, that adds a new dimension to suburban redevelopment. I define Civic Ecology as the integrated web of energy, nutrient, resource, financial, information and cultural flows and interactions that are envisioned, created and managed by citizens acting for the common good within a geographically-defined community and its region. This human ecology of place intimately integrates natural and social/cultural systems and is both a product and a process. The product could be a new public works of resilient infrastructure, a nature-works that does not just provide ecosystems services to humans, but engages citizens as an integral part of a human-nature-community ecosystem.

Context

We live in an urban era and cities are our present and future. Globally, urban population has increased from 30% of world population in 1950 to 47% in 2000, and is projected to reach 54% by 2015 and 67% by 2050. In the United States, the numbers are even more telling: In 1950, 64% of US population resided in urbanized areas while in 2000 79% did so. US urbanization is projected to increase to 83% in 2015 and 89% in 2050 (United Nations, 2012).

In this era of increased urbanization what are we to make of suburbs? While cities may be our future much of what is counted as urban in America is actually characterized by low density, automobile-dependent sprawl development, in other words, suburbs. Today's suburbs are not just bedroom communities anymore but increasingly places of employment. Almost half of the jobs in America's largest 98 metro areas are more than 10 miles away from the city center (Glaeser, 2011). These areas are also not entirely prosperous anymore. As of 2010 the majority of the nation's poor lived in suburbs (Urban Land Institute, 2012).

Suburbs have been a feature of the American landscape since the mid-19th Century. Many early streetcar suburbs have matured around transit lines into fine city neighborhoods and first-tier suburbs. The post WWII version of suburbs built for and now dependent on the automobile is a different animal, however. Not city and not country, these recent phenomenon are one of the most highly subsidized landscapes in world history. Conceived in an era of cheap fuel, free roads, unlimited parking, cheap land and favorable housing costs, many post WWII suburbs are now on life support struggling with a new calculus amidst ever rising resource costs and ever decreasing subsidies. These sprawling post WWII suburbs will be the focus of this paper.

Challenges for suburban communities

In a resource-scarce era, American suburbs will face a number of challenges as subsidies come to a gradual or cataclysmic end. These challenges are:

Can suburbs become resilient communities within their metropolitan regions?

In the future resilience will be as much about being prepared for the sudden storm, power outage or act of terror as it will be about adapting to increasing food, product and fuel prices, sea level rise due to climate change, aging infrastructure, unemployment spikes, housing challenges, political dysfunction and the erosion of wealth due to recession. Recent events suggest we are nowhere near the resilient society we should be. Suburban resiliency seems like an oxymoron amidst increased traffic congestion, crime, poverty and a host of other stresses that have appeared since the 1980's (Lucy and Phillips, 2000). Some predict the current malaise is a precursor of greater and more cataclysmic economic, ecological and social stress within the next few decades (Gilding, 2011 and Kunstler, 2005). The need for community resilience has never been greater.

Is it enough to focus solely on re-forming suburbia? What about re-wiring it?

Much attention has been devoted to deficiencies in suburban design and planning. New Urbanist

critiques and proposals for retrofitting suburbia are important efficiency and livability initiatives. As important, however, is suburban community "software". Addressing the deficiencies in local resource flows, particularly social capital, will be as critical to place-making as revitalizing suburban arterials, retro-fitting underperforming suburban malls or introducing transit-oriented development.

How can we repair our democracy and activate citizenship to meet these 21st century challenges?

The ancient Greeks had a term for those who participated in civic affairs: citizen. They had an equally descriptive term for those who did not: idiot. Today there are enough distractions to make idiots of us all, but if cities are our future, it must be citizens that make them. The same holds true for suburbs. Merely voting and paying taxes will not be enough. The art and practice of citizenship must be central to 21^{st} century community making.

And finally, how can we forge a new, more integrated relationship with nature?

