



City and County of Denver Phase I Stakeholder Meetings

Residential Meeting: October 3rd 8-11 AM at the Energy Efficient Builders Association (EEBA) annual meeting at the Embassy Suites

Embassy Suites Denver Downtown
1420 Stout St, Denver CO 80202
Section A of the Silverton Ballroom

ATTENDEES:

Jonny Rogers, CCD
Sara Sullivan, 186 Lighting Design
Colleen Mentz, Habitat for Humanity
Fran Penafiel Vial, CCD
Josh Palmeri, CCD
Scott Prisco, CPD Building Official
Erik Sandstrom, Meritage Homes
Jenny Willford, Sierra Club
Jenn Jaffke, DDPHE
Mahi Palanisami, NREL
Amir Abu Jabr, DDPHE
Chuck Kutscher, NREL
Jim Meyers, SWEEP
Robby Schwarz, Energy Logic
Nathan Kahre, THRIVE Home Builders
Kristin May, Xcel Energy
Kim Burke, Colorado Energy Office
Maria Stamas, NRDC, American Cities Climate Challenge
Reilly Loveland, NBI
Paul Kriescher, Lightly Treading
Ken Higginson, David Weekley Homes
Dane Sanders, Clanton Associates
Christy Collins, CCD
Norbert Klebl, Geos Community
Amber Wood, CCD
Ernie Stevens, City of Tucson, Planning and Development
Keith Emerson, ASHRAE Committee for Standardizing ZE Performance
Heidi Williams, HBA Metro Denver
Matt Johnson, Namaste Solar
Christina Schlecter, City of Denver

People to add:

Oakwood Homes – net zero prefab



Agenda

8:00 – 8:20 AM

Welcome

Introductions, Purpose and Process of Stakeholder Meetings

8:20 – 8:30 AM

Background: State of New Construction and National Perspective

- *Big Picture: Denver's Current State of New Construction*
- *Setting National Perspective*

8:30 – 9:00 AM

Denver Case Studies of Net Zero Energy Implementation

- *Nathan Kahre, Thrive Home Builders – Thrive Home Builder's Implementation of Net Zero*
 - Efficient, healthy, local homes
 - ZE ready homes program
 - Healthier = indoor air quality (EPA indoor airPLUS, radon)
 - 2009 – started offering solar as a standard – made them stand out
- *Norbert Klebl, Geos Community – Geos Community Project*
 - Decarbonize living! Not just buildings, but our lives
 - Infill development between golf course and commercial development – important to have developments near recreation and jobs to reduce carbon
 - *Orientation is potentially enormous benefit of Colorado*
 - 75% of heating comes from passive solar gains
 - Geos homes are 80% more efficient
 - Average American homes has plug load of 8890 kWh/yr and geos is 4,200 kWh/yr (includes dishwasher, clothes washer, dryer, lighting, range top, fridge and misc)

9:00 – 9:15 AM

Denver's Definitions and Metrics (Denver)

9:15 – 10:15 AM

Facilitated Discussion: Challenges, Opportunities and Solutions to Achieve Net Zero?

KEY THEME FOR RESIDENTIAL:

- This market focuses on the intent that they're buying as opposed to renting
- Custom homes are totally different – this is focused on home building at scale

Energy Efficient

Technology/Building Design

- Builders need an option to choose which efficiency measures to implement, then that leads to having to do all the things as requirements.
- Design:
 - Homes have to have the full package – solar + efficiency not just solar
 - Air quality benefits of ERV is an enormous sales tipping point
 - Easy home management is very important – simple design
 - Design orientation to be optimized – overall net zero requirements
- Getting builder involved earlier:
 - Builders need developer lots to build homes so some are doing small complexes
 - Building and lot development is totally different – they need to be at the table and agreeing together on net zero
- Design Standards:
 - Zoning dept of Denver needs to set the standards: orientation, goals for development. Making the units focus on energy efficiency before just trying to get as many units in as possible.
 - Creating standards with multiple pathways to achievement to encourage creative solutions.
 - Ex from Geos: Came up with onsite water management system by cutting the curves – 3 swale instead of lawns. Swale collect water for trees. Then the structure before the lawn and the swale now has woodchips. City would not approve! Went to the county drainage people who gave them a trial waver.
- Technical Challenges to NZ:
 - Getting to NZ is not a technology issues
 - We know how to build a good envelope, don't even need spray foam (high embodied carbon), tapes, etc.
 - We need leap frog from current building technology to high performance in 3 years – has to be production because can't retrain, etc. BUT! In the mean time we need energy efficient homes with our current system
- Factory Homes as a Solution
 - Still build homes on site instead of factories where it can be controlled, incentivized



