zHome

Blog Highlights

Contents

Our future...

September 19th, 2008

It takes my breath away a little to be writing this inaugural blog post. It was two and a half years ago that a small group of us, representing different organizations and perspectives, under the leadership of the City of Issaquah, got together to pursue building an out-of-the-box housing development that drove to the heart of environmental problems. We wanted to build something revolutionary – something that would inspire the average person with a vision for how mainstream housing could be radically – not incrementally – greener, yet be market rate, and a cool place to live. A project with audacious goals like true zero net energy/zero net carbon emissions. I think zHome has achieved that vision, and can't wait to share with you all its construction and evolution. Over the coming year, the site will grow, and we will be sharing as we learn via the blog and the Dig Deeper sections of the site. Sign up for email updates if you would like to know when the site is updated, or for upcoming events and classes.

If this project has taught me anything, it is that turning something this visionary into reality takes an incredible amount of work by a number of folks. Many, many people have touched and affected zHome already, including our Mayor and City Council, our friends at Howland Homes, our terrific partners, and our great design team. While the vision of zHome has captured people's imaginations and helped propel it forward, it definitely didn't happen by accident. Thank you to everyone who has brought it to this point!

This is a picture of a young friend of mine playing in a pea patch. Ultimately, zHome is about the future – showing that there are real, hopeful solutions to our significant environmental problems. There's a lot of handwringing going on about how to address climate change, salmon habitat, deforestation, environmental health – the list goes on. Housing is a big part of our environmental footprint – and zHome provides a way forward into the future.

Brad Liljequist – zHome Project Manager, City of Issaquah

zHomepeople: Built Green Executive Director Aaron Adelstein

November 2nd, 2008

When I walked into Aaron's office today to work on a grant application to the Department of Ecology, I noticed a framed chart showing his personality type – RED. I wasn't sure if this was a warning, or simply informational, but it is right on. (If I remember right, red means assertive, Promethean, volatile, and generative).

Aaron is the Executive Director of Built Green. He was part of the core group that came together in early 2006 to shape and launch the project (that initial group included David Fujimoto and I from the City of Issaquah, Aaron and Koben Calhoun from Built Green, and Patti Southard and Katie Spataro from King County). From the start Aaron has been filled with a passion for what the project can be and mean in advancing ultra sustainable housing, but at the same time his passion is balanced with pragmatism and realism. He is quick on his feet, and is a very direct communicator (a couple of days ago, after Aaron shared some thoughts with Doug Howland, I asked Doug if those thoughts were consistent with what I had said, and Doug said yes, except that I had taken five minutes longer to say the same thing).

When he is not helping us move our project along, Aaron is focused on running the Built Green program. Built Green of King/Snohomish Counties is one of the largest and most successful green building programs in the country. Aaron manages the Executive Committee, certifies thousands of units a year, runs a major regional conference, and acts as one of the leading spokespeople for green building in the region. He manages this with a steadiness and verve that are the envy of many. We are lucky to have Aaron as part of our core team moving this project forward.

zHomepeople: Issaquah Mayor Ava Frisinger

November 3rd, 2008

I am quickly finding I really enjoy doing these zHomepeople posts, because I learn a lot about people that I've been working with for a long time. Such is the case with this post.

Mayor Ava Frisinger has a long standing commitment and orientation to the environment, in her words "the relationship of people and ecology". She was raised in rural Michigan, where the local farming community, and its rootedness to the Earth, helped form her thinking about human/environmental connections. The Michigan wildlands – seen via canoe, hikes, and birding outings – also formed an early environmental ethic. A major in English literature and an equal emphasis on biological sciences reflected these connections, and served to articulate and strengthen them.

In 1967, Mayor Frisinger moved to Issaquah. The City then had 4,000 residents, compared to the current 27,000. The Mayor found Washington "unspoiled", and felt even then a strong commitment to protecting that heritage. In 1982, she was appointed to the Planning Commission, and sat on the City Council from 1986 to 1994, and also in 1996 and 1997. In 1998, she was elected Mayor, a role she has served in to this day.

Mayor Frisinger is known regionally as an innovator in sustainability and the environment. She was an early advocate of the Issaquah Highlands and Talus urban villages, which were a new regional paradigm for contained, livable, walkable communities as an alternative to suburban sprawl. Work with the Planning Accreditation Board and the Global Action Plan Eco Team program in the mid 90s gave her an exposure to sustainability that resonated with her already established values. A sustainability symposium in Canada further heightened her interest, leading to establishment of the City's Resource Conservation Office.

zHome is lucky to count the Mayor as one of its strong supporters. She has made the project a high priority, and has helped move it forward during its long and winding path. But it will be just one part of the larger legacy she will leave the City.

Final touches on the rainwater system design

November 9th, 2008

Rainwater system team in action!

Last week we brought parts of the design and permitting teams together to work through the final details of the rainwater catchment system. It is one of the very last details to be resolved prior to approval of the building permits. I thought the discussion was an interesting example of process and evolution in the design process. Participating were Dennis Rominger, Howland Homes project manager; Mark Weirenga, project architect from David Vandervort Architects; John Minato, City of Issaquah Building Official; Sylvia des Rochers, City of Issaquah plans examiner; Doug Schlepp, City review engineer; Mark Buehrer, system design engineer with 2020 Engineering; and myself.

The design team proposed a very simple, elegant system for rainwater recycling. Water from the roofs flows into a gutter and downspout and then directly into a cistern (one for each home). Rainwater is then pumped into the homes, where it is placed in a pressure tank, where it then is used in toilets and clotheswashers (I am skipping over many details which will be covered in a later post). In the event that the tanks run dry (unlikely, but possible during a very dry summer) they could be manually refilled by the residents with a hose.

The permit review team's comments focused mainly on health and maximizing water conservation. To maximize the safety of the system, the design team proposed plumbing the potable and rainwater systems completely separately, so that non-potable water would not be cross contaminated with non-potable water. But to be completely belt and suspenders in terms of safety, the permit team suggested a number of additional measures. First was a backflow prevention device on each unit's individual water line, so that in the unlikely event that someone at a future date replumbed the homes and mistakenly connected the potable and non-potable systems, that contamination could never enter into the public system. Second, routing of the lines will be done carefully so that potable and non-potable lines are not adjacent. Furthermore, non-potable lines will be clearly labelled at frequent intervals that it is non-potable water.

A lot of attention was given to the refill process for the cistern. The permitting team was concerned that during drought refill, that the hose might be tossed into the cistern, and that however unlikely, a backflow might occur, pulling non-potable water from the cistern into the hose and into the potable system (of course, a very rare occurance). There was also concern that residents might leave the hose running longer than necessary and fill the entire cistern with potable water, rather than a small amount needed to tie the resident over to the next rainfall. Initially the permitting team suggested an automated refill system that would add potable water into the system when it ran low. An air gap would be provided on the refill, to ensure non-potable water couldn't be syphoned into the potable system.

However, the design team didn't like the potential of that system breaking down, and also didn't like the hands off feeling of the automated system – they wanted the residents to be in touch with their system, at least to some degree. So both teams synergistically developed a new idea – a timed manual refill from within the homes, plumbed with an air gap into the downspout system. Physically, it will be impossible for non potable water to be syphoned into the potable system. And the timer will ensure that refilling is limited to that needed for a couple of laundry loads. It is nearly a simple as the original design, keeps the residents connected to their water supply, is more convenient, and addresses some potential health risks (albeit, very low likelihood ones).

Habitat for Humanity – zHome shares its knowledge

November 13th, 2008

Habitat for Humanity design charrette goes on the road and visits the site

Today I was at a design charrette (an interactive design collaboration with all key stakeholders) for the Eastside affiliate for Habitat for Humanity. The charrette was led by Vicki Colgin, Department of Ecology green building lead. Habitat is building a 10 unit duplex project in the Issaquah Highlands, making it zHome's cousin! It was exciting to hear about the project and start sharing some of the things we've learned with zHome. We are looking forward to continuing to work with Habitat and others to spread the zHome gospel!

Thoughts on innovation, the Model T, and zHome

November 19th, 2008

Think about just about any industry – telecommunications, computers, aerospace, heck, even automotive – and the list of innovation and progress over the last 100 years is long. Think about where all those industries were 100 years ago – the state of the art for those industries were:

- crank telephones through a community switchboard
- mechanical adding machine
- the very earliest airplanes (Wright Bros. flight was in 1903)
- Ford Model T (prototype 1908)

How many of those pieces of technology are actually in use today, without massive improvements?

Then consider housing. The history of innovation in housing over the last century and a half is short, and a lot of it happened a LONG time ago:

- 1833 Stick framing invented
- 1920s Beginnings of widespread home electrification
- 1930s Forced air furnaces introduced
- 1940s Basic insulation mandated by code
- 1970s Double paned windows become standard

The house we live in was built in 1925. Its tiny garage is sized to fit a Model T (or, a Smart Car!). When I look at our house and compare it to a new one, it's not all that different – the rooms are smaller, there was no insulation in the walls until five years ago, at some point along the way the coal burning stove was replaced with forced air, and it has single paned windows. But really, that's it.

I don't think that an "innovation is a priori good" stance is a reasonable, don't get me wrong. Thinking about Christopher Alexander's A Timeless Way of Building, I think there's a strong case to be made that the materials and methods that stand the test of time are a good way to go. Heck, even in zHome we are making the case – particularly in the world of materials – where we are even harkening back thousands of years and finishing some walls in clay.

For me the core issue is that we think about what we're doing. To me the home is the lowest hanging fruit of potential environmental innovation. Homes are so core to who we are, and their share of our environmental footprint is so big, that a concerted reevaluation of what home is seems in order. Through that process, I think we're likely to find that some of the answers lie far in the past, and others in the untapped future.

zHomepeople: Mark Weirenga, Project Architect, David Vandervort Architects

November 25th, 2008

Mark Weirenga, Project Architect for David Vandervort Architects

Mark is our project architect with David Vandervort Architects. Mark exudes a sense of solidity and craft, so it came as no surprise when I learned a while ago that he used to be a finish carpenter.

Mark grew up here in the Northwest, in Kirkland. He attended WSU for architectural training. It was working as a carpenter that he learned how buildings are put together, how all the trades are involved, and about the pressures builders are under – "crucial", as he puts it, to pulling a design into the real world.

Working with David Vandervort since 1995, Mark is part of a firm that has designed many beautiful homes and buildings that are a tribute to the Northwest contemporary school and other styles. To see one of my all-time favorite web sites, please see www.vandervort.com. Mark cites as personal inspirations the architects Bernard Maybeck, Charles Mackintosh, and Alvar Aalto, who, as he puts it, have a sense of history while being willing to push the envelope.

First Church of Christ, Scientist, Berkeley, CA - Bernard Mayback, architect

Here is Mark talking about the project in his own words:

Mark Weirenga talks about zHome

December 2008

zHome inspiration: The Sensible House

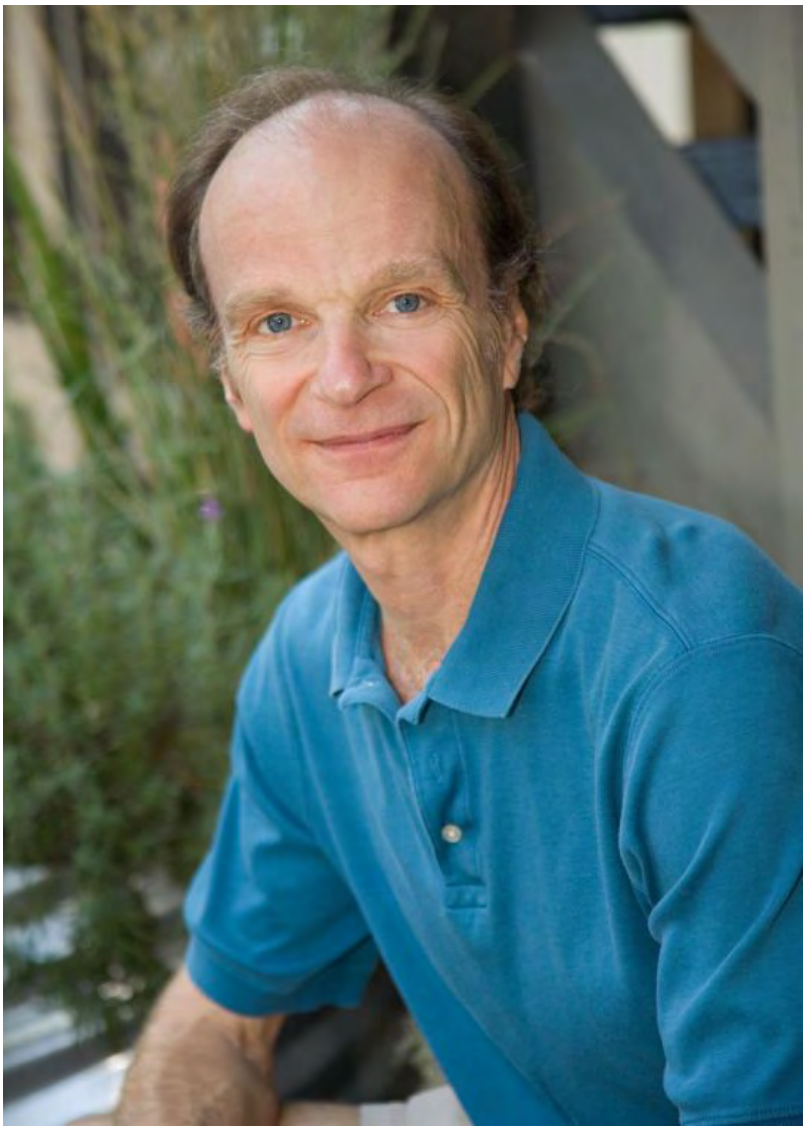
December 18th, 2008

Sensible House

I have come to believe that innovation rarely occurs in a vacuum, with a mad scientist coming up with something that noone else could see or envision. Even with radical jumps in design, there are prototypes, predecessors, and context. We all stand on each others' shoulders – there are very few if any islands out there.

And so it is with zHome. In particular, there are several of specific zero energy or close to zero energy projects that inspired it – specifically, the Sensible House in Seattle, and BedZED and Hockerton in England. I want to highlight each of these projects, and this will be the

first of several posts on this subject.



Jon Alexander, Builder, Sensible House

The Sensible House was built by a friend and mentor of mine, Jon Alexander of Sunshine Construction. Jon is one of the very earliest builders in Seattle to get involved with green building, and is truly a pioneer. He began thinking about and applying principles in the 1980's. He is also one of the founding members of the Northwest Eco-Building Guild.

The Sensible House was built as a personal residence for Bob Scheulen and Kim Wells, who were directly involved in its design and construction. Bob himself has had a long time interest in green building, and maintains a dedicated to the house and how it works.

I first visited the Sensible House just as it was finishing construction about five years ago. It remains in my mind as one of the greenest, if not the greenest single family home in the Seattle area. It includes double wall construction, a structural insulated panel roof, very cool triple paned windows from cold Alberta, as well as a hybrid water based heating system with solar hot water pre-heating. According to a presentation that Bob gave a couple of years ago, the house isn't quite achieving zero net energy – but it is darn close, within 15% of zero or so. Lots of neat green materials are included throughout the house as well. The web site is a great technical resource, and Bob has added additional information about the home over time.

I was in awe of the house when I first visited it, and continue to be – it is a very early pioneer locally of ultra-sustainable housing. It is safe to say that the Sensible House is a direct inspiration and parent to zHome. I want to recognize and honor Jon, Bob, and Kim for their trailblazing in green, low carbon building – without you and other projects such as BedZED, zHome would have been much more difficult to envision and design.

zHome inspiration: BedZED

January 19th, 2009

BedZED – solar atrium elevation

BedZed sits like an island in the south London suburb of Beddington (BedZED stands for Beddington Zero Energy Development). The day I visited it, I did the long walk from the local train station, along a fairly busy, not very attractive arterial. Suddenly, there it was – a sort of Earthbound naturalistic UFO set amidst the dreary backdrop of run of the mill flats and commercial buildings.

BedZED is mixed housing/office development, with about 100 townhome units and about 13,000 square feet of offices. But that benign, run of the mill description doesn't really give you any sense of it. My visit to BedZED is perhaps the single most hopeful day in my life, environmentally speaking (except for my visit to Hockerton – more on that later). BedZED is one of a handful of buildings planet-wide that has what is at least close to a truly sustainable footprint. Like zHome, BedZED established a number of environmental benchmarks, shown below, along with how well they've actually performed (the community was completed in 2002). What BedZED shows us is that radically more sustainable buildings are possible, and within reach now, not some indeterminate time in the future. Here is a chart of the environmental specifications for the project, along with how it's actually performed:

The energy component of BedZED is what I think is most compelling, and I am really taken with the technologies they used. What is most interesting to me is that many of them are completely different from zHome, even though the climates are quite similar. This gives me a lot of hope because it says there are a lot of technological pathways to achieve zero net energy/carbon buildings.

