

Priority Items For Home Energy

- Get an Energy Audit XCEL subsidized
- Replace All Incandescent Bulbs With LEDs
- Seal & Add <u>Maximum</u> Insulation to Attics (R 60+ add)
- If Furnace is OLD: Replace with Highest Efficiency
- If Fit, Dig and Insulate Your Foundation (add R-25 outside)
- If Windows are Alum Framed or Single Glazed: Replace with Triple or Quad Glazed... fiberglass framed.
- .
- More to Follow after Climate, Ethics, Theory, Doing It



We Have Not Yet Found A Place Hospitable to Nature As We Know it ... & To Human Life

So, Why Would Any Sane People Risk

The Slow Climate Apocalypse

"Our Blue Boat Home" • A Molten Core



- A Crust with Faults
- A Thin Layer of Water
- A Thin Layer of Air
- Circling Around a Star... Our One Power Source



This is "Plan A".

Plan B is Not Yet Ready

But Elon is Working on it. He wants to make Life Multi-planetary!



BFR Mars Landing

One Mars City Concept



https://www.space.com/38881-mit-team-wins-mars-city-design-competition.html?utm_source=sdcnewsletter&utm_medium=email&utm_campaign=20171125-sdc

Mars Neighborhood Design

by Valentina Sumini & MIT Team





Another Mars Colony/ Farm Concept



BUT:

Are those Images as Inviting as a **Lovely Neighborhood with a Park** and School?... And a Collection of **National Parks to Visit?... or Beaches to Swim / Surf / Snorkle ?**

Do We Have a Lot to Lose?

"We are running the most dangerous experiment in history right now, which is to see how much carbon dioxide the atmosphere can handle before there is an environmental catastrophe."

Elon Musk

Out of the Morning's Dawn... We get a Vision... Of Converting our <u>Values into Actions</u>!

Paths to Sustainability in Daily Life

BEYOND NET ZERO

Steve Stevens – AT&T Bell Telephone Laboratories (Retired)

The Dimensions Of The Situation

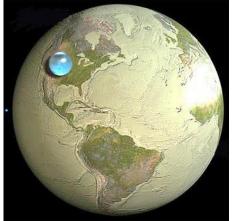
- Climate Multifaceted
- Ethics Human / Biosphere Standpoint
- Responsibilities: Individual and Collective
- Energy Principles: The <u>Axioms</u> for Personal Action
- Personal Energy Practices: The <u>Theorems</u> Needed to Drive Our Future Lifestyles

Again, ... We Are Here in Space: Thin Air Layer / Thin Water Layer

Earth Rising



Earth's Water



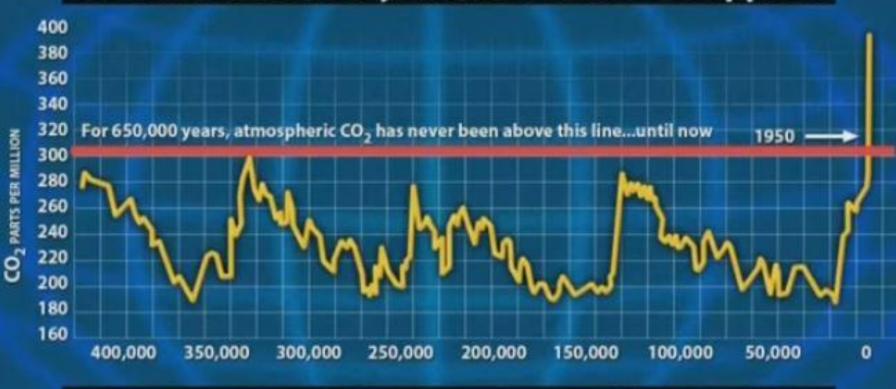
Shop Vac & Water Balloon

It Starts With the Air: Local Air Quality: http://waqi.info/



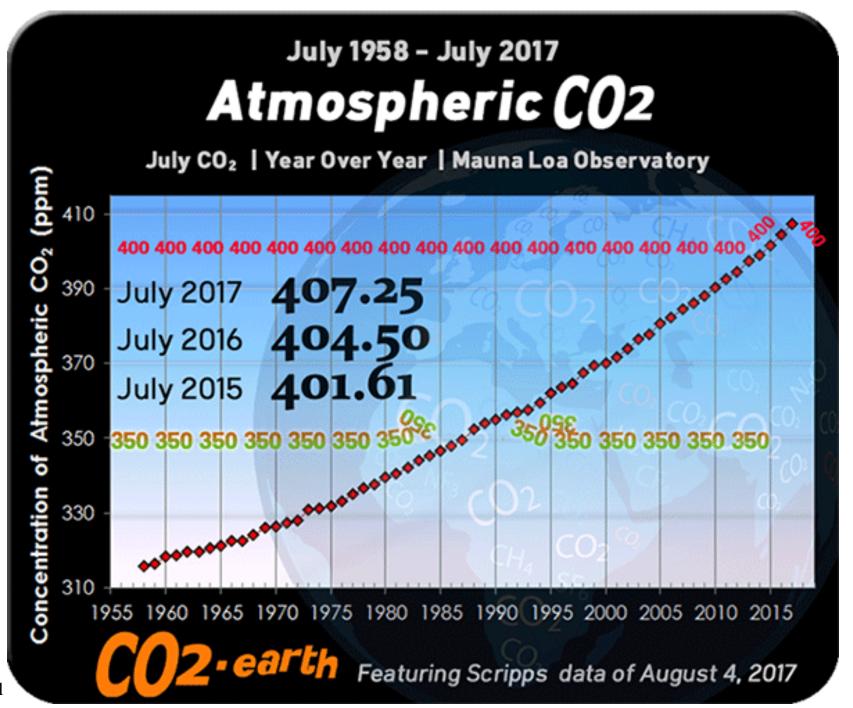
"Global" Air Quality ... CO2 & CH4

Carbon dioxide levels did not exceed 300ppm for the last 650,000 years, but are now 400ppm...



...carbon dioxide levels today are likely higher than for the last 20 million years

