Nevada Energy Code Collaborative meeting
January 7, 2020
1:00 PM ~~ 2:30 PM (PST)

Teleconference call-in number: (872) 240-3412
Participant Access code: 731-719-181

To View Slides and Online Presentation join
https://global.gotomeeting.com/join/731719181

1. **Welcome, introductions**
2. **Review previous meeting**
   Jim Meyers, SWEEP
   - A quick summary of discussions from the last collaborative meeting. Any open items?
3. **2021 IECC Update**
   Jim Meyers, SWEEP /
   - The 2021 IECC code hearings are now behind us and the governmental vote was completed in December. A *highlight* of residential and commercial changes will be discussed.
   - Open conversation invited to hear questions, support and concerns of changes.
4. **Update Residential Energy Code Field Study**
   Shaunna Mozingo, Mozingo Code Group / Jim Meyers, SWEEP
   - Phase 1 of the project is starting where data collection occurs in the field. Who will participate, needs for data collection, communication
5. **Training opportunities for 2020**
   Collaborative Participants
   - ZERH trainings – what opportunities to continue this year
   - NV Energy trainings in 2020, highlights of potential trainings
   - GOE and U.S. DOE training opportunities
   - EduCode – 2020 and expand in 2021?
   - Potential partners…are there some in Nevada?
6. **Innovative Heat-Pump Programs**
   Tom Polikalas, SWEEP
   - Heat pump growth, both hot water and heating/cooling systems are growing across the U.S. Can these products work in Nevada buildings.
7. **Nevada Governor's Office of Energy – Building program update**
   Robin Yochum
   - Robin to share brief overview of energy programs in the office
8. **Utility and Legislative Report**
   Tom Polikalas, SWEEP
   - Current status and opportunities for building efficiency from current legislative and regulatory actions. What activity is planned for the interim year?
9. **Wrap Up & Next Steps**
   - Closing comments
   - Next meeting date

Nevada Energy Code Collaborative

Meeting 1Q 2020

1

Last Meeting

State of Nevada Energy Code Collaborative Meeting Minutes
September 24, 2019
Link to Webinar Recording (https://vimeo.com/363016161)

Study on RESNET Data in Nevada (Minute 2:00 in the video recording)
Christine Brinker with SWEEP presented on the findings when analyzing three years of RESNET data for Nevada. SWEEP had procured this data from RESNET and all data was sanitized to remove any identifiable information such as address, builder, rater, etc. to see the scatter across the state. With the majority of data from southern Nevada. The purpose of the study is to understand what is being constructed today (this data is from 2014-2016) and how codes align with energy code requirements.

Zero Energy Ready Overview (Minute 35:00 in the video recording)
Les Lazareck with Home Energy Connection discussed zero energy which aligned with the closing remarks from the previous discussion where communities are setting goals to reach zero energy. Les discussed what is zero energy and what are the definitions such as source, site, net zero, grid connected, zero energy ready, zero electricity and others. Showing an example of a very low HERS, 19, house built in the valley in 2005 which had electric and gas costs from the respective utility grids.

2

Last Meeting

General Service Lighting Update (Minute 56:00 in the video recording)
Robin Yochum with the Governors Office of Energy discussed the draft regulations to set a minimum efficiency standard for general service lamps sold on or after January 1, 2020 and defining what a general service lamp is. The regulations are a result of the passage of AB 54 in the 2019 legislative session. AB 54 changed requirements for general service lamps in NV effective January 1, 2020. The Governor's Office of Energy is currently going through the rulemaking process in the state which includes a workshop on October 1st to gather public comments. Public comments can be submitted via a form which is available on the Governor's Office of Energy website under the Notices page.

Update on the Residential Energy Code Field Study - Minute 1:07:00 in the video recording)
Jim shared the update on the residential energy code field study and the upcoming kickoff meetings in October. There will be two meetings to support the state, one in Reno (10/16) and another in Las Vegas (10/17). Invitations will be sent the week of September 23rd. PNNL has developed sample sets of communities where houses can be sampled. A sample set of jurisdictions has been reviewed with comments from GOE. This sample set will be discussed at the meetings and opportunities for comments will be accepted.