BedZED starts with the same hyper-insulated wall section that zHome does – that seems like a basic constant in our climate. But BedZED uses masonry (brick and concrete) walls – typical of European residential construction – rather than wood stick frame. BedZED has also wholeheartedly embraced passive solar heating of the homes, with a solar atrium sitting on the south side of the homes, unlike zHome. This solar atrium has glass with a high solar heat gain character, allowing it to heat up dramatically. Once this atrium has warmed up toward the end of the day, the residents open an inner set of highly insulated triple paned French doors to allow the heat into the units. This solar heating provides the majority of the required heating for the units. Hot water, and supplemental water based hydronic heating, is provided by means of a combined heat and power unit for the whole project. This is essentially a large boiler with a turbine attached to generate electricity. This system was designed to run off wood waste, but when I was there it was running off of natural gas. The passive solar heating system heats the homes well enough to only need one heating element in the homes: a heated towel rack!

Combined heat and power building

Where are your priorities? Heated towel bar

My favorite view of BedZED is across the soccer pitch, with BedZED, and a neighboring project which was built at the same time, in view next to each other. The BedZED architects (Bill Dunster Architects) nicknamed the neighbor BedHED, for Beddington High Energy Development. It's a pretty amazing image – two projects, built at the same time, with the same essential building structure and technology, but one which uses radically less resource and emits radically less CO2. Smart, thoughtful design, coupled with innovative technologies

got them there – Yes they did – and Yes we can! (Forgive me, I couldn't help myself, it's Inauguration Day tomorrow).

BedZED and BedHED

Here is a link to the official BedZED website.

Detailed zHome benchmarks: design integrity

January 19th, 2009

zHome is being built in accordance with stringent environmental benchmarks. These are actually contractually established between the City of Issaquah and Howland Homes. You can read the benchmarks here if you would like to delve into these further (all 14 pages of them!). You can see for yourself exactly what design criteria have been established for the project.

So why benchmarks? To me it goes back to the graph shown on the Why Green Homes? portion of the site. In big picture terms, zHome is about looking at the cold hard numbers of building's hefty environmental impacts, and taking those numbers as close to zero as possible. There is something pure about a numeric driven design process: set your goal, and let the design process figure out the most efficient way to get there. It's not that dissimilar to a gas or carbon tax – get aggressive, and then get out of the way and let the people involved figure out how to respond. I also think there is something powerful about giving a number to what you've achieved, as opposed to some more qualitative measure – I think your average person can get it better.

And then there's accountability and integrity. The zHome benchmarks are all subject to verification by the City. In some cases our other partners are involved in this process as well. For example, Howland Homes' energy model (done by Stantec) has been vetted and reviewed both by the City and the WSU Energy Program. We feel that if you're going to make strong claims (such as the project is achieving zero net energy), there should be integrity and transparency behind those claims. Very few of the projects that are claiming zero net energy have actually undergone energy modeling to verify the claim, and fewer still have been verified by outside parties. And many projects and builders that use the term "zero energy" are actually talking about it conceptually, in terms of it simply being a goal or good idea, or being part of a long term program to achieve zero net energy sometime in the future. I feel that that dilutes the power of the name because it implies this very difficult goal is being met regularly. Certainly our goal should be zero energy, but when it comes to individual projects, zero energy terminology should be used carefully and transparently.

February 2009

A fantastic resource for ultra-green remodels – Now House

February 23rd, 2009

I was out for a run and started to daydream about turning out house into a zero energy remodel. And then, I kid you not, within five minutes of getting back I found this fantastic site. These folks in Toronto have done a near zero energy remodel. Way cool!

June 2009

zHome inspiration: Hockerton Housing Project

June 16th, 2009

Hockerton Housing Project

Another amazing zero energy project in England is the Hockerton Housing Project. This project was built in the 1990s by five pioneering families, who wanted to radically reduce their environmental impacts.

I visited Hockerton in 2005 during my same trip as my BedZED visit. Hockerton is way up north by Southwell, in the Midlands. Incidentally, Southwell has a gorgeous Romanesque cathedral, promoted to cathedral status just at the end of the 1800s.

Southwell Cathedral

Even though zHome and Hockerton share the same core paradigm of low impact living, they go about it in completely different ways. Hockerton is completely passively heated – relying on solar energy completely. A solar atrium in the front of the homes heats during the course of the day, and this heat radiates back into the homes. The main part of the homes is super insulated, and then covered with earth. The earth acts as a heat sink, retaining heat energy over the course of the summer, and then radiating that heat back into the homes over the winter. The result is interior temperatures which rise and fall on a sine wave, peaking at 75 degrees at the end of the summer and dropping to 62 degrees at the end of winter.

This is just a quick snapshot of the project, please see their great website for more information.

July 2009

EcoCool Source for Green Remodels & Retrofits

July 24th, 2009

EcoCool cutaway house

So, let's say you're planning a few energy-efficient upgrades, or maybe you're getting ready to gut your entire kitchen to bring it into this century. Where can you turn for reliable information on environmentally sensitive products and building practices? From my own experience, it has been a challenge to find a one-stop shop online that covers all aspects of home upgrades, whether for the sake of water efficiency, energy efficiency or indoor air quality. And it's especially tough to find a site that brings together all the local resources out there that can help.

But then the EcoCool Remodel Tool came along – an interactive online tool that was developed late last year by King County. This tool is a virtual house where you can quickly click around to get tips on green remodeling and upgrades room-by-room. For every "tip" there is an opportunity to click for more in depth information, including a list of resources – from where to recycle your old fridge to where to buy recycled countertops to where to learn more about adding solar to your home.

The tool includes not only tells you what you can do and how, but also some reasons why you should. Tips and resources range from simple steps such as selecting healthy paint products or setting your thermostat, to what you should consider when replacing your furnace, upgrading your bathroom or landscaping your yard. The information was reviewed for accuracy by local green building pros and experts and will be updated on a regular basis.

Check it out and happy remodeling!

zHome starts construction and goes international!

April 5th, 2010

zHome starts construction tomorrow, April 6th! After some initial utility work, we will be installing the ground source wells. I will do a separate post on that, and include some video so you can see what it's all about. We will also have an onsite informal get together next week if folks want to view the well drilling. We will be continuing construction for about a year, when we will open for public tours.

So, how did this come about? Howland Homes, our builder partner, has formed a joint venture with Ichijo USA, which is providing project financing. Ichijo USA is the American subsidiary to the Ichijo Group of Japan, which is a major homebuilder there. Last year they built about 8,000 homes with a total sales value of $2.1 billion. Ichijo is currently building highly energy-efficient homes in Japan, including the i-cube, which includes a heavily-insulated exterior (R-30 walls) and air source heat pumps as standard specification. They completely get what zHome is about, and have been real leaders and innovators in their home market.

It feels great to be starting construction. The team is really excited to begin our education program and start rolling with our market transformation. I am personally incredibly excited to have Ichijo as part of the project. zHome is now international in scope, influencing not only Issaquah, the Puget Sound region, and the Northwest, but potentially Japan as well. If we are going to be serious about addressing climate change, it is going to be these sorts of international partnerships that are going to do it.

More on details of all this as we move forward – I just wanted to get the word out!

Ground source wells being drilled and installed this week!

April 24th, 2010

We started drilling the ground source heat pump wells last week. We've had a couple bumps which I thought I'd share about.

Drilling the first well

But first maybe I should give a little explanation of what I'm actually talking about.

Ground source heat pumps in homes are used for heating both hot water and the home interior. Generally, they are a water based system – they heat water, rather than air, like your typical forced air furnace.

Ground source heat pumps essentially combine two very efficient technologies to result in an extremely efficient technology. They include two parts: a ground well system for preheating the fluid to the average ground temperature (in Issaquah, 50 degrees or so). Once the fluid has run through the ground well field and been prewarmed, it is then run through the heat pump, which then heats it further up to 125 degrees or thereabouts.

The radical thing about using the preheating loop is that effectively, the heat pump only has to heat from the 50 degree baseline, year round. That means that in the dead of winter, when it's 30 degrees outside, the heating system is effectively only having to heat from 50 degrees, since it's using the well field water. The heat pump has its own cool efficiency which I'll explain another time.

So, back to our well field. To create our well field, our mechanical engineer (Stantec in Seattle) determined the appropriate sizing based on the total heating load for our ten units. They determined we needed 3,000 feet of vertical wells. Our initial design configured that 3,000 feet into ten 300 foot deep wells connected by a set of pipes (called a manifold) just under the surface.

Into each well, a very heavy duty double U shaped one inch diameter pipe is run down the bore hole. The pipe is made out of polyethylene, and is the same pipe used to carry natural gas to homes. The pipe is then grouted in place with a material called bentonite, which is a sort of flexible inert concrete. The grouting ensures that the pipe and the fluid inside the pipe is in full contact with the surrounding ground, to maximize the thermal conductivity.

The problem we've run into is that we've had some issues boring holes that deep. Portions of Issaquah Highlands are an old lateral moraine from the big Puget Sound glaciations of the last Ice Age. There are lenses of gravel which tend to collapse when we've drilled through them. In particular, there is a lens at around 200 feet. As a result, we've had to modify our well field, and increase the number of wells to fifteen or thereabouts. It's added cost and taken more time.

I was in the field yesterday watching them place one of the pipes and grout it in place. It is tough work for the drillers – sledgehammers, rubber boots, hard hats, a big drill rig and a lot of sweat. It was a very good reminder to me that this is where the rubber hits the road. After years of planning, evaluating the options, and weighing the pro's and con's, here was a crew of three guys working hard all day, drilling a hole, muscling a tube down the hole, mixing a big batch of grout, pumping it down the hole, and moving on to the next one. When zHome is done it will be a mix of brains and guts and stamina.

Interview with Ichijo USA

May 11th, 2010

As I wrote earlier, Howland Homes has formed a joint venture partnership with Ichijo USA to build zHome. I have been working now with Ichijo USA for a few months and have had the great pleasure of working with their excellent staff. I thought it would be interesting to interview Akinobu Ohno, the President of Ichijo USA, to get his perspective on their company and their new work on zHome.

Q: Tell us a little bit about Ichijo as a company.

A: Since our company, Ichijo, was established on 1978, we have focused on the business for custom-built houses. Unlike as is typical in the United States, our custom homes are factory built, and thus able to be offered at more typical production home prices. Currently, we have more than 3,400 employees, and last year, we built more than 8,000 houses nationwide in Japan (revenues were approximately 2.1 billion US Dollars). Although there are many major home builders in Japan, Ichijo was ranked No.1 in performance in Super-Insulated Houses ("Energy Efficient Houses" in broad sense), and had the No.1 track record in Seismically-Isolated Houses as well.

Prebuilt wall panels being fabricated

Q: zHome is Ichijo's first venture in the United States. I think this says a lot about both zHome and Ichijo. What was attractive to you about zHome?

A: It was August last year when we first heard about the zHome project. The net zero energy consumption design concept of zHome is exactly the same direction where Ichijo is heading. Last year, when we found out about zHome, we wanted to know our worldwide position in energy efficiency performance, and how our houses would be evaluated by the people and construction industry of the US, which is the country of origin of wood framed construction.

One more attractive thing is that there is the participation of a great home builder, Howland Homes. Just like us, Howland Homes is oriented toward environmentally-friendly houses. I am sure that we could not move forward by ourselves without their sincere cooperation. It was only a couple of days when we stayed in Seattle last year, where we met Matt Howland and learned about zHome. So, I would say it was a miracle that both of us could meet each other and we were able to find out about the zHome project during our brief stay. It will be very impressive for our colleagues as well as our customers in Japan if they know that we are participating in this project in the US.

Q: I understand Ichijo has an innovative housing model in Japan, the i-cube. Can you tell us more about it?

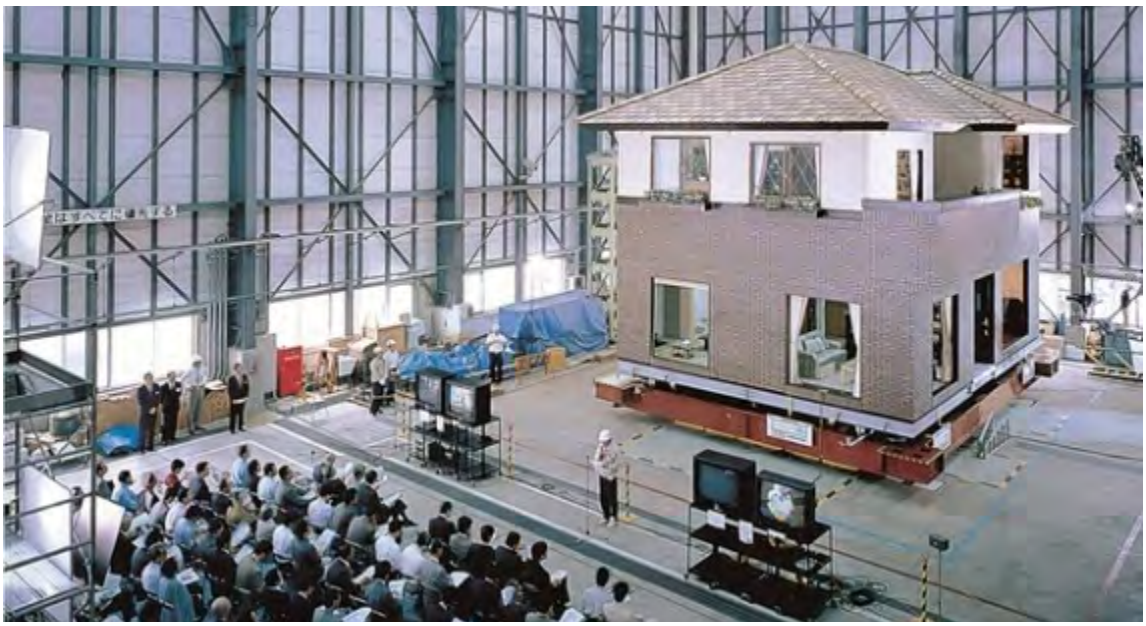
A: Briefly speaking, there are three key features in the i-cube. First, very high insulation performance, second, very high air-tightness performance, and third and most important, that we could provide reasonable and affordable price to our customers in Japan. In combination with other hi-tech items, i.e. heat pump, heat exchange ventilation, and PV systems, these enable the i-cube to be an ideal highly energy efficient house. Based on all these energy efficient components, the i-cube uses about 54% of the energy of a similar sized and configured home built to the Washington State Energy Code.

i-cube under construction

The current Japanese home buying market is primarily focused on durability, as well as homes being earthquake proof. However, new home durability mainly benefits the next generation, and a giant earthquake might happen less than one or two times in a lifetime, while highly energy efficient houses are closely related to your daily comfort and daily energy expense. But then again, most Japanese home buyers are hesitant to buy highly energy efficient houses with significant extra budget. So, we think that innovations in reasonable pricing for highly efficient homes are most important for them to become widespread, and then it will finally contribute to a large amount of CO2 reduction.

Q: What sorts of other innovations has Ichijo introduced in its homes?

A: Among other things, we are proud to introduce our Seismically-Isolated Houses. This is a technology which physically isolates the home from earthquakes. It involves the homes being built on a large set of vibration controllers which sit between the foundation and the home structure. We developed it in partnership with Bridgestone, the world's largest tire and rubber company. We have a track record of 3,600 Seismically-Isolated Houses as of Dec. 2009, and the No. 1 track record in total number of Seismically-Isolated Houses so far built in Japan.



Seismically-isolated home demonstration at testing laboratory

We have also developed heat exchanger ventilation systems which have a 90% heat recovery rate, radiant floor heating systems, and double paned windows we build ourselves. This enables us not only to minimize costs, but to optimize quality control through the entire production process. We manufacture more than 70% of the total housing components which go into the i-cube, and we need only 45 working days of construction for home completion once the foundation is complete and the components are on the building site.

Q: On a personal note, what have been your impressions of the United States? Is it the same or different than you imagined?

A: Thanks to the zHome project, I was able to visit the US for the first time. I was very much impressed that there is so much green, forests, and the beautiful waterfront in greater Seattle area, and it reminded me of the importance of consciousness about sustainability.

Also, business infrastructure through the internet, specifically the websites of each government agency, is very advanced and well organized. I did not feel any discomfort with starting business here in US.

June 2010

High flyash concrete

June 9th, 2010

zHome retaining wall under construction

One of the zHome materials benchmarks is for all concrete to include 30 percent flyash by volume. This is an aggressive percentage, reflecting the nature of zHome's pushing the envelope.

Flyash is the byproduct from coal burning power plants. Flyash is a recycled material that reduces the need for cement. Another benefit to using flyash beyond simply reducing material use is that the production of cement produces a significant amount of CO2 – so using less is good.

High flyash concrete is different than typical cement. It is stickier and harder to form and work. It takes longer to cure, which particularly in structural situations can mess with your timeline. On the upside, in addition to its environmental benefits, it has less voids than typical concrete (the flyash is like little ball bearings and helps the concrete flow) and is stronger once fully cured.