- Move forwards to factory controlled and built homes – will also bring down cost
- Automation like in Europe – cheaper – something we need
- Issue: More predictive your fabrication comes – the more home buyers hands are tied in terms of personalization and at what point they can make changes.
 - A lot of business is homes that they start until there is a buyer – then they move forward to finalize stuff
 - Need personalization ability
- Building Performance
 - Rating labels
 - Often put inside the circuit cable box away from consumers ability to see
 - *Builders don't make money on the performance over the home – discourages builders from showing the product outcomes in the long run*
- Districts and Neighborhoods:
 - How do we consider this as districts as opposed to just a single house? Biomass, heating our homes on a district scale
 - How districts can negotiate better prices
 - Work together on a larger scale
 - Work with city when digging up the street for example – how to deploy smart city systems at one time so we don't have to dig up again.
 - More grid interactive

Cost

- Been tricky to get buy in at a corporate level to make NZ a standard
- Costs in doing the work is a barrier, designs, contracts, materials – need to make cost delta low as possible
- Lots of choice in suburban areas – competing areas near the net zero homes, looking for price competitiveness as well
- Affordability for First Home Generation (sustainability minded but limited resources):
 - Providing options that are smaller and cost effective – geos or condos townhomes
 - Position these homes so that they are affordable, accessible, and visible. Will help drive uptake in other home buyers
- Affordability/Market Demand
 - Economy of scale is needed to be affordable
 - Energy star was a way to differentiate at the height of the last recession and still have demand even when the market was low – custom builders doing this (Keith E). Maybe a good model here for net zero demand
- Financing Development
 - Biggest hurdle is the direct cost – financing credits or back end rebates are great – but sales prices are based on price of land and construction



- Land is 20-25% of total cost – however in past 10 years this has appreciated the most
- Showcasing incremental costs
 - NZ cost this much to build BUT you save XX in the long run, include mortgage. So NZ mortgage costs an addition \$120 a month but you save \$200 in utilities a month. Showing that the delta between the original cost and the savings. Could be on a monthly mortgage statement?
- Financing – appraisals need to value the added cost of EE
 - Residential in CO needs a PACE type financing mechanism too
 - Banks – working with them to finance more efficient housing. Incentives for these houses.
- The typical payment structure is a problem, trades get paid per home and not for training, they get paid per job. It's a contract issue on the way the system is set up
- Local benchmarking should be happening on builder costs – we need to know what is costing a lot to know where to focus efforts

Incentives

- Zoning dept of Denver needs to set the standards: orientation, goals for development. Making the units focus on energy efficiency before just trying to get as many units in as possible.
- Financing support needed if want to get developers involved – providing layouts and orientations that are sustainable. Solar lots, etc.
- Incentivizing efficient and standardized building by building factory homes
- Support could be provided by land that is available – cities buying grey area land to provide sustainable development – have to then provide sustainable guidelines
- Cash money is very important! Get incentives to get builders to go after NZ
- Incentivize with expedited permits – faster reviews
- Incentivize Increased density
 - Parking requirements can be a big factor. Sometimes jurisdictions require so much that it conflicts with density.
 - Is there a parking trade conversion to be had in single family?
 - Some communities have shared driveways and less land per house devoted to cars, could be a starter density conversation.

Workforce

- Developers are the drivers:
 - Developers need to understand they are the king pin on moving the market to NZ – they set the standard for a neighborhood and all of the builders are on a level playing field to achieve developer standards. (See forest city example below)



- Home owners and codes force developers to elevate their building level – get homes buyers to look for net zero
- Rating Systems:
 - Energy star was a way to differentiate at the height of the last recession and still have demand even when the market was low – custom builders doing this
Maybe a good model here for net zero demand and workforce uptick
- Continuing Education
 - Encourage city code staff have to do CEU
 - PE's and licensed architects do, but others probably not... especially across jurisdictions
 - CEU should be required for code staff, planners, bldg. officials
 - Associates could be the conduit for this – HBA not exactly the most helpful and pushing initiatives down. AIA and green builder initiative could step in
- Workforce and Codes
 - Change code = need to educate the city and permitting staff.
 - Immediately set up a team that educates city departments involved in permitting and support the developer. Then the developer doesn't have to jump through so many hoops
 - In residential – don't need to be a designer or architect to build or design or review these homes! This is an issue for requirements, updates and updating standards
- Need for Skilled Labor:
 - Skilled labor is what is missing
 - Not technology – it's the process of educating good subcontractors to build
 - Paying for highly skilled vs regular subcontractors
 - Subcontractors partner with builders BUT they see an opportunity to cover costs in other areas by upgrading ex. To AirPlus
 - Also can't find labor at any cost sometimes
 - *Training and experience is the biggest hurdle to achieve NZE*
 - *Retraining workforce to your standards, need to put out ¼ million \$\$*
 - Common Thread – evaluating and identifying skill sets on retraining insulation contractors. The right pathways for insulation contractors – RG insulation. More focused on Nonprofit and grass roots organizations – NEED for this in the private sector.
 - Making the labor jobs valuable – people like insulators don't see the value in their work. They do their work based on speed not quality. The market says do it fast – but really they need to be fast and do it right. Market can help demand this.
 - Reeducating permitting crew to new standards – VERY important
- Modular or factory homes as a solution:



