

Annual Building Industry Research Alliance (BIRA) Partners Meeting 2006 Review & Summary

PREPARED FOR:

MIDWEST RESEARCH INSTITUTE,
NATIONAL RENEWABLE ENERGY LABORATORY DIVISION,
1617 COLE BOULEVARD,
GOLDEN, CO
80401-3393

PREPARED BY BUILDING INDUSTRY RESEARCH ALLIANCE (BIRA)
7407 TAM O'SHANTER
STOCKTON, CA 95210-3370
TEL: (209) 473-5000 / FAX: (209) 474-0817
CONTACT: STEVE VANG / BRUCE BACCEI

TEAM CONSORTIUM MEMBERS:

CONSOL
CENTEX HOMES
CLARUM HOMES
CONTEMPO HOMES
KB HOMES
LENNAR
MORRISON HOMES
NC INVESTMENTS
PARDEE HOMES
PINNACLE HOMES
PREMIER HOMES
TREASURE HOMES
CALIFORNIA LIGHTING TECHNOLOGY CENTER
GREEN INQ.
JZMK ARCHITECTS
BUILDING INDUSTRY INSTITUTE
COLORADO ENERGY GROUP
DOW
RINNAI
LAWRENCE BERKELEY NATIONAL LAB
OAKRIDGE NATIONAL LAB
ROSEVILLE ELECTRIC
SACRAMENTO MUNICIPAL UTILITIES DISTRICT
SOUTHERN CALIFORNIA EDISON
FLUENT, INC
GE ENERGY
POWERLIGHT
SHARP
WSU

DATE: SEPTEMBER 28, 2006

Table of Contents

Introduction.....	1
Objective	1
Participating Experts	1
Presentations and Discussions	2
1. Building America from the Top.....	1
2. BIRA Research to Date and Directions	2
2.A. Premier Gardens: Energy Efficiency + PV= \$ & Peak Savings	3
2.B. RAND Study of "Side-by-Side" Communities	5
2.C. MSNBC Video Clip	6
3. Early Research Findings: Advanced System, Prototypes in Borrego Springs, CA	6
3.A. Building America-3 homes: Pre-cooling experiment	7
3.B. Cooling systems description and performance findings	9
4. The CEC's and ZENH Program	12
5. Pinnacle Homes: Vinings, Las Vegas	12
6. Western States Project: AZ, NM, NV	14
7. Near Zero Energy Project Plans, Arvada, CO	14
8. Clarum Homes: Upcoming Projects & Plans.....	17
9. BA, BIRA & Climate Change	18
Conclusion	18
Appendix I -- List of Participant.....	I
Appendix II--Agenda	II

Table of Figures

Figure 1- Brief History of BA Residential Innovation	1
Figure 2- Buildings Consume 39% of Total U.S. Energy	1
Figure 3- “Side-by-Side” Communities, Premier Gardens vs. Cresleigh.....	2
Figure 4 - Energy Efficiency Features	3
Figure 5- Average Monthly Net kWh Used, ZEH vs. Control	3
Figure 6- Average Annual Electricity Bill Savings, Predicted vs. Actual.....	4
Figure 7- ZEH Peak Demand Reduction from July 31- August 5, 2005.....	4
Figure 8- Results of Average Power Produced by PV if all PV were Facing West	5
Figure 9- Prototypes in Borrego Springs, CA.....	6
Figure 10- Dow T-Mass Wall	7
Figure 11- Structural Insulated Panels (SIP)	7
Figure 12- Optimum Value Engineered (OVE).....	7
Figure 13- Pre-cooling Results of SIP Panel Home (Left) and “OVE” Home (Right)	8
Figure 14- Pre-cooling Results of T-Mass Home	8
Figure 15- Outside Air Temperature vs. Inside Room Temperature of SIP Panel Home (Left) and “OVE” Home (Right)	9
Figure 16- Outside Air Temperature vs. Inside Room Temperature T-Mass Home	9
Figure 17- OASys 2-stage Evaporative Cooler	10
Figure 18- Freus Evaporative Condenser	10
Figure 19- NightBreeze Ventilation Cooling.....	10
Figure 20- Results of Freus Night-Floor Cooling.....	11
Figure 21- Results of OASys Operation	11
Figure 22- Results of AC Cooling Operation	11
Figure 23- Construction at Vinings, Las Vegas.....	13
Figure 24- Real Usage Data: Air Conditioner Power Usage ZEH vs. Baseline	13
Figure 25- Energy Rate Comparison, Time of Use Rate (TOU) vs. Normal Rate	14
Figure 26- Mixed Use New Urbanism Planned Community.....	15
Figure 27- Innovative Urban Passive Solar Design.....	15
Figure 28- Mobile Installation	16
Figure 29- Earth Tube Aspired Energy Recovery Ventilation System.....	16
Figure 30- Energy Efficient Targets	17

Introduction

The Building Industry Research Alliance (BIRA) conducted its second Annual Partners meeting on September 12, 2006. The meeting was held at the facilities the Sacramento Municipal Utility District (SMUD), one of BIRA's most important partners, in Sacramento, California.

Objective

The primary objective of the meeting is to review progress to date and to seek input from BIRA partners for future directions in research. To this end, the meeting focused on the projects that BIRA has completed this year. Also discussed were issues BIRA will focus on in the upcoming year and beyond.

Participating Experts

Participants represented a wide range of interests and expertise in various areas of professional knowledge: academicians, builders, Building America teams, energy consultants, electric utilities, national labs, planners, PV industry representatives, city and state offices and federal agencies. Individuals attending represented the following organizations:

1. Academicians:
 - a. Arizona State University
 - b. University of California, Davis
2. Builders:
 - a. Clarum Homes
 - b. Treasure Homes
 - c. CoHousing Partners, LLC
3. Building America teams:
 - a. BIRA
 - b. CARB/DEG
4. Consultants:
 - a. Green INQ
5. Electric Utilities:
 - a. Sacramento Municipal Utility District (SMUD)
 - b. City of Roseville/Roseville Electric
6. National Labs/BA Leadership:
 - a. NREL
7. Industry:
 - a. The Dow Chemical Company
 - b. Amvic-Pacific
 - c. Owens Corning
8. PV Industry:
 - a. Sharp
 - b. Energy Ideas

9. City
 - a. . City of San Jose, Environmental Services Department
10. State:
 - a. California Energy Commission
 - b. Nevada State Energy Office
 - c. New Mexico Energy Minerals & Natural Resources Department
- 11 Federal Agency:
 - a. US Environmental Protection Agency

A complete list of participants is available in Appendix I.

Presentations and Discussions

The meeting was moderated by Rob Hammon and Bruce Baccei from ConSol. The presentations focused on BIRA projects completed this year, upcoming plans/projects, and future goals.

The following table lists the agenda and the various presenters in the meeting. The complete agenda can be found in Appendix II.

Presentation	Presenter
Welcome and Introductions	Bruce Baccei (BIRA/ConSol)
Building America from the Top	Ren Anderson (NREL)
BIRA Research to Date and Directions • Premier Gardens/SMUD: Energy Efficiency + PV = \$ & Peak Savings • RAND Study of “Side-by-Side” Communities • MSNBC Video Clip	Rob Hammon (BIRA/ConSol) Mike Keesee (SMUD)
Early Research Findings: Advanced Systems	Bruce Baccei (BIRA/ConSol)
Prototypes in Borrego Springs, CA • Building America-3 homes: Pre-cooling experiment • Cooling systems description and performance findings	Abe Cubano (BIRA/ConSol) Bill Dakin (DEG)
The CEC’s ZENH Program	Cheri Davis (CEC) Steve Vang (BIRA/ConSol)
Pinnacle Homes: Vinings, Las Vegas	Faith Shimamoto (BIRA/ConSol)
Western States Project: AZ, NM, NV	Rob Hammon (BIRA/ConSol)
Near Zero Energy Project Plans, Arvada, CO	Norbert Klebl (Cottonwood Park West)
Clarum Homes: Upcoming Projects & Plans	Aaron Nitzkin (Clarum)
BA, BIRA & Climate Change	Rob Hammon (BIRA/ConSol)
Recommendations, Discussion, and Closing	Rob Hammon (BIRA/ConSol)

1. Building America from the Top

System Integration Research Leading to Zero Energy Homes

Presented by Ren Anderson, NREL

The long term goal of the Building America Program (BA) is to have homes that produce as much energy as they use on an annual basis.