Closeup of 30% flyash wall - almost void free.

Centralia power plant, source of our flyash

An interesting sidenote is that flyash locally has historically come from the Centralia power plant. However, during the boom times, local demand for flyash resulted in it being brought in by rail from Alberta, which created its own carbon issues. Now, with construction significantly reduced, we are back to Centralia flyash being easily available.

zHomepeople: Dennis Rominger of Puget Sound Energy

June 12th, 2010

Dennis Rominger, Puget Sound Energy

Dennis Rominger is Puget Sound Energy's representative on zHome. He's been heavily involved in the project for years now, and has been a very important person in its life. Right now Dennis is taking the lead on college and youth zHome education and has been doing

a terrific job. He recently did a class for Shoreline Community College's zero energy class and it was great to hear another perspective on our design process and the importance of the project.

Dennis is a great guy, and a ton of fun to work with. He is a very hard worker and a project manager par excellence. He is very passionate about energy efficiency and getting real change on the ground. There are a lot of dreamers involved in zHome, and even though Dennis dreams with the best of us, he is also pragmatic and always thinking about getting the job actually done. We are very lucky to have him involved in the project!

zHome's concrete form release oil is recycled from McDonald's!!

June 19th, 2010

Concrete forms are typically sprayed with diesel oil to allow the form boards to come easily away from the forms once the concrete has dried. Check out this short video of Nick Nied of Ichijo USA discussing the recycled fry oil we used instead!

Who are these guys?

July 2nd, 2010

Nick Nied of Ichijo USA and Clint Hamilton of Howland Homes

This is Nick Nied of Ichijo USA, and Clint Hamilton of Howland Homes. These are our joint venture partners building the project. Nick is project manager for construction, and Clint is the site superintendant. I will do more extensive profiles on both of them in the future.

Wall drain board made out of recycled pipe

July 7th, 2010

This is an interesting video of Nick talking about the recycled content of our drain board. The left over scrap from our ground source well pipe was 100% recycled into materials such as the drain board.

Tubes, tubes, and more tubes!

July 12th, 2010

What's up with all these tubes?

Tubes!

The tubes are conduit runs through the foundation. This is a photo of the concrete forms. Concrete will be poured into the forms to create the foundation walls. The tubes provide a chase for things to be run up into the unit – wires, pipes, etc.

Seems like a lot of tubes, right? We have a lot going on in these units – regular stuff like water pipes and electricity, but in our case ground source piping, extra wires for the solar panels…and who knows what else? So we have a lot of tubes.

zHome in France

July 29th, 2010

PV installers in 8th Arrondisement with zHome stickers – true believers!

We were in France on vacation this year, and I was interested to see a growing deep green orientation there. In the past, it has always felt like France was lagging behind Germany, Sweden, and the UK in addressing climate change on the ground. I could feel a difference this year though – in the street art, growing bio street markets, and green initiatives.

In Paris, a year long planning process resulted last year in "le Grand Paris", sponsored by President Sarkozy as a way to reshape the capitol to have a smaller footprint in the coming centuries. Several new deep green skyscrapers, such as Hypergreen, have been proposed in the last several years. Just in the last two years, Paris has started a dedicated effort to promote bicycling, and there was a new bike rental program called Velib which was used by lots of folks, including commuters – in a short amount of time it has become a great success.

zHome at Hypergreen display, Cite de l'Architecture et du Patrimoine

Out in the countryside, PV panels were showing up on roofs. Folks said the big controversy was the local planning authorities were concerned about the aesthetic integration of the panels on the historic tile roofs. All in all, really positive signs – you could feel the change in the air.

PV installers' van

August 2010

Aerial photo of zHome and YWCA Family Village

August 12th, 2010

I haven't mentioned that zHome is being built in conjunction with the YWCA Family Village. The Family Village is an incredible project – it is a 150 unit affordable housing project being built by the YWCA of Seattle – King County – Snohomish County. It is aimed at families earning an income ranging from 30-60% of median income. The two projects have been planned for a number of years on parallel tracks, and it turns out they will be complete at almost the same time. The two projects have been designed in conjunction with each other, to provide on integrated, sustainable center. The Family Village is incorporating a number of green features which I'll cover in a later post.

Aerial photo of YWCA Family Village and zHome, 7/14/10

This aerial photo shows both projects – zHome is the area in the upper right hand side of the construction. You can also see the Issaquah Highlands Park and Ride (in the lower section of the photo), which will be connected to the Family Village with a dedicated pedestrian bridge.

Social sustainability has been an important part of zHome, and the social and physical integration of the Family Village and zHome is a critical component. They are physically linked and connected through urban design, and share a comm0n pedestrian/vehicular plaza. After both projects are complete, they will be linked by a common stewardship center for sustainability education (more on that later, too).

Meet Nick Nied of Ichijo USA

August 31st, 2010

Nick Nied at sea, with his tuna.

Nick Nied is Ichijo USA's project manager for zHome (as well as other things). Nick is a hard worker, thinks big picture, and is a heck of a lot of fun to work with. It is great to have him on the project – he's really brought great fresh energy to a project that has been going on for quite a while. He is very passionate about zHome and we are lucky to have him on board and playing such a key role. He and I talk at

least once a day and he is very patient with my quirks. He gets what we are trying to do with education and has jumped into participating in our on-site classes. We tag team the classes and I think we compliment each other well as far as covering all the bases, from policy to construction.

This photo is of Nick far off Westport, where he caught an albacore tuna for his sashimi loving coworkers at Ichijo USA. He got up at 12:30 at night to be fishing before sunrise. Hard core!

September 2010

Nick and Clint share their thoughts on the initial phases on construction

September 6th, 2010

Nick Nied of Ichijo USA and Clint Hamilton of Howland Homes

Nick Nied and Clint Hamilton, our construction managers, talk about the first phases on construction – ground work. Hear about lessons learned, challenges, and inspirations.

Nick and Clint share their thoughts on initial phases of construction from zHome on Vimeo.

Rainwater cistern and stormwater system

September 8th, 2010

Our rainwater cisterns are in the ground and about ready to be backfilled. Watch this very interesting video of Nick Nied explain how the cistern and stormwater systems are tied together – low water use and low impact development hand in hand.

Nick Nied discusses zHome cistern and raingarden system from zHome on Vimeo.

Meet Clint Hamilton, Construction Superintendent – see the interview

September 18th, 2010

Clint is our construction superintendent. He is a steady hand with a lot of experience and has been a great addition to the team. I have personally appreciated just how seriously he has taken the project and getting the details right. He is great to work with, fun, smart, and engaged. I know as we move into vertical construction that he will steer the ship and keep the myriad subcontractors working well together.

Clint Hamilton, zHome construction superintendent from zHome on Vimeo.

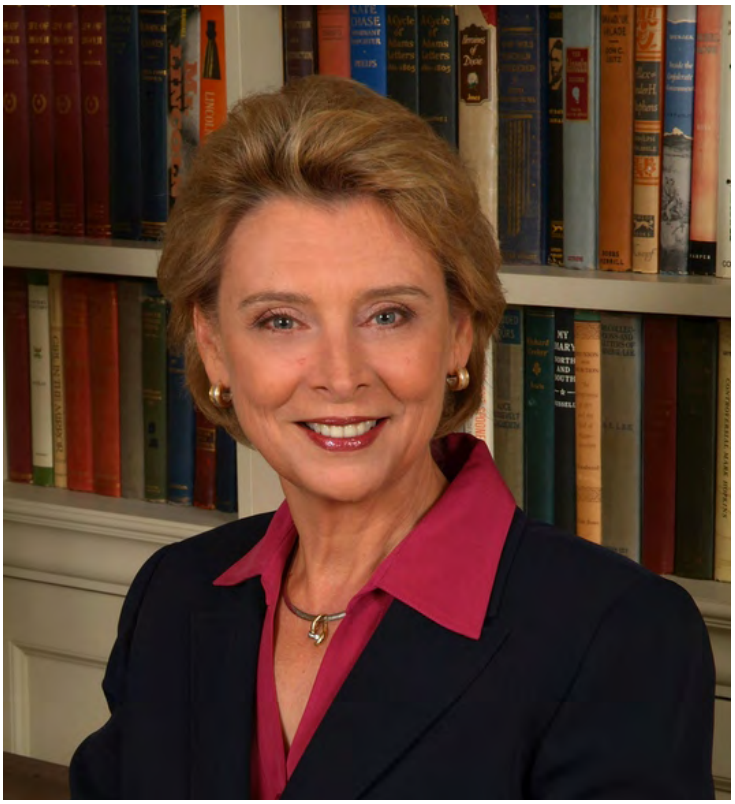
Governor Gregoire mentions zHome in Sustainable Cities Forum speech in Shanghai

September 21st, 2010

World Expo in Shanghai

I was really pleased to learn on Friday that the governor had mentioned zHome in a speech in Shanghai, at the Sustainable Cities Forum

that was part of the World Expo. It is great for zHome and other initiatives like the BMW Mega-City electric vehicle to get this sort of exposure – it's all part of leading the way into a carbon free, economically healthy future.



October 2010

Meet our UW Community, Environment, and Planning 460 seniors!

October 14th, 2010

Team zHome – Sorayya Aminian, Avery Hilliard, and Marissa Heath

Jill Sterrett, a well known local planning consultant and UW lecturer, has a terrific class for seniors in the Community, Environment, and Planning program at the College of Architecture and Urban Planning, where the students work with local jurisdictions as clients and do a planning or environment related project.

We are very excited about working with our students. Sorayya interned this last summer at IslandWood on Bainbridge Island and also interned at the City of Seattle DPD. Marissa is interested in interior design and event planning – an important skill in our transformational world. Avery is focused on both planning and sociology, with a research focus. They are super enthusiastic and we are all really looking forward to working with them! They are putting together a couple of proposed scopes right now for their actual project. They don't know this yet, but I'm planning on having them blog weekly to share their perspectives on zHome and the world.

First framed panels delivered!

October 15th, 2010

Nick Nied winches HRD panel out of the container

Our Japanese partner, Ichijo USA, specializes in prefabricated panelized construction in their Japanese home market. Ichijo is a major player in the Japanese market, building over 8,000 homes, with about $2 billion in revenue per year. Their panelized construction is a pretty fascinating system – they assemble all the wall components (siding, framing, insulation, windows, electrical, plumbing, sheetrock, etc.) in a 120 acre, modern factory in the Philippines, and then ship them in containers for assembly at the home site. Once on site, the panels are bolted together and the home is completed.

There are a number of benefits to this approach. Construction is performed on jigs, and tolerances can be much tighter than in site built construction. Framing is done under cover, with the home being assembled in a short period of time, resulting in much dryer wood during construction, reducing mold concerns. Overall construction is much more efficient with an assembly line approach. Better quality control can also be provided in a setting where all trades work for one company. Finally, the construction timeline is significantly shortened, from about one year to three months. A significant percentage of the Japanese market has moved to this construction method, and large corporate players (including Toyota) are involved.

Ichijo USA wanted to participate in the actual construction of zHome, and so they are contributing the exterior walls, which are built in the HRD Philippine factory (HRD is a corporate partner to Ichijo). Unlike in their Japanese market, they are providing just the framed walls with insulation, not the fully completed assemblies. This hybrid approach was a way to provide Ichijo an opportunity to participate in the construction of zHome without significantly changing the existing project design.

zHome stamp from factory

Ichijo plans to use its standard panelized production for future projects in the United States. Depending on market response, over time they may open a factory in the US to meet local demand.

Our first panels were delivered to the site yesterday. They will start to be installed first thing next week!

Panel assembly underway at HRD

zHome in Japan

November 7th, 2010

This is fun – zHome got a spread in the Ichijo company magazine. Neat to see it written up in Japanese! Issaquah's on the map!

Stewardship center getting framed in

November 9th, 2010

Ground floor of Stewardship Center

The wall panels are coming together amazingly fast – the project is already almost half framed. Excitement is really building as we go vertical.

Panel being dropped into place

zHome takes form

November 29th, 2010

I wanted to share these photos with you – the project is starting to really shape up. The spaces look great and I am appreciating all the more the great design that David Vandervort and Mark Weirenga put together for us.

Fiberglass windows being installed

December 3rd, 2010

Installation of our windows started last week. Our window selection was quite deliberate. A couple of considerations intersect – energy efficiency and materials.

Through our extensive energy modeling effort, we determined that going to triple paned windows was not cost effective, even relative to the power production price based on photovoltaic panels ($8/watt at the time our modeling was done). Given how minimal our heating loads will be because of our very efficient shell and ground source heating system, the incremental benefit of going to triple paned, better insulated windows was not worth it. This honestly surprised us, because going into design we had expected we would use triple paned windows. These Pella Impervia windows are about U=.30, about typical of new construction these days.

Another consideration was the window framing material. zHome has a no vinyl in the homes specification, for toxicity reasons. The toxicity of vinyl is something that is debated, and we felt that good alternatives were available so we simply established a specification which prohibited it in the homes. I think this is a good summary about the pro's and con's of vinyl from a green building standpoint. The

truth is that there are cost-effective, quality alternatives currently in the market for most home building products built out of vinyl (storm sewer excepted; I will discuss this later). Our feeling was that given the debate we would simply take a prudent path.

Our windows have fiberglass frames. While more expensive than vinyl, the costs are coming down. There are a couple of key benefits to the fiberglass windows. They are quite durable, and as someone who has spent weekends of my last couple of summers slowly restoring my windows, this counts for a lot. Also, fiberglass is easily repairable, with typical repair kits used for boat repair. Overall I think we made a good choice. The Pella windows feel quality and came at a reasonable price.

Plumbing rough in starts – including the rainwater pipe

December 7th, 2010

Here is a photo of our purple rainwater pipe. We are collecting our roof runoff into 1,700 gallon cisterns in each unit. In addition to the normal blue and red pex tubing for cold and hot water, we have purple pipe which denotes it is non-potable water. We are plumbing this into the homes, where it will be used for clothes washing and toilet flushing. Why waste perfectly good water?

Roof rough in – where the PV panels will sit

December 30th, 2010

Here is some video of our roofs – the PV's will cover them!

Roofs go up – photovoltaic panels go here. from zHome on Vimeo.

The Stewardship Center starts to take shape

December 30th, 2010

One of our homes will be used as a Stewardship Center for educating the public and professionals about sustainable building. Here is some video of Nick Nied discussing the Stewardship Center shell and the high performance heating system running into it.

Stewardship Center construction update from zHome on Vimeo.

Nick Nied talks about panel installation

December 30th, 2010

Nick Nied, Ichijo USA, talks about panel installation on zHome from zHome on Vimeo.

This is some video I neglected to add in November – Nick talking about panel installation.

Happy New Year from zHome

December 31st, 2010

zHome at sunset

I just missed the money shot by a couple minutes, but here is zHome in the last few seconds of sun in 2010. Best to everyone in the coming year – we can do it!

America's oldest zero energy home

January 16th, 2011

You too can do this!

A couple in Ann Arbor, MI has restored their home and are achieving zero net energy. What are we waiting for? Oh, yeah, we're not!

Siding going on – zHome's looking great!

January 29th, 2011

Here's some photos of zHome as the siding goes on – it is a great looking project!


Tyvek
WESTERN
W
PACIFIC


WESTERN
W

Site produced art! FSC certified wood!

zHome colors have been picked

March 14th, 2011

zHome consists of ten different housing units that will vary in color. Three different colors have been picked. Here is a recent photo sampling the different color swatches on the development:

Sheetrocking starts!

March 15th, 2011

Started sheetrocking over the weekend – the units look terrific!

These are photos of the Stewardship Center.


WESTERN
W
PACIFIC

zHome joins forces with Americorps!

March 22nd, 2011

Americorps volunteers from EOS Alliance have teamed up with the City of Issaquah Resource Conservation Office to work on the zHome project, in addition to other sustainability related programs at the City. Hai, Brianna and Kelly will be helping out with all different aspects of this project, so keep your eye out for them!

Hai Nguyen

Hai received a degree in architecture from the University of Illinois. He spent the last year weatherizing homes with the Green Iowa Americorps. Hai aspires to become an architect one day and to incorporate environmental and social responsibility into his work.

Brianna Craft

Brianna grew up in a passive solar home in Kelso, WA. Inspired by its efficiency, she graduated from the University of Washington with a degree in Architecture in June 2010. Brianna will be attending graduate school this fall to obtain a Master's degree in Environmental Policy.

Kelly Ferron

Kelly graduated from Santa Clara University in June 2010 with a degree in Environmental Science. She spent her senior year interning with the City of San Jose and as a Research Intern researching land management and endangered plant species. Kelly hopes to receive a Master's degree in environmental management.