Suburbs are viewed as places of refuge from the stresses of city life and as places to be closer to nature. In the 21st century neither of these hold true. The stresses have caught up to the typical suburbanite and nature, more and more, seems like something one sees out the window of a car or mows on the weekend. If we are to re-inhabit suburbs let us re-inhabit ourselves as well. As Ian McHarg wrote in Design with Nature

Dominion and subjugation must be expunged as the biblical injunction of man's relation to nature. In values it is a great advance from "I-it" to "I-Thou", but "we" seems a more appropriate description of ecological relationships...separation rules, yet integration is the quest (McHarg, 1971).

Civic Ecology is a way forward amidst uncertainty and a pathway along which the "we" are active citizens in the service of community and regional sustainability. Civic Ecology addresses four major problems endemic to Post WWII suburbs: a lack of resilience, a low degree of local control over community resources, civic poverty and a lack of commitment to community building.

Lack of resilience

Much criticism of post WWII suburban development centers on mobility and urban form. The inefficiencies of separated land uses and auto-dependent transportation patterns, the economic, health, safety and psychological impacts on families of these conditions as well as the architectural monotony of the visual environment have been well documented. To this litany we must now add the social, economic and ecological impacts of recent disasters, climate change, aging infrastructure, energy, water and food system stresses, unstable politics and loss of habitat and natural systems. Attaining a measure of sustainability in this milieu will require resilience.

Gunderson and Holling define resilience as "*The capacity of a system to experience disturbance and still maintain its ongoing functions and controls.*" (Gunderson and Holling, 2002). In an era of growing potential disruption resilience becomes a measure of how well a community can roll with the punches, take care of itself after the inevitable downturn, or just manage its future in the midst of chaos. In other words, how well it adapts to change. Disaster-proofing physical infrastructure is critical, but the community's soft systems may be just as important for resiliency.

Resilience is also an important measure of how well an organism deals with long term, noncataclysmic change. The impact of climate change on communities represents just such a risk. In *The Great Disruption*, Paul Gilding outlines the need for a herculean, World War II-like effort to create resiliency to mitigate the impacts of climate change. Fossil-fuel dependent post WWII suburbs will be severely impacted and will require resiliency frameworks that are intergenerational, appropriately scaled and civic in nature.

Lack of control over community resources

A closer look at resilience reveals two other factors to consider: connectedness and potential for change. Connectedness is the degree of internal control that a system can exert over external variability (Gunderson and Holling, 2002). Post WWII Suburbs fail here, as do most communities because their life support systems, the energy, food, water, transportation and waste treatment infrastructure are mostly parts of larger systems fed from and controlled by sources outside the community. This goes also for the goods and services purchased within the community. Suburban shopping malls filled with national chain stores ensure that money spent at these establishments will leave the community and enter a global financial system rather than cycle within the community enriching a local system.

Suburban utility systems were constructed by experts using concepts and technologies considered innovative and appropriate in an era of plenty. Energy intensive sewage systems, transportation dependent food systems and fossil fuel-based energy sources were created and delivered by expert engineers and planners with no input from future residents. These state-of-the-art public works rely on endless supplies of remotely-sourced virgin inputs and generate waste to be thrown away- "away" meaning out of sight and out of mind (see Figure 2).

Mass producing community kept prices low while government subsidies of fuel, infrastructure and mobility ensured things stayed that way. In many cases suburbs were built on rich agricultural land upending locally-based farming communities. The result is some of the most fertile private backyards in world history, as well as one of the most inefficient food systems in the world. Storm water management was highly engineered and often ignored the valuable services that healthy natural systems can provide. The disconnect between citizens and their life-system flows ensures poor feedback and low resilience.



Figure 2. Suburban linear resource flow system

Is there potential for change? The previous era's infrastructure is nearing the end of its useful life. As suburban communities densify and introduce mixed uses and transit, they will also have the opportunity to re-think their infrastructure. The next generation suburban infrastructure offers opportunities for a citizen-based, nature-works rebuilding program, aimed at replacing aging infrastructure with lighter less resource intensive technologies (see Figure3).