A brief history of BA's Residential Innovation was discussed. This timeline shows goals accomplished through the work of all BA partners beginning in 1993.

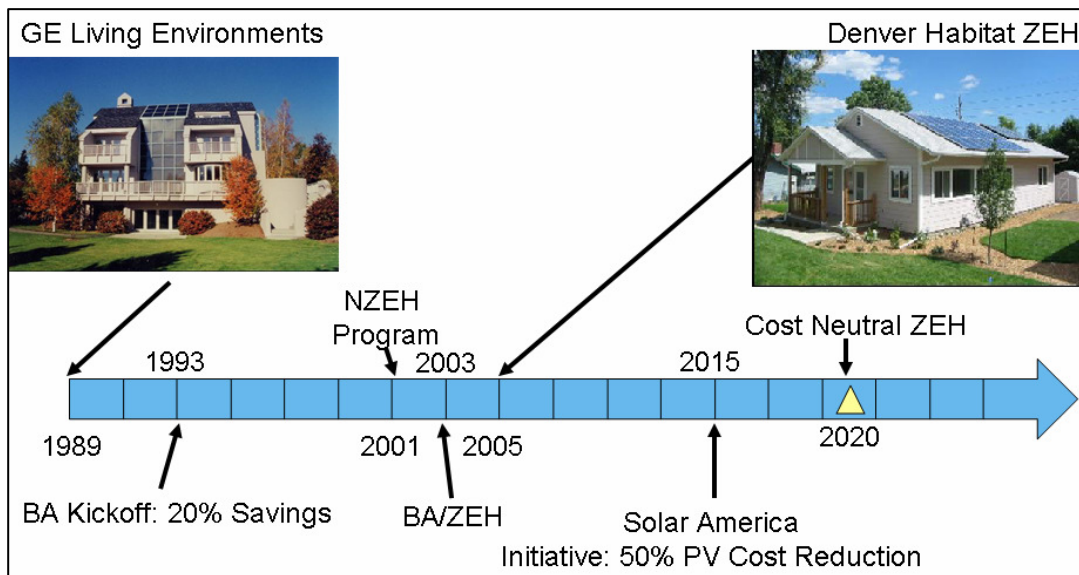


Figure 1- Brief History of BA Residential Innovation

Due to the fact that buildings consume 39% of total U.S. energy, 71% of electricity and 53% of natural gas, the Department of Energy has focused its efforts on the development of cost neutral Zero Energy Homes (ZEH).

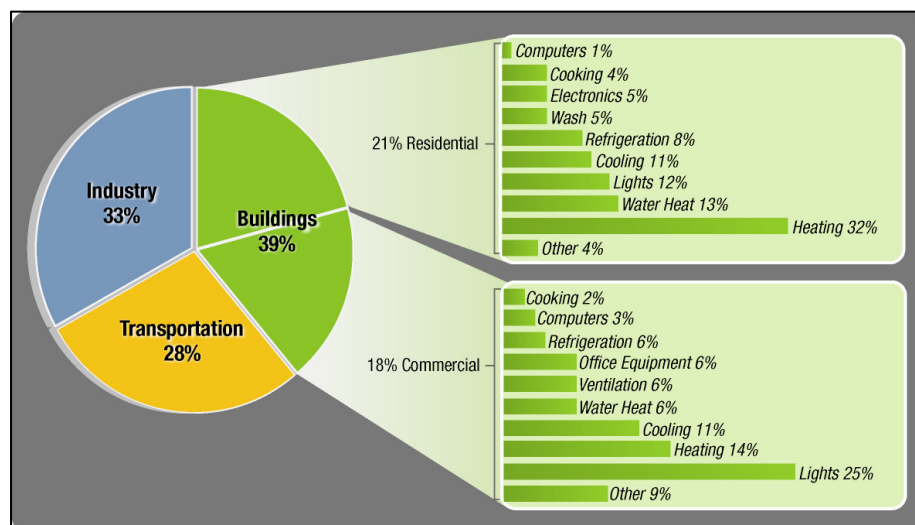


Figure 2- Buildings Consume 39% of Total U.S. Energy

Some key system integration questions were brought up that need to be answered:

- What combinations of energy saving features provide customers with the most bang for the buck?
- What is the least cost required to achieve different levels of energy savings?
- What are the estimated costs to achieve different levels of energy savings?
- What R&D is required to reach future goals?

The last topic discussed by Ren Anderson was market accelerators for above code programs. He stated that builders tend to embrace changes that ultimately reduce risks, reduce cost, reduce complaints, reduce training requirements, reduce planning steps or approvals, and increase reliability of suppliers, materials, and equipment.

2. BIRA Research to Date and Directions

This part of the meeting discussed “Side-by-Side” analyses of two communities. The two communities included a Near-ZEH Community (Premier Gardens) vs. a SMUD Advantage Community (Cresleigh).

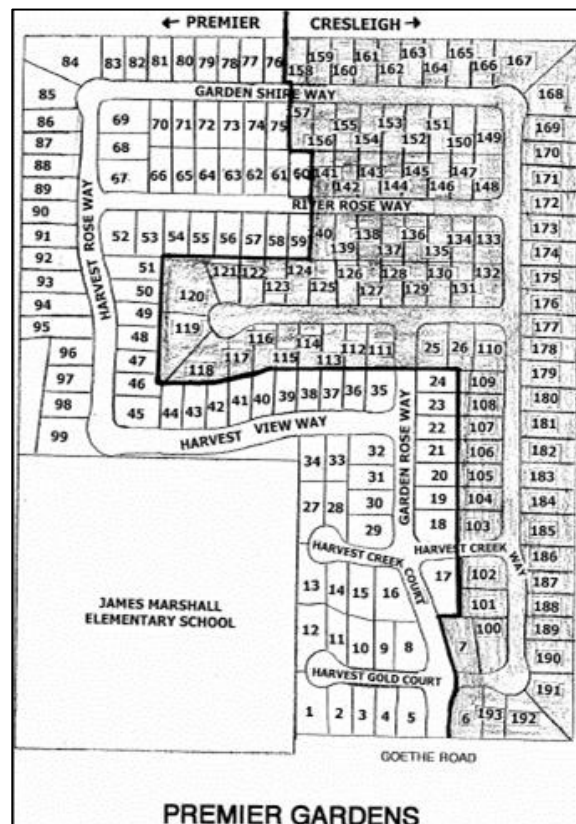


Figure 3- “Side-by-Side” Communities, Premier Gardens vs. Cresleigh

This included the following three presentations:

2.A. Premier Gardens: Energy Efficiency + PV= \$ & Peak Savings

IMPACT OF DISTRIBUTED SOLAR ON SMUD'S PEAK LOAD

Presented by Mike Keesee, SMUD

The “Side-by-Side” communities in Rancho Cordova are being monitored by SMUD. A Near-ZEH Community built by Premier Gardens provides a 60% whole house savings. Whereas the SMUD Advantage Community built by Cresleigh provides a 35% cooling reduction. SMUD is monitoring the electric utility bills of all the homes in both communities. SMUD is also monitoring eighteen homes in each community in more detail, collecting data every 15 minutes. This more detailed information enables analysis of energy consumption and PV production peak demand savings, and electric exports to grid.