3

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4

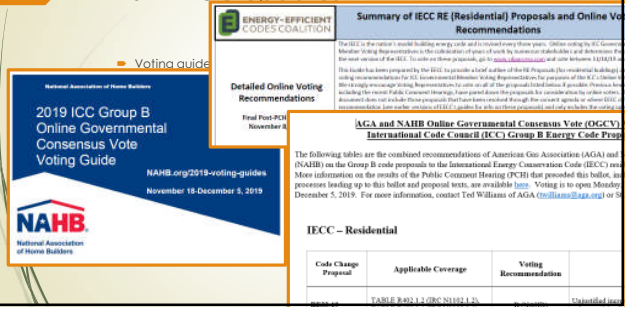
2021 IECC Updates

- Industry of all types produced voting guides

5

2021 IECC Updates

- Voting guide



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2021 IECC Updates

- ICC releases **preliminary** 2019 Group B Online governmental consensus vote (OGCV) results
- PRELIMINARY RESULTS OF THE OGCV. THE RESULTS ARE NOT FINAL as they are subject to certification by the **Validation Committee** and confirmation by the **ICC Board** in accordance with Section 10.1 of CP 28 Code Development.
- The 2019 Group B Final Action results, including vote tallies from the OGCV, will be posted following certification in accordance with Section 10.4 of CP 28.

7

2021

- ICC r vote
- PRELI are s by th Deve
- The 2 will b 28.

PRELIMINARY 2019 GROUP B
ONLINE GOVERNMENTAL CONSENSUS VOTE (OGCV) RESULTS

The 2019 Group B Public Comment Hearings were held in Las Vegas, NV, October 23 – 30, 2019. The results were posted on November 13, 2019. The 2019 Group B Online Governmental Consensus Vote (OGCV) on the PCH results was conducted during the period of November 19 – December 6, 2019. This document includes the PRELIMINARY RESULTS OF THE OGCV. THESE RESULTS ARE NOT FINAL, as they are subject to certification by the Validation Committee and confirmation by the ICC Board in accordance with Section 10.1 of CP 28 *Code Development*.

The 2019 Group B Final Action results, including vote tallies from the OGCV, will be posted following certification in accordance with Section 10.4 of CP 28.

LEGEND:

AS	**Approved as Submitted**
AM	**Approved as Modified at the Committee Action Hearing**
AMPC	**Approved as Modified by Public Comment**
D	**Disapproved**

Code Change Number	PCH Action	OGCV Result
ADMINISTRATIVE PROVISIONS CODE		
ADM3-19 Part I	AMPC1	AMPC1
ADM4-19	D	D
ADM5-19 Part II	AMPC1	AMPC1
ADM7-19	D	D
ADM10-19 Part II	D	D
ADM12-19	D	D
ADM16-19 Part II	D	D
ADM19-19	AM	AM
ADM20-19	D	D
ADM21-19	D	D

Code Change Number	PCH Action	OGCV Result
ADM47- NFPA 285-19	AS	AS
ADM47- MSF 359-19	AS	AS
ADM47- NMX-J-521/2-40-ANCE/CAN/ CSA-22.2 UL 60335-2-	D	D
INTERNATIONAL BUILDING CODE – GENERAL (heard by IBC – Structural & IRC – Building)		
G10-19	AMPC2	AMPC2
G12-19 Part I	AS	AS
G12-19 Part II	AS	AS
G14-19	AMPC1	AMPC1

8

CE217 - example

Code Change Number	PCH Action	OGCV Result
CE209-19	AM	AM
CE213-19	AMPC1, 3	AMPC1, 3
CE215-19	AM	AM
CE216-19	AM	AM
CE217-19 Part I	AM	AM
CE217-19 Part II	D	AS
CE218-19	AM	AM
CE219-19	D	D
CE220-19	D	D

Code Change Number	PCH Action	OGCV Result
RE74-19	AMPC1	AMPC1
RE75-19	AMPC1	D
RE79-19	AS	D
RE80-19	AMPC1	D
RE81-19	AMPC1	D
RE84-19	AMPC1	D
RE85-19	AS	D
RE94-19	D	D
RE95-19	D	D

- Example - 50 votes at PCH, 40 D, 10 AS
- 100 votes at OGCV
- Two outcomes –
  - Majority 66 AS and 34 D = 76 AS – 74 D
  - 2/3rs Majority 91 AS and 9 D = 101 AS (0.67333) – 49 D