Figure 3. Nature-works: A suburban cyclical flow system

This nature-works program could draw upon the EcoDistrict concept pioneered in European cities and further developed by the Portland Sustainability Institute (PoSI) in Portland, Oregon. PoSI defines EcoDistricts as "a comprehensive strategy to accelerate sustainable neighborhood development by integrating building and infrastructure projects with community and individual action." (PoSI, 2012).

Rebuilding infrastructure in this manner would be a strategy towards resilience. Opportunities abound. For example, low suburban density affords solar access and nature-based means of waste treatment and storm-water management through constructed wetlands. Many suburban communities feature open space areas that could, if re-thought, afford opportunities for localized food production, organic waste composting and nutrient cycling. Mixing uses could provide a means for energy sharing and co-generation. The potential for systemic change toward greater resource connectivity is there, but tapping this latent resiliency needs social capital.

Civic Poverty

Resilience is linked to healthy social capital, the *"features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions."* (Putnam, Leonardi, and Nanetti, 1993). In a recent New Yorker article, Eric Klinenberg identified healthy social capital as one of the determining factors in how well a community fared in response to weather disasters. This suggests that social capital may be a critical element of resilient infrastructure (Klinenberg, 2013).

It is interesting to note that for the first time in history the majority of America's poor now live in suburbs (Urban Land Institute, 2012). This troubling rise in individual and family poverty is accompanied by civic poverty. In *Bowling Alone,* Robert Putnam identifies the factors contributing to America's declining levels of civic engagement (Putnam, 2000). These include the pressures of time and money, the increased use of electronic entertainment, the impacts of generational change and suburban sprawl. The sprawl impacts are largely due to time lost to commuting and the fact that civic engagement tends to decline in socially homogenous communities, a characteristic of the American suburb. (Putnam, 2000). Quantifying the impact of commuting on civic engagement, Putnam says *"each additional ten minutes in daily commuting time cuts involvement in community affairs by ten percent."* (Putnam, 2000). Thus approaching resilience through infrastructure redesign (hardware) and social capital building (software) would seem to be a sustainability one-two punch.

Disconnected resource flows and weak social capital do not seem like a rich context for innovation and change. Indeed with respect to social entrepreneurship and innovation cities seem to be where the action is. Cities have been first to comprehend the need for resilience. While suburbs have historically provided escape to comfort, homogeneity and privacy, cities have been the settings for active civic life. As suburban municipalities contend with aging infrastructure, growing poverty and fiscal challenges, and suburbanites endure increasing traffic congestion and higher costs of living, the suburban civic realm atrophies from low community participation.

Suburbs could become engines of innovation and create enduring ecological, economic and social wealth by linking their physical reforming with resource re-wiring. The suburban landscape of the future could become a regional web of high-density transit-accessible town centers animated by locally-based webs of energy sharing, food production, waste to resource transformation and strong local economics. Silicon Valley is an example of a suburban environment that is leading the way with such sustainability innovations as greywater reuse, transit-oriented development and, in the case of Mountain View, California, development incentives for sustainability measures that are built into its General Plan update. These innovations are inspiring, but deeper change will need civic engagement.

Driving such change could be the increasingly diverse and technology-savvy suburban citizenry who, if inspired, could imagine and create locally-based systems and patterns of exchange to enhance their community's resilience. They could, for a limited time, draw upon the experiences of the *"long civic generation"*, a cohort of people born before WWII who were civically active and are now well into retirement (Putnam, 2000). The long civic generation became civic through the shared sacrifice necessary to win WWII. Perhaps the seriousness of the climate change challenge could help energize a new long civic generation through *"the mobilizing power of shared adversity"*. (Putnam, 2000). Viewed through this lens, climate change is as much a problem as it is an opportunity and if seized could lead a suburban transformation fueled by citizen engagement.