	<u>Non-ZEH</u>	<u>Premier</u>
Walls	R-13 + 1" Foam with Stucco	
Ceiling Ins.	R-30	R-38
Windows	Vinyl-Framed Low-E2	
AFUE	80	92
SEER	10	14 w/TXV
Air Flows	Normal	ACCA - Tested
Ducts (attic)	R-4.2	Buried in ceiling Ins
Duct Sealing	Normal	Sealed
Air Infiltration	Normal	<3 SLA, tested
Water Heater	40gal 0.60EF	Tankless 0.82EF
Lights	Incandescent	Fluorescent
Solar	None	2.4kW BIPV

Figure 4 - Energy Efficiency Features

The average monthly net kWh used in the ZEH house was 312 kWh compared to 655kWh in the control house. In the summer months such as July, the ZEH house used 640 kWh compared to 1,246 kWh in the control house.

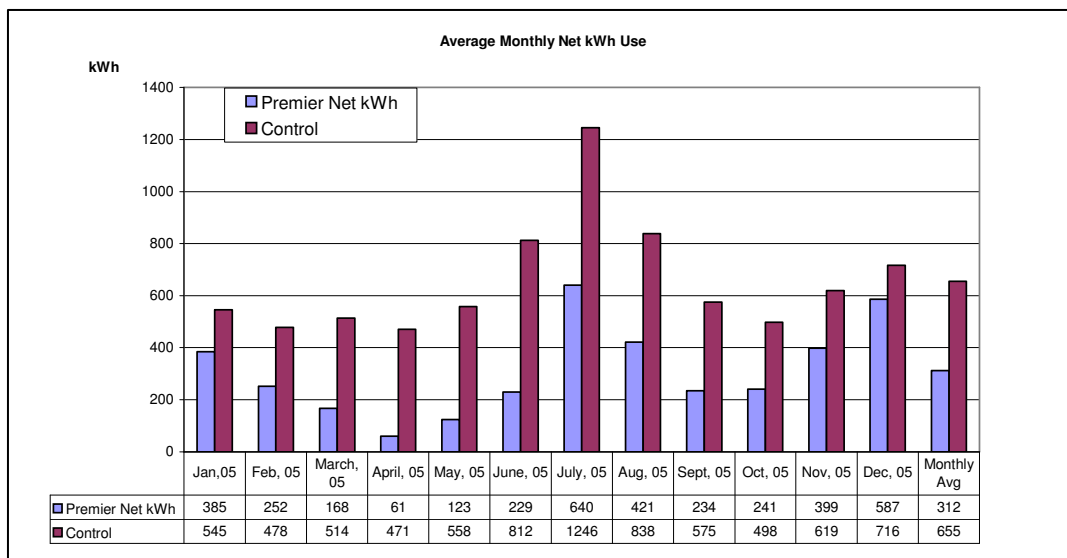


Figure 5- Average Monthly Net kWh Used, ZEH vs. Control

The average annual electricity bill savings was predicted at 512 dollars. However, it only showed a 440 dollars savings. The predicted annual electricity bill was determined to be less than 100 dollars. However, the actual electricity bill was around 350 dollars. The reason for this discrepancy is believed to be due to the addition of everyday plug usage by electronics in the household such as DVD players, mp3 players, game stations, etc.

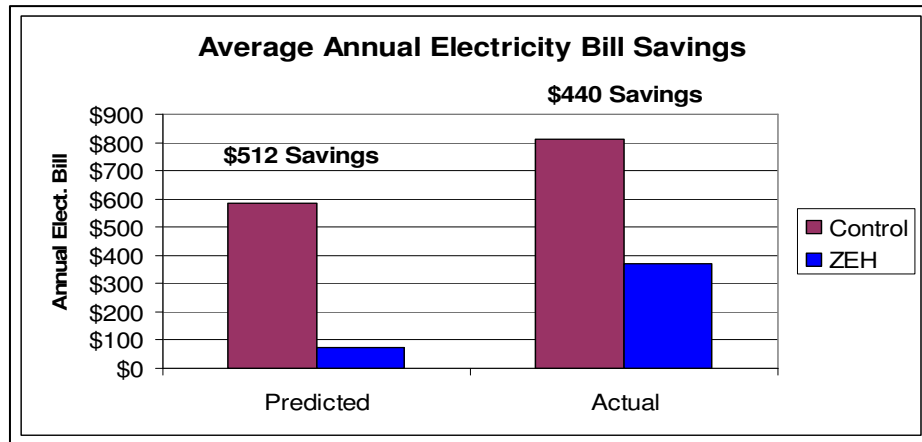


Figure 6- Average Annual Electricity Bill Savings, Predicted vs. Actual

The average peak demand savings from noon to 7pm was 1.74 kW, 65% less than the control house. SMUD could possibly benefit from the 65% peak savings in ZEH house over the control house with the power produced by PV during peak.

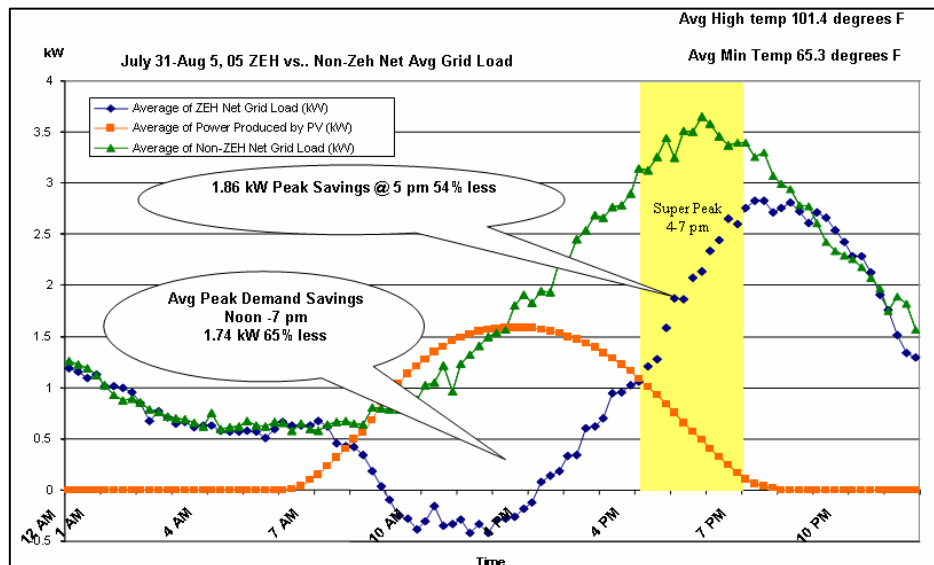


Figure 7- ZEH Peak Demand Reduction from July 31- August 5, 2005

In a simulation, it was determined that 75% reduction in peak would be possible if all the PV systems had west solar orientations.