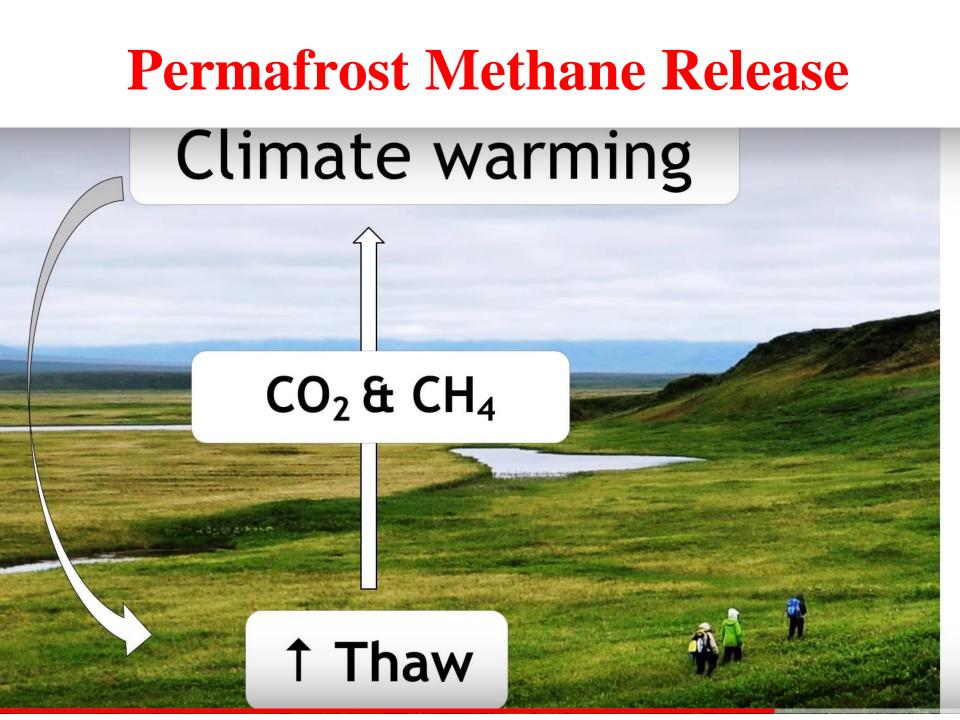
²⁶GREENHOUSE GASSES"... Warm The Planet



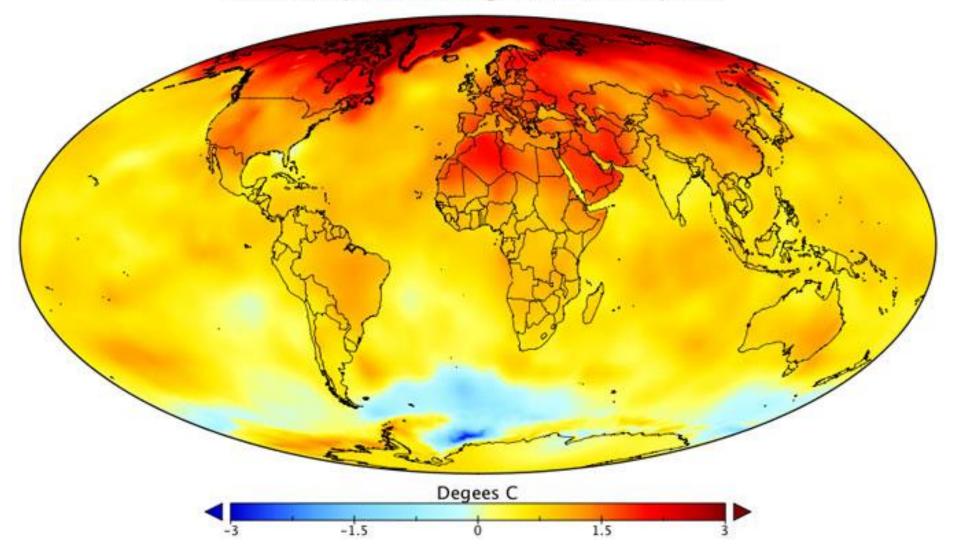


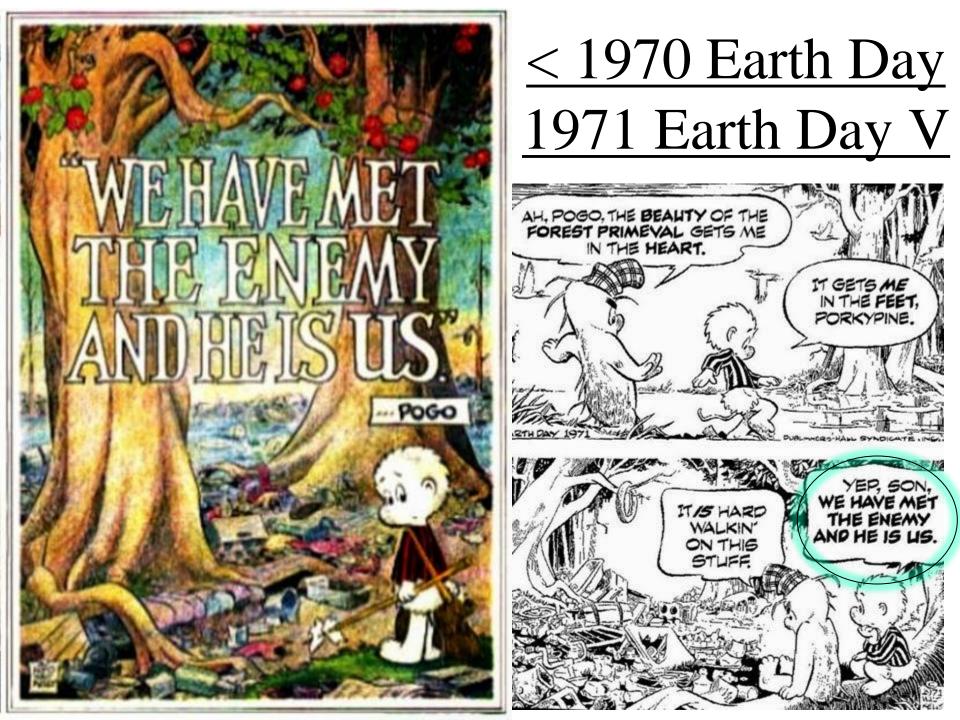
• CO2 drives the amount of Water Vapor...& Warmer air holds More Moisture!

• CO2 also Drives CH4 Levels... It melts the Perma-Frost in the Arctic ... releasing Methane...



Global Temperature Change since Earth Day 1970





* <u>Garbage brought disease</u> to our streets. We learned to dispose of it.

* <u>Sewage poisoned our waters</u>. We learned to treat it.

* <u>Local Air Pollution</u> harms Health – We have reduced it.

* <u>Global Air Pollution (CO2)</u> Is changing our climate. Hence, we must COMMIT to Stop Creating it, Capture it and Bury it."

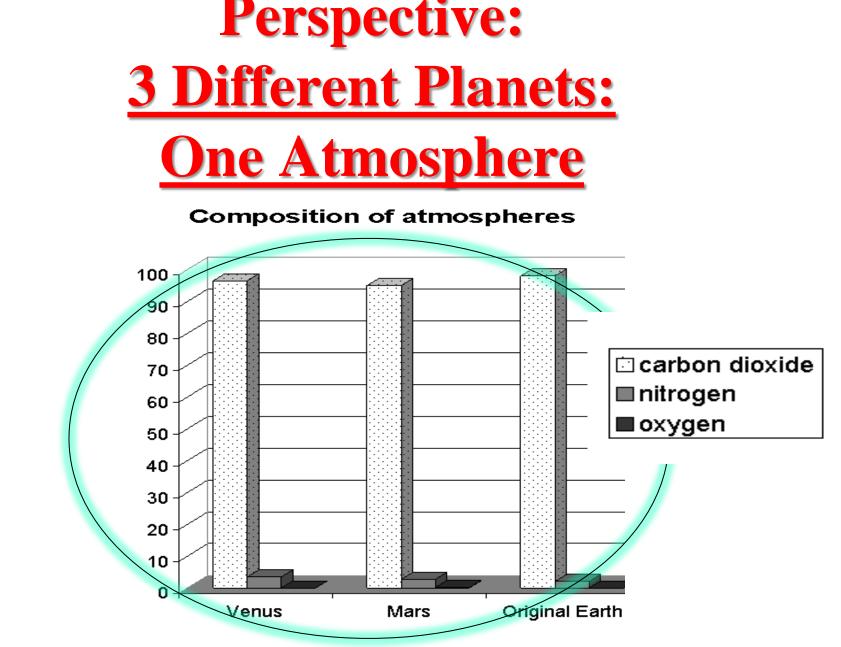


 Chart: "Atmosphere composition" by Chris Evans, Dr. Roger Peters, Dr. Mike Thompson, Chris Gadsby, Ken Partridge, Roy Mylan, Yehoshua Sivan, Tom Nation, Dr. David Follows, Vikash Hemnath Seeboo - D:\My Webs\index.htm. Licensed under CC0 via Wikimedia Commons -