Yes, citizen engagement has been the cause of much obstruction to change, particularly in suburban environments. But NIMBY-ism is a reaction to a lack of true civic engagement. NIMBY-ism would not be the outcome in a community where citizens are tasked with defining problems and designing solutions rather than just sitting in judgment of solutions offered by technicians. Lacking that power, many citizens resort to obstructionism. Better no change than change you don't know, understand or feel invested in. Empowering social, economic and ecological innovation, to create a sense of ownership of resources would be a YIMC (Yes, In My Community) paradigm.

Lack of commitment to community building

At the root of all of these problems is a lack of commitment to community building, an endeavor in which cities and suburbs could both use improvement. The process of urbanization does not necessarily yield communities or even cities, just development. Do suburbs lack public life? Yes, but so do many cities. The typical response is to create more public space as if 21st century citizens will practice democracy better if they just had more public plazas and piazzas (just like the Greeks!) Suburbs do have public life it is just not generally focused on building and managing their community future and it tends not to occur in fully public places.

So, yes we do need to re-form suburbia to provide opportunities for formal and informal public interaction. The containers can provide for that positive social friction but we also need the institutions to focus the resulting heat, to create a living culture that practices resilience on a resource-finite planet. How do suburbs make such institutions?

The Need for a New Suburban Paradigm

America is beginning an era of suburban transformation. Suburbs represent some of our greatest achievements during a resourcerich, highly subsidized era. That era is now over and a new resilience imperative is needed. Suburbs have latent resilience because they offer potential for change and opportunities for enhanced local resource and social connectivity.

I believe that smart growth and new urbanism are important, but partial solutions to the resilience imperative. They will address the need to enhance mobility and re-form suburbs for mixed use and greater density. Yes, suburbs need better hardware, but they also need better software. Physical places need to be built around the software of resource flows that animate community life. The emerging paradigm should start with software as the enabler of hardware, and hardware as the container for software.

Toward these ends I propose Civic Ecology as an urban design of soft system flows:

Why Civic? The Civic Ecology framework proposes that better democracy, a richer, more engaged civic life in the service of greater community control of resources become the basis for a new and more holistic suburban paradigm. Imperative is that this civic engagement not be a one-time volunteer effort in response to a crisis but an on-going civic duty practiced by citizens and passed on as part of local civic culture.

In Chestnut Hill, a Philadelphia, PA neighborhood, volunteers gather monthly to help their fellow residents collect, sort, and bundle items for transport to a local materials recycling center. The items are not accepted in the City's curbside program, but local residents found a source that would pay for the materials if they were delivered.

The money earned from this enterprise goes to the Chestnut Hill Community Association to fund various community projects, such as greening public spaces.

This self-created community system emerged to help residents of this 10,000 person community address a number of neighborhood issues: reducing stress on landfills, creating a market for currently nonrecyclable items, funding local improvements and enhancing community spirit.



A community park was redesigned by local school kids and improved with the funds collected from the recycled materials.

Why Ecology? A Civic Ecology framework will facilitate the emergence of suburban nodes of civic innovation where citizens envision and manage their future by creating webs of resource flows and interactions to localize shared wealth. Such a framework is a human-nature ecosystem where citizens do not seek to dominate nature and create wealth at its expense but instead create a harmonious integration of social and natural systems where healthy ecosystems and strong social capital are viewed as aspects of shared community wealth on par with economic wealth. In these ways Civic Ecology would empower citizens of suburban communities to "own" their sustainability.

This soft systems urban design framework will engender a new pattern language of resource flows around which to build resilience. It will transform (sub)urbanized landscapes into active, vibrant communities in full. Civic Ecology will also help suburban residents see themselves as not just voters, tax payers and constituents, but as citizens in service of a resilient durable future.

CIVIC ECOLOGY 5 PRINCIPLES

- 1. Employs a whole systems approach
- 2. Focuses on place
- 3. Requires a new social contract
- 4. Matches needs and capacities
- **5.** Is dynamic

Five Principles for a Civic Ecology

The Civic Ecology framework has five essential qualities. Suburban communities that practice Civic Ecology will: 1) employ a **whole systems** design approach; 2) focus their systems work on their specific **community place**; 3) Initiate a **new social contract**; 4) Align **shared community needs with local assets**; and 5) maintain an open, flexible and adaptive **framework**.