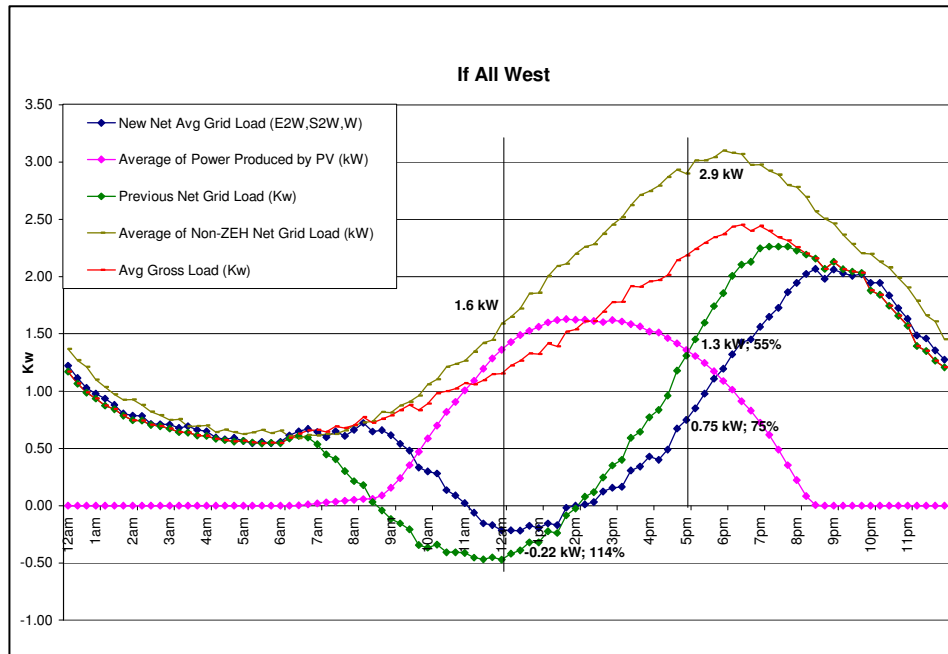


Figure 8- Results of Average Power Produced by PV if all PV were Facing West

Lessons learned from this study are:

1. Production builders will commit to building ZEH with proper products, incentives, and support.
2. Builders combining energy efficiency and PV systems for entire developments seem to garner significant media attention and sales interest from home buyers.
3. ZEH production homes offer substantial utility bill savings, and potential for significant peak load reduction and distribution system benefits.
4. Builders want turnkey PV systems that are backed by long-term warranties and service.
5. PV System costs need to come down, and need buy-down support until they do.
6. Home buyers need to be targeted, increase their awareness of energy efficient homes.
7. Distribution system savings need to be documented and valued.

2.B. RAND Study of "Side-by-Side" Communities

The Role of Energy Efficiency in Home buying Decisions: Results of Initial Focus Group Discussions

Presented by Rob Hammon, ConSol

RAND conducted focus groups to better understand purchase decisions of homebuyers.

The results of the Rand studies showed that participants were not first-time buyers, Non-ZEH owners earn slightly higher incomes and have larger households, and that ZEH owners previously owned more homes in the past. ZEH owners seemed to have greater enthusiasm for talking about their new homes; they responded to the opportunity to participate in the focus groups by a ratio of four to one.

Some other findings of this study included important factors that affect home buyers decisions. Some highlights included: size of the house mattered but particularly with bedrooms for the non-ZEH buyers, early release ZEH owners bought “on faith”, and Non-ZEH homeowners were disappointed with the energy performance of their homes despite performance that was certified to perform 30% better than code for cooling.

2.C. MSNBC Video Clip

Energy Savings- Going Green

Presented by Rob Hammon, ConSol

The video clip was aired on MSNBC. The video demonstrated an example of the national media attention and exposure that Premier Homes continues to receive as a result of developing and building Premier Gardens and other near ZEH developments.

This video can be viewed at the ConSol/BIRA website at:

<http://www.bira.ws/partnersmeeting06.php>

3. Early Research Findings: Advanced System, Prototypes in Borrego Springs, CA

This part of the meeting discussed the four prototype homes being built in Borrego Springs, California by builder-partner Clarum Homes. In this project Clarum is working in close collaboration with BIRA, Davis Energy Group (DEG) and NREL.

The four homes employ the same floor plan with three different wall systems and three different cooling) systems. The detailed monitoring of these homes is important to BIRA’s efforts to improve understandings and modeling of wall systems, particularly homes with high thermal mass and ground-coupling effects. Ground coupling has become a more important issue to be able to estimate more accurately as homes have become much more energy efficient.



Figure 9- Prototypes in Borrego Springs, CA

This included the following two presentations:

3.A. Building America-3 homes: Pre-cooling experiment

Borrego Springs: Experiment in Pre Cooling

Presented by Abe Cubano, ConSol

The four homes have a goal of 90% cooling savings; contain three advanced wall systems, three cutting-edge cooling systems, PV, and Shading. The three advanced wall systems are T-Mass, Structural Insulated Panels (SIP), and 2x6 wood framing. The three cutting-edge cooling systems are the Freus Evaporative Condenser, Lennox 20.5 SEER 14.75 EER, and Direct-Indirect Evaporative Cooling.

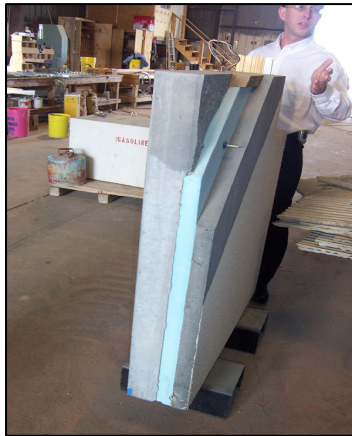


Figure 10- Dow T-Mass Wall



Figure 11- Structural Insulated Panels (SIP)

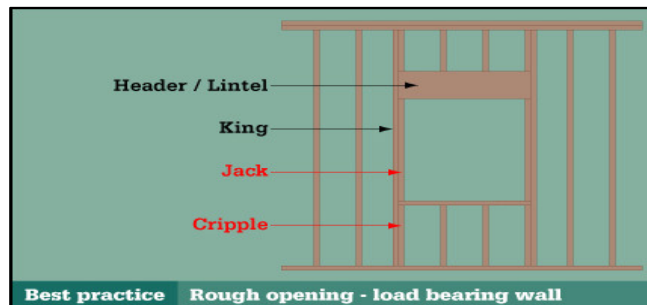


Figure 12- 2x6 (Frame)

A short term experiment was conducted with three of the four prototype houses in Borrego Springs to determine if the T-Mass homes could be pre-cooled and maintain comfort through the peak electric demand period without using additional air conditioning. This test all evaluated the SIP and 2x6 Frame homes. In this test, the homes are pre-cooled to the specified temperature (72°), and then allow no cooling as the peak energy period begins. By monitoring the change in temperature over a period of time we can observe if comfort can be maintained while avoiding any peak energy use for cooling. The results of pre-cooling in the three advanced wall systems are as follows: T-Mass average increase in temperature over an 11 hour period was only 3.5°; SIP average increase in temperature over the same period was 8°; 2x6 Frame home average increases in temperature during a 4.5 hour period was 6°.