9

CE217 - example

- Overturning the committee to get a proposal passed into code requires a two-thirds majority of voters
- Confirming a committee recommendation requires just 50 percent of votes

- Example - 50 votes at PCH, 40 D, 10 AS
- 100 votes at OGCV
- Two outcomes –
  - Majority 65 AS and 35 D = 75 AS – 75 D
  - 2/3rs Majority 91 AS and 9 D = 101 AS (0.67333) – 49 D

10

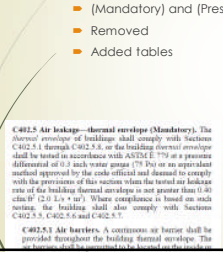
Themes

- Clean-up, Clarify, Compliance
- Increased efficiency
- Trade-offs and options
- ERI
- Leakage
- Power, Energy, and Efficiency
- Electricity
- Zero
- New technology/requirements

11

Clean up – Res and Com

- (Mandatory) and (Prescriptive) CE42
- Removed
- Added tables



Add new text as follows:

TABLE R406.2 (IRC N1106.2)
REQUIREMENTS FOR ENERGY RATING INDEX

Section[a]	Title
General	
R401.3	Certificate
Building Thermal Envelope	
R402.4.1	Vapor Retarder
R402.4	Air Leakage
R406.3	Building Thermal Envelope
Systems	
R403.1	Controls
R403.3 except sections R403.3.1, R403.3.4, R403.3.6, and R403.3.7	Ducts
R403.4	Mechanical system piping insulation
R403.5.1	Heated water circulation and temperature maintenance systems
R403.6	Mechanical ventilation
R403.7	Equipment sizing and efficiency rating
R403.8	Systems serving multiple dwelling units
R403.9	Snow melt and ice systems

12

Fenestration

- Fenestration u-factors and SHGC (RE35)
  - 0.32 to 0.30 in CZ 3

13

Water Heat

- Hot water (RE162-19)
  - Compactness of hot water systems

1-Story, 3 Bedroom, 2 Bath

1. Conditioned floor space: 1,147 SF
2. Hot water system rectangle: 36x23 = 828 SF
3. Compactness Ratio: 828/1,147 = 72%
4. HWDS Factor for 1-Story: 0.0

PROPOSED DESIGN

As proposed

Use, in units of gal/day = 20 + (10 × N_{br}) * (1-HWDS)

where:

N_{br} = number of bedrooms.

HWDS = factor for the compactness of the hot water distribution system

Compactness Ratio		HWDS Factor
1 story	2 or More Stories	
≤ 60%	≤ 30%	0
>60% to ≤ 80%	>10% to ≤ 30%	0.05
>10% to ≤ 30%	>5% to ≤ 15%	0.10
< 10%	≤ 7.5%	0.15

14

Water Heat

- 1. Storage gas water heater with a uniform energy factor (UEF) that meets the requirements of Table R403.5.1.
- 2. Storage electric water heater utilizing not less than 1.0 kW of on-site renewable energy.
- 3. Heat pump water heater with a UEF not less than of 2.0.
- 4. Tankless water heater.
- 5. Grid-enabled water heater.
- 6. Solar water heating system having a solar fraction of not less than 0.5

FIRST HOUR RATING[a]	MINIMUM UEF
Very Small	0.24
Low	0.50
Medium	0.64
High	0.68

15

Trade offs and options

16

Insulation

- Cavity plus exterior insulation
  - 20 + 5
- Attic
  - R 49, R 60

17

Duct Testing

- Removes option for ducts in conditioned space
- Duct leakage testing when located within building envelope (RE112)
- Maximum total leakage rate of 8.0 cfm with any compliance path (RE115)

18

Readiness

- Electric Readiness for appliances, ready circuits
- Lighting controls in residential, 70 l/watt
- Exterior lighting controls, impacts multifamily

19

ERI preliminary changes

- Where on-site renewable energy is included for compliance using the ERI analysis of Section R406.4, the building thermal envelope shall be greater than or equal to the levels efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the **2018** International Energy Conservation Code.
- Changes ERI scores to 2015 IECC
- Removes backstop language
- On-site renewable energy shall not exceed 5 percent of the total energy use.