A whole systems approach

Civic Ecology is the web of flows that animates community life. Resilient communities will have a refined array of locallybased systems that enhance livability. The premise is that great communities have great software. Moreover, the systems and flows cross sectors, intertwining economic, ecological and social relationships in a non-zero-sum game. In a resilient community it will be impossible to describe an economic system without including its essential social and ecological components.

Clackamas County is a suburbanizing area east of Portland, Oregon, characterized by low density development, family farming, natural resource based industries and rich natural systems. The Civic Ecology Resource Flow map (refer to Figure 4) from the Clackamas County Soil and Water Conservation Master Plan illustrates a localized web of energy, food, water, waste and money patterns of flow. It is a construct intended to guide future development in the region by providing a soft systems pattern language around which to build a healthy, local and vibrant economy where food is locally sourced, local wastes are transformed into useful soil enhancement and energy is created locally. As such it represents a citizens' owner manual for how to operate the place. Taken a step further it could become a public resilience policy as central to new development as a zoning code or a community comprehensive plan.

A focus on place

The premise of this quality is that in a globalized world, communities with a distinct sense of place will be highly valued. Beyond resource efficiency these communities will enjoy the benefits of life in a place where everyday functions pulse in full view. Kevin Lynch referred to this quality of place as



Figure 4. Community Flows and Interactions, From Clackamas County Soil & Water District Master Plan, 2008

"transparency" and described it as "the degree to which one can directly perceive the operation of the various technical functions, activities and social and natural processes that are occurring within the settlement." (Lynch, 1982).

This quality also speaks to appropriately scaled resource flows. A resilient future does not mean a self-sufficient community. Such a scenario would assume that all resources optimize at the same scale. In fact, we know that water has a watershed, food a food shed, energy optimizes at a different scale as do certain waste transformation systems. If systems flows are bounded differently then they are shared with outside communities and institutions. What becomes most important in such a complex framework is the center, the sense of place that is the community's catalytic heart.

A new social contract

Transforming suburban communities will require a new paradigm that includes an operating manual for citizenship. The present social contract, arising out of liberal democracy maximizes for privacy, liberty, individualism, property and rights exercised through power and law. The problem with these premises is what is missing: responsibilities, mutualism, fellowship, community and citizenship. We are used to electing others to do government for us relieving us of the burden of confronting conflict in the public realm. This model has engendered voters and tax payers, but not citizens. It does not offer a way for citizens to discover their shared core values and use them as a basis for creation of a resilient future.

Benjamin Barber has suggested we need to thicken up our thin democracy and create the means to enable civil society to take the lead in formulating community-supported responses to this fundamental question:

"What shall we do when something has to be done that affects us all, we wish to be reasonable, yet we disagree on means and ends and are without independent grounds for making a choice?" (Barber, 2003)

Damascus, Oregon, a suburbanizing community in the Portland metropolitan region embarked on a new social contract in 2003 by identifying its shared community values in preparation for an era of planning for anticipated growth. In order to answer the community's question "how will we know a good plan when we see it?" citizens crafted a series of community principles and a decade later, still refer to them whenever confronted with the need for decisions that will affect the community. These values provided the jumping off point for a Civic Ecology process described later in this paper.

As noted above, suburban communities suffer from low levels of civic engagement but certainly have the potential for empowering change. Dedication to a new social contract could unleash citizen creativity toward resilience just as it did in Damascus. Indeed, for communities with a fine grain of ownership interests, Civic Ecology provides the appropriate emphasis for a citizen-activated nature-works program. While public works programs have typically been engineering-centric, a nature-works initiative that empowers citizen leadership will be citizen-centric.

In Figure 5, the Democracy graph illustrates a continuum of contexts for citizen involvement and future nature-works. Suburban neighborhoods have fine-grained ownership patterns requiring high levels of citizen leadership for nature-works initiatives. Engineering /technology-led processes for infrastructure often result from "top-down" decisions made by centralized entitities. In between these two extremes are public and private institutions whose contexts present collaborative challenges and opportunities.