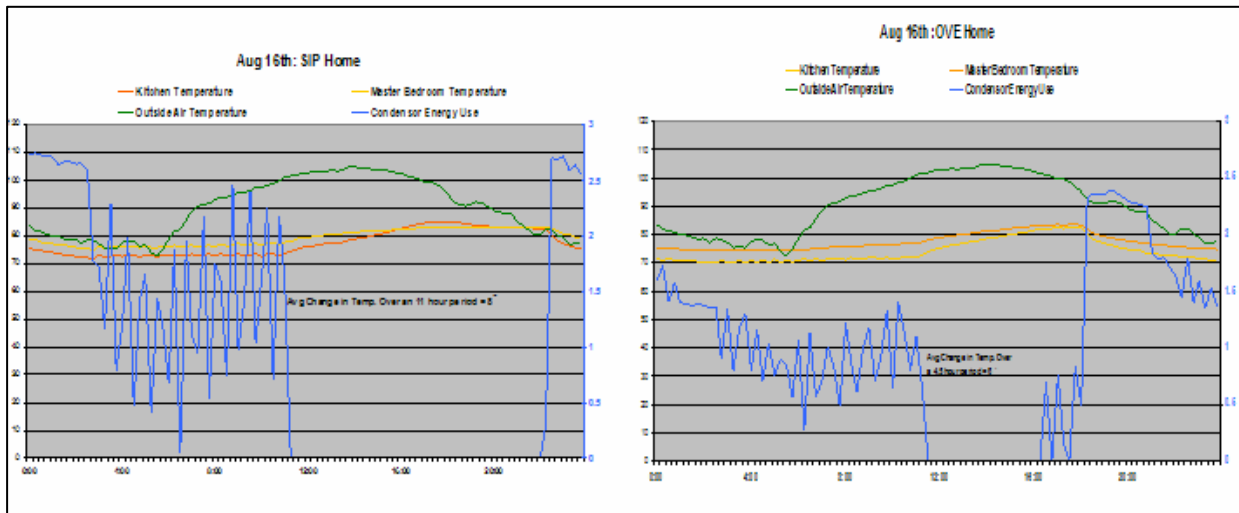


Figure 13- Pre-cooling Results of SIP Panel Home (Left) and “OVE” Home (Right)

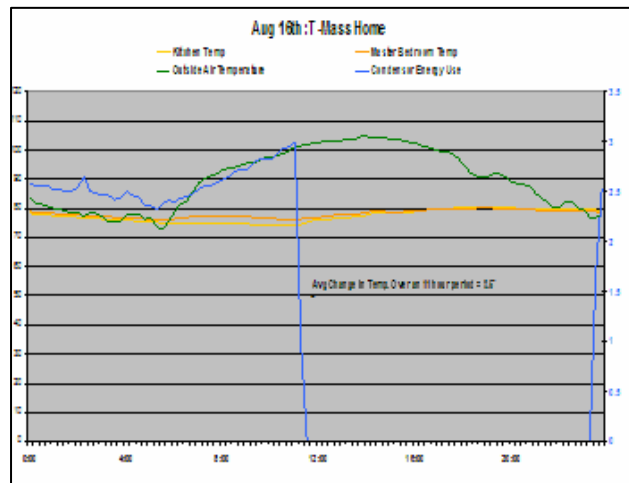


Figure 14- Pre-cooling Results of T-Mass Home

The wall sensors were placed inside the exterior wall of the kitchen and the master bedroom, four per wall location. The 2x6 Frame house reached the 85° set point in 4.5 hours with a temperature change of 9° over 11 hour interval. The SIP house never

reached the 85° set point with a temperature rise of 8°. The T-Mass house never reached the 85° set point with a temperature increase of only 3.5°.

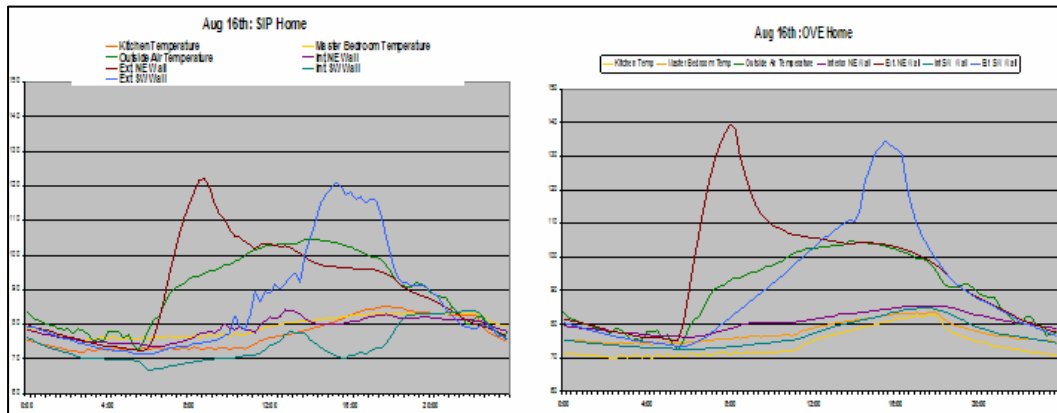


Figure 15- Outside Air Temperature vs. Inside Room Temperature of SIP Panel Home (Left) and “OVE” Home (Right)

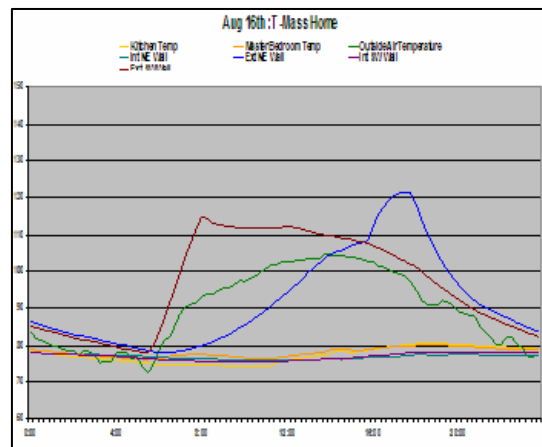


Figure 16- Outside Air Temperature vs. Inside Room Temperature T-Mass Home

3.B. Cooling systems description and performance findings

Borrego Springs Summary & Status

Presented by Bill Dakin, DEG

The OASys 2-stage Evaporative Cooler is the ideal technology for a hot-dry climate, uses 100% outside air, has a multi-speed blower, 75% demand reduction, 60-80% energy reduction, and has a 110% effectiveness. The challenge for this system being used in Borrego Springs is that for a period of 4 to 6 weeks each summer high humidity occurs greatly reducing the effectiveness of evaporative systems, requiring conventional AC backups adding to expense to service a small but period of the year that is crucial to comfort.

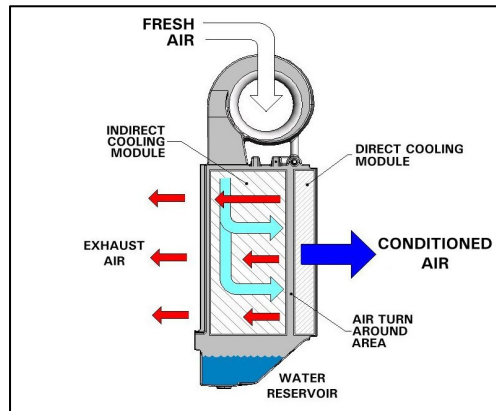


Figure 17- OASys 2-stage Evaporative Cooler

The Freus Evaporative Condenser water cooled condensing unit uses less power, has a higher capacity, refrigerant operates at lower temperatures, efficiency and capacity function of WB instead of dry bulb temperature, and used as cooling tower on cool evenings to pre-cool slab.

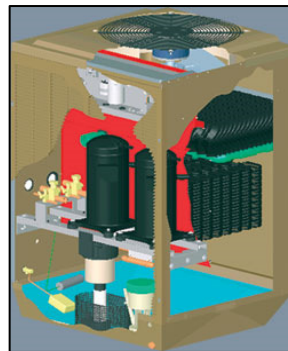


Figure 18- Freus Evaporative Condenser

The NightBreeze Ventilation Cooling brings filtered cool outdoor air into the house without opening windows, pre-cools the house and building mass to reduce cooling loads during the day, contains a variable-speed blower, is estimated to produce 10% cooling savings in CZ 15, provides fresh air ventilation, and provides ventilation cooling with thermal mass when it is not too hot outside at night. This will most likely be during spring and fall.