Hai, Kelly, Brianna

Heat Recovery Ventilation at zHome

April 1st, 2011

To achieve zero net energy, zHome is super insulated and extremely tightly sealed. This is great for preventing energy and heat loss, but also prevents any naturally occurring ventilation. A home needs proper ventilation to bring in fresh air, remove stale air and provide moisture control. Heat Recovery Ventilation provides the perfect solution for providing fresh air while maintaining energy efficiency.

Heat Recovery Ventilation (HRV) is a countercurrent heat exchange between inbound and outbound airflow. Heat from the outgoing stream of air is transferred to the incoming stream of fresh air. The HRV contains an air to air heat exchanger (essentially a honeycomb with half the pipes for exhaust and half for intake) This way, there is constant air flow, with less loss of heat than would occur with direct ventilation of outside air. Less energy is needed to heat the house because the heat is continuously exchanged.

Below is a photo of the HRV system in zHome:

zHome includes a small ducting system to route the fresh air through the home – about 25% the size of forced air furnace ducting.

zHome recycled material #1: Sheetrock

April 8th, 2011

Our sheetrock has a recycled content in the low 50% content range. It is made by Georgia Pacific and is called ToughRock. Made just down in the road in Tacoma! It also includes 100% recycled paper facing.

Please note if you spec ToughRock manufactured at other plants, it has a much lower recycled content.

Here is a video of Nick Nied explaining how it works:

zHome recycled material #1: drywall from zHome on Vimeo.

Blower door test demonstrates zHome efficiency

April 16th, 2011

Tom Balderston, Conservation Services Group

A blower door test exposes energy waste. At the March monthly walkthrough, a blower door test at zHome demonstrated the importance of efficient energy use and how zHome maintains zero net energy emissions. A blower door is a fan that mounts in the frame of an exterior door. As the fan pulls air out of the house, it lowers the air pressure inside. The outside air flows in through unsealed openings, exposing air leaks in the building. Just walking around your house, you will be able to feel the air right where it's leaking out of your house: your vents, windows, roof or wherever. Part of the test requires taking measurement of air flow. In essence, a blower door test just

exaggerates the natural air leakage rate, allowing someone to efficiently air seal the building. Luckily, this energy inefficiency is something that can easily be fixed through good insulation and extremely tight exterior walls. Blower door tests can also calculate air changes per house to see how many times the air within the house is replaced over the course of a day.

The building is air sealed while the blower door is running, measuring results as it is sealed. Blower door directed air sealing is a process that makes it possible to determine the effect of each particular measure or how much reduction has occurred over a certain amount of time. Directed air sealing is more productive because it allows for sealing to be done where the best results will be obtained.

Building code does require energy efficiency, but energy code lags behind best practices. zHome is shooting for an air leakage rate that is half of the code requirements.

Watch this video to see Tom Balderston of Conservation Services Group walk us through a real blower door test!

zHome blower door test from zHome on Vimeo.

Check out our new radiant floor heating video

April 26th, 2011 - Posted By: Brad Liljequist

Hydronic heat pipes coming up through one floor to the next

Brad and Nick tag team to explain the why's and how's of our radiant floor system. Check out Ichijo's proprietary quick track pex hydronic floors – they were a big hit at the Eco Building Guild's tour.

zHome – Hydronic floors from zHome on Vimeo.

zHome Salvages Native Plants

May 2nd, 2011

Last week Ichijo USA and the Americorps team set out to salvage native plants from the Highlands. These plants were dug up from an area that will be developed in the future and will be transplanted to the zHome site. The team dug up three types of plants: Vine Leaf Maples, Western Sword Ferns, and Mahonia Nervosa. Reusing native plants helps maintain natural continuity, saves water (since the native plants are already perfectly adapted to the local climate), is organic as it gets (no fertilizer needed to get these plants going), and saves money (since the plants are free).

Kyle, Nick, Victor, Britta, Brianna, Kelly, Hai

On the left, Mahonia bealei (Oregon Grape). On the right, Vine Leaf Maples.

Passive Solar Design is another example of Energy Efficient Housing

May 10th, 2011

Brianna Craft, Americorps Volunteer

Brianna, an Americorps volunteer working on the zHome project, grew up in a passive solar house in southern Washington. Passive solar design distributes solar energy in the form of heat in the winter and rejects solar heat in the summer.

Watch this video to hear more about it:

Living in a passive solar house from zHome on Vimeo.

Check out these new aerial shots of zHome

May 17th, 2011 - Posted By: Kelly

Photo taken on 3-16-2011.

Photo take on 04-15-2011.

How to seal the ducts on your house

May 25th, 2011

Back in January, the City of Issaquah sponsored a weekend long class on retrofitting existing homes for better energy efficiency. We did the classes in a real house in Issaquah, based on an actual retrofit of the home. Yves Vetter with Vesta Home Performance managed the retrofit and is the star of the show. Please check out this very informative video about the why's and how's of duct sealing – in this case a newer flex duct.

Duct sealing video from zHome on Vimeo.

Sealing your ducts, part two!

June 9th, 2011

Continue onward with Vesta Home Performance's Yves Vetter in the ins and outs of improving the air leakage of your home. In this video, Yves shows us how to seal a duct return from above.

More duct sealing – this time from inside the house from zHome on Vimeo.

Office of President Obama visits zHome!

June 14th, 2011

Brad Liljequist, zHome project manager, Nicole Reed, Department of Energy, and Brandon Belford, National Economic Council

Brandon Belford, with the Better Building Initiative in the National Economic Council (part of the White House) and Nicole Reed with the Department of Energy's Retrofit Ramp Up program, recently visited zHome during a Seattle visit. Patti Southard, our partner at King County GreenTools, brought them out to tour the project. It was great to share zHome with Brandon and Nicole and have a chance to talk about long term directions in energy and buildings.

Home Sealing part three: Seal your can lights!

July 31st, 2011

Join Yves Vetter for more great home sealing information!

Sealing a leaky can light from zHome on Vimeo.

Home sealing part 4: Seal your skylights!

July 31st, 2011

Yves Vetter, home performance expert, shows you how to seal your skylights. They can leak a lot, and it really isn't that hard to fix. A good Sunday afternoon project!

Sealing a skylight from zHome on Vimeo.

zHome receives Taiwanese trade delegation

August 23rd, 2011

I just had the pleasure of providing a tour to a group of Taiwanese building scientists and policy experts, including professors from the National University of Kaohsiung and the National Pingtung University of Science and Technology, the CEO of the Taiwan Architecture and Building Center, and researchers from the Architecture and Building Research Institute. We spent well over two hours going through the ins and outs of zHome.

zHome was internationally inspired, has an international builder, and it is great to spread the word to key folks in other countries. If we all work together, we CAN deal with climate change – and even have fun doing it.

zHome Stewardship Center Solar Panel Monitor Goes Live

August 30th, 2011

Click on the link below to check out Enphase Energy's website and see solar power production information for zHome's Unit 1!

http://enlighten.enphaseenergy.com/public/systems/4jfN26325#

Performance information can easily be viewed "at a glance" or in detail, including graphs, totals by day/ week/ month/ lifetime, and time-lapse videos. Every zHome unit's PV array will be continuously monitored this way, checking the health and performance of every solar module and microinverter in the array and giving zHomeowners important feedback about how much energy their home is producing. Net zero, here we come!

September 2011

The Road to Net Zero Energy

September 6th, 2011

Click to see a video detailing how zHome became the first townhome development in the U.S. to achieve net zero energy.

Rainwater Catchment System

September 6th, 2011

In this video, Nick Nied of Ichijo USA explains zHome's rainwater catchment system. Learn how collected rainwater will be used for toilet flushing and laundry.

Ground Source Heat Pump Video

September 6th, 2011

In this video, Tom Marseille of WSP Flack & Kurtz explains in detail the three parts of the zHome Ground Source Heat Pump system.

FSC Certified Wood in zHome

September 9th, 2011

Learn about Forest Stewardship Certified wood in this video featuring Ian Hanna, FSC Director of Business Development and Patti Southard, King County GreenTools Manager.

2,000 visitors in 2 weeks

September 29th, 2011 - Posted By: Brad Liljequist

We've had a great opening couple of weeks for our on site education. We've had about 800 folks each weekend, plus several hundred for the Government Confluence, Built Green conference, and a variety of other on site events. Folks either stroll through on their own or take a guided tour. We've had an amazing positive response for the project. Don't let the numbers scare you, the site absorbs people well and it doesn't feel crowded even with a 100+ on site.

Be sure to also check out Ichijo's model homes - they're awesome!

October 2011

zHome Project Manager, Brad Liljequist, to Speak at the Future Energy Conference

October 7th, 2011

The Future Energy Conference, an unmatched forum for learning, networking and business development, is October 18-19, 2011 in Seattle. Brad Liljequist, zHome Project Manager has been invited to participate in a disucssion about Buildings of the Future. Roughly 40% of America's energy is used in buildings, and much of it is wasted. Speakers will discuss how pioneering energy efficiency techniques and practices can be brought into widespread use and how can they be made more cost-effective.

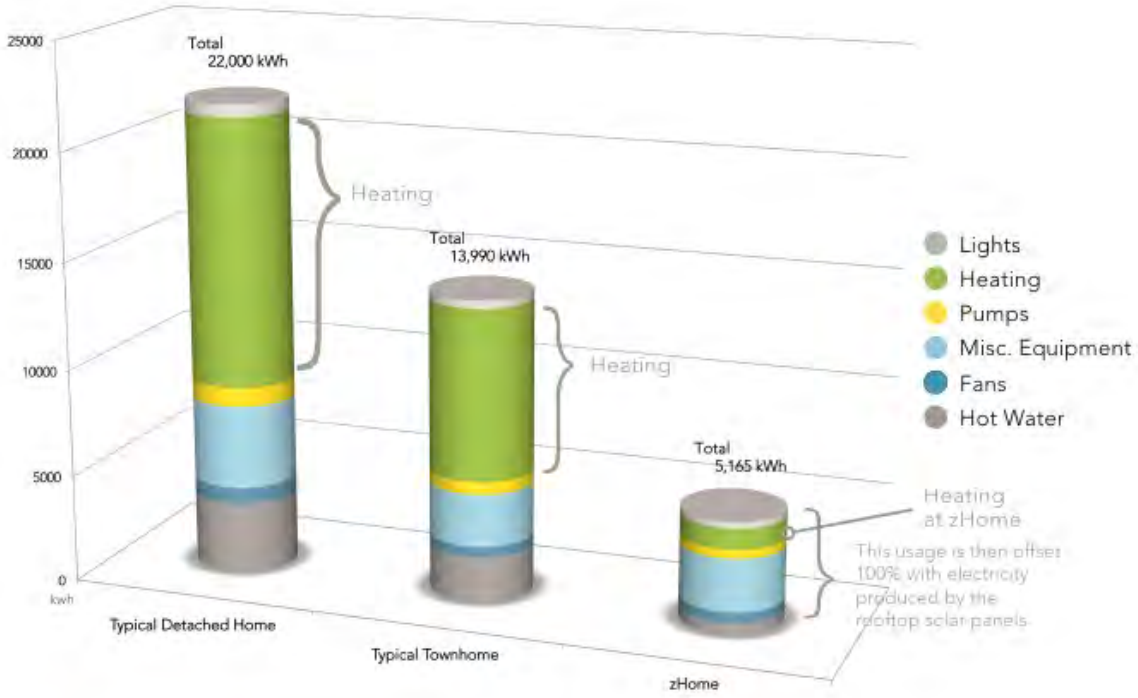
zHome Educational Tour Signs

October 8th, 2011 - Posted By: Elizabeth

zHome Signs 1

BUILDING LOADS

Comparative energy use between an average new detached home, an average new townhome, and zHome.



What does this chart show us?

- Energy efficiency is the primary strategy zHome uses to achieve zero net energy. Many people focus on solar panel energy production, but reducing energy use is the hardest and most important part to achieving zero net energy. There's a lot of room for improvement in a typical new home. zHome has a 65% smaller energy demand per square foot!
- Heating is by far the largest part of energy use of a typical house, and that's where zHome was able to make the biggest reductions.
- The overall load of a typical townhouse is about one third less than a typical detached home. This reduction comes from the reduced size and attached walls.
- After all the energy saving technologies have been installed in zHome, the largest individual load is "miscellaneous equipment" (also called "phantom loads") that represent the things that are plugged into the wall by the resident. Ultimately, achieving zero energy will be in the hands of the zDwellers.

GROUND SOURCE HEAT PUMP

How is the zHome heating system three times more efficient than the best forced-air furnace?

Three efficiencies build into one super strategy.

Stage One:
Using the Earth as a heat source

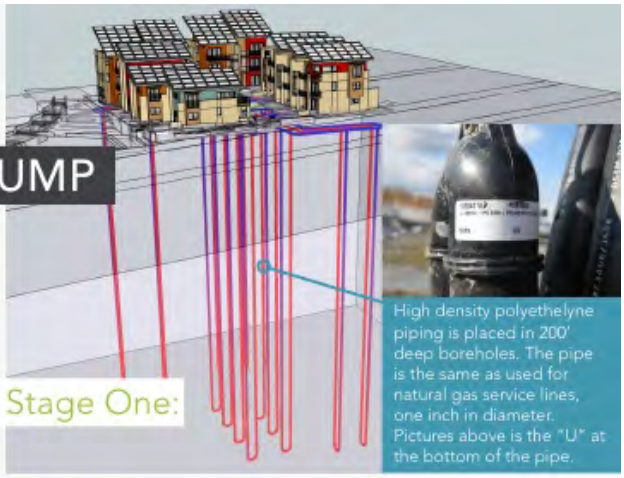
zHome uses 3,000 feet of underground continuous looped pipes, which circulate water, warming it to the ground temperature of 51 degrees. This pre-warmed water is run into the home, where it is further heated. Rather than heating from our cold air temperatures, it's as if zHome is located in a moderate climate that never drops below 51 degrees!

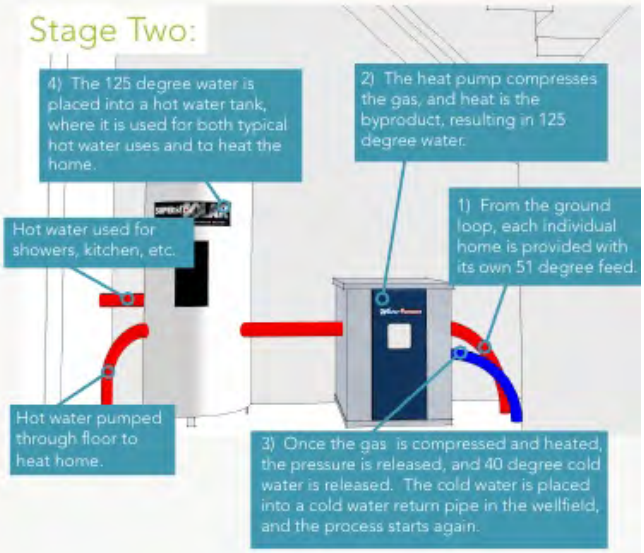
Stage Two:
Using highly efficient heating equipment

A heat pump heats the 51 degree water further to 125 degrees. Heat pumps are highly efficient, by taking advantage of the chemical principle that gas increases in temperature when compressed. This process about doubles the heat energy created for each unit of electricity used by the pump.

Stage Three:
Using water-based heat distribution

Most houses are heated via forced air, but water holds heat much more effectively than air. zHome units are heated with water that runs through the floors. And without any ductwork, there is a reduction in air leaks.





ENERGY

Re-energize your home: Invest in energy efficiency

Improve your comfort

Insulation
If your home was built before 1980, you most likely need an insulation upgrade. Good insulation is an inexpensive way to make a big improvement in home comfort. Insulation performs best when combined with comprehensive air sealing.

Sealing
Air leaks in the home and duct system can be the single largest cause of heat loss. Sealing them can reduce drafts and moisture problems, while making your home more comfortable and energy efficient.

Heating
Your heating system is the largest energy user in your home. Some of your biggest energy savings will come from replacing an inefficient system with an ENERGY STAR heat pump or natural gas furnace.

Water heating
Replace any water heater more than 12 years old with an ENERGY STAR qualified model.

Get the most for your money

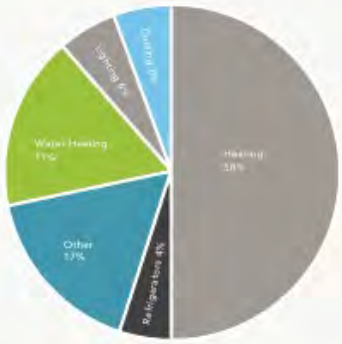
Lighting
Replace incandescent bulbs with ENERGY STAR qualified compact fluorescent light (CFL) bulbs and fixtures. They use 75 percent less energy, last up to 10 times longer and now come in a variety of sizes.

Appliances & electronics
Electronics draw power even when turned off. Plug items like TVs, DVD players and game consoles into power strips that can switched off when not in use. Purchase ENERGY STAR appliances and electronics.

Windows
Double-pane, low-emissivity windows will keep your home warmer in the winter and cooler in the summer. Upgrading is a higher priority for homes with single-pane windows.