Figure 5. The Democracy Graph

Aligning shared community needs with local assets

Shared needs become an agenda for community resilience. The central question for suburbs is "how do we separate individual desires from shared needs? In the land of privacy, public discussions of such matters range from not happening to taboo. Using shared core values is a beginning. Knowing what you value will help you determine what is missing. But how do we know if satisfying a shared need will lead toward resilience?

Citizens can use a sustainability filter to separate the "good for me" from the "good for us all". Understanding a community as a web of ecological, social and economic relationships enables a systemic needs analysis. In Civic Ecology we have found the Natural Step framework to be a useful tool in this regard. Examining existing energy, food, waste, water and economic systems through the lens of the Natural Step's four systems conditions enables a community to benchmark its existing systems and then do a gap analysis to determine needs.

Community assets are the other side of the equation. Here is where the richness and density of a community's We have reformed the Natural Step principles into four simple questions that citizens can ask:

Do our community systems and practices:

- 1) Eliminate resource depletion and reliance on fossil fuels?
- 2) Eliminate persistent chemicals in the environment?
- 3) Respect nature's diversity? and
- 4) Use energy and resources fairly and equitably?



social capital comes to bear. Identifying the talents and expertise within a community's civil society and empowering those individuals to lead Civic Ecology efforts is crucial. While home-grown talent is important to success, it should be noted that in a complex world, expertise from the public sector, private consultants, local businesses and non-profits is equally important. Communities need to expand the emerging reliance on public-private partnerships (usually government and private development interests) to include a leadership role for civil society. The Civic-Public-Private Partnership (CPPP) will become increasingly important for suburban community transformation.

Maintain flexibility

The last quality of Civic Ecology is the need to create a framework that maintains a sense of openendedness. Cites, communities and institutions are never done. The best ones are always using their social capital and institutional knowledge to adapt to new challenges and circumstances. Civic Ecology is intended to create an integrated framework that constitutes a "learning ecology." Kevin Lynch described this idea as a fundamental part of good city form. It should be central to good suburban form as well. An evolving learning ecology might be a more appropriate concept for the human settlement, some of whose actors, at least, are conscious, and capable of modifying themselves and thus changing the rules of the game. The dominant animal consciously restructures materials and switches the paths of energy flow. To the familiar ecosystem characteristics of diversity, interdependence, context, history, feedback, dynamic stability, and cyclic processing, we must add such features as values, culture, consciousness, progressive (or regressive) change, invention, the ability to learn, and the connection of inner experience and outer action (Lynch, 1982).

The goal of flexibility is to afford transformative yet incremental change that adapts to emerging problems, opportunities and fiscal constraints. This sounds messy and it can be. Frustration with seemingly inefficient citizen-led decision-making is understandable but a necessary part of working in an empowered civil society. Part of the frustration may be the lack of tools necessary to reach agreement in such rich contexts.

CIVIC ECOLOGY 5 BENEFITS

- 1. Greater control of resources
- 2. Enduring wealth
- **3.** A strong sense of community
- **4.** Greater resilience
- **5.** A living culture

Why bother? What are the benefits?

Communities that employ Civic Ecology enjoy the following benefits:

Greater control of resources. Civic Ecology affords communities greater control and therefore greater ownership of their shared assets and collective future.

Enduring wealth. This wealth includes healthy ecological systems, strong and dense social capital and a vibrant and healthy local economy. While it is common to speak of an economic multiplier as the number of times a dollar spent in the community cycles within the community, the same can be said for ecological and social systems. A high ecological multiplier could result from a nature-works infrastructure program that shares energy, cycles nutrients and reuses resources within the community. A high social multiplier cycles ideas, good will and mutual aid within a community.