27 http://commons.wikimedia.org/wiki/File:Atmosphere_composition.gif#mediaviewer/File:Atmosphere_composition.gif

<u>2 Different Atmospheres – 1 Planet:</u> Natural Sequestration of Carbon

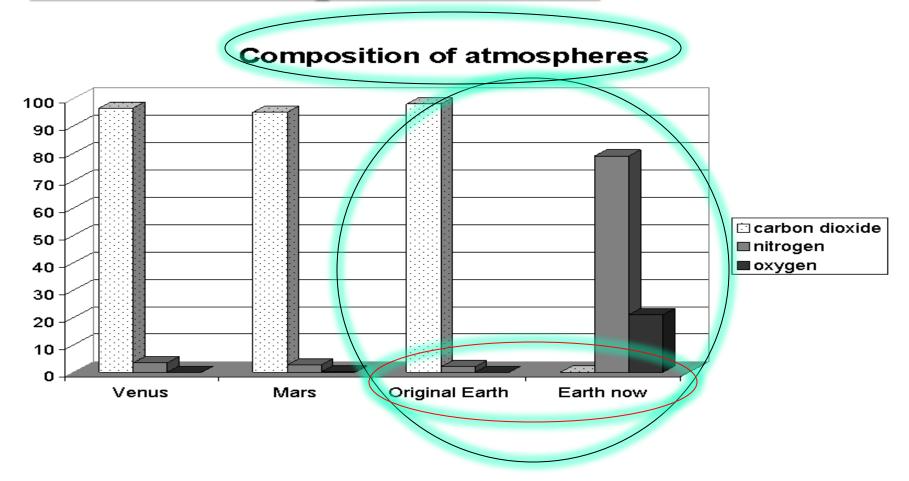
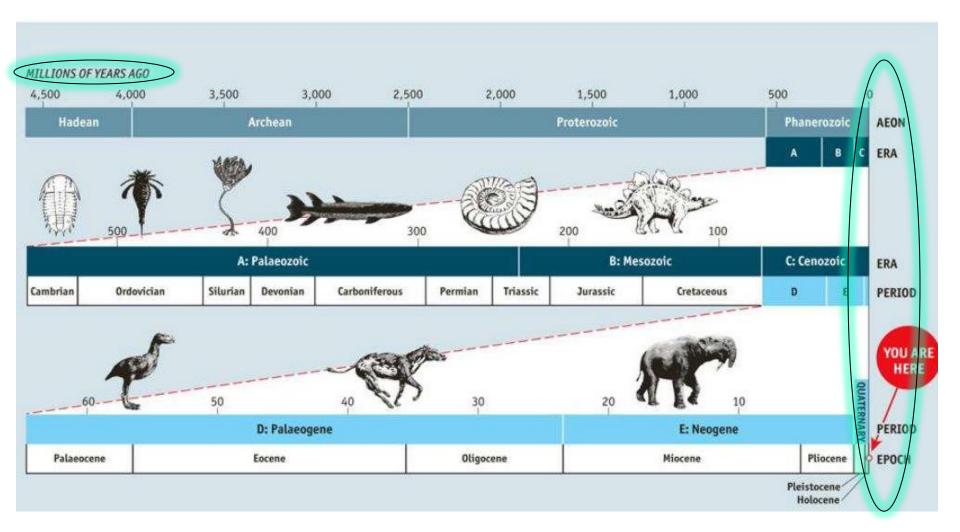
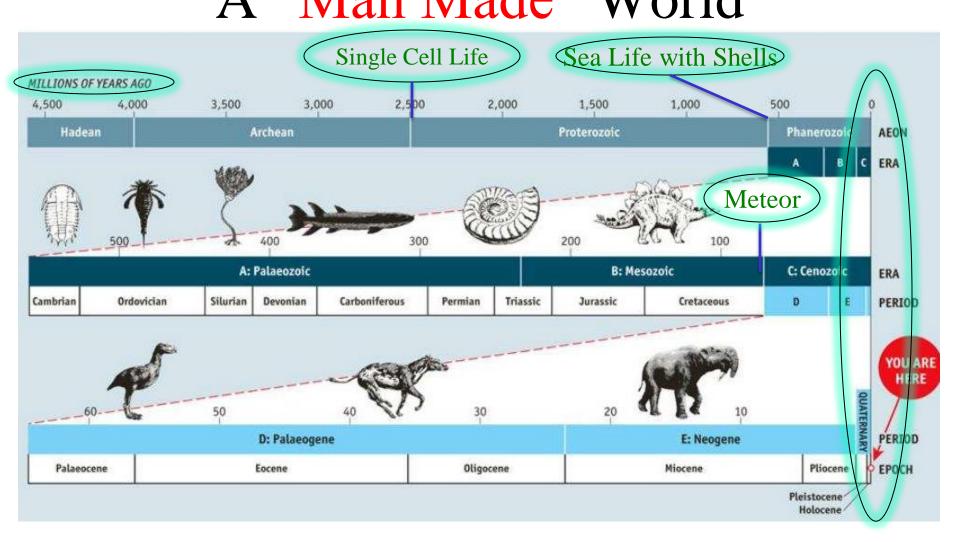


 Chart: "Atmosphere composition" by Chris Evans, Dr. Roger Peters, Dr. Mike Thompson, Chris Gadsby, Ken Partridge, Roy Mylan, Yehoshua Sivan, Tom Nation, Dr. David Follows, Vikash Hemnath Seeboo - D:\My Webs\index.htm. Licensed under CC0 via Wikimedia Commons http://commons.wikimedia.org/wiki/File:Atmosphere_composition.gif#mediaviewer/File:Atmosphere_composition.gif

Putting that into a 4.6 Billion Year Perspective:

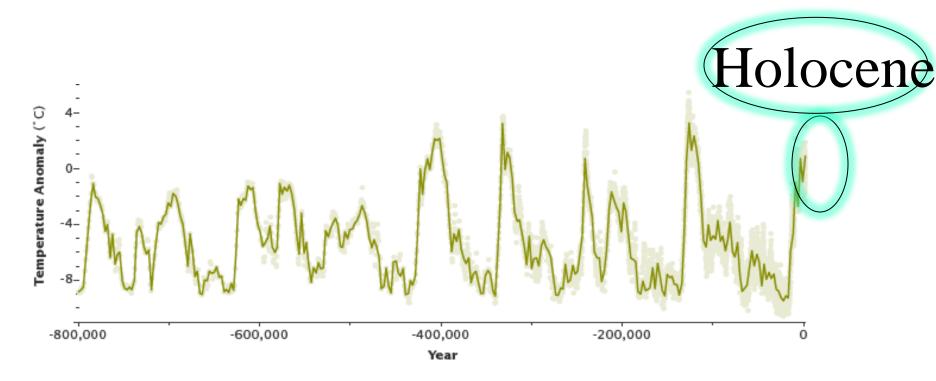


We are Here in Time: The Dawn of the Anthropocene: A "Man Made" World



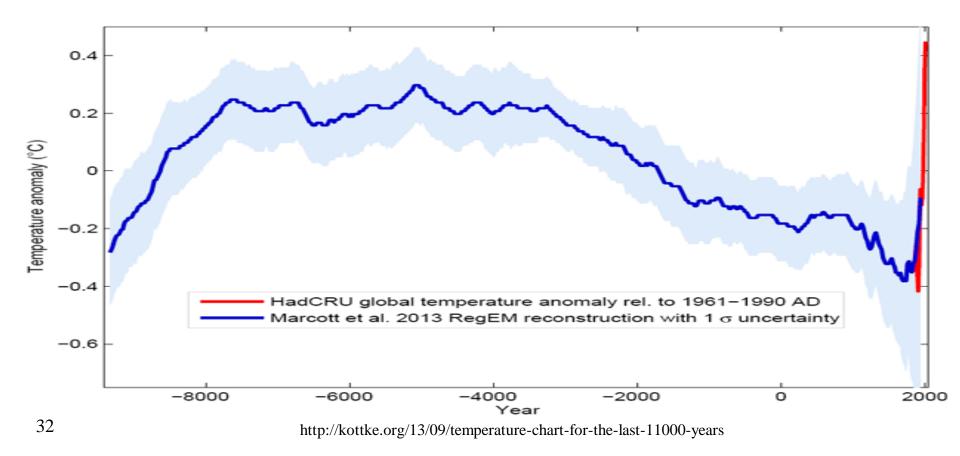
800,000 Years Of Earth's Temperature History

(NASA DATA)

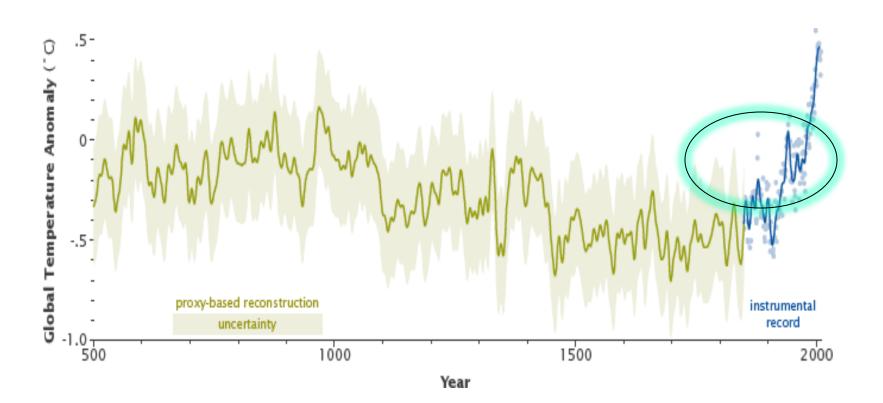


http://earthobservatory.nasa.gov/Features/GlobalWarming/page3.php

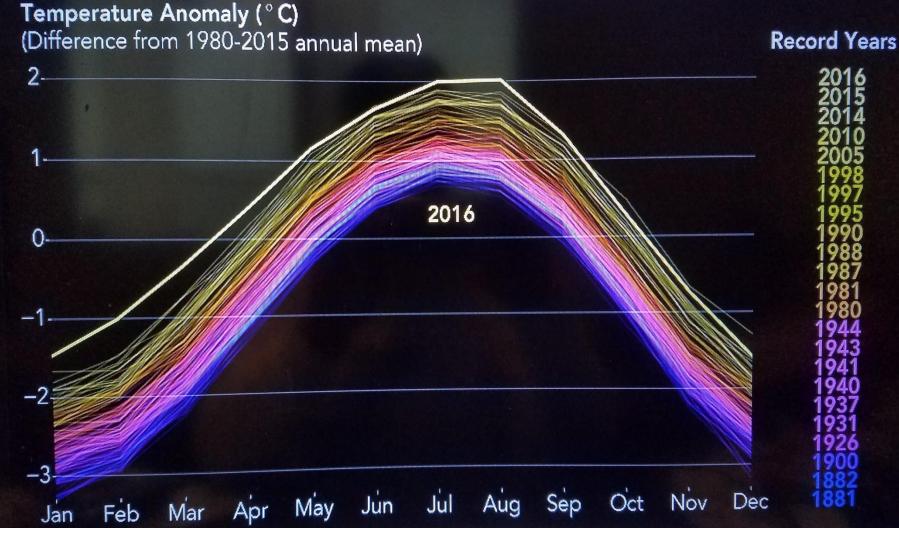
Last 11,000 Years Of Earth's Temperature History: The Holocene (NASA DATA)



Last 1500 Years of Earth's Temperature History

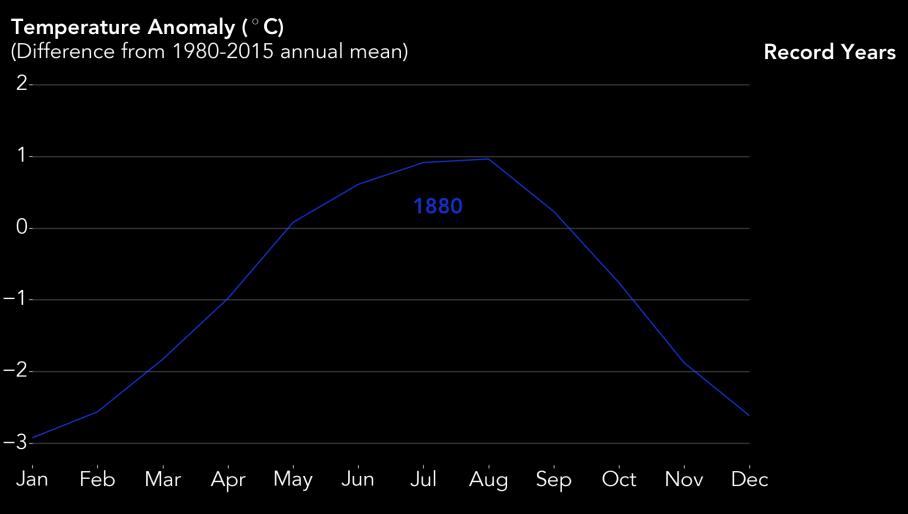


https://www.nasa.gov/sites/default/files/thumbnails/ image/2016gistempupdateblack.gif