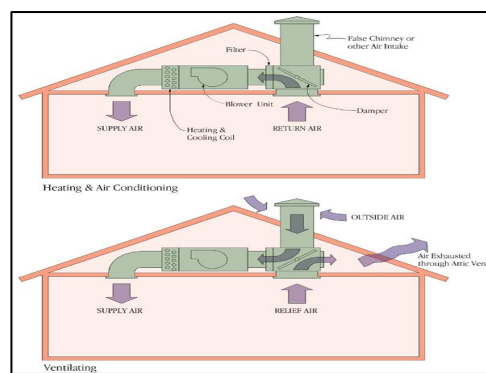


Figure 19- NightBreeze Ventilation Cooling

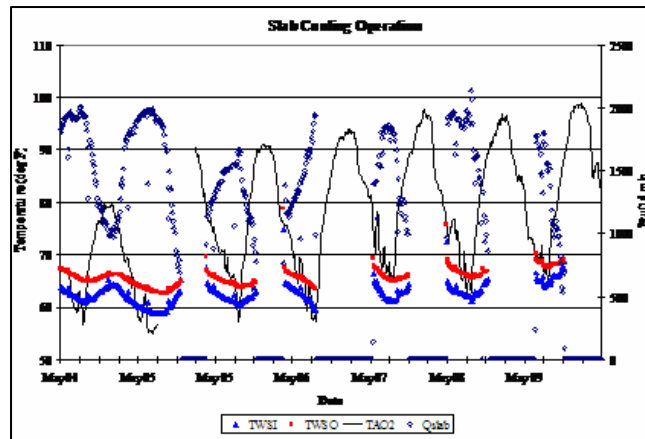


Figure 20- Results of Freus Night-Floor Cooling

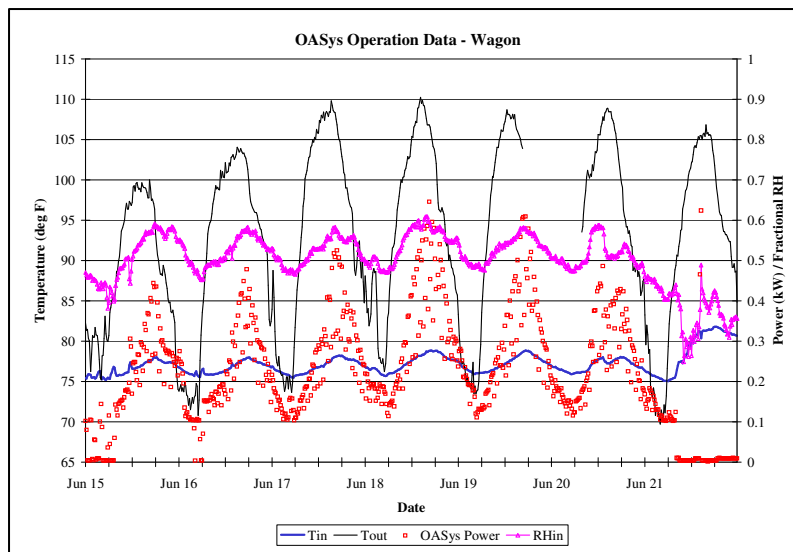


Figure 21- Results of OASys Operation

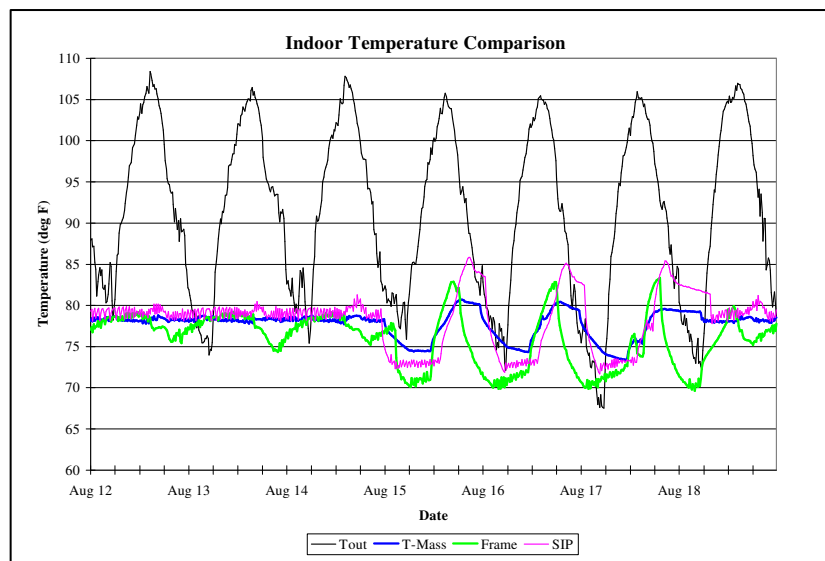


Figure 22- Results of AC Cooling Operation

4. The CEC's and ZENH Program

Presented by Cheri Davis, CEC and Steve Vang, ConSol

The ZENH goals that were established by the California Energy Commission were discussed:

1. Energy Efficiency must be at least 25% or better than 2005 Title 24
2. Electricity Bill reduced by at least 70%
3. Peak Load must be no more than 1Kw
4. Additional cost of energy efficient factors should not exceed \$5,000 maximum per unit (a goal)

Four new projects were also discussed, affordable multi-family ZENH, Utility-Focused Market Model for ZENH, Lakeside, and SMUD project. Three contracts are underway and the SMUD project is scheduled to begin in early 2007.

5. Pinnacle Homes: Vinings, Las Vegas

Pinnacle Homes T-Mass Wall Performance and Rate Structure Analysis

Presented by Faith Shimamoto, ConSol

A baseline house built to the left of a ZEH house in Las Vegas, Nevada. The energy efficient features of the ZEH house included:

1. T-Mass Walls
2. A CopperSun solar water heating system looped into the heating system minimizing natural gas consumption for hot water heating.
3. A Noritz “tankless” hot water heater.
4. Approximately 400 square feet of roof-mounted photovoltaic panels rated at 5.28KW manufactured by GE Energy to generate electricity during low usage periods. Electricity will be fed back onto Nevada Power's grid, helping offset energy use.
5. A 19 SEER water-cooled air conditioning condensing unit manufactured by Freus.
6. Energy efficient vinyl framed windows with Low “E” glass.
7. PolarPly reflective roof sheeting.
8. Energy Star rated light fixtures with highly efficient fluorescent bulbs.
9. Energy Star rated GE appliances.



Figure 23- Construction at Vinings, Las Vegas

Stimulated total peak load gave a 10% reduction between T-Mass and normal walls, 0.5 ton smaller HVAC unit, and gave stable indoor ambient temperature. T-mass walls enabled the peak load to shift to a later time when electricity costs are reduced.

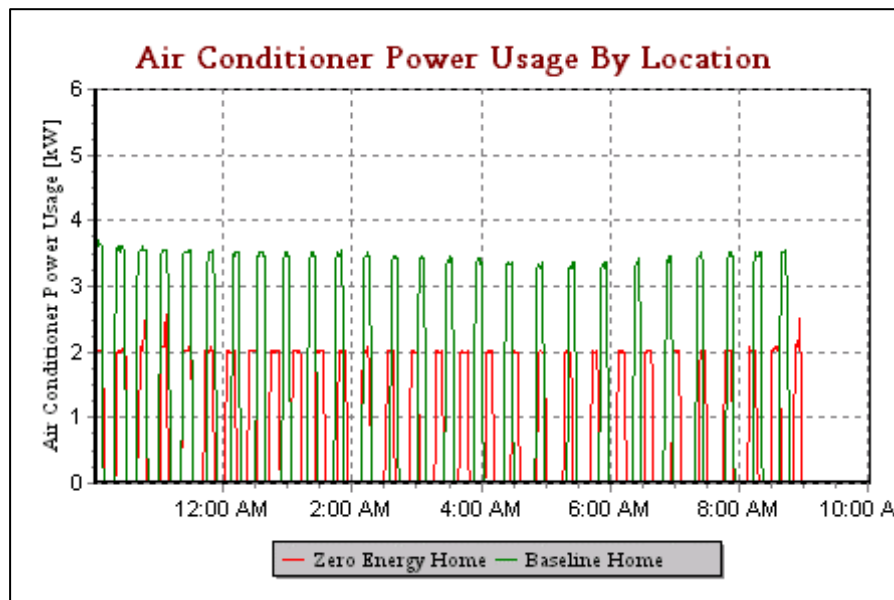


Figure 24- Real Usage Data: Air Conditioner Power Usage ZEH vs. Baseline

With the Time of Use Rate the monthly cost were higher. The ZEH offsets peak, but not enough to overcome the cost of the TOU structure.

