

zHome: Catalyzing Ultra-Sustainable Buildings for the 21st Century

The Problem

The City of Issaquah, which places a very high priority on sustainability, has numerous challenging environmental policies, including an 80% reduction in CO2 emissions by 2050.

These policies are often viewed with incredulity and skepticism, and shelved along with other “ivory tower” policy documents. Particularly in the areas of climate change, ocean acidification and energy dependence, the problems appear to defy solutions. There is also a tendency to defer to federal or state authorities on such challenges. However, these issues represent substantial risks to local citizens, and can be ignored at the City’s peril.

Buildings, in many cases, have the largest share of net environmental impact. For example, 40% of all CO2 emissions in the U.S. come from building operations. Issaquah grew by more than 1,000 homes a year (construction, not annexation), and had the second most residential building permits of any city statewide (right behind Seattle) for several years during the past decade. This growth is anticipated to continue as the economy restarts. Given buildings’ impact and the City’s growth, placing a major focus on reducing the environmental footprint of new homes makes sense.

In response, the City has operated a sustainable building program since the early 2000s, including free technical education; permit expediting for green-certified projects; code flexibility; LEED certification of its own new construction; and participation in a green demonstration house (2004). While this program has been highly successful, resulting in about a dozen LEED-certified buildings and 2,000 Built Green-certified homes, these homes and buildings only moved incrementally toward achieving the City’s policies. For example, they typically achieve carbon reduction of about 15-20% - excellent, but not far enough.

The Solution

Over the last decade in Europe, deeply sustainable new demonstration buildings that incorporate advanced technologies are catalyzing a wave of development there that has a significantly lower ecological footprint. The City concluded that similar, market-rate development locally and regionally could have a similar impact. The result is zHome, the first net-zero, carbon neutral, multi-family community in the United States. Featuring 10 townhomes, zHome represents an opportunity for individuals to live in a compact, transit-oriented community with the smallest possible environmental footprint, by achieving the following benchmarks:

- Zero net energy usage/carbon neutrality
- 70 percent reduction in water usage
- 15 materials sourced within 500 miles
- 78 percent FSC certified wood
- 100 percent low VOC/ low toxic finishes
- Stormwater infiltrated on site
- 92 percent reduction in construction and demolition waste



zHome at completion

Building costs per square foot increased by less than 20%, while homeowner operating costs were radically reduced. zHome is now completed, sold out and fully occupied. Initial results are showing that zHome is performing as anticipated.

To fully catalyze the marketplace, a number of key audiences were identified, including developers, policymakers, design professionals, homebuyers and the general public. Thus a broad educational and market transformation program accompanied the actual development, educating about zHome and green building in general. This included:

- Onsite tours to 10,000 visitors after project completion in Fall 2011

- 125 classes/events for various industry and government audiences (4,000+ attendees)
- An extensive website (z-home.org)
- Extensive regional and national media outreach
- An onsite Sustainability Education Center, located in one of the zHome townhomes

Implementation

zHome began in 2006. The City started by assembling a public/private partnership, including regional government (King County), a private utility (Puget Sound Energy), a green building program (Built Green), an academic partner (WSU Energy Program) and an industry partner (Port Blakely Communities). These partners provided credibility; technical and implementation support; and marketing opportunities. This broad involvement also allowed zHome to impact the policies and understanding about sustainable building by each partner internally.

The construction budget for zHome was about \$5 million, and the market transformation program and project management was an additional \$500,000. The City used a highly innovative set of agreements to keep the City's direct costs minimal. First, the City negotiated with one of the partners, Port Blakely Communities, to obtain the zHome land at no cost (Port Blakely is master developer of Issaquah Highlands, a large master planned community within the City, and sought revisions to its development agreement, which were costly for them but of insignificant public benefit). The City then issued an RFQ to select a zHome developer, offering the land at no cost as a major incentive, but also contractually obligating the developer to build the project according to a set of stringent environmental benchmarks, pay all City management costs and provide one unit for the Sustainability Education Center. Other substantial marketing costs (website, branding, media relations, etc.) were covered by the City's larger partners. This

allowed each sector to play their appropriate roles (public – education, technological innovation and market transformation to achieve policies; private – development and sale of the product).

One very challenging aspect of the project was the economic downturn. zHome had three builder partners – the first two went out of business (not due to zHome, but other projects). The second largest homebuilder in Japan, Ichijo, which recently entered the U.S. market, was attracted through Built Green contacts and ultimately financed and developed the project. This transnational partnership brings a unique technological and policy perspective to zHome.

Tangible results

Even though zHome was recently completed, its impacts are already being felt:

- Built Green is establishing a new top certification level based on zHome.
- Ichijo USA, the zHome developer, has four new communities underway regionally, all of which will reduce carbon emissions by at least half of that required by code. This will have spin-off market impacts as the rest of the building sector responds to compete.
- Next generation buildings in region: the City's latest building, Fire Station 72; the Bullitt Center; and the Seattle Center House of the Future are taking many of zHome's concepts and evolving/innovating them even further. All include education programs informed by zHome.
- 10,000 site visitors and 4,000 industry professionals received in-depth education about zHome and things they can do in their own projects and homes.
- An average of 125 in-depth web visits daily to zHome site (z-home.org).
- Very positive local, regional and national media coverage by The New York Times, The Wall Street Journal, NPR, front page of The Seattle Times (twice), Dwell, many national trade journals, local TV and an ongoing column about green home retrofits in the local newspaper (The Issaquah Press). This expanded zHome's reach to much larger audiences.

- zHome identified building technologies that any developer or government agency can use. Approximately 85% of the technology is transferable and available in the market. The rigorous benchmarks are available online as an example for other projects nationwide.
- Finally, this project created a model for collaborative processes that can be implemented by organizations and government agencies undertaking similar demonstrations in their region.

Lessons learned

- A core reason for zHome's success was that specifics of the goal were established and agreed upon early on between the partners. This clear articulation made it easier to attract later partners such as Ichijo, as the end product was clear. This also enabled a more entrepreneurial approach in project execution.
- However, even compared to the technical and economic challenges zHome confronted, managing the partner team was more difficult. zHome's organic and opportunistic evolution at times collided with the partners' differing views of roles, priorities and process. While a partner agreement was created partway through the project, a more deliberate understanding at higher management levels initially, and on an ongoing basis, between the partners would have been beneficial. However, the benefits of the partnership hugely outweighed these difficulties.
- Projects such as zHome are complex, long term and take unanticipated turns. A long City Council review process (nine committee meetings) of the initial contracts ultimately paid off in ongoing community project support through difficult periods.