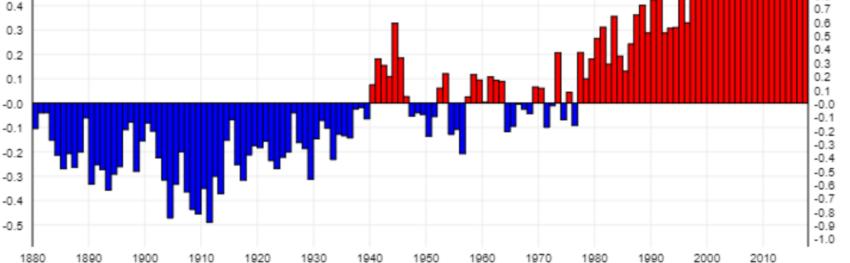
2015 & 2016 Were **El Nino Years**

Lets Watch that History Unfold



So Far 2017 – Land & Ocean (Not an El Nino Year)

Global Land and Ocean Temperature Anomalies, January-September 1.1 1.9 1.0 1.8 1.70.9 1.6 1.5 0.8 1.4 1.3 0.7 1.2 1.1 0.6 1.0 0.9 0.5 0.8

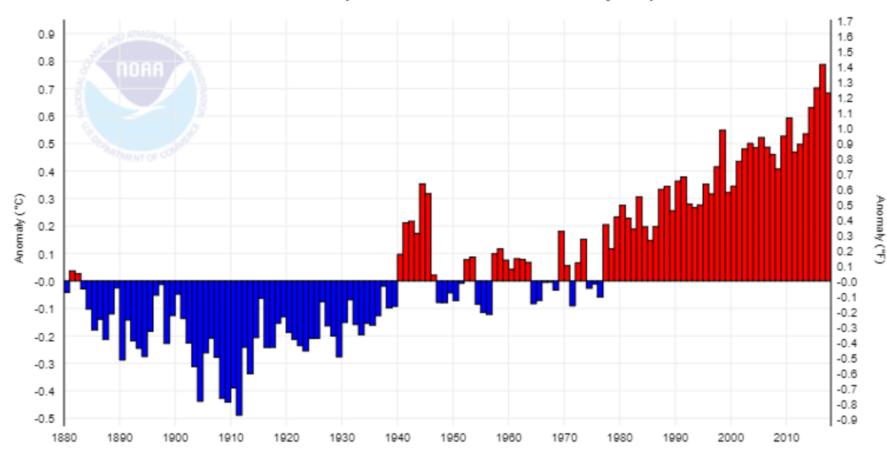


Anomały (°F)

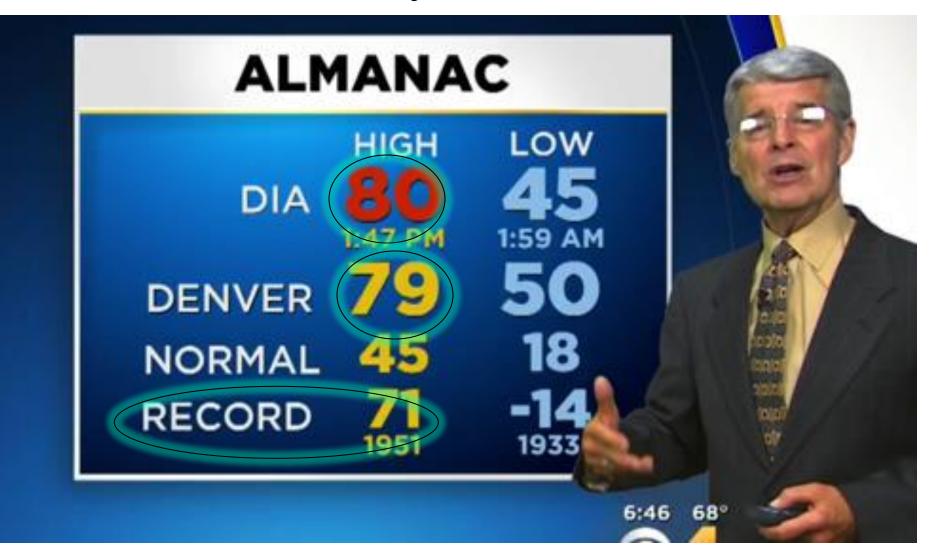
So Far 2017 – Ocean Only

https://www.ncdc.noaa.gov/cag/

Global Ocean Temperature Anomalies, January-September

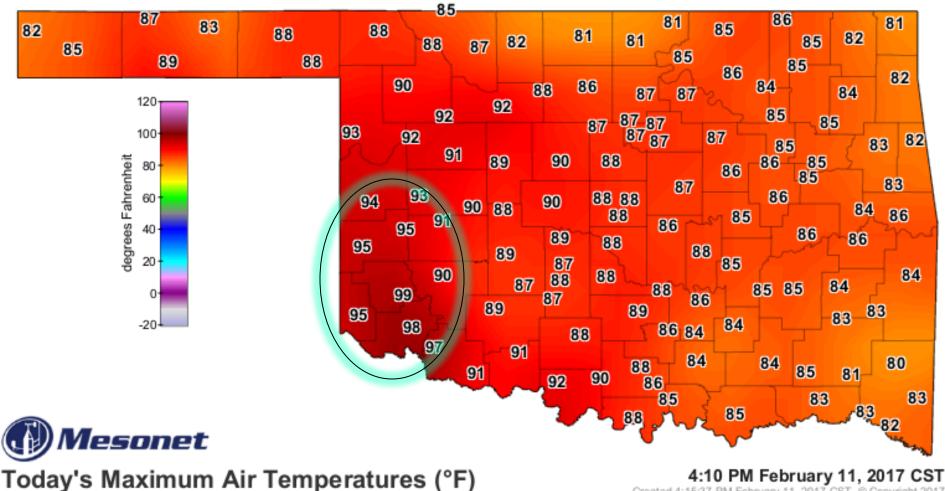


A Winters Day in Denver....?



³⁸ Early February 2017 ? ! ? ! Wow!

Mid Winter (Feb 11, 2017) in Oklahoma



Created 4:15:37 PM February 11, 2017 CST. © Copyright 2017

Another Crazy Denver '17 Record !