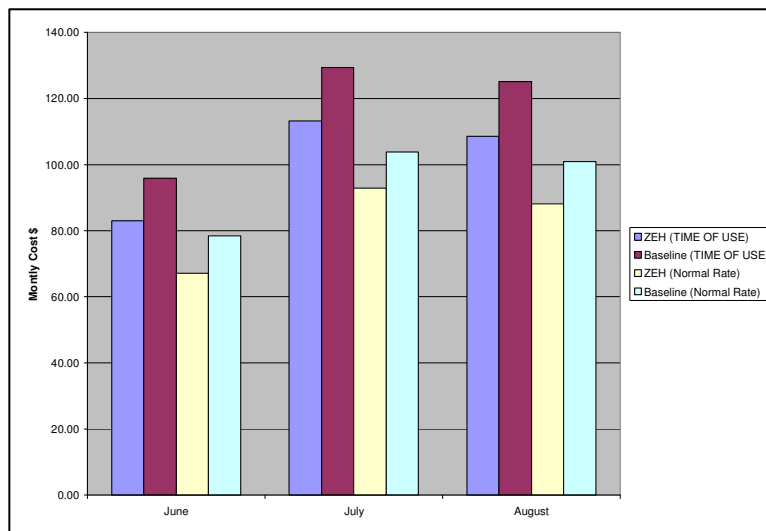


Figure 25- Energy Rate Comparison, Time of Use Rate (TOU) vs. Normal Rate

6. Western States Project: AZ, NM, NV

Zero Energy Homes in the Southwest

Presented by Rob Hammon, ConSol

The importance of the Western States Project is to accelerate development of high performance production builder projects in Arizona, Nevada, and New Mexico.

These are the goals of the project:

1. Develop broad spectrum support for lead builders and developers that are committed to building communities to BA's 50% performance level in each state.
2. Identify key market and technical support components that are resented in each state.
3. Work with individual states to remove barriers to future ZEH communities.
4. Increase construction productivity.
5. Reduce time that is required to bring new energy products and systems to market.
6. Contribute to the development of a new paradigm for delivery of energy efficient, affordable, quality housing that will result in a minimum of 50% energy or bill savings.

7. Near Zero Energy Project Plans, Arvada, CO

Geo Solar Home

Presented by Norbert Klebl, Cottonwood Park West

Mixed use new urbanism planned community includes single family homes, live/work townhomes, stacked flats, apartments, and residential mixed use. The energy efficient features of this community are:

1. South Oriented
2. Have an Airtight, Super-insulated Shell with blown in insulation and airtight windows.
3. Raised heel trusses
4. Passive Solar Design
5. Thermal Mass
6. Mobile Insulation, mobilized window blinds
7. Earth Tube Aspired Energy Recovery Ventilation System
8. Geothermal Exchange
9. Community Ground Source Heat Pump for Domestic Hot Water



Figure 26- Mixed Use New Urbanism Planned Community

The passive solar design is a checker board design which allows each home to absorb the maximum amount of passive solar energy.

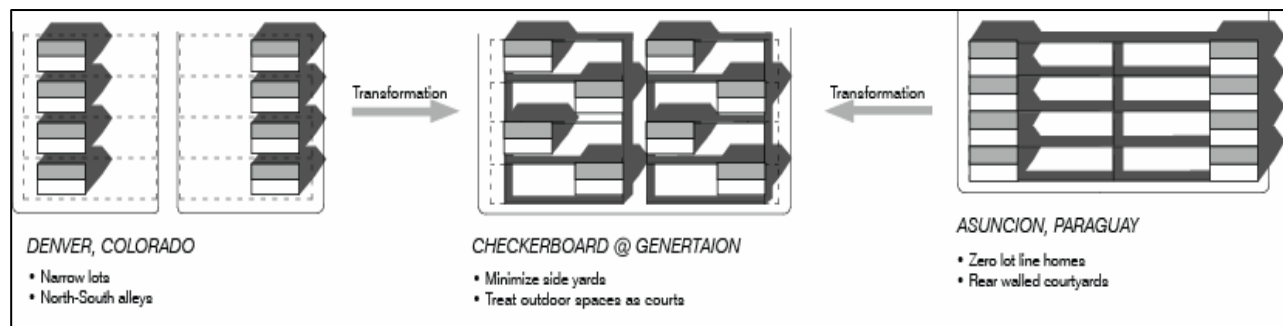


Figure 27- Innovative Urban Passive Solar Design

Mobile Insulation is created with window coverings as energy management tools which create a double R factor. With an added inexpensive solar sensor the shade could open allowing the sun to enter the house. The Earth Tube Aspired ERV system has a six foot deep tube that can generate a 55° air temperature.

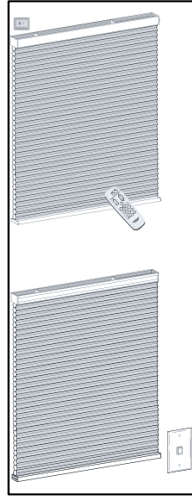


Figure 28- Mobile Installation

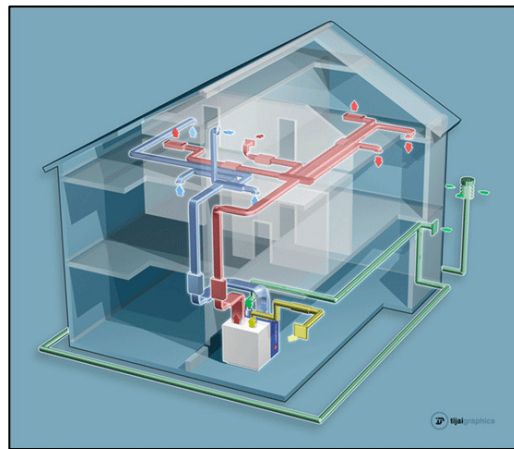


Figure 29- Earth Tube Aspired Energy Recovery Ventilation System

Actual performance rating from November 2005 to July 2006:

1. Warm during the Winter and cool during the summer
2. With nighttime outdoor temp at 15°, after a sunny day, and with radiant underfloor heat off, at the dining room table it was 73°
3. Outside Temperature -18°, home stayed 68-70° and comfortable.
4. At 3 a.m. and -7°, bedrooms would stabilize at 64° – with radiant heat off – due to occupants generating ~400 BtU/hr.

