

Questioning the Stand-Alone Building

Ellen Dunham-Jones

Assistant Professor of Architecture, MIT

The profession of architecture has defined "the dimensions of sustainability" from a variety of perspectives. In the 1970's solar cabins in the woods were associated with the counter-culture and alternative lifestyles. In the nineties, parallel but uncoordinated, efforts at sustainability have developed between approaches more aligned with urban design or with engineering. In the former, dimensionality is associated with the kind of broadening of perspective brought on by a systemic environmental approach. Architecture's sustainability is judged in relation to its role in urban and regional systems. The latter approach works at the scale of the individual building and its precisely detailed components designed to minimize energy use or maximize energy-production. In this case, the dimensions of interest are the quantifiable measures of the building's self-sufficiency. Ideal performance is represented by the "stand-alone" building. Able to produce its own power and recycle its own waste, the stand-alone building seemingly does not contribute to environmental degradation. However, the engineered ideal of a self-sufficient building is too often at odds with the urban design ideal of a self-sufficient town or region. As a step towards allowing these two approaches to better complement each other and without demeaning the stand-alone building's obvious benefits, I want to point out its limitations from a social and urban design perspective.

The **engineering-oriented** fascination with performance **criteria** serve a useful purpose in convincing clients of the economic value of energy-conserving measures. Daylighting can be correlated to employee productivity. Natural ventilation can be indexed to employee health. Operating costs can be compared to construction costs for various energy-reducing or energy-producing systems. Outside of governmental regulation, such calculations are perhaps the most effective means of advancing the collective cause of sustainability because they reveal how environmentally-friendly measures serve the individual client's self-interest. However, the translation of collective benefits into individual benefits is far from direct when screened through cost analysis. While an ecologically based understanding of environment emphasizes inter-relationships and systemic networks, performance-based comparisons tend to examine each project as an isolated phenomena of calculated inputs and outputs. That which cannot easily be measured, or which is not an immediate cost to the client, tends to be left out of the equation. The energy costs associated with global warming, non-renewable resources, embodied energy, and transportation have a global impact but only an indirect affect on the performance of the building from a client's perspective, and as such are relatively absent from performance-oriented analyses. Instead, (and without a trace of irony,) **such analyses** present sustainability in terms of the single object.

This has been most emphatic in the glorification of the stand-alone building. Whether a low-impact eco-resort or a daylit manufacturing facility, stand-alone buildings have been presented to us as ideals of self-sufficiency. Able to produce as much, if not more, energy than they consume, their independence from utility companies allows them to locate wherever they like, to literally stand-alone. Unfortunately, this is also where the problem lies. Buildings that stand alone also stand apart - from the city, people, and transit.

Most of the contemporary buildings held up as models of self-sufficiency have to be driven to. Stand-alone buildings tend to locate in either exotic, remote sites and or on low-density exurban fringes where they can control access to sunlight, wind and soil. Unfortunately, such strategies tend to preclude urban infill sites and instead encourage sprawl and decentralization. While they may stand-alone from collective power and waste systems, they are very much engaged with transportation networks, exacerbating problems of impervious road surfacing, erosion, the delimiting and contamination of wild animal habitats, depletion of fossil fuels, and pollution from cars and trucks. Such transportation costs rarely figure into the client's costs or the performance criteria cited for stand-alone buildings. Less prominent, they nonetheless add significantly to the problems of unsustainability. In fact, due in large part to decentralized development's mandated use of the automobile, transportation accounts for approximately one third of all energy use in the U.S.¹

Hal Harvey, executive director of The Energy Foundation, argues that there are principally two ways to reduce transportation energy use.² The first is the technofix: improve the fuel efficiency of the car, play with alternative fuels, various Intelligent Highway Vehicle Systems, (IHVS) etc.. The technofix has made great strides since the oil crises of the **seventies**. Unfortunately however, the effect of the gains in efficiency and emissions control have been largely neutralized by the greater numbers of vehicles on the road and the accompanying growth in average vehicle miles traveled per year - now climbing at twice the rate of population growth.³ Christopher Flavin and Nicholas Lenssen of the Worldwatch Institute write;

¹ In addition, transportation is also responsible for nearly 30% of total U.S. carbon emissions. Cars and trucks alone consume 63% of all petroleum in the country. *The Energy Foundation, 1995*, (San Francisco, CA: The Energy Foundation, p. 24.)