ENERGY STAR

Places a typical Northwest home uses energy:



WATER

How to "z" your home using WaterSense!

By making just a few changes, you can save water, save money and preserve our fresh water supplies far into the future. Look for the WaterSense label to help you identify high-efficiency products, which provide the high performance and quality you've come to expect, but have the added benefit of water savings.

WaterSense labeled products:

- Showerheads
- Toilets (check into ultra low flush and dual flush models)
- Faucets
- Clothes washers (Look for an ENERGY STAR model with a low water factor (WF))
- Homes
- Irrigation controllers*

*coming soon!

Check with your local water utility for rebates on appliances, fixtures, irrigation upgrades and more. Free leak test kits, faucet aerators and other resources may be available as well.

Along with using WaterSense labeled products, adopt water efficient practices:

Fix that leak

Leaky faucets that can waste more than 3,000 gallons of water each year. Leaky toilets waste about 200 gallons of water every day.

Make it a full load

High-efficiency washing machines use 30-50% less water per load. Make the most of that water and energy by washing only full loads of laundry. Do the same for dishwashers!

Shower down

A full bath tub uses about 70 gallons of water, while an efficient 5-minute shower uses 8-12 gallons.

Turn it off

A typical faucet flows at two gallons per minute. Turn off the tap while brushing your teeth.

Water wisely

Typical homes use 30 percent of their total drinking water outdoors for irrigation. As much as 50 percent can go to waste due to evaporation or runoff caused by overwatering. Use drip irrigation, shrink your lawn and select plants that are right for your site – and you won't need as much water for irrigation.

EPA WaterSense PARTNER

MATERIALS

How to "z" your own home with green materials!

It can be overwhelming to choose from the many available building products for your own home. zHome materials were selected using performance and environmental criteria to reduce the impacts of the building.

Specifically, zHome materials were selected because they helped support local economies; were recyclable at the end of their life; conserved natural resources in their harvest or manufacturing; and/or were healthy for the manufacturing staff and homeowner.

zHome also proves that deep green materials don't compromise aesthetics or cost more. At zHome, materials were minimized and structural elements were used as a finish. This provides a cutting edge "modern organic" aesthetic at a price any homeowner can afford.

There are often tradeoffs when selecting materials, and there aren't always clear answers. When searching for materials for your own home, consider the following options:

- Don't replace it until you need to. Keep existing materials working for you for as long as you can, or refurbish what you have. This minimizes waste, natural resource consumption and the environmental impacts associated with new material transportation. However, if the product uses significantly less energy or water, the environmental benefits of increased efficiency usually outweighs the impact of producing the new product.
- Reuse what you can. Whether it is from your own home or from recycled house-part stores, find creative ways to reuse existing materials. Turn gym bleachers into floors, find an antique claw foot tub, re-stain that antique desk and you have both style and a great story.
- Recycle construction waste from your house projects. Much of the waste thrown into landfills can be re-manufactured into building products, lowering the amount of new resources needed.
- Use Forest Stewardship Council (FSC) certified wood – which ensures that a forest is managed based on ecologically-sound principles and remains a viable ecosystem – while also allowing wood harvest. FSC products bear the FSC logo and are readily available in flooring, decking, framing lumber, sheathing, window frames and trim.
- Look for materials with recycled content. The less raw material that has to go into a new building product, the lower the environmental impact. You can find countertops made from recycled glass or recycled paper; tile made from recycled glass and porcelain; recycled wood fiber decking and siding; and even recycled gypsum in drywall.
- Buy products that are manufactured or harvested locally. Locally manufactured materials help to support local economies and lower the carbon footprint of a product by reducing the distance it is shipped.
- Choose materials that last a lifetime. Highly durable products go a long way to reducing the amount of resources we consume over time, because they have to be replaced less frequently. Challenge yourself: Can you find an appropriate product that will last 100 years?
- Look for products with a green certification. Third-party product certification means that a product is recognized as sustainable by an independent entity. Certifications include Built Green, Greenseal, CRI Green Label+, Greenguard, ENERGY STAR, WaterSense and FSC. In a market where it can be tough to tell the difference between a truly green product and just green marketing, looking for a certification can help.
- Research the products you like and ask about them. Ask suppliers and retailers about their environmental products and values. The more frequently consumers ask, the more likely manufacturers and suppliers will be to provide more green choices.
- Design for disassembly, which ensures that materials can be reused in a future life should the project ever be deconstructed. An easy way to design for disassembly is to use fasteners, like screws, instead of adhesives.
- Reduce the number of materials used in your project by designing construction materials as finish. For example, concrete can be used as building structure and finished flooring.
- Use rapidly renewable products, which are manufactured from plants that grow in a 6-10 year lifecycle. Because they are non-petroleum based, they easily biodegrade at the end of their lifespan. Examples include cork, sisal and bamboo.

MATERIALS

How to "z" your own home for a healthy indoor environment

- Clean your home. Regular cleaning will prolong the life of your new green materials, and keep your indoor air healthier. Use green cleaning products. Remove shoes before entering the house and consider walk-off mats. Shoes track in all sorts of unhealthy things, including dirt, toxins and petroleum products.
- Use low toxic and low VOC paints and finishes, which reduces the amount of chemicals that off-gas from a product and makes for healthier indoor air. They are safer to handle, easier to clean up and do not emit harmful fumes as they dry. Look for paints and finishes that bear the Green Guard or Green Seal label.
- Avoid thick wall-to-wall carpeting. Use tile, wood and linoleum. If you must have carpet, use less dense "Berber" carpets. Wall-to-wall carpet traps dust, dirt and other tracked-in toxics and allergens, releasing them slowly with every step.
- Avoid products containing urea-formaldehyde, especially particleboard or medium density fiberboard (MDF). Urea formaldehyde is a frequently-used building adhesive that can create respiratory issues and may cause cancer. If you have a lot of particleboard (cabinets, shelves, trim, etc), it should be sealed with a laminate or vapor barrier sealer. Also avoid furniture made with particleboard and fabric coated with "stain guards."

  Consider these greener options:

  - Formaldehyde-free MDF made with exterior-grade resins for added durability
  - Agricultural fiber panels such as wheatboard or strawboard
  - Forest Stewardship Council (FSC) certified exterior grade plywood made with phenol formaldehyde-based glue, rather than harmful urea formaldehyde-based glue
- Avoid toxins (pesticides, solvent-based paints, etc.) in your house. Store any potentially toxic materials in airtight boxes in an outdoor storage unit or in a detached garage. Over time, these toxins can migrate out of their containers and then move around inside the home.
- Open windows and doors, operate window or attic fans (when the weather permits) or run a window air conditioner with the vent control open to increase the outdoor ventilation rate.
- Use bathroom or kitchen fans that direct exhaust outdoors. This removes contaminants directly from the room where the fan is located, and also increases the outdoor air ventilation rate.
- Avoid wood-burning fireplaces, which contribute to poor indoor and outdoor air quality and are the least efficient way to heat your home (90% of the fire's heat goes up the stack). Change to a certified wood stove, a wood pellet stove or a high-efficiency gas fireplace.
- Install a carbon monoxide (CO) detector near your wood- or gas-burning stove or fireplace that warns occupants when CO levels reach unhealthy levels. They are inexpensive and relatively easy to install.

Retail resources for green materials:

- Green Depot
- Green Home Solutions
- Lowe's
- McClendon Hardware
- ProBuild
- ReStore
- Second Use
- Seattle Habitat Outlet (Habitat for Humanity)

YARD

Green your yard!

Creating a more natural landscape reduces use of water and chemicals. Plus, a natural landscape retains more water than a lawn, and can recharge groundwater and streams during droughts.

Follow the zHome path:

Use native plants, remove unneeded lawn and add compost to your soil

- Select plants that grow well in the Northwest, and consider the sun, soil and water available in your yard before planting.
- Mix lots of compost into your existing soil, which holds rainwater and gives plants lots of natural nutrients.
- Replace some or all of your lawn with native plants. They require less care, and they can be a home for native wildlife.

If you decide to keep some lawn, use natural lawn care

Weed and feed products spread herbicides and fertilizer over your entire lawn. These chemicals end up in our lakes and streams. Children are especially sensitive to pesticides, which may cause cancer. Frequent use of chemicals also damages native organisms that help keep your lawn and soil healthy.

Keep water on site with a rain garden

Rain gardens are areas of deep organic soil, with wet tolerant plants, where the rainwater can seep back into the ground like it did before the site was cleared. Roof and driveway runoff can be channeled to these areas, rather than into the storm drainage system, which often discharges directly into salmon streams with no treatment.

Create a backyard wildlife sanctuary

You don't have to use feeders. Choose plants that provide berries, food and shelter, which will attract many friendly birds to your yard. Nest boxes are also easy to install.

Plant a vegetable garden

Growing your own food gets you closer to natural rhythms and saves on the environmental impacts of food transportation. Get closer to the Earth, plant some seeds and watch them grow.

EFFICIENT USE OF MATERIALS

The materials that go into any building have an impact on both the environment and the quality of the indoor environment.

Construction and demolition waste constitutes about 45% of the total solid waste stream nationwide. To protect the environment, the zHome team worked to reduce, reuse and recycle building materials:

Reduce

The greenest material is one that isn't used. Using fewer materials means fewer impacts from manufacturing, transportation and waste disposal.

Reuse

Reusing existing materials prevents the negative environmental impacts of the harvest or extraction of new materials. Salvaged materials can also reduce costs and add character to the building.

Recycle

Recycling helps prevent pollution by keeping waste out of landfills and incinerators, and lessens the demand for raw materials.

Strategies utilized at zHome

- zHome recycled over 90% of its waste from construction. That's more than 164,175 pounds diverted from landfills!
- Many "extra" products were repurposed right on site and transformed into key features in the project. For example, framing elements were reused for the trellis and handrails.
- Locally manufactured or harvested materials include sheathing, framing, roofing, sheetrock, concrete, siding, cabinets and flooring.
- Prefabricated panelized foam components reduced wasted material from cutting.
- Exposed beams are beautiful, and they "save" materials by not requiring additional materials to cover or finish them.
- Reclaimed wood was used as a butcher block for the kitchen countertop.
- The concrete elements used a high percentage of flyash, a waste product from coal plants (zHome used 30% while typical is 5-10%).
- The sheetrock contains 50% recycled content.

zHome was designed to minimize the use of materials through the whole project lifecycle.

FOREST STEWARDSHIP COUNCIL (FSC)

The Forest Stewardship Council (FSC) is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world's forests and forestry products.

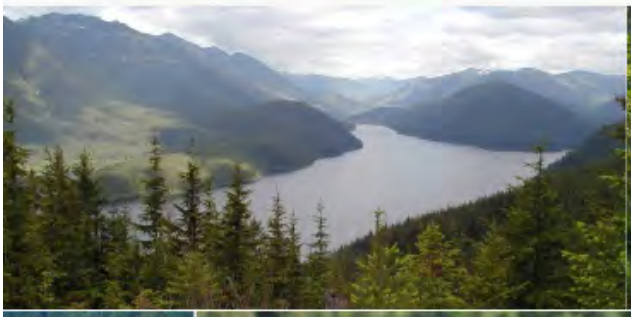
Established in 1993 as a response to concerns over global deforestation, FSC is the pioneer third-party system for responsible forest management. FSC is the only global certification system in which forest management practices are evaluated by an independent third party according to strong social, environmental and economic standards.

Driven by strong market demand for responsible forest products, FSC is the fastest growing forest certification system worldwide with more than 140 million hectares in over 80 countries. In 2011, FSC chain of custody certification surpassed 20,000 certificates. The green building industry can take a lot of credit for increasing the demand of these products.

Green building is booming in the United States. By 2013, green building is expected to represent 25 percent of all commercial and institutional building starts and 20 percent of residential construction. Programs like Built Green encourage the use of FSC wood and consider it the highest standard of certification in today's wood market. FSC certified wood was found to be the most commonly specified green building product in McGraw-Hill's database, even surpassing the Energy Star label.

zHome set a benchmark of 25% FSC wood and exceeded those goals by purchasing over 78% FSC wood products for the project. FSC certified lumber products for zHome include:

- Framing lumber
- Flooring
- Cabinets
- Butcher block counters
- Decking
- Trellis and fence materials






LOCAL/REGIONAL MATERIALS AND DURABILITY

Local products

Buying locally manufactured or assembled materials and products helps support local economies and lowers the carbon footprint by reducing transportation. Generally, products are considered local if they are manufactured or assembled within 500 miles of the project site.

Durability

When selecting a building material, look for time-tested materials such as linoleum, metal roofs or wool carpet. Durable materials can reduce maintenance and replacement costs, and extend the history of the building.

zHome materials sourced locally:

- Solar panels – Hillsboro, Oregon
- Framing lumber - Forest Grove watershed, Oregon
- Roofing – Portland, Oregon
- Concrete – Snoqualmie, Washington
- Siding – Tacoma, Washington
- Sheetrock – Tacoma, Washington
- Cabinets – Lynnwood, Washington
- Rainwater cisterns – Vancouver, Washington
- Metal railings and stair stringers – Seattle, Washington
- Butcher block countertop – Olympia, Washington
- Aluminum ventilation panels – Wenatchee, Washington
- Doors – Grants Pass, Oregon
- Topsoil and compost – King County, Washington
- Pre-grown green roof - Cornelius, Oregon
- Landscape plants – Oregon and Washington

zHome materials chosen with durability in mind include:

- Siding with a 50-year warranty
- Roofing with a 40-year warranty
- FSC hardwood decking
- Woven bamboo flooring
- Solid surface countertops made with recycled content
- Aluminum and glass railings
- Fiberglass windows and doors
- Concrete floors
- Concrete pavement and walls
- Fiberglass exterior doors
- Metal garage doors and ventilation panels
- Pump-based heating system
- Stainless steel and aluminum solar panel racking
- Tempered glass and aluminum solar panels

Solarworld solar panels from Hillsboro, Oregon.

TOXICITY

Americans, on average, spend approximately 90% of their time indoors, where the concentrations of some pollutants are often 2 to 5 times higher than typical outdoor concentrations.

Most pollutants affecting indoor air quality come from sources inside buildings, although some originate outdoors.

Common indoor pollutants include:

- Formaldehyde
- Particulates
- VOCs
- Carbon monoxide
- Mold
- Radon

Most products that are applied wet and dry later on give off volatile organic compounds (VOCs) . They are emitted by thousands of products. Examples include: paints and lacquers; paint strippers; cleaning supplies; pesticides; building materials and furnishings; office equipment such as copiers and printers; correction fluids and carbonless copy paper; graphics and craft materials including glues and adhesives; permanent markers; and photographic solutions. That new carpet or new car smell is one indication of VOCs, but VOCs don't always have an odor. Concentrations of many VOCs are consistently higher indoors (up to 10x higher) than outdoors. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects.

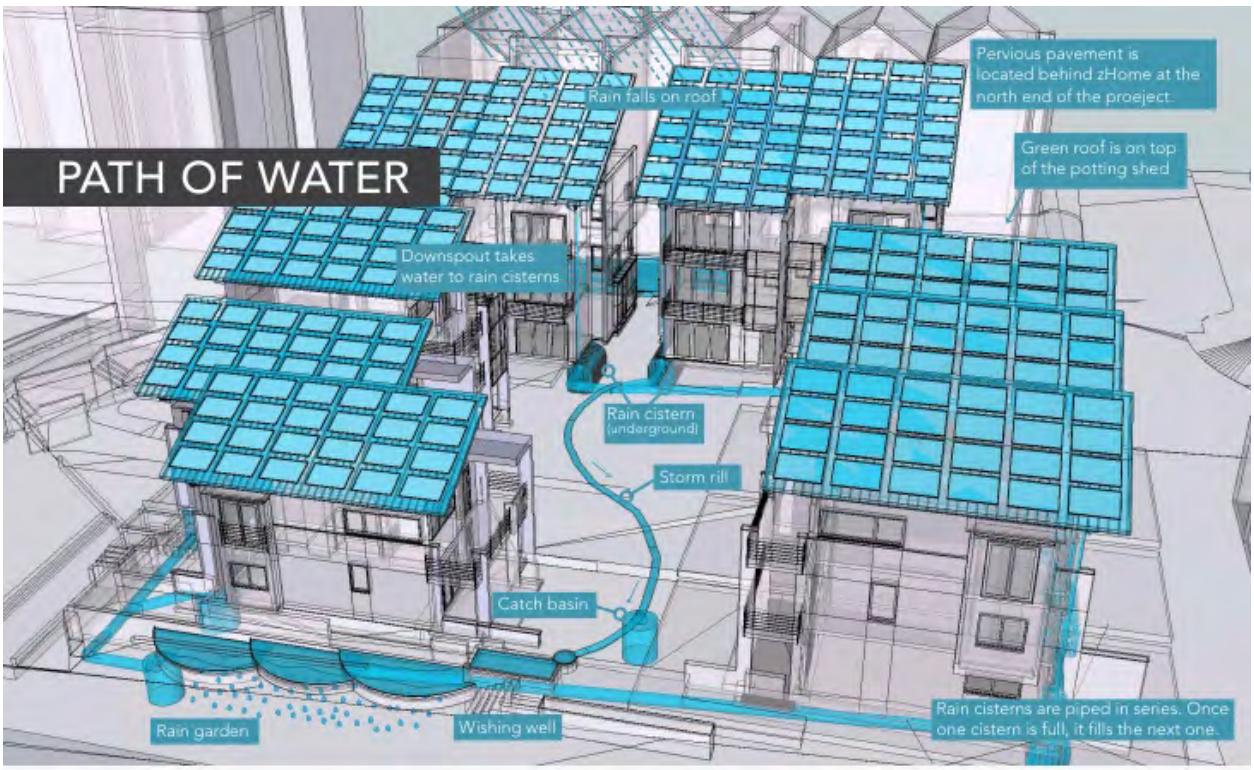
Strategies utilized at zHome

- Use of Greenseal and GreenGuard certified low or zero VOC paints
- Use of plant-based or Greenseal, or GreenGuard certified adhesives, floor finishes, caulks and sealants
- No urea-formaldehyde products used in interior spaces
- Homes are ventilated continuously for one week after final finishes are applied and prior to occupancy
- Minimal vinyl
- The cars/garages are isolated/sealed from the units and are vented to the outdoors
- Use of passive ventilation with architectural perforated screens
- Built in track-off mats are installed at the entrance of each zHome

Low VOC paints meet the 50 g/L VOC threshold, with many paints doing better than this.