A strong sense of community. A vibrant and active civic realm generates a sense of pride in one's place. The act of designing resilient systems with strangers, casual acquaintances and even enemies and seeing these systems realized creates a strong bond among citizens and between citizens and their community. Building enduring social capital is the one form of infrastructure that improves over time and becomes more valuable with use. Hardware, as we know, begins to wear out the minute we start to use it.

Greater resilience. This is the big one for suburban communities. This work is all about making the community adaptable to stress, better connected with respect to resource flows and social capital, better able to monitor progress and adapt as needed and more adept at identifying and taking advantage of opportunities to leverage change.

A living culture. Why work so hard to become resilient if the ideas and strategies die on the vine with no next generation to pick up the framework and own it? Civic Ecology is an intergenerational enterprise whose real value will be realized by future generations, much like in the Chestnut Hill example. The Civic Ecology framework is intended to identify and transmit the community's DNA to future generations.

Taken together these benefits represent a value proposition that suburban communities will find appealing. These benefits will accrue not just to one sector of the community but to the public sector, businesses, and civil society.

How does a community begin the transformative process?

The Civic Ecology process requires communities to answer five fundamental questions:

- 1) Where are we now?
- 2) Where do we want to be in 5, 10, 20 and 50 years?
- 3) How do we get to where we want to be?
- 4) How do we know if we are getting there?
- 5) Who wants to help find out?

Answering these questions is done through a five-step **CIVIC** process that involves: Convening, Investigating, Visioning, Implementing and Charting Progress.

CIVIC ECOLOGY PROCESS Convening Investigating Visioning Implementing Charting progress

Convening The first step in the Civic Ecology journey toward resilience is to establish a local working group to lead the effort. Commitments on time, rules of engagement and training in systems thinking, The Natural Step and Civic Ecology facilitation are important elements of this step. The training is especially important because over time the community must learn how to facilitate itself and own the process. An outside team of consultants and others may assist the community in getting the venture off the ground, but it is the working group that will plant the resilience flag for others to follow. Convening must also include forming partnerships like a CPPP with representatives of larger scaled institutions such as county and municipal governments, regional governments if they exist, watershed organizations and others.

Investigating The next step is for the community to learn about itself with eyes it did not think it had. Peering below the surface to examine underlying flows will require citizen working groups to ask such questions as: Where does our energy come from now? Where does our waste go now? From where does our water come? Our food? How much of our money leaks outside the community? How resilient are these systems today? What are our shared core values?

Visioning With a knowledge of baseline conditions in hand the community, led by the working group and using a method known as "Backcasting", can begin to paint a picture of where it would like to be. Conscious of the trajectory it could follow (the result of forecasting) the community can begin to describe its desired future story. The goals formulated will draw upon shared core values to respond to resiliency gaps identified during the Investigation phase.

Implementing This phase begins with resource flow mapping, a tool designed to empower citizens to create the systems that will underpin the shared vision. This exercise enables citizens to design their future community in a way that does not require formal building or infrastructure design training. Instead, facilitated systems gaming empowers citizen designers to create a conceptual circuit diagram of how energy, nutrients, food, water, money and culture can flow toward and throughout the community. From these diagrams, citizens extract projects, some easy wins, others big, hairy and audacious. These projects are described with respect to shared community benefits provided, the champion and team who would like to own it, the barriers to implementation likely to be experienced and the community assets that could be brought to bear.



Projects that resulted from the workshops included:

- Connecting farmers and consumers with locally grown produce through a Community Supported Agriculture (CSA) initiative, community food cooperative, and public farmers market

- A community composting and materials recovery facility

- A community center to serve as Damascus's social hub to improve networks.



Damascus's "Fresh and Local Market" opened in the Summer of 2012.

A prioritization exercise follows this and after much integration and horse trading, what emerges are a series of priority projects for which business plans and funding strategies are created. An example from recent Civic Ecology project illustrates this critical phase.