Nov 22, 2017 – In California

New Daily & Monthly Record! Camarillo, CA

20

0

20

November 22, 2017

Broke All Time High for November Which was 98 degrees

- 11/01/1997
- 11/02/1997
- · 11/05/2012

Old record for today: 90° F in 2015



Weather Forecast Office Los Angeles/Oxnard, CA



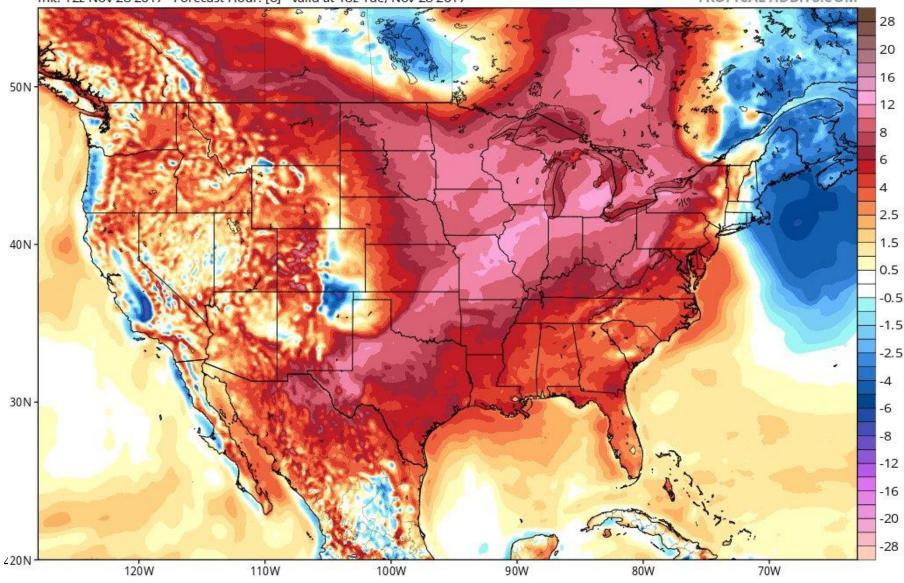


Nov 28th, 2017

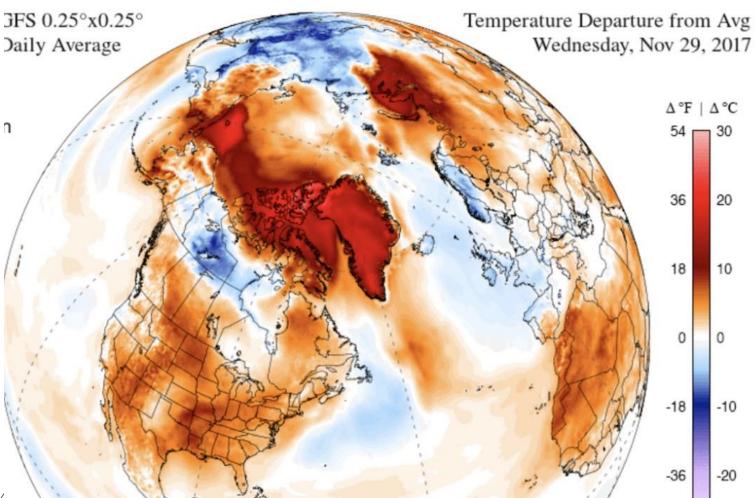
GFS 2-meter Temperature Anomaly (°C) (based on CFSR 1981-2010 Climatology)

Init: 12z Nov 28 2017 Forecast Hour: [6] valid at 18z Tue, Nov 28 2017

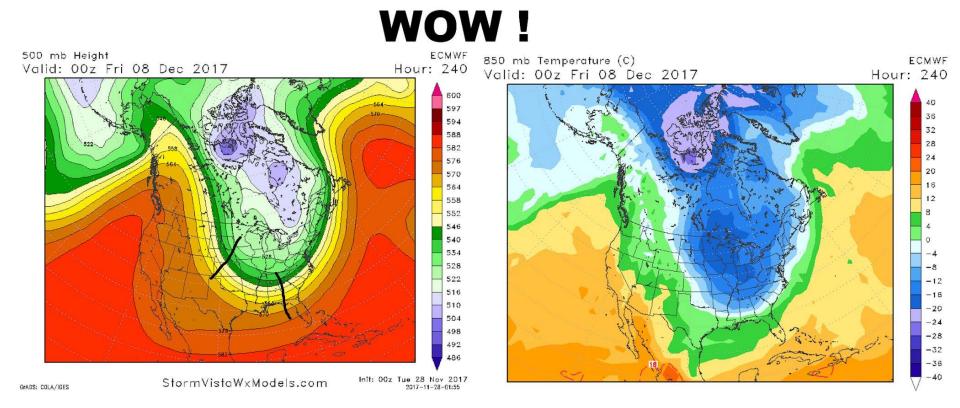
TROPICALTIDBITS.COM



Greenland Yesterday... Nov 29, 2017



Look What is Coming... in 8 days



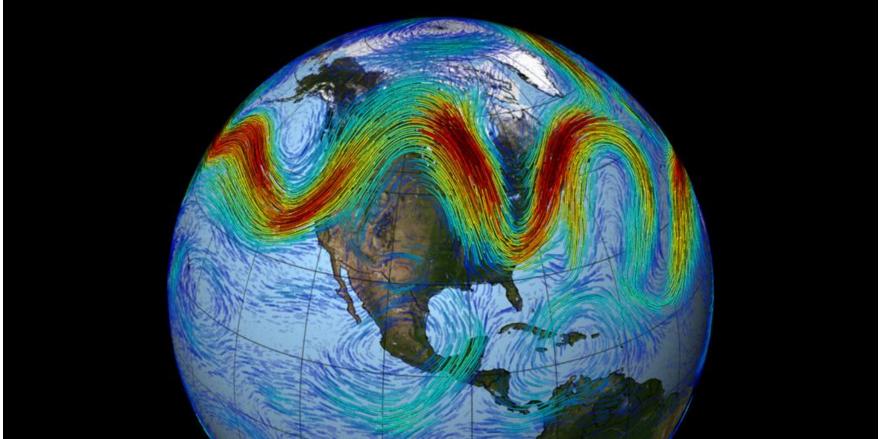
A BIG Polar Vortex

Editorial Note: This did bring Major Snow to Corpus Christie / Atlanta

This Month – Climate Turned Upside Down: 3 records/ 4 near records.

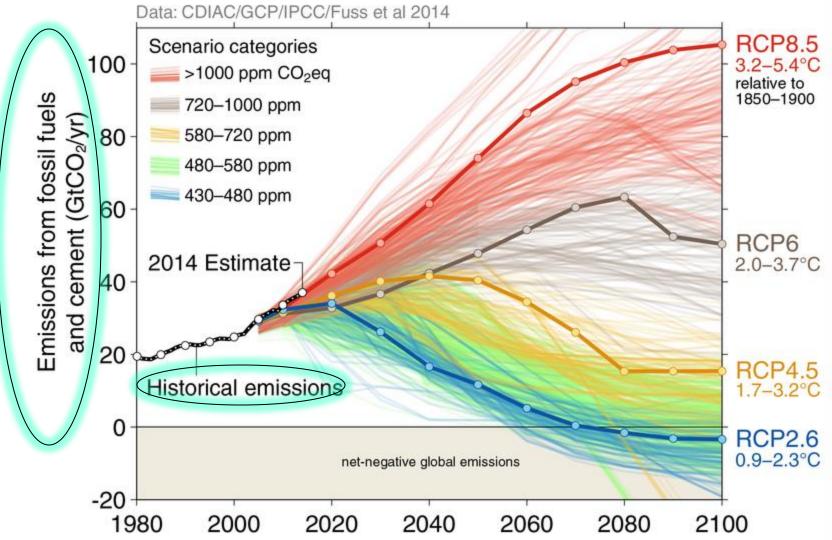


Jet Stream Patterns are Less Traditional Yielding Strong Seasonal Abnormalities: Shorter Fruit Growing Seasons (Late Spring Frosts) Milder Mid Winters (Earlier Budding... risking frost off)