GREEN SEAL CERTIFIED

GREENGUARD® Indoor Air Quality Certified



In a typical development, storm water collects in large detention ponds or vaults, where it is piped to local streams and rivers. This requires significant infrastructure and can contribute to local water quality problems. In green construction, Low Impact Development (LID) works with nature to manage storm water close to its source.

SALMON SAFE

zHome is the first residential community in Washington to be certified as Salmon Safe. Salmon Safe certification requires design and mangement practices that protect water quality and downstream fish habitat, such as infiltration stormwater on site, and landscaping with native plants, and avoidance of irrigation and pesticides Everywhere in the watershed matters to the survival of our native salmon.

= the flow of water of through zHome

Low Impact Development features at zHome

- Preserve natural landscape features
- Create drainage that treats storm water as a resource, not just waste
- Put water back into the ground close to where the rainwater falls

Rainwater runs off zHome roofs, and flows through downspouts into rain cisterns, where water is collected and stored. The overflow water flows down a storm rill and into a rain garden, where it is absorbed back into the ground.

Green roof

The potting shed at zHome has a green roof, which is covered in plants to absorb rainwater.

Rain cisterns

There are 10 rain cisterns at zHome. They range in size from 1,000-1,800 gallons. This water is stored and used for flushing toilets and washing clothes.

Pervious pavement

zHome uses a pervious pavement that allows water to run through it.

zHome PARTNERS

zHome

Sponsored by:

CITY OF ISSAQUAH

Built and developed by:

ICHIJO Technological Homes

Matt Howland

In partnership with:

King County GreenTools
Powered by the Solid Waste Division

PB PORT BLAKELY COMMUNITIES
Integrity and Innovation since 1864

BUILT GREEN

PSE PUGET SOUND ENERGY
The Energy To Do Great Things

WASHINGTON STATE UNIVERSITY
EXTENSION ENERGY PROGRAM

BUILT GREEN

Built Green™ is a rating system that scores and certifies environmentally-friendly housing. By including features to lower its environmental impact, a home can earn between 2 to 5 stars.

The number of stars is determined by the number of requirements met, and the total point score on the Built Green checklist.

Built Green 5-Star	zHome
Minimum 500 Points	850 Points
Minimum 30% more energy efficiency than code	zero energy = 100% more efficient than code
Minimum 125 points in Site and Water	158 Points
Minimum 1/3 of hardscapes must be pervious	35% of hardscapes pervious
Use drought tolerant plants in landscaping	✓
Use only low flow faucets	✓
Use only low VOC paints	✓
Ventilate home after each new wet finish	✓
Provide walk off mat at front door	✓
Amend soils to 10-12 inches to ensure landscaping health	✓
Limit grass in landscaping to less than 25%	No grass used in landscaping
Retain 30% of trees on site	There were no trees on zHome site
Pre-wire for future solar panels	4.9 – 7.1 kw of solar panels installed (varies between units)
Garage detached or air sealed from home	✓
Use only plywood and composites with no added formaldehyde	✓
Use a minimum of 10 materials with recycled content	zHome used 22 materials with recycled content

Built Green certifications

Built Green has certified nearly 20,000 homes in King and Snohomish Counties since the program started in 1999.

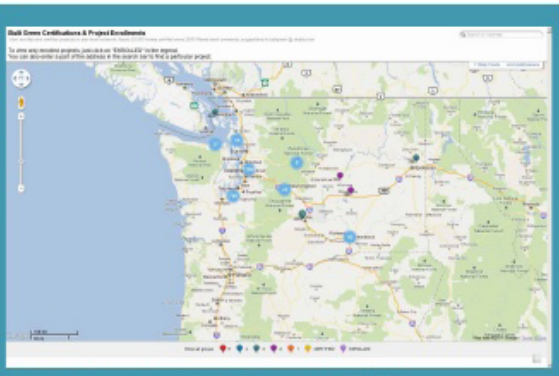
Total number of homes certified: 19,778

- Total 1-Star homes: 266
- Total 2-Star homes: 2883
- Total 3-Star homes: 15338
- Total 4-Star Homes: 1198
- Total 5-Star Homes: 92
- Total Zero Energy Homes: 10 zHomes!

City with the most Built Green homes: Seattle (5795 units).

Certified homes in the City of Issaquah: 1802

Estimated annual kilowatt hour savings of Built Green homes: 5.9 million



To find out if your home is certified, or see the Built Green certified homes in your neighborhood, visit Built Green's map of certified and enrolled projects.

BUILT GREEN®

★ ★ ★ ★ ★

zHome Built Green™ Vital Stats

zHome	
Star Level: 5-Star Checklist: Single Family (v.2007) Certification awarded Sept 14, 2011	
Section	**Points**
Site and Water	158
Energy Efficiency	265
Indoor Air Efficiency	175
Material Efficiency	175
Home size multiplier	77
Total Score	850

zHome DESIGN TEAM

zHome

Project Architect:

DAVID VANDERVORT ARCHITECTS AIA

Energy consulting and modeling:

WSP · FLACK+KURTZ

Mechanical Engineer:

Stantec

Civil Engineeer:

CORE DESIGN

Landscape Architect:

Darwin Webb landscape architects, p.s.

Structural Engineer:

HSV Harriott Smith Valentine Engineers Inc.

Rainwater/low impact stormwater:

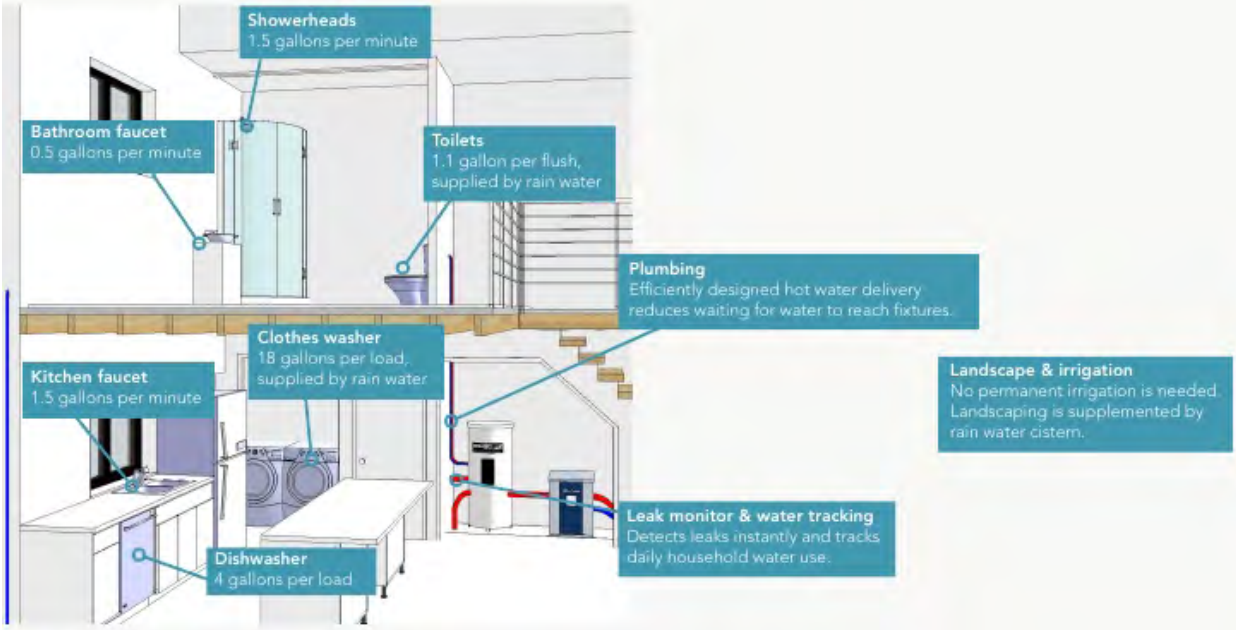
2020 ENGINEERING

WATER CONSERVATION

WaterSense for Homes

The EPA's WaterSense program labels plumbing fixtures, and now homes. To be eligible for a label, a WaterSense home must reduce water use by 20%. zHome is the first WaterSense certified project in the State of Washington.

z-Home goes further, achieving a remarkable 70% reduction using the following strategies:



EPA WaterSense PARTNER

SOLAR ENERGY

Solar electricity is generated using photovoltaic (PV) cells, which convert sunlight into electricity. Grid-tied PV systems, such as at zHome, provide power that is compatible with the utility grid and can be interconnected easily.

Did you know?

- Federal and State incentives support the investment in solar electricity.
- You can use renewable energy while enjoying the benefits of reliable grid power.
- As more people install renewable energy systems, we reduce our reliance on new power plants to meet the growing energy demands of our region.

How does zHome's solar energy system work?

Like almost all systems these days, zHome's solar systems are tied to the electric grid. Each zHome includes enough solar cells to generate the same amount of energy the unit is expected to use over the course of a year. The larger units are expected to use more power and thus have more panels. Individual unit arrays range from 4900 to 7100 kwh – considered quite large for a residential installation.

zHome's cells are regionally made in Hillsboro, Oregon

Solar cells are the basic building blocks of a PV system, consisting of semiconductor materials made of silicon crystals grown from very pure sand. When sunlight is absorbed by the silicon, the solar energy knocks electrons loose from their atoms. This is called the "photoelectric effect." These free electrons then travel into a circuit built into the solar cell to form electrical current. Only sunlight of certain wavelengths will work efficiently to create electricity. PV systems can still produce electricity on cloudy days, but not as much as on a sunny day. zHome's solar cells are made by Solarworld in Hillsboro, Oregon.

zHome microinvertors, visible on back side of solar trellis

A power inverter converts the DC output of the PV cells into usable AC output that can be fed directly into the home or business and the utility grid. In many systems, a number of cells wired together run through one larger inverter, operating as an single unit. At zHome, each cell has its own small inverter, called a microinverter. This provides greater system efficiency and reliability, because if one cell is dirty or damaged, it doesn't impact production of adjacent cells.

Net meters for three zHomes

Production meters three zHomes

Two meters are provided for each unit - a production meter and a net meter have been installed by PSE. The production meter measures the total solar production of each home. This enables the 15 cent/kwh production incentive to be determined. The net meter shows monthly net power usage. This will run forwards and backwards, and at the end of the month be positive or negative, resulting in either a charge or a credit.

THE ROAD TO ZERO

Each of the following strategies help zHome achieve zero net energy and carbon neutrality:

CONSERVATION

- 25% Ground source heat pump
- 15% Super insulated walls
- 7% Hydronic heating
- 7% Highly efficient appliances
- 5% Super tight air sealed envelope
- 5% Highly efficient lighting
- 5% Good windows
- 3% Heat recovery ventilation

PRODUCTION

- 33% Solar panels

= Zero net energy and carbon neutrality

PERVIOUS PAVEMENT

A porous concrete pavement that allows water to permeate directly into the ground instead of running off into storm drains.

Pervious paving is also a more efficient use of land, as it removes the need for stormwater ponds and facilities.

Benefits of pervious pavement: When it rains, it drains!

zHome uses pervious paving to allow storm water to permeate through to the soil. Here, it is naturally filtered and pollutants are removed. Oil and gas pollutants are oxidized, volatized and dispersed in the top layer of the pervious concrete. This also recharges groundwater, which is particularly important in an area like Issaquah, where drinking water is pumped from the ground.

Pervious pavement is a solution to storm water pollution.

Storm water runs off of paved roads, driveways, and yards and flows to our streams and the Puget Sound. Storm water carries common pollutants like pesticides, fertilizers, motor oil, detergents and pet waste.

GREEN ROOF

A roof covered with plants over a waterproof membrane.

Green roof on top of zHome potting shed/ recycling center. View this roof from the sales unit's center balcony.

Absorbs rainwater
Rain is absorbed by plants or evaporates back into the atmosphere. Green roofs can reduce storm water runoff by 50-90%.

Provides insulation
The vegetation absorbs heat during the day, and retains it at night. This helps reduce the amount of energy needed to heat and cool the building.

Creates habitat for wildlife
Green roofs can encourage wildlife (such as butterflies, birds and insects) to stay in urban areas.

Lowers urban air temperature
Green roofs cool and humidify the surrounding air. In contrast, a normal roof absorbs heat that is radiated back into atmosphere, causing urban areas to heat up.

Improves aesthetic value
Green roofs improve the look of a flat roof while creating natural amenities.

Increases roof life span
Because the vegetation is placed on top, the roof membrane underneath is protected from climatic and physical damage.

DROUGHT TOLERANT LANDSCAPNG

The typical household uses at least 30% of its water outdoors for irrigation. zHome's landscaping uses drought-tolerant and native plants that won't require any watering once they're established.

Soil in the Northwest can be hard-packed and full of clay. Amending the soil with compost can create a more fertile soil that drains better.

Amended soil:
Bottom 2": Compost tilled into existing soil

Top 10": 70% topsoil and 30% compost mix

Cedar Grove topsoil
- 50% compost and 50% sand
- Improves the poor quality of native soil
- Sand provides necessary drainage

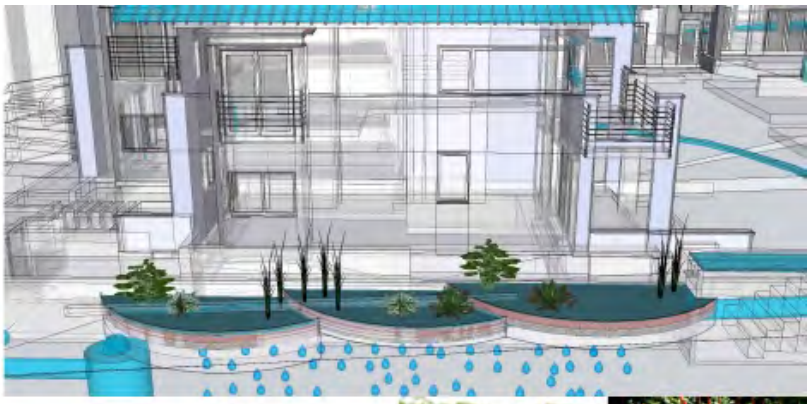
Cedar Grove compost:
- Made from locally recycled garden and vegetable trimmings
- Provides nutrients and organic matter to increase plant growth
- Increases capacity to hold water during dry months and reduces runoff during wetter months
- Reduces fertilizing and watering needs
- Makes weeding easier

Some plants at zHome:

Native plant salvage. Many native plants at zHome were harvested for reuse from Ichijo's future development site about a mile away.

RAIN GARDEN

This rain garden includes a deep layer of gravel under the soil, which allows the water to filter directly into the ground. Nearly all the rain water that falls on the site – except for portions that go into the rainwater re-use system – ends up here or drains into the alley.