The Damascus, Oregon Community Ecology Initiative

Damascus citizens embarked on a series of workshops to design their future systems of resilience. The community has been politically polarized for a decade over the need to plan for growth. A community of 5,000, the 10,000 acre Damascus area was brought into the Portland Metro urban growth boundary, requiring the community to produce a comprehensive plan for growth. Planning for new hardware had the community factionalized. Civic Ecology, or "community ecology", as it was termed by citizens, was seen as a way to focus positive collaboration on issues central to resilience in the hopes that it could inform the physical planning process.

Building on their core values, citizens convened to create five sets of community resource flow maps. Tables featured citizens who had often been at odds through the years about hardware planning. Included were citizens, local business owners, representatives from area churches, students, local and regional government staff, farmers, community activists, and non-profit volunteers. Many have said that the Civic Ecology process helped to heal fractured politics and empowered citizens to come together to plan for the next generation. Teams identified a number of projects, and over the course of four workshops identified project teams, leaders, shared community benefits, barriers to success, community assets that could be brought to bear to overcome these hurdles, potential partners and implementation plans.

The community has re-purposed an existing non-profit to serve as the implementation institution for the community ecology projects. This Civic-Public-Private Partnership has elected a board and been awarded grant funds to help launch and support its projects. As a result the community has been able to initiate a weekly farmer's market and is now pursuing through a partnership with the City a site for a new community center to house many of the programs planned for the future.

Charting progress The final and never-ending task is to devise a means to measure progress, monitor results and adjust projects for optimal results. It is important that metrics and methods be created that citizens can manage, in partnership with potential public and private sector activities.

Conclusion

This paper proposed Civic Ecology as a framework for designing the next generation suburban landscape. The Civic Ecology process places citizens in the forefront of this endeavor, speculating that climate change and the need for resilience could be this era's great challenge. The intended outcome is a web of locally-based resource flows and interactions that catalyze a new public works program or nature-works that will inform physical redevelopment, densification and enhanced mobility.

This work will require new tools and institutions to be successful. The central institution is the Civic-Public-Private Partnership (CPPP). This mouthful is intended to be an example of Putnam's "bridging social capital", an outward oriented enterprise led by civil society but linked to local and regional government and the private sector. In our work we have seen community-focused working groups grow into CPPP's once the strength of the mission and seriousness of the effort become apparent.

Community resource flow mapping is a tool developed by SERA Architects in Portland, Oregon to facilitate citizen-led systems design. We have engaged citizens of all ages in developing their community's soft system pattern language. The flow maps have proven to be compelling documents and SERA is currently exploring how to incorporate digital applications into the flow mapping exercise to make the process more interactive for those unable to participate live. We speculate on using refined versions as public policy tools on par in their legal standing with a comprehensive plan or a zoning code. Imagine a community resource flow map that drives community software investment decisions much as building codes and zoning ordinances do for hardware. In a citizenempowered era, a resource flow map should be highly interactive, and we envision suburban communities with a live version in their town halls and on their websites. It could be both a policy and a teaching tool.

We speculate further on how to energize the nature-works infrastructure model. Perhaps an EcoDistrict policy overlay within a zoning ordinance could provide incentives for nature-works investment and the metrics against which to measure progress. Civic Ecology workshops have yielded implementation strategies that employ a rich kit of tools and policy permutations including community-based co-operatives, Real Estate Investment Trusts (REIT's), land trusts and others. As Civic Ecology is deployed in suburban communities, these and other tools will be developed in response to problems on the ground.

Our biggest concern however is civic engagement. Will the combined stresses of climate change, economic hardship, political instability and resource depletion be enough of a generational challenge to stimulate enduring engagement? How many climate-induced tragedies will it take to stimulate citizen action? Workshops in many communities reveal a distrust of both the public and private sector to effectively address today's challenges. For many climate change feels like a problem to get to after we solve unemployment, the housing crisis, health care, fossil fuel dependence and so on. But perhaps Civic Ecology could provide a way to discuss these issues and build enough social capital to achieve some modest low-hanging fruit victories. Perhaps it could teach us how to solve shared problems in the public realm so when we are finally challenged to address larger issues, we know what to do.

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