²Hal Harvey, presentation to the Congress For The New Urbanism III, San Francisco CA, February 18, 1995.

³*The Energy Foundation, 1995, ibid.* Since 1990 alone, American driving is estimated to have increased 18%. *A Blueprint for ISTEA Reauthorization*, (Washington DC: Surface Transportation Policy Project, 1997, p.6.)

No matter how much less polluting automobiles become in the future, one thing is clear: they will not be a panacea for the world's transportation problems. Although the new technologies could greatly reduce many of the energy related problems caused by cars, they could exacerbate others, including the suburban sprawl, congestion, and destruction of neighborhoods that is rampant in so many parts of the world. This suggests that the redesign of the automobile must be accompanied by efforts to spur an array of new transportation options and to change regional development patterns so as to reduce the need for travel and create more livable communities.⁴

Flavin and Lenssen suggest that in addition to the technofix, we need an urban design fix.

I would argue that the same applies to architecture. The stand-alone building is a technofix. Like electric vehicle or IHVS systems, it relies on technical solutions, passive or active, mostly to do with making a more energy efficient building envelope. However, without more attention to an urban design fix, the worthwhile gains are likely to be offset by inefficient lower density land-use patterns.

One need only look at the tremendous growth in sprawl and land consumption since the 1970s to appreciate the environmental dangers of making it technologically easier for people to move further away from city centers and their services.⁵ Christopher Leinberger, a noted real estate analyst points out that between 1970 and 1990, Chicago's population grew 4% while its size grew 45%. This is due to the growth in the exurban rings that now extend some sixty miles beyond the downtown. Los Angeles is even more extreme. In the same time period its population grew 45% while its size grew 300%!⁶ At least five and a half square miles of rural land are converted each day in the U.S. to urban, suburban, or other uses.⁷ Not surprisingly, the spreading of the low-density landscape has been accompanied by a doubling of the vehicle miles traveled per capita in the U.S. since 1960.⁸ The distance between buildings makes them extremely difficult to serve efficiently with public transit, such that commuting by private car is all but required by decentralized development.

⁴Production of automobiles has gone from roughly 50 million worldwide in 1950 to approx. 600 million in 1994. Christopher Flavin, and Nicholas Lenssen, *Power Surge, Guide to the Coming Energy Revolution*, Worldwatch Environmental Alert Series, (W.W. Norton & Company, NY, 1994) p. 198.

⁵Advanced telecommunications have allowed the back offices of the service economy to migrate out of downtown locations, fueling exurban sprawl. See, Ellen Dunham-Jones, "Temporary Contracts; The Economy of the Post-Industrial Landscape", *Harvard Design Magazine*, Fall 1997.

⁶ Christopher B. Leinberger, presentation to the Congress For The New Urbanism III, San Francisco, CA, February 18, 1995.

⁷V. Gail Easley, "Staying Inside the Lines: Urban Growth Boundaries", *Planning Advisory Service Report no. 440*, American Planning Association, Chicago, 1992.

⁸Interpolated from figure 4, a graph presented by Hal Harvey in "Essay From the Executive Director", *The Energy Foundation, 1994*, (San Francisco, CA: The Energy Foundation, p. 4.)

Even telecommuting, a dream solution raised by those looking for more technofixes, still promotes further decentralization and sprawl. By allowing the place of work to be detached from proximity to other people and uses, telecommuting cuts down on work trips, but not the, now lengthened, non-work trips.⁹ Despite significant advances in various forms of telecommunications and modest increases in the number of "electronic cottages" operating from remote mountain tops or beachfronts, car use has only increased. From 1970 to 1990, the percentage of U.S. households with three or more cars jumped from 7% to 18%.¹⁰