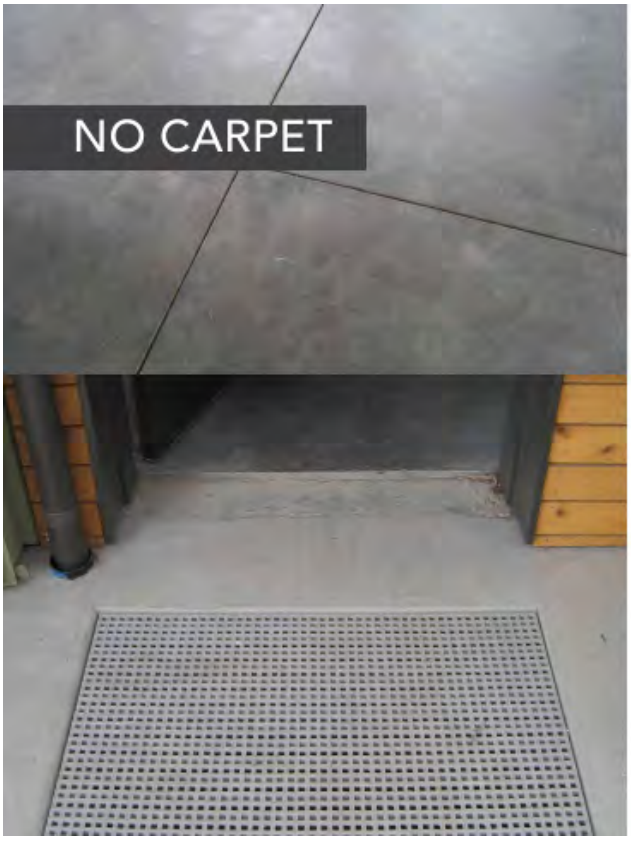


Benefits:

- Provides better water quality by filtering runoff pollution. This prevents pollutants from entering storm drains and eventually streams.
- Conserves water through less irrigation
- Recharges local groundwater
- Enhances landscape
- Creates habitat for wildlife

Rain gardens may either be more urban (such as zHome's) or more natural in aesthetic. Despite the variety in appearances, rain gardens all serve the same function.

NO CARPET



A large amount of indoor air pollutants are tracked in on the bottom of shoes. Carpets trap pollutants indoors, causing air quality problems. By not installing carpet, you reduce material usage and toxic byproducts, and what eventually might become landfill waste. Also, solid surface floors are easier to clean!

Strategies utilized at zHome

- Hard surface concrete and bamboo flooring – no wall-to-wall carpet
- Built in track-off mats are installed at the entrance of each zHome

CONSTRUCTION RECYCLING

SOURCE-SEPARATED RECYCLING is the process of separating recyclable materials as they are generated on the job site. The separated materials are hauled directly to a recycling facility or transfer station that accepts the specific materials.

CO-MINGLED RECYCLING is the process of mixing recyclable materials in one container onsite. The container is taken to a material recovery facility, where materials are separated for recycling.

zHome sent some materials to be reused:

- EPS (expanded polystyrene) was sent to VG Recycle where they sell it to packaging manufacturers for reuse.
- Shipping pallets were reused for interior framing/ blocking (handrails,hardware, etc) on site.
- Slurry was sent to Pacific Topsoils to be reused for soil amendments.
- Concrete demolition debris was sent to Renton Concrete Recyclers.

Strategies utilized at zHome

- Use salvaged plants from offsite
- The majority of the waste produced in the building process is a combination of wood, cardboard and scrap metal, all of which are easily recycled if kept separated. zHome was able to successfully recycle or reuse over 90% of its construction waste through source-separated recycling and co-mingled recycling:

Source-separated materials

- Concrete
- Plastic film
- Field office waste
- Clean wood
- Metal
- Clean drywall scraps
- Cardboard
- Rock and soil

Co-mingled construction waste was taken to a material recovery facility with a minimum of 75% diversion/recycling rate

MOISTURE CONTROL

With the Pacific Northwest's wet climate, mold can hide in homes at any time of the year, especially in damp places like basements, attics and bathrooms. Moisture trapped in unventilated areas causes mold, which reduces indoor air quality and impacts occupant health. Current evidence indicates that the most common symptoms caused by molds are allergies.

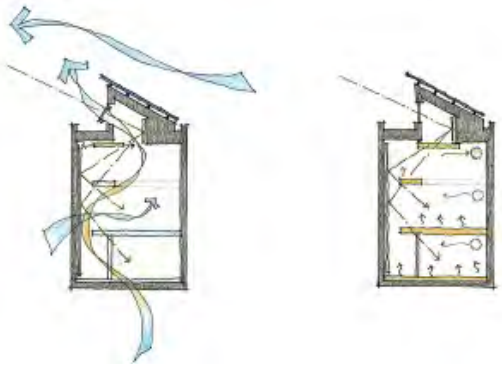
More serious health issues have been linked to various types of mold in individuals with weaker immune systems. Preventing moisture from getting trapped in the wrong places and proper ventilation are key to keeping mold growth under control.

Strategies utilized at zHome

- Prior to the installation of insulation or interior coverings, all wood products were inspected for mold and fungus by a third-party inspection agency.
- Metal flashing and waterproofing techniques were detailed carefully to ensure the water intrusion is minimized.
- Broad eaves at zHome not only provide more space for solar panels and rain collection, but also keep rain off of the building.
- A rainscreen under the siding helps the moisture underneath evaporate and prevents mold from growing in that space.

VENTILATION

Optimal ventilation makes a home fresh and comfortable. Having a tight building envelope means that energy efficiency is high since the amount of outdoor air "leaking" in is minimized. But if too little outdoor air enters a home, pollutants can accumulate to levels that can pose health and comfort problems.



Outdoor air enters and leaves a house by: infiltration, natural ventilation, and mechanical ventilation.

Infiltration: Outdoor air flows into the house through openings; joints; and cracks in walls; floors; ceilings; and around windows and doors.

Natural ventilation: Air moves through opened windows and doors. Air movement associated with infiltration and natural ventilation is caused by air temperature differences between the indoors and outdoors, as well as by wind.

Mechanical ventilation: Examples include outdoor-vented fans that intermittently remove air from a single room, such as bathrooms and kitchens, to air-handling systems that use fans and duct work to continuously remove indoor air and distribute filtered and conditioned outdoor air to strategic points throughout the house.

zHome was tightly sealed to help with energy performance – twice what is required by code. It is tight enough that typical natural ventilation and even whole house fans won't work because the home is so tight that the whole house fan can't pull air out of the house with limited intake leaks. The following strategies were utilized by zHome to ensure adequate ventilation and air quality:

Strategies utilized at zHome

- Actively ventilated home via an air to air heat exchange system
- Garages semi-open to the outside which allows passive ventilation
- Duct openings covered during construction
- Thorough cleaning of ducting prior to occupancy
- Heat recovery ventilator acts as a whole house fan
- 0.20 air changes per hour (ACH)
- For summer months, zHome was specifically designed to naturally ventilate using stack effect. The high clerestory and lower doors are intended to be opened to allow air to rise through the units with a natural suction.

WATER USE

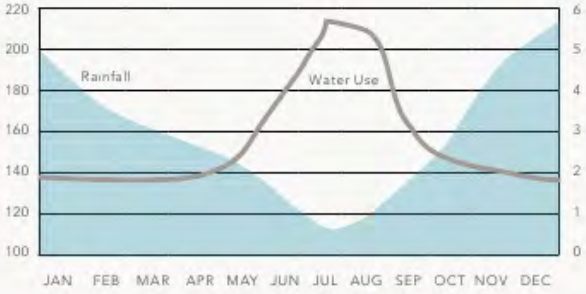
Average daily water use per person

zHome – 29 gallons

Typical new construction – 77 gallons

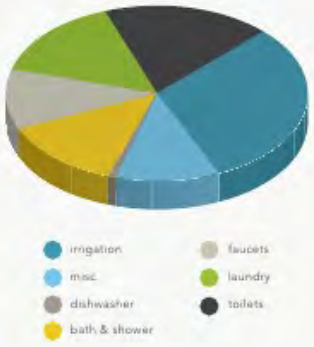
Typical existing homes – 101 gallons

The summer water crunch



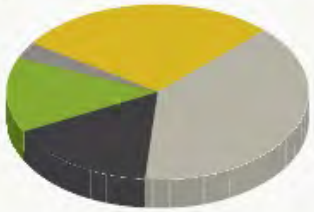
U.S. Average

101 gallons per person per day



zHome

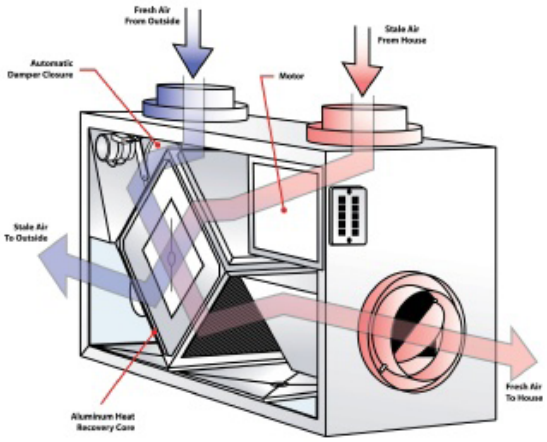
29 gallons per person per day / laundry and toilets supplied by rainwater



HEAT RECOVERY VENTILATOR

Providing fresh air while saving energy!

To save energy, each zHome is very tightly sealed (twice what is required by code). This prevents cold air from leaking into the home. Very tight homes need to pay extra attention to providing good ventilation. In zHome, fresh air is brought into the home by a heat recovery ventilator (HRV). HRVs exhaust warm, stale air and pull in fresh, cold air. Inside the HRV, a honeycomb heat exchanger transfers the heat pf the exhaust air to the incoming air, so that it is closer to a comfortable indoor air temperature. Throughout each zHome, supply and return air is transported in very small ducts which are about ¼ the size of a traditional forced air ducting system.



Mitsubishi i-Miev visits zHome during construction

ELECTRIC VEHICLE

Why electric vehicles?

EVs are a breakthrough in reducing the environmental impacts of driving. Vehicles that run on petroleum pollute the air with CO_2 and other toxins.

Although some of the electricity used in EVs comes from coal and natural gas burning power plants, the amount of CO_2 emissions resulting from EVs is nearly two thirds less than conventional vehicles. In the Pacific Northwest, where very little of our electricity comes from burning petroleum products, EVs cause even less indirect pollution.

Vehicle Type	CO_2 / mile
gasoline vehicle	380 grams
electric vehicle	140 grams

Based on national average

An added benefit of EVs are the avoidance of toxic oils and gas which come from petroleum based vehicles. Oil drips, splashed gas at the pump, and car washing all impact our waterways and salmon.

Today's electric vehicles can travel at the same speeds as conventional vehicles and provide the same safety and performance. Newer vehicles have a minimum targeted range of 100 miles when fully charged. While this is shorter than the range on most conventional vehicles, according to the U.S. Federal Highway Administration, more than 90% of all household vehicle trips in the US are less than 100 miles, making them great commuter vehicles.

Electric vehicles (EVs) use electricity as the only or primary power source. EVs use a battery to store the electrical energy that powers the motor. EV batteries are charged by plugging the vehicle into an electric power source, such as this charging station.


This is a charging station for electric vehicles.

Charging station levels

Charging stations come in three different levels: 1, 2, and 3.

Level	Voltage	Time for Complete Charge	Ownership
One	120	8-10 hours	Primarily residential
Two	240	2-3 hours	Residential, governmental, commercial
Three	480 three phase	20-30 minutes	Governmental and commercial only

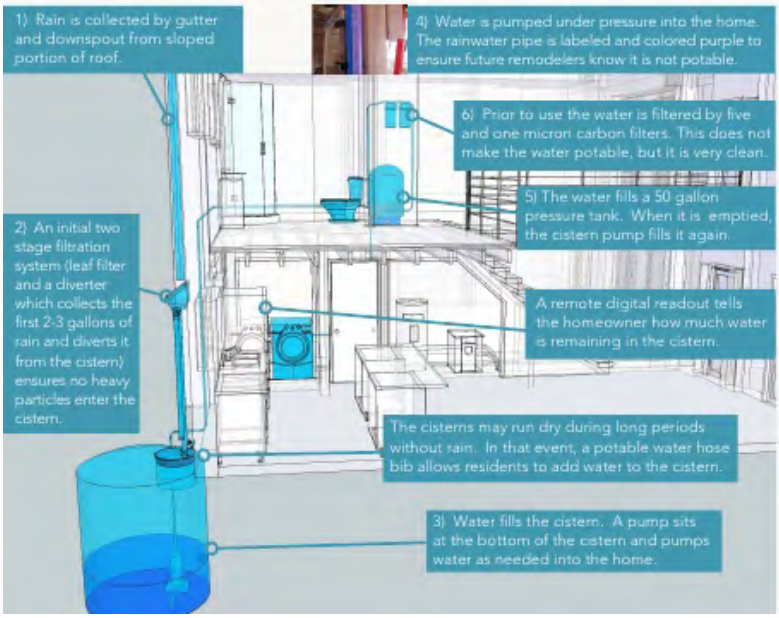
This station includes one Level One and one Level Two outlet.

Why these small parking stalls?

In many parts of the urban area, paved areas exceed 50% of total land area. This car habitat worsens stormwater runoff and creates environments which is more friendly to cars than people. 67% of trips in the urban area include only one person and realistically can be done with much smaller, compact cars. These stalls only accept sub-compact vehicles, allowing residents to reduce the environmental footprint of their cars as well as homes.

RAINWATER REUSE

Each zHome has its own rainwater cistern which provides water for toilet flushing, clothes washing and outdoor uses.



This system is anticipated to save nearly 9,000 gallons a year in each zHome.

1,700 gallon cisterns for units 4-6. Units 1 and 2 have 1,000 gallon cisterns which sit partially above ground, and units 3-10 have 1,700 gallon cisterns which are completely buried.

Big news: come drive the new Mitsubishi i electric vehicle at zHome 10/15 and 10/16

October 9th, 2011

Mitsubishi i visits zHome earlier this year

We have partnered with Mitsubishi to bring you this amazing opportunity to check out this deep green vehicle, with a miles per gallon equivalent of 112. Did I say 112? Yes I did.

So what's the big deal with electric vehicles? A lot, actually. For me, the beauty of EV's is that they are a total game changer when it comes to their carbon footprint per mile. A typical electric vehicle emits 115 grams of CO_2 per kilometer, while a similar gasoline powered vehicle emits about 250 grams per km. Here in the Northwest, the EV amount is even lower since we have a hydroelectric dominated electric system.

I was able to borrow a Japanese spec i over the summer and loved it. It was quiet, quick, and surprisingly roomy given its small size.

zHome also has two super cool Chargepoint charging stations. Many folks have driven to zHome and plugged in during their visit! Check out their usage status here. Whoa, is that for real? The future is here!

Come on down next weekend and test drive an i. If you've been holding out on touring zHome, this is a great time to check out the project and drive a great new low carbon car. Come on down!

zHome Receives WaterSense Certification!

October 18th, 2011

Great news! zHome recently received word that all 10 units have successfully earned WaterSense New Home Certification. These are the first homes in the State, and among the first in the nation, to receive this recognition.

Certification in the EPA WaterSense New Homes Program means that all zHome units have been designed and third party verified to meet high performance water efficiency standards. Water Sense certified homes use at least 20 percent less water than a standard newly constructed home. zHome goes even further, demonstrating an amazing 75% reduction in water use as compared to a typical home. High-efficiency fixtures and good plumbing layout provide superior performance.

Thank you to the Cascade Water Alliance for partnering with zHome to demonstrate the potential of advanced water efficiency strategies. Cascade supported the project with WaterSense labeled toilets, showerheads, and bathroom faucets, and the innovative, real-time water use monitors.

Cascade is a wholesale water provider which serves 400,000 residents and 22,000 businesses in the region. Cascade and its members, including Issaquah, design water conservation programs and services throughout the area. They have a number of excellent programs and rebates.