Target Level of Energy Efficiency Arvada GeoSolar Home Semi-detached, 2 stories, 1,500 total SF		
Build America Benchmark House	8,000 KWhs	1000 Therms
	Reduction Potential	
Building Features	Elec. (%)	Gas (%)
Air tight, super insulated shell	15	40
Passive solar, thermal mass and mobile insulation	10	40
Energy Recovery Ventilation (EVR) with Earth Tube	10	20
Other features	20	0
Total	55%	100%
Geo Solar House	3,600 KWhs	0 Therms

Figure 30- Energy Efficient Targets

8. Clarum Homes: Upcoming Projects & Plans

Presented by Aaron Nitzkin, Clarum

A brief description of Clarum's Enviro-Home was given by Aaron Nitzkin. Clarum Homes introduced the Enviro-Home in 2002, as its own Zero Energy Home prototype. This home not only reduces the utility prices but also minimizes the use of resources, produces less harmful effects to the environment, and provides a more comfortable living space.

Clarum's upcoming projects and plans include:

1. Clarum is currently exploring ways for a home to have plug-in electric/hybrid cars and also how a car could be a possible back-up generator to a house during a blackout.
2. Clarum is also using on site grinding of construction waste. They recycle construction debris to lower material cost onsite and the additional of more construction debris placed into landfills.
3. Structured plumbing to provided instant hot water to the whole housing community.
4. Developing affordable apartments in the Fresno area.

9. BA, BIRA & Climate Change

Turning the Tide on Climate Change One Community at a Time

Presented by Rob Hammon, ConSol

The problem is that nationally, buildings are the single largest consumer of energy (39%), are the largest emitter of CO2 (38%), and consume 76% of all plant produced electricity. The solution is to either build one or two homes at Net Zero or BIRA's approach to build hundreds of homes at Near Zero (50-70%) and begin to change the market.

Conclusion

It seems as if there are three important areas BIRA should be focusing on mass, PVs, and solar thermal. For mass, BIRA needs to figure out what mass is good and how much of it to use. For PVs, BIRA needs to determine how to bring down the price in order for builders to be more willing to include PVs in production. For solar thermal, BIRA needs to do more research regarding which person will take responsibility of the system. Using Europe as an example, where there is a specific person who takes care of solar thermal.

BIRA should explore the importance of miscellaneous end uses to determine if that is in fact the reason why the actual annual electricity bill is a great deal higher than the predicted annual electricity bill. If it in fact is a problem BIRA would begin to further our research into everyday plug usage.

The awareness of energy efficient homes of home buyers needs to be targeted as well. Homeowners need to be educated in order for them to show more interest. Bruce Cenicerros from SMUD mentioned that BIRA is too concerned with making energy efficient homes look and feel like normal homes. Well this is a new product, and lets market it like one. Also BIRA should focus on Build it Green, an organization that educates real estate agents to sell and educate the masses.

Appendix I -- List of Participants

Ren Anderson
NREL
(303) 384-7433
ren_anderson@nrel.gov

Andrew Au
ConSol/BIRA
(209) 473-5000
Aau@ConSol.ws

Bruce Baccei
ConSol/BIRA
(209) 473-5000
bbaccei@consol.ws

Rocky Bacchus
Freus
(915) 472-5729
Rockyb@freus.com

Martin Bailey
City of Roseville/Roseville Electric
916-774-5617
MBailey@roseville.ca.us

Phil Barnes
Treasure Homes
(916) 773-5581
pbarnes@treasurehomes.com

Jerry Eaton
UC Davis/CLTC
(530) 757-3479
jleaton@ucdavis.edu

Edgar Becerra
Sharp
(714) 903-4790
edgar.becerra@sharpusa.com

Harvey Bryan
Arizona State University
(480) 965-6094
harvey.bryan@asu.edu

Bruce Cenicerros
Sacramento Municipal Utility District
(916) 732-6747
BCenice@smud.org

Howard Clearfield
The Dow Chemical Company
(408) 978-7141
HMClearfield@dow.com

Abe Cubano
ConSol/BIRA
(209) 473-5000
acubano@consol.ws

Bill Dakin
Davis Energy Group
(530)-753-1100
bldakin@davisenergy.com

Cheri Davis
California Energy Commission
(916) 654-4781
Cdavis@energy.state.ca.us

Michael Foster
City of San Jose Environmental
Services Dept.
(408) 975-2601
Michael.Foster@sanjoseca.gov

Rob Hammon
ConSol/BIRA
(209) 473-5000
rob@consol.ws

Craig Hoellwarth
GREEN INQ
(916) 683-5151
craig@greening.com

Wade Hughes
Sacramento Municipal Utility District
916-732-5858
whughes@smud.org

Bill Juhl
Amvic-Pacific
(530) 265-9085
bjuhl@amvic-pacific.com

Mike Keesee
Sacramento Municipal Utility District
(916) 732-5244
mkeesee@smud.org

Norbert Klebl
Cotton Wood Park West
(303) 449-3232
cottonwood60@hotmail.com

Ryan Kerr
ConSol/BIRA
(209) 473-5000
RKerr@ConSol.ws

Leif Magnuson
EPA
(415) 972-3286
magnuson.leif@epa.gov

Susie Marbury
New Mexico Energy Minerals, & Natural
Resources Dept
(505) 476-3254
susie.marbury@state.nm.us

Joseph McCabe
Energy Ideas
(530) 902-4577
energyi@mccabe.net

Kathryn McCamant
CoHousing Partners, LLC
(303) 449-3232
Kathryn.mccamant@cohousingco.com

Rick Mockler
CoHousing Partners, LLC
530-297-7115
rick@whdc.com

Jay Murdoch
Owens Corning
(301) 493-4890
jay.murdoch@owenscorning.com

Aaron Nitzkin
Old Country Roofing
(707) 469-7470
anitzkin@oldcountryroofing.com

Nancy Kirshner Rodriguez
ConSol
(209) 473-5000
NancyKRod@ConSol.ws

Arthur Rudin
Sharp
(714) 903-4880
RudinA@sharpsec.com

Faith Shimamoto
ConSol/BIRA
(209) 473-5000
fshimamoto@consol.ws

Flor Tataje
ConSol/BIRA
(209) 473-5000
ftataje@consol.ws

Steve Vang
ConSol/BIRA
(209) 473-5000
svang@consol.ws

Lorayn Walser
Nevada State Energy Office
(775) 687-9706
lwalser@dbi.state.nv.us

Bruce Wilcox
(510) 601-7475
bwilcox@imi.net

Appendix II--Agenda

Turning the Tide on Climate Change One Community at a Time

10:00	Welcome and Introductions	Bruce Baccei, BIRA/ConSol
10:15	Building America from the Top	Ren Anderson, NREL
10:30	BIRA Research to Date and Directions	Rob Hammon, BIRA/ConSol Mike Keese, SMUD
	• Premier Gardens/SMUD: Energy Efficiency + PV = \$ & Peak Savings • RAND Study of “Side-by-Side” Communities • MSNBC Video Clip	
11:15	Early Research Findings: Advanced System	Abe Cubano, BIRA/ConSol Bruce Baccei, BIRA/ConSol
11:45	Prototypes in Borrego Springs, CA	Aaron Nitzkin, Clarum Bill Dakin, DEG
	• Building America-3 homes: Pre-cooling experiment • Cooling systems description and performance findings	
12:15	<i>Lunch – Break</i>	
1:00	The CEC’s	Cheri Davis, CEC
1:15	ZENH Program	Steve Vang, ConSol
1:30	Pinnacle Homes: Vinings, Las Vegas	Faith Shimamoto, BIRA/ConSol
2:00	Western States Project: AZ,NM,NV	Rob Hammon, BIRA/ConSol
2:15	Near Zero Energy Project Plans, Arvada, CO	Norbert Klebl, Cottonwood Park West
2:45	Clarum Homes: Upcoming Projects & Plans	Aaron Nitzkin, Clarum
3:15	BA, BIRA & Climate Change,	Rob Hammon, BIRA/ConSol
3:30	Recommendations, Discussion, and Closing	Bruce Baccei, BIRA/ConSol