Concern over the environmental consequences of sprawl and the increased reliance on private automobiles has prompted a number of architects to develop sustainable urban design strategies. The environmental virtues of compact, transit-oriented, mixed-use and mixed-income developments - whether in the form of urban infill, suburban retrofit, or greenfield projects - have recently been extolled by a variety of professionals interested in reducing and slowing car trips, promoting communal engagement through pedestrian public places, protecting regional habitats and generally resisting sprawl.¹¹ Sadly, the profession of architecture is currently sharply - but unnecessarily - divided between these environmentalist efforts by "new urbanists" to join regional and master-planning and the environmentalist work of "high-tech" architects manipulating the forms of individual buildings so as to exploit wind and solar power, natural ventilation, daylighting, etc.. To date, there has been **far too** little conversation between the neo-traditional architecture and urbanism of the former group, (with the resistance many of its members have to modernist styles) and the high-tech object-focused work of the latter (and their **general** disdain for traditional **architectural styles and urban patterns**.) Unfortunately, though interest in energy efficient building envelopes and energy efficient urban design are hardly mutually exclusive, stylistic differences have clouded the contributions each could make to the other. This professional gap has to be closed before architects can seriously employ the full range of tactics necessary to significantly advance us towards a more sustainable environment. **Happily, the gap is**

⁹This issue is further complicated by comparing trip lengths. Telecommuting from home enables greater sprawl. However, telecommuting centers outside the home can re-introduce a centralizing focus to development and reduce commute distances. Small neighborhood telecommuting centers in Chula Vista, California double as classrooms at night, and are estimated to save 5000 miles of driving each month. See Environmental Protection Agency, brochure EPA 230-F-96-003, *Smart Moves*, August 1996.

¹⁰Surface Transportation Policy Project, *ibid.* Thomas C. Palmer Jr. reported in *The Boston Globe* that nationally, the number of homes with three-car garages has grown steadily from 11 % of new single-family homes in 1992 - the first year multiple garages were tabulated by the US Census Bureau - to 13 % in 1994. "Tripling the Premium on Parking Spaces", March 20, 1995, p.13-17.

¹¹These proposals have coalesced within an interdisciplinary movement called new urbanism. For a discussion of the environmental agenda within new urbanism see Doug Kelbaugh, *Common Place, Toward Neighborhood and Regional Design*(Seattle: University of Washington Press, 1997), and Peter Calthorpe, *The Next American Metropolis , Ecology, Community and the American Dream* (New York: Princeton Architectural Press, 1993)

unnecessary and I, for one, am optimistic that the power of the concept of sustainability will invoke greater architectural integration of innovative engineering with more compact planning strategies.

It will also be necessary for architects to consider the social dimensions of sustainability. The withdrawal of stand-alone buildings from public spaces and services into private domains has unintentional overtones of survivalists or militias who forsake participatory democracy for self-sufficiency and controlled enclaves. Robert Reich, former Secretary of Labor under President Clinton has described the increasing secession of the wealthy from the poor into gated communities and fortified enclaves in similar terms.¹² Both groups abandon communal responsibilities to anyone but themselves. Aided and abetted by new technologies and decentralized development, this social and spatial segregation is on the rise and mirrors the widening income gap between rich and poor.¹³ The immobile urban poor are distanced from the new jobs on the exurban, privatized periphery and left to fend for themselves in a city with degraded public services and infrastructure. This is in contrast to traditional urban structures where self-sufficiency outside of the city was understood as a **deprived condition relative to the superior services offered by the city**. Its infrastructure for defense, water supply, power, etc., provided cities with monumental walls, bridges, wells, and dams that defined the city as a collective enterprise dedicated to providing the good life for its citizens. Today, "public" is often associated with "shabby" and second-rate. Instead of living well together, contemporary development patterns reveal the degree to which communal ties are increasingly frayed. The city as a place of shared destiny and inter-relationships has been increasingly replaced by individual self-sufficiency. Stand-alone buildings contribute to this formation of removed, individualistic, privatized domains. Something of a contradiction in terms, they make sustainability exclusive.

¹²Robert Reich, *The Work of Nations, Preparing Ourselves for 21st - Century Capitalism*, (New York, Random House, Vintage Books, 1992)

¹³The Human Development Report of the United Nations Development Programme cites a dramatic enlargement of global income differences in the past three decades. In 1960 the wealthiest 20 percent of the world population had more than thirty times the income of the poorest 20 percent. In 1989 that figure had grown to more than sixty times, such that the richest 20 percent of the population held 82.7 percent of global income. This comparison relates to the distribution between rich and poor countries. If one also looks at the income disparities within countries, the richest 20 percent of the world population have at least 150 times the income of the poorest 20 percent. Ingomar Hauchler and Paul M. Kennedy eds., *Global Trends, The World Almanac of Development and Peace* (New York: Continuum, 1994, p.54) Within the United States, Reich writes, "For most of the nation's history, poorer towns and regions steadily gained ground on wealthier areas, as American industry spread to Southern and Western states in search of cheap labor. This trend ended sometime in the 1970s, as American industry moved on to Mexico, Southeast Asia, and other places around the world... American cities and counties with the lowest per-person incomes in 1979 had dropped even further below the nation's average by the late 1980s; cities and counties with the highest incomes headed in the opposite direction." *ibid.* p.272