Come see the pioneering water saving measures at zHome!

zHome Materials, Suppliers, and Subs Information

October 20th, 2011

Z home materials_sub_and_supplier_list

zHome Materials and Suppliers List

Item	Description	Supplier	Contact	Phone	Website
APPLIANCES					
Refrigerator	Stainless Steel, GE Hotpoint® ENERGY STAR® 18.2 Cu. Ft. Top-Freezer Refrigerator, Model No: HTJ18GCTZRSA	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
Range	Stainless Steel, Samsung 30" Freestanding Induction Range Cooktop, Model No: FTQ307NWGX	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
Dishwasher	Stainless Steel, BOSCH Energy Star Integra Dishwasher 4 Wash Cycles, Model No:SHX45P05UCD	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
Clothes Washer	GE® Energy Star 2.2 DOE Cu. Ft. Frontload Washer, Model No: WCVH4800K0WW	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
Dryer	GE® 4.0 Cu.Ft. Capacity Electric Dryer, Model No: DCVH4800EK0WW	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
Microwave	Stainless Steel, Samsung 1.6 Cu ft 1000 Watt Microwave, Model No: SMH8165STE	Fredricks Appliance	Luke Colby	425-885-0000 x107	http://fredericksappliance.com
EXTERIOR					
Decking	2nd Floor: 5/4x6 Tigerwood Decking, FSC	Green Depot	Elliott Kopett	206-315-1974	http://www.greendepot.com/greendepot/
	3rd Floor: Tufflex Waterproofing, 15 year warranty	Spec 9 Services	Ray Weber	206-434-2845	
Handrails	Aluminium Handrail with Clear Tempered Glass	Railpro	Billy Langdon	425-251-5958	http://www.railpro.us/
Doors	Fiberglass Exterior Door, Low-E glass, U-Factor 0.20				
	Pella Impervia Fiberglass Sliding Glass Door, U-Factor 0.30 or below, Double Pane Low-E glass with Argon, Screen				
	Metal Garage Door, Perforated Screens for Passive Ventilation	Cressy Door	Tim	206-632-0533	
Entrance	Built in Walk-Off Mats in Front of Exterior Door				
Reclaimed Lumber		Duluth Timber	Eric	360-766-6253	http://www.duluthtimber.com/
Gutters and Downspouts	Downspout: 3" Round direct connected to cistern intake; Gutter: 5" K-Line G	JS Contracting	Monica	253-631-9021	
Plant Supplier		Pacific Plants	Sarah Fletcher	425-392-6164	http://pacificplants.com/

zHome_Materials_Sub_and_Supplier_List

Soil and Compost	Organic soil composition, organic compost	Cedar Grove	Sarah Klages	206-832-3069	http://www.cedar-grove.com/
Pavers	Abbotsford 18"x18" Texada Natural Sand Set Pavers				
Cisterns	Non Potable System: Submersable Ecos 1200 Pump, 22 Gallon Buffer Tank	Mather & Sons	Scott	1-800-257-1310	http://matherpumps.com
Green Roof Supplier		Green Feathers	Jenny Ruthven	503-207-0269	http://www.greenfeathers.info/
Roofing - Composite	40 year warranty composite shingles (w/ Solar PV panel)	Legends Roofing	Rob	206-255-6366	
Roofing - TPO	15 year warranty TPO (Thermoplastic Polyolefin)	Star Roofing	Vance	425-508-6333	
Siding	Hardie Plank Lap Siding (50 year warranty)/ low VOC paint finish	Dom Construction	Vacek	206-679-5572	
	Hardie Panel Siding (50 year warranty)/ low VOC paint finish	Dom Construction	Vacek	206-679-5572	
	Horizontal Rainscreen 1x4 Tight Knot Cedar Siding/low VOC stain	Dom Construction	Vacek	206-679-5572	
Windows	Pella Impervia Fiberglass Windows, U-Factor 0.30 or below, Double Pane Low-E glass with Argon, Screen	Pella Windows	Eli Griffin	425-223-2148	http://www.pella.com/home/default.aspx
HARDWARE					
Toilet Paper Holder	Taymor Astral Series, Satin Nickel	Karrtak	Mark Peterson	425-742-7520	
Towel Bar	24" Taymor Astral Series, Satin Nickel	Karrtak	Mark Peterson	425-742-7520	
Towel Ring	Taymor Astral Series, Satin Nickel	Karrtak	Mark Peterson	425-742-7520	
Shower Rod	Taymor Aluminum Curtain Rod	Karrtak	Mark Peterson	425-742-7520	
Shower Enclosure	Alumax Model 350 - 60" x 70" BiPass	Karrtak	Mark Peterson	425-742-7520	
Mirror: Main Bath	14"x22" Brushed Nickel Pivot Swing Mirror	Karrtak	Mark Peterson	425-742-7520	
Mirror: Master Bath	5mm Clear Glass Mirror, Frameless, 36x42	Karrtak	Mark Peterson	425-742-7520	
Cabinet Pulls	Berenson Pulls #4113-1BPN				
Exterior Door Knobs	Schlage F-Series Century 716				

Interior Door Knobs	Schlage F-Series Latitude 626, Privacy on Bedrooms and Bathrooms, Passage all other interior doors				
Bi-Pass Doors	Taymor Bipass Cups, 626				
Pocket Door Pulls	Taymor Pocket Pull, 626				
INTERIOR					
Kitchen Backsplash	Full Height Glass Mosaic Tile, 75% Recycled Content	Macadam Designs	Brian Sherrill	206-658-7808	
Bath Tub/Shower	6" Height Glass Mosaic with Tile Liner, 75% Recycled Content	Macadam Designs	Brian Sherrill	206-658-7808	
Kitchen and Bath	32mm Eurostyle Frameless Maple Veneer Cabinets, FSC Mixed Credit, Full Extension, Soft Close Hardware, Low VOC Finish	Sheldon's Custom Cabs	Mike Connor	425-778-0043	
Countertops	2cm Eased Edge, ECO™ by Cosentino, 75% Recycled Content, Steel Reinforced Island Overhang	Western Tile and Marble	Shawn Brady	425-766-6422	http://www.westerntile.com/
Butcher Block Countertops	Recycled Pallet Wood	Windfall Lumber	Michelle	360-352-2250	http://www.windfalllumber.com/
Interior Doors	2 Panel Shaker MDF, 88% recycled, Paint Finish				
Drywall - Supplier	5/8" Drywall Type X, Orange Peel Texture Finish, contains recycle contents with low VOC painting	Kent Gypsum	Greg Erwin	253-722-1234	http://www.kentgypsum.com/default.asp
Floors	Second, Third Floors: Prefinished Hardwood, 3/8" Strand Bamboo Plyboo Flooring, FSC Pure Material, No Added Urea Formaldehyde	Smith and Fong	Dino Bagetales	415-896-0577	http://www.plyboo.com/
	Main Floor: 5" Structural Concrete Slab, VoComp 20 Sealer Finish				
	Loft Bath: Ceramic Tile, 75% recycled content				
	Laundry: Forbo Marmoleum				
Millwork	Base: 1x6 Spero MDF, 100% recycled, Paint Finish	Pacific Coast Door & Mill	Bob Porter	206-793-1200	
	Casing: 5/4"x3 Spero MDF, 100% recycled, Paint Finish	Pacific Coast Door & Mill	Bob Porter	206-793-1200	
	Wall Caps: 1x4-13/16" Spero MDF, 100% recycled, Paint Finish	Pacific Coast Door & Mill	Bob Porter	206-793-1200	
	Window Sills: 1x10 Spero MDF, 100% recycled, Paint Finish	Pacific Coast Door & Mill	Bob Porter	206-793-1200	
Paint		Sherwin Williams Paint	Issaquah Branch	425-391-0482	http://www.sherwin-williams.com/

zHome_Materials_Sub_and_Supplier_List

Stair Treads	First to Second Floor: Prefinished Hardwood, 3/8" Strand Bamboo Plyboo Flooring, FSC Pure Material, No Added Urea Formaldehyde Second to Third Floor: Painted Metal Exposed Stair Treads, 95% Recycled Content, 3x11 Douglas Fir Appearance Grade Glulams installed for Stair Treads, FSC Lumber, Stained Finish				
Interior Metal Handrails	Interior: 2x4 Advanced Framing, FSC Lumber	Metalwood Designs	Dan	425-870-3106	
LIGHTING					
Entrance	1x CFL Wall Sconce	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Main Floor	3x LED Spotlight	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Bathroom	1x CFL Wall Sconce, 1x CFL Ceiling Surface Mount	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Kitchen	3x LED Spotlight, 2x CFL Pendant, 1x CFL Ceiling Surface Mount	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Stairway	2x CFL Wall Sconce	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Bedroom	1x CFL Ceiling Surface Mount, 3x LED Spotlight	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Laundry Room	1x CFL Ceiling type	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Attic	2x CFL Pull Chain Surface Mount	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
Deck	1x CFL Wall Sconce	Seattle Lighting	Bruce Hamilton	206-622-1962	http://www.seattlelighting.com/
MECHANICAL					
Ground Source Heat Pump	Community Based Ground Loop System, 6000 lf of HDPE Tubing in Ground, Community Based Pumping Facility				
	Heat Pump: Water Funace ENVISION Model No: NSW025B13HCC	Water Furnace			
	Metalpres 120 Gallon Hot Water Tank				
Hydronic Heating	Main Floor: In Slab, 1/2" Pex Tubing, 1 Heat Zone				
	Second Floor: Non Structural Radiant Panel, 3/8" Pex Tubing, 1 Heat Zone				

Energy Monitor	The Energy Detective (TED) Energy monitoring system, Model 5000C				http://www.theenergydetective.com/
Water Meter	Badger Potable Water Meter No. 59949-002				http://www.badgermeter.com/
Photovoltaic	30 Solar World Sunmodule 240W Monocrystalline Module, Total 6.68 Kw	Solarworld	Main Office	503-844-3400	http://www.solarworld-usa.com/
	Micro Inverter M190 with Enphase Enlighten Online Monitoring System	Enphase			http://enphase.com/products/microinverters/
Ventilation	Heat Recovery Ventilator: Lifebereath ECM 155 HRV unit *Max tempareture				
	Bathroom, Laundry: Panasonic FV-08VKS2				
	Range: Micro/Hood Combo Samsung SMH8165STE				
PLUMBING					
Kitchen Sink	Undermount Fluid Point 90 Degree Angle UD2920				
Kitchen Faucet	Kohler Evoke K-6333, Single Control with Side Sprayer				
Bathroom Sink	Undermount Kohler Water Cove K-2332 Self Rimming				
Bathroom Faucet	Kohler Purist K-14402, Watersense Certified, 0.5 gpm				
Toilet	Dual Flush, Caroma Sydney 622322W, Rainwater Supplied, Watersense Certified				
Showerhead	Kohler Purist K-14421, Watersense Certified, 1.5 gpm				
Tub/Shower Surround	Full Height Tile Surround, 75% Recycled Content				
STRUCTURAL					
Foundation	Steel Reinforced Concrete Footings and Walls per approved Structural Plans, 30% recycled content, Drain Matt and Drainage provided for all exterior walls below grade.				
Framing Lumber		Pinnacle Lumber	Dave Meadowcroft	253-572-0400	http://www.pinnaclelumber.com/
Insulation	EPS(Expandable Polystyrene) and Rockwool	Arrow	Kevin Long	206-251-4274	

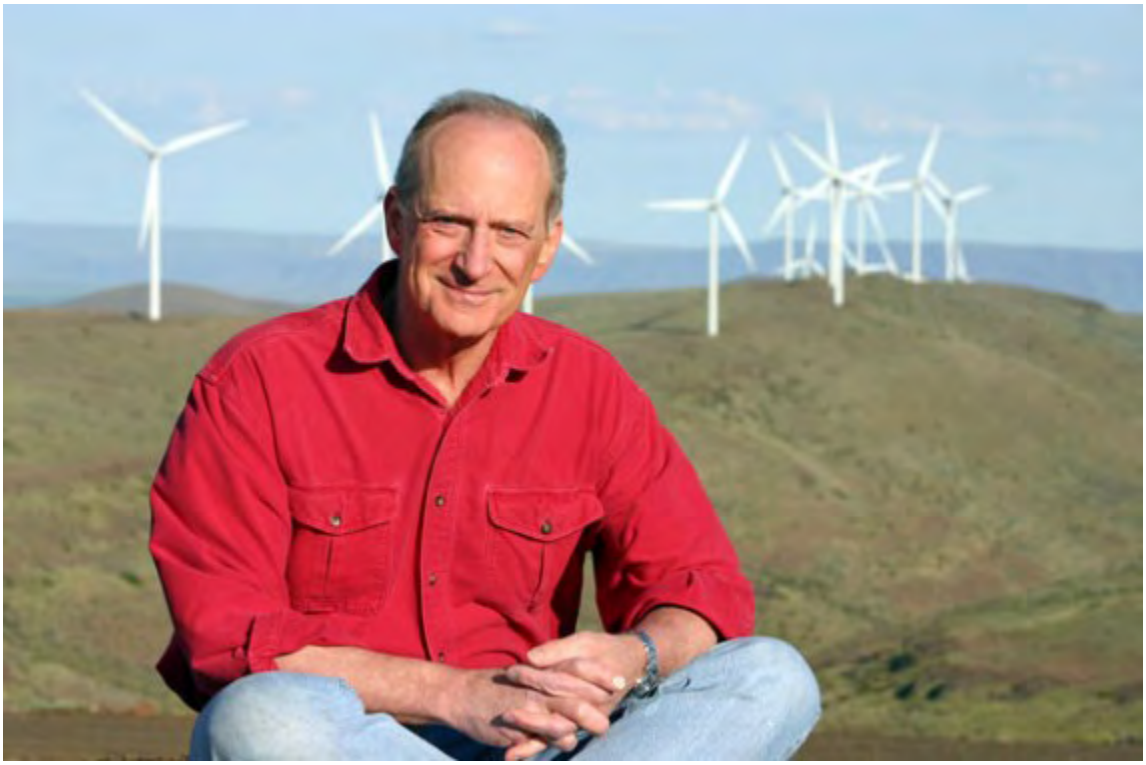
zHome_Materials_Sub_and_Supplier_List

Wall	Exterior: 2x6 Advanced Framing Panelized System, FSC Lumber, 1/2" OSB, 3-1/8" Continuos EPS Insulation, Tyvek, 3/4" Furring Strips (Rainscreen System), Exterior Siding				
Sub Contractors					
Builder		Ichijo USA	Akinobu Ohno	206-629-4691	http://www.ichijousa.com/ICHIJO_USA/Welcome.html
Cable/Internet		Highland Fiber Network	Dave Huber	425-708-1602	https://www.highlandsfibernetwork.com/
Cedar Fence		Jacy Construction	Terry	206-730-2455	
Concrete - Flatwork	6" Exterior Flatwork, 30% recycled content, Rough Trowel Finish	Swanson Bros Concrete	JC Swanson	206-255-5727	http://www.sbci.us/
Concrete - Foundations		Curt Wilson Concrete	Curt Wilson	360-661-3828	
Dirtwork/Excavation		Howland Homes	Ryan	206-793-4727	
Drywall - Installer		Advanced Drywall	James Hernandez	425-231-0435	http://www.advanced-drywall.com/
Electrican		Bennett Electric Inc	Mark Bennett	206-799-9105	
Framer		TMB Elite Framing	Tom Bradshaw	206-730-5437	
Finish Carpenter		Custom Installations	Todd	206-909-1003	
Ground Source Well Drilling		Cascade Drilling NW Inc	Curtis	425-879-9509	cascadedrillingnw@msn.com
Hardwood - Installer		Macadam Designs	Brian Sherrill	206-658-7808	http://macadamflooranddesign.com/
HVAC		Bobs New Construction	Tom Chandler	253-405-4834	
Mechanical Contractor		NW Mechanical	Brendan Brown	206-793-4439	http://www.nwmechanical.com/
Painter		Painters Unlimited	Robert Nichols	206-399-6960	
Plumber		United	Randy	206-571-4261	
Pervious Concrete		PCI	Michael Bledsoe	425-308-5555	

Rainwater Systems	Lakeside Plumbing	Larry	206-363-4513	
Solar - Installation	NW Wind & Solar	Kevin Charap	509-679-5993	http://www.nwwindandsolar.com/
Survey	Core Design	Glenn Sprague	425-885-7877	http://www.coredesigninc.com/
Design Team				
Architect	David Vandervort Architects	Mark Wierenga	206-784-1614	http://www.vandervort.com/
Built Green Verifier	CSG	Tom Balderston	206-715-6865	http://www.csgrp.com/
Civil Engineer	CORE Design	Glenn Sprague	425-885-7877	http://www.coredesigninc.com/
Energy Consulting & Modeling	WSP Flack + Kurtz	Tom Marseilles	206-342-9900	http://www.wspgroup.com/en/Welcome-to-WSP-Flack--Kurtz/WSP-Flack-Kurtz/
Geotechnical Engineer	Icicle Creek Engineers	Brian Beaman	206-498-1279	http://www.iciclecreekengineers.com/
Interior Designer	LH Design	Lydia Huffman	206-650-4360	http://www.mylhdesign.com/
Landscape Architect	Darwin Webb			http://www.darwinwebb.com/
Mechanical Engineer	Stantec			http://www.stantec.com/default.htm
Rainwater/Low Impact Stormwa	2020 Engineering			http://www.2020engineering.com/
Salmon Safe	Salmon Safe	Main Office	503-232-3750	http://www.salmonsafe.org/
Structural Engineer	Harriet Smith Valentine	Main Office	206-624-4760	http://www.hsveng.com/
Water Sense	Cascade Water Alliance	Mike Brent	425-453-1810	http://cascadewater.org/

Denis Hayes star of new zHome video

November 9th, 2011



Don't miss our awesome new zHome introductory video by the dynamic duo of Sheila Mullen and Valerie Vozza. This introductory video features Denis Hayes, founder of Earth Day and Bullitt Foundation president. It was truly an honor to have Denis do this video with us. People have told me they get goosebumps watching it; don't miss it!

The Bullitt Foundation is building an amazing new project called the Bullitt Center. I will post on this soon but if you haven't heard about it, you need to check it out – it's even more sustainable than zHome, and that's hard to do!

zHome from valerie vozza on Vimeo.

Dwell zHome blog three – interview with David Vandervort Architects

January 18th, 2012

Here I have an interview with David Vandervort and Mark Weirenga of David Vandervort Architects.