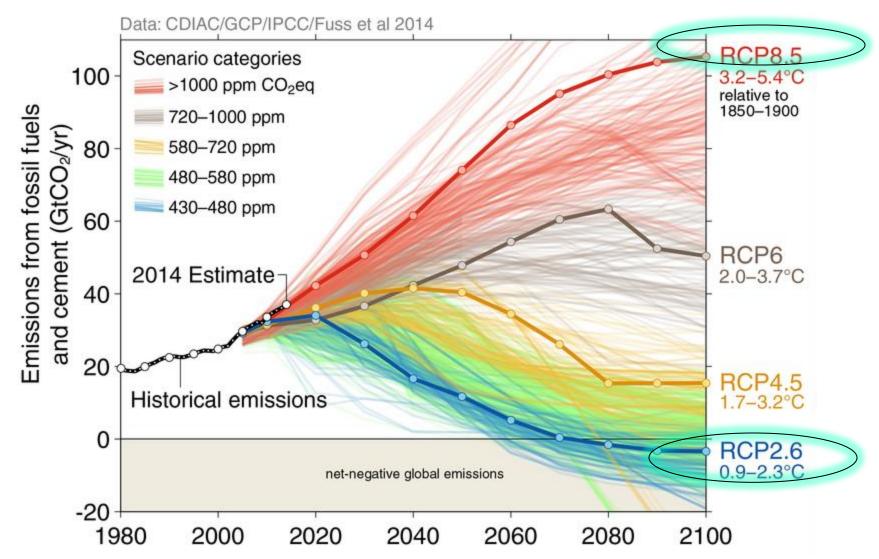


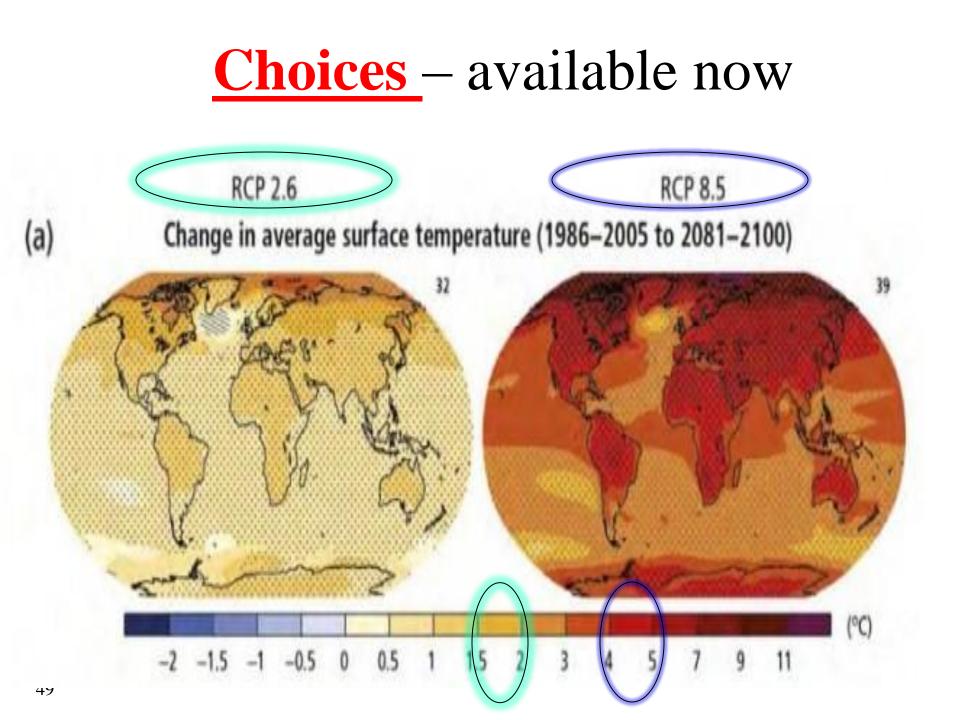
Polar Vortex in the East: Hot in the West

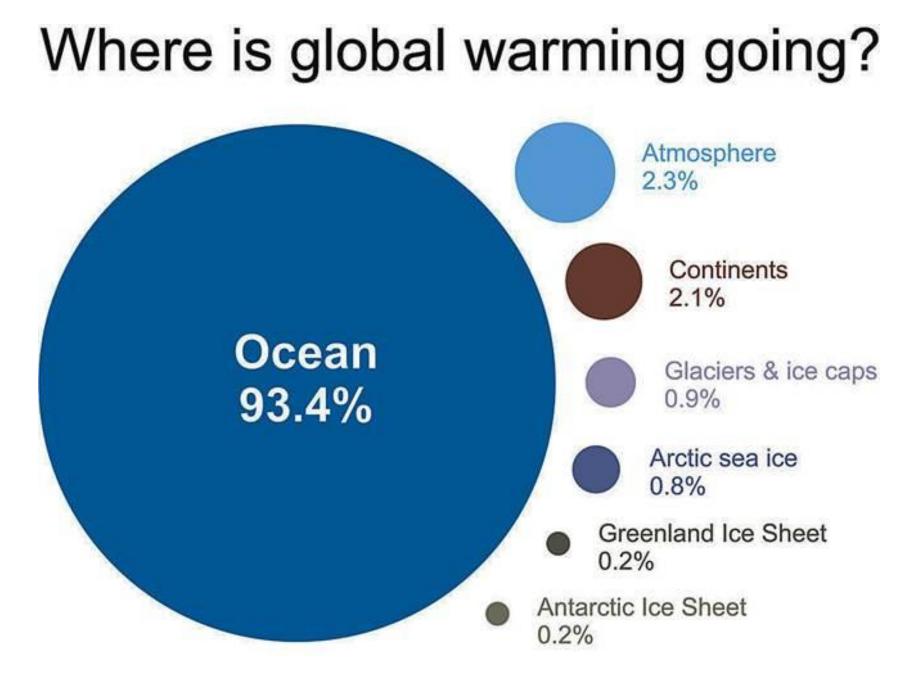
International Panel On Climate Change (IPCC) Scenarios



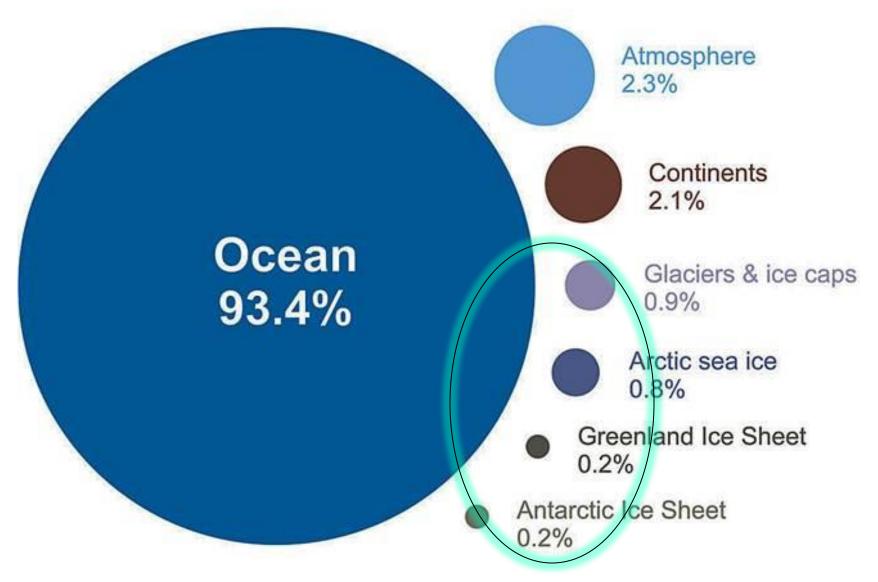
International Panel On Climate Change (IPCC) Scenarios