It is because I have such tremendous respect for the work involved with self-sufficiency that I offer these criticisms. I greatly admire designs which have proved themselves capable of standing alone, working within the limits of available conditions such that they neither pollute nor consume natural resources. My hopes for such a model compel me to want to further coordinate the work done at this scale with that being done at the larger urban and regional scale. Even if we can produce buildings that are internally energy efficient, given population predictions for 2050 of half again as many people in the U.S. and double the worldwide population, we simply cannot afford more sprawl.¹⁴ Nor can we afford to continue to socially and economically segregate our society. By better integrating building and urban design, the profession of architecture can truly contribute to a society that is sustainable economically, socially, and environmentally.

¹⁴Hauchler and Kennedy, *ibid.*, page 111. **Note that the footnote for Hannah Arendt was eliminated as unnecessary.**

Illustrations

1. Opposite the title I propose using a image my husband photographed of a parking garage in a typical sprawl environment. Unfortunately, I don't have an 8'x 10' of it, only a 20"x 24". It know its large and inconvenient for sending to the publisher. Phil should be going into the dark room later this week and can print a smaller version, but if you need it right away all I have is the big one, and I need to pick it up from the offices of the Harvard Design Magazine. It's ready to be picked up, but I can't get it today being Sunday. I can bring it in on Tuesday. The title is simply Fairfax, Virginia, 1997. The photo credit goes to Phillip Jones. Though he shot it for me as simply a documentary type photo, the curator of the Boston Center for the Arts loved it's surreal emptiness so much she selected it to be included in an exhibition there recently. It should make quite a good powerful intro image.

2. Unfortunately I again don't have the image in hand because I loaned my copy of the Phaidon monograph on Grimshaw's Seville Expo Pavilion to a student. I wanted to include his sketch of the section where he indicates the different temperatures and the treatments of the skins. If anyone else is also using illustrations of Grimshaw I could use something else. I just thought it would be good to have a sketch showing what I'm referring to as the engineering perspective. The caption should read: Title: Nicholas Grimshaw & Partners, British Pavilion, Seville Exposition 1992, developmental sketch. Text: Grimshaw's manipulation of the different skins of his pavilion in relation to solar conditions so as to cool internal temperature's exemplifies the internal focus of innovative engineering in contemporary building design.

3. I thought 2. and 3. could be paired opposite each other. Title: Peter Calthorpe/Doug Kelbaugh Team Proposal for a Pedestrian Pocket in the Green River Valley, outside Seattle, *The Pedestrian Pocket Book*, (New York, NY: Princeton Architectural Press, 1989, p. x.) Text: An early example of new urbanism, the pedestrian pocket concept organizes mixed uses and mixed incomes around light rail stations in compact, pedestrian-oriented developments.

4. and 5. These are strictly optional - really only to be used if you think you need more illustrations to graphically balance out the text. They are my own work. Each of them could be further broken up into more than one image.

4. Title: Park/Park, Dunham-Jones and LeBlanc Architects with Reiter and Reiter Architects Competition Entry, Public Space in the New American City, Atlanta, GA, 1994. Text: Combining engineering and urban design concerns, this retrofit of the parking lot for the Georgia Dome gathers run-off water, filters it and uses it to irrigate a proposed park alongside the parking lot as well as ivy-covered trellises intended to provide surface cooling of the lot.

5. Title: Redesigned Mass Pike Tollbooths, Boston, MA. Ellen Dunham-Jones Architect, 1994. Text: By only allowing electric vehicles into the city, and re-directing fossil-fuel burning vehicles to a proposed parking garage connected to a subway stop, these redesigned tollbooths integrate the techno-fix into an urban design fix. Outfitted with massive solar collectors, the facility also serves as an electric vehicle battery recharging station while delivering surplus energy to the local utility.