- Ex. Precision Building systems – 24/7 operation in a factory and they cant keep up with demand! Even without weather and other issues like traditional outside building processes. Need more like this.
- Rework associated with people not understanding how to do this – reducing this is key
- 3rd party certs- people and homes (insulators do their job well)

Equity

All Electric

Technology/ Building Design

- Homes have to have the full package – solar + efficiency not just solar

Cost

- See above in Energy Efficiency

Incentives

- Need to incentivize first costs of things like heat pumps. First costs can be a hurdle especially when only savings about \$200 per year in utilities but spending \$7-8000 on technology

Workforce

- See above in Energy Efficiency

Equity

Powered by Renewables

Technology/ Building Design

- Homes have to have the full package – solar + efficiency not just solar
- David Weekley did a purchase solar program – never saw a big uptake
 - Solar the last thing you do – people would rather see the money in proper insulation as opposed to “green bling”



- People concerned about the resale value because some people don't want solar panels
- Applications, permitting and interconnection to the utility slowing down the process

Cost

- Cheap energy is a barrier – natural gas especially. Elec also cheap so cost savings not a priority.

Incentives

- Interest rates being lower for utility bills? Now interest rates are low enough that this not an issue now. Also this was being done on some affordable units.
- Cash money is very important! Get incentives to get builders to go after NZ
- Incentivize with expedited permits – faster reviews
- Insurance savings/incentives for healthy homes
- There is financing for solar, they provide many options for financing with low interest rates.

Workforce

Equity

Grid Interactive

Not much discussion of grid interactivity in residential. This however does relate to simple homes that can regulate demand as mentioned in technologies above.

Technology/ Building Design

Cost

- Understanding time of day rates from Xcel – using details to solve problems

Incentives

Workforce

Equity

OTHER TOPICS:

Community/Homeowner Buy In:



- Community buy in that made the builders wanted to work towards a higher goal – in the best selling communities – communities SET the rules. You have to build like we want if you want to build here
- Home owners and codes force developers to elevate their building level – get homes buyers to look for net zero
- Educating buyers and getting them to see the long term benefits
- People not buying net zero if neighbors aren't net zero – need to be a full neighborhood or development
- First time home buyer not going to see the long term benefits – not looking at it as a long term investment (Ken)
 - But! They may also see the resale value on it
- Buyers need to push sustainability - buyer education is VERY IMPORTANT.
 - People visited geos 10 times before they understand net zero
 - City of Denver role to push this buyer education

Net Zero Messaging:

- Net Zero is almost like a nice view from the window. Individually based and hard to measure.
- Health issues – considering the net zero building as a holistic idea. How do we message this? Saving planets, GHG, etc. Get people excited!
- Focus group on what do customers care about? Xcel did a study
 - Energy efficiency doesn't really mean anything – a little less on their bills but that doesn't really mean much or they don't see it
 - Health benefits and the environmental impact a much bigger care
 - Health benefits, environmental impact important and great to also save a little money
- Role of the City in Outreach:
 - Realistic is it to do a social media or outreach campaign to homeowners?
 - Stats of emissions
 - Here's how you can get a net zero home!
 - Here are people who can help you (designers approved)
 - Here's how you can get advice for your home now to get to net zero
 - Similar to the Denver Water Campaign

Follow Up Note re: Workforce:

- Common Thread – evaluating and identifying skill sets on retraining insulation contractors. The right pathways for insulation contractors – RG insulation

Examples for Research

Case Study Example – Forest City



- Forest City's vision was great to start. From the beginning, build green and energy star at the least (early 2000s)
 - Builders building to this because their competitor down the street has to build to this
 - Started at the developer level – builders have a common impetus to raise the bar to build

Energy Star Example

- Now there is not a builder that can't build to energy star – good model to base this on. Everyone had to learn together how to do it, but now it is the norm.
- Now you can achieve Energy Star rating at very little cost – low bar though – performance-wise
- Energy star also a way to differentiate at the height of the last recession – custom builders doing this

Energy Star New Homes Xcel

- Energy star new homes – January no gas allowed any more through Xcel
- Heating cooking and fireplaces – how do we convince to purchase with no gas
- All electric homes in this Xcel pilot don't want to touch solar... consider it more of a hassle. Another thing to do, find someone to put on the panels and connect, etc.

10:15 AM – 10:25 AM **Break**

10:25 AM – 11 AM **Group Report Back and Discussion**

*As a community need to understand where we are and what's going on now – to make the best decisions going forward.

11 AM – NOON **EEBA Closing Plenary Featuring Mayor Michael B. Hancock**

As a group, we will walk over to the closing plenary to hear the Mayor speak about the City's Net Zero goals and the inspiring path forward!