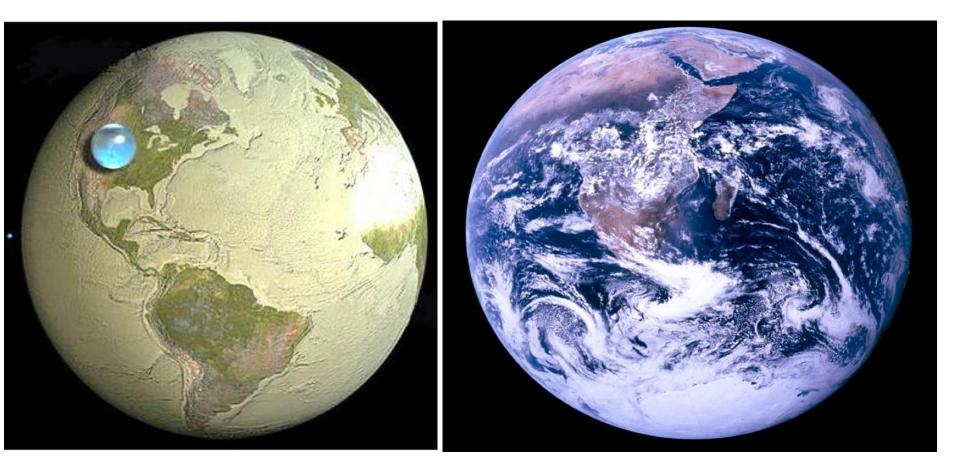




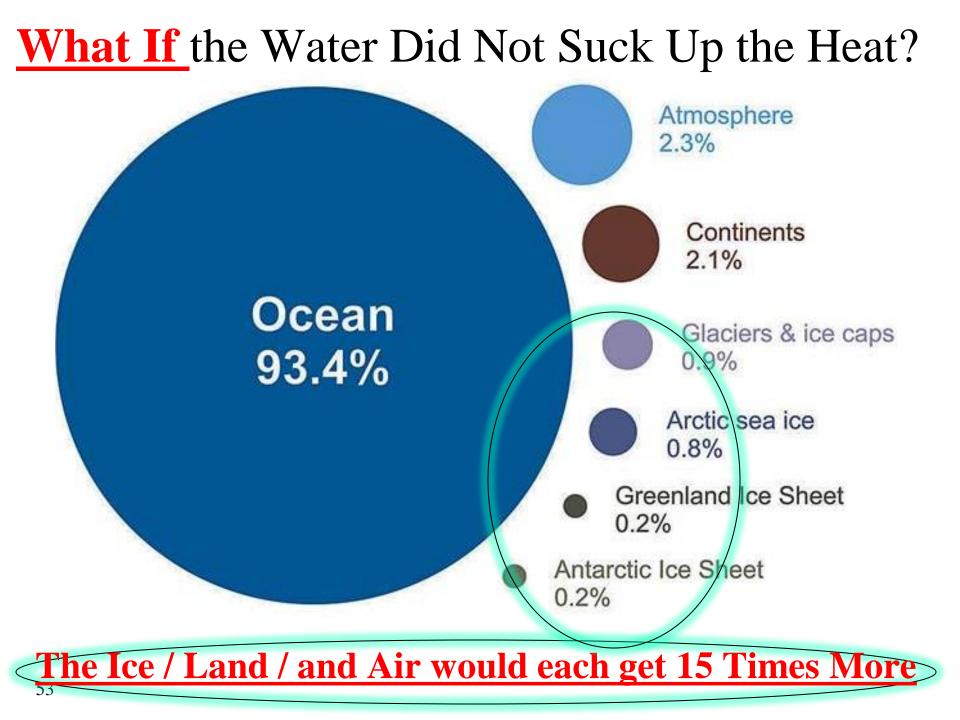
Where is global warming going?



Remember Earth's Thin Water Layer



Earth's Water is a **Buffering Thermal Mass**



If the Oceans did Not Suck Up the ~94% of Warming:

- 15 Times More Atmospheric Warming
 - -<u>2 deg. C</u> Becomes 30 deg. C Warming.
- 15 Times More Ice Melt
 - <u>3 ft Sea Rise Becomes 45 ft Sea Rise</u>.
- 15 Times More Continent Warming

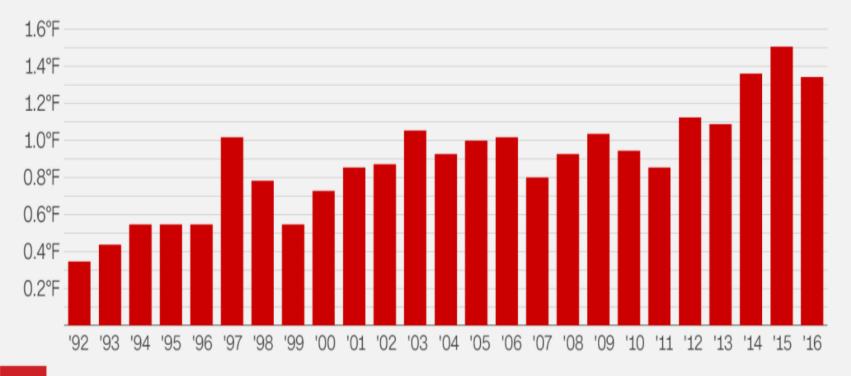
- You do not want to walk Barefoot!

LETS THANK THE OCEANS FOR CARRYING THE STABILIZATION DUTIES !

But There are Consequences...

Warmer ocean temperatures make hurricanes more intense

As NASA says, tropical storms "are like giant engines that use warm, moist air as fuel." And global ocean temperatures have gradually been warming over the last quarter-century. This chart shows how sea temperatures in recent years have climbed about 1.5 degrees Fahrenheit higher than what their average was for most of the 1900s.



CNN

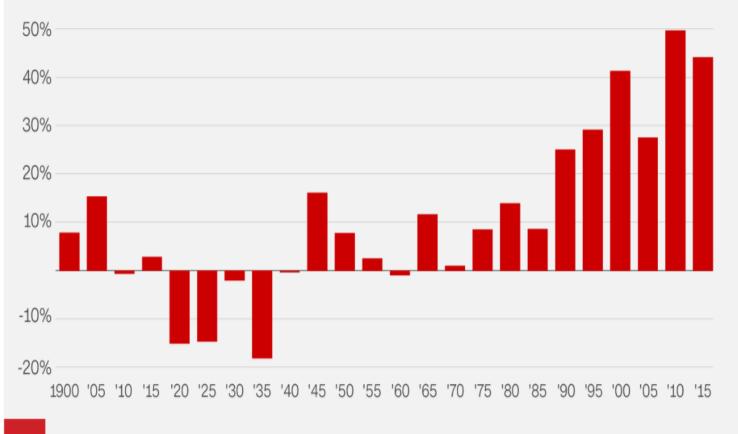
Note: Global anomalies are with respect to the 20th century average. Source: NOAA, 1