CLIMATE ZONE	ENERGY RATING INDEX[a]
1	~~57~~ 52
2	~~57~~ 52
3	~~57~~ 51
4	~~62~~ 54
5	~~61~~ 55
6	~~61~~ 54
7	~~58~~ 53
8	~~58~~ 53

20

Net zero energy/carbon

- Residential Zero energy appendix
  - ERI score with onsite power production
  - ERI score for zero energy house
- Zero code renewable energy standard (comm)
- The purpose of the Zero Code Renewable Energy Appendix is to supplement the International Energy Conservation Code and require renewable energy systems of adequate capacity to achieve zero-net-carbon.
- EUI

TABLE AX104.1 ENERGY UTILIZATION INTENSITY FOR BUILDING TYPES AND CLIMATES (kBtu/ftÂ²-Y)

Building Area Type	Climate Zone 0A/ 1A	0B/ 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
kBtu/ftÂ²-y																	
Multifamily (R-2)	43	45	41	41	43	42	36	45	43	41	47	46	41	53	48	53	58
Healthcare/hospital (I-2)	119	120	119	113	116	109	106	116	109	106	118	110	105	126	116	131	142
Hotel/motel (R-1)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

21

Shaunna Mozingo – Mozingo Code Group

Nevada Residential Field Study - Update

1

Highlights

- Only new, site-built single-family homes
- Single site visit
- Focus on review of individual code requirements rather than homes
- Sample size of 63 observations
- Energy saving metric

2

Current step

- Waiting for final contract from DOE to start contacting jurisdictions and identify homes for data collection

3

Highlights – Key Items

- Envelope tightness (ACH50)
- Window SHGC
- Window U-factor
- Exterior wall insulation
- Ceiling insulation
- High-efficiency lighting
- Foundation insulation (floor / basement wall / slab)
- Duct leakage

4

Highlights – data collection

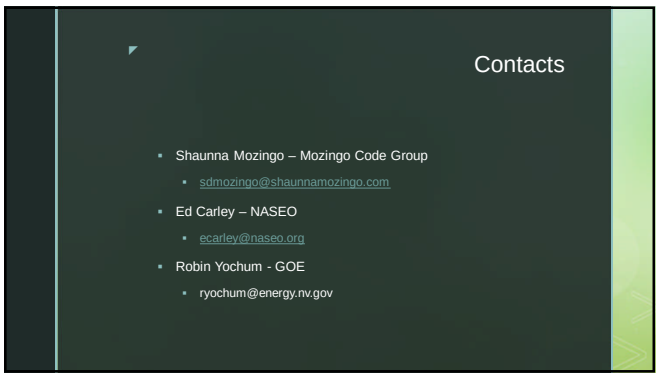
- Project team will perform blower door tests
- Project team will perform duct leakage tests
- Observation of frame cavity insulation installation grade will be done

5

Confidentiality

- No personally identifiable information to be reported to DOE/PNNL
- Data collection form and online tool use an identification code to identify individual homes
- Format: Two-digit state abbreviation + a unique number assigned by the Project Team
- DOE/PNNL reporting will be done only on a STATE basis, not at the jurisdictional or home level

6


Contacts
Shaunna Mozingo – Mozingo Code Group
sdmozingo@shaunnamozingo.com
Ed Carley – NASEO
ecarley@naseo.org
Robin Yochum - GOE
ryochum@energy.nv.gov

7

Training opportunities 2020

1

Educode 2020

- March 9-13
- Orleans Hotel & Casino Conference Center
- www.educode.us – to register
  - Wednesday March 11 – Building Science Meets Energy Code
  - Thursday March 12 – 2018 IECC Residential Applications
  - Friday March 13 – 2018 IECC & ASHRAE 90.1 Commercial Real World Applications

2

Others

- Zero Energy Ready Homes (last held in November) – future funding sources
- NV Energy trainings – Green Builder Media
- Governors Office of Energy

3

Pumping Up Savings through Innovative Heat-Pump Programs

Building Energy Code Collaborative"

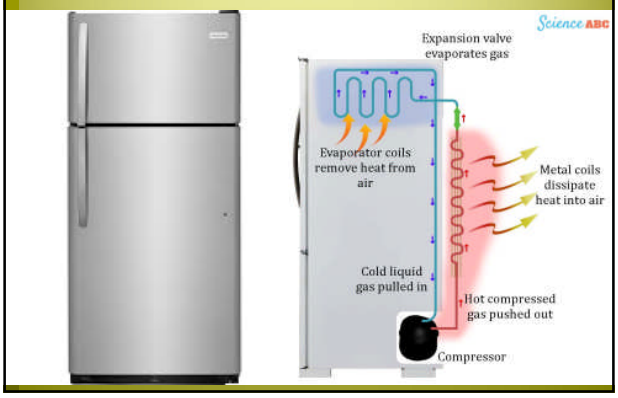
Jan. 7, 2020

Tom Polikalas, Nevada Representative

SWEEP

1

We all have heat pumps in our homes



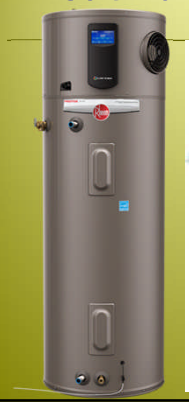
2

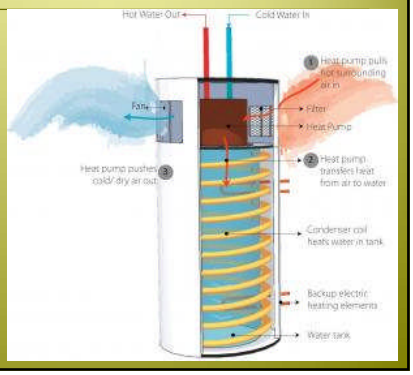
3

In 1913, refrigerators for home and domestic use were invented by Fred W. Wolf of Fort Wayne, Indiana, with models consisting of a unit that was mounted on top of an ice box.[6][7]
In 1914, engineer Nathaniel B. Wales of Detroit, Michigan, introduced an idea for a practical electric refrigeration unit, which later became the basis for the Kelvinator.

4

Heat Pump Water Heaters





5

Heat Pump Water Heaters

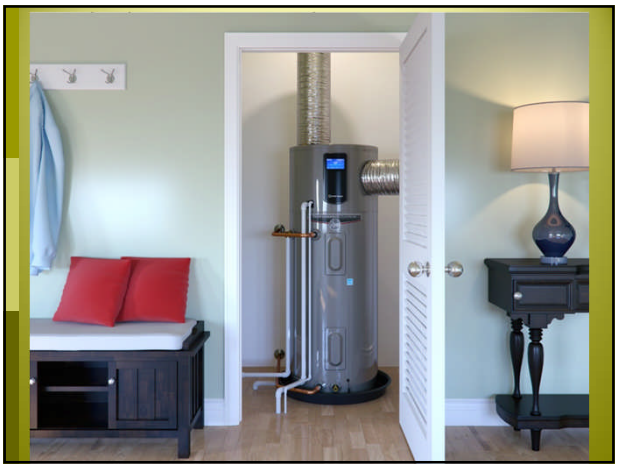
Features:

- **2-3 times as efficient as electric resistance water heaters**
- **60% lower life-cycle cost as compared to standard electric water heating.**
- **Have potential to make grid more efficient, store renewable energy**

"Water heaters connected with the local utility or grid operator having real-time communications and control can take advantage of the thermal storage capacity of the water heater to shift electricity load away from grid peak times, help integrate renewable electricity into the grid"

Source: https://www.nrdc.org/experts/pierre-delforge/very-cool-heat-pump-water-heaters-save-energy-and-money

6



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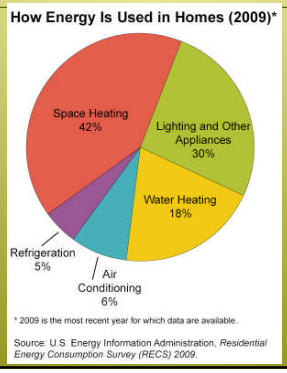
Water Heating a Large Component of Our Energy Bills



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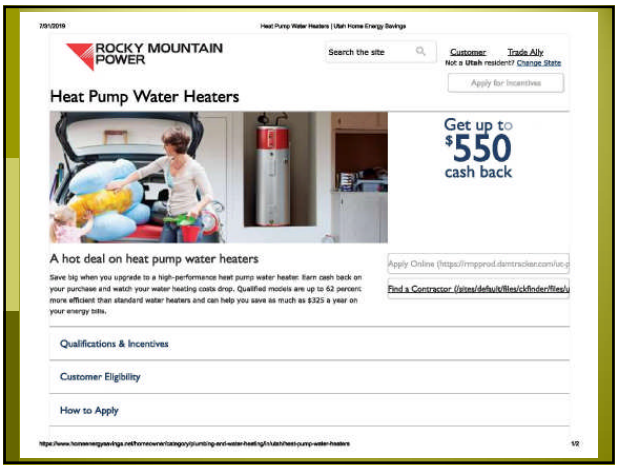

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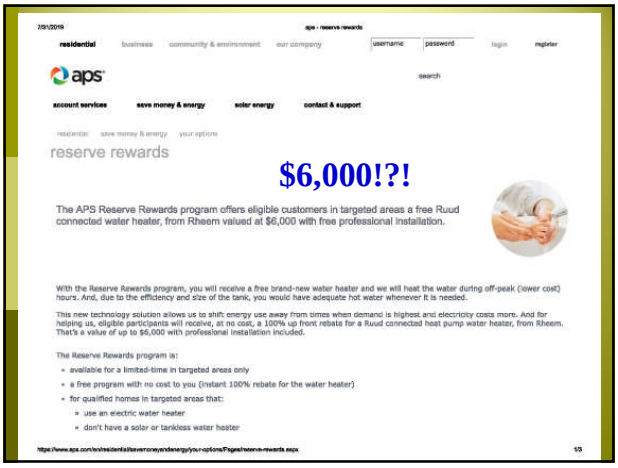
Energy Star Certified Heat Pump Water Heaters
Hot Showers Without Huge Bills
Heat pump water heaters use electricity to move heat from the air to the water. While it sounds straightforward, the cost efficiencies you can achieve over normal water heaters are nearly threefold, so you can heat your water and stay within your budget. Incentives for heat pump water heaters are $750 per unit.
$750/unit!
Learn more about heat pump water heaters
For more information regarding Residential High Efficiency Heat Pumps, Water Heaters & Rebates, please contact Kurt Campbell campbellk@nhec.com or 603.536.8672.
For more information regarding Commercial Heat Pumps, Water Heaters and available commercial incentives, please contact Joe Lajewski at lajewskj@nhec.com or call 603.536.8663.
2019 Residential Heat Pump & Equipment Terms and Conditions
2019 Energy Star Certified Heat Pump Water Heater Application

10


aps
reserve rewards
$6,000!?!
The APS Reserve Rewards program offers eligible customers in targeted areas a free Ruud connected water heater, from Rheem valued at $6,000 with free professional installation.
With the Reserve Rewards program, you will receive a free brand-new water heater and we will heat the water during off-peak (lower cost) hours. And, due to the efficiency and size of the tank, you would have adequate hot water whenever it is needed.
This new technology solution allows us to shift energy use away from times when demand is highest and electricity costs more. And for helping us, eligible participants will receive, at no cost, a 100% up front rebate for a Ruud connected heat pump water heater, from Rheem. That's a value of up to $6,000 with professional installation included.
The Reserve Rewards program is:
available for a limited-time in targeted areas only
a free program with no cost to you (instant 100% rebate for the water heater)
for qualified homes in targeted areas that:
use an electric water heater
don't have a solar or tankless water heater

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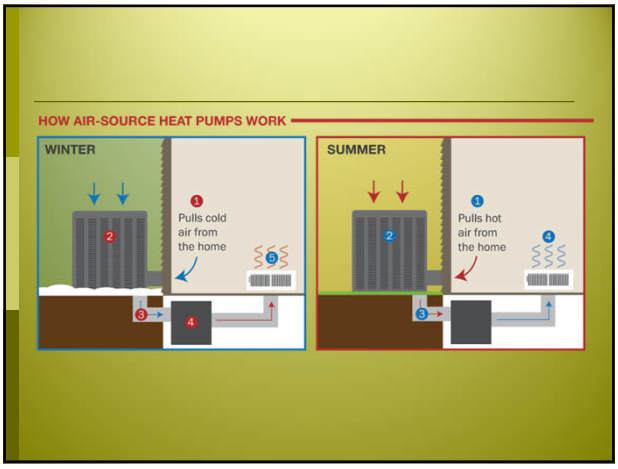
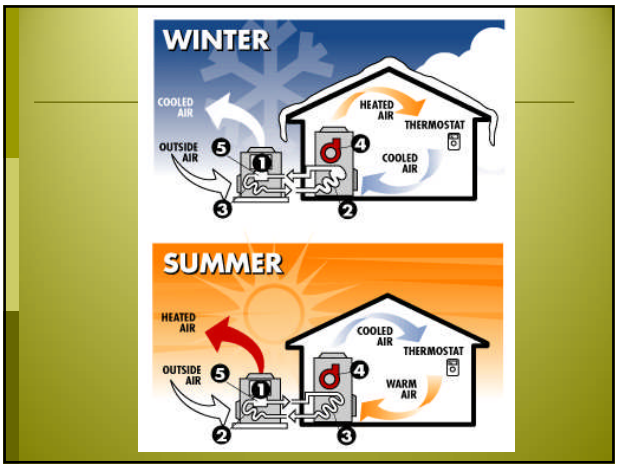

HOW AIR-SOURCE HEAT PUMPS WORK
WINTER
Pulls cold air from the home
SUMMER
Pulls hot air from the home

12



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14

70 degree heating and cooling

Electric Resistance $2640
(100% radiant/convector zoned system with 13 SEER A/C)

Propane $2474
(91% condensing system with 13 SEER A/C)

Natural Gas $1021
(91% ignitor condensing system with 13 SEER A/C)

GeoExchange $724
(350% efficient system with horizontal ground loop)

Assumes:
- *Typical 2,000 sq foot home (48,000 Btu/hr heating load & 20,000 Btu/hr cooling load)*
- *Average temperature design data for Montrose, CO*
- *Energy costs: Electricity@ $.093/kWh; Propane @ $1.96/gallon; Natural Gas @ $.76/therm*

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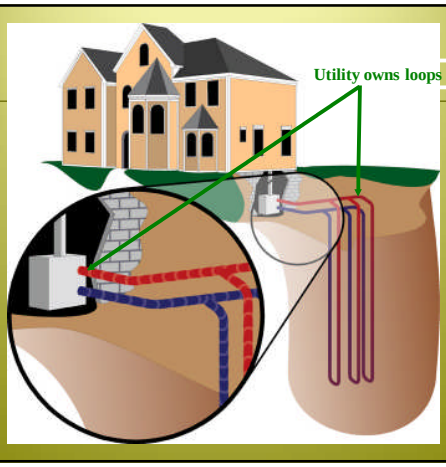
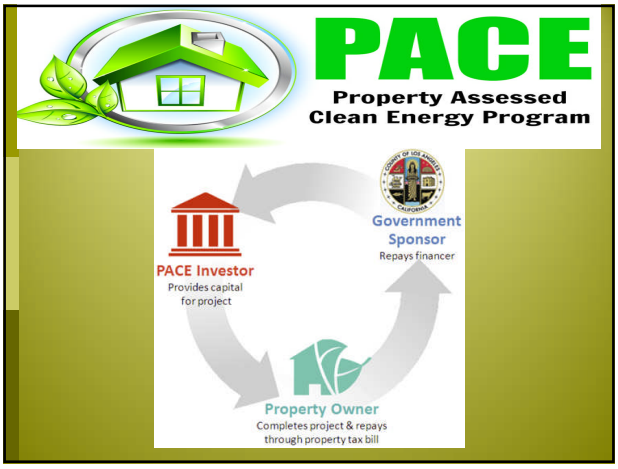


16

The Ground Loop "Utility"

- A loop Tariff eliminates the "higher sales price" barrier for home builders, as they can build "GeoExchange" homes, for little or no premium versus a quality gas furnace and air conditioner.
- Eliminates "what if I sell in a few years" first cost barrier for home buyers.

17



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Cost-effective opportunities to save energy and money are out there; we just need to look harder.

19

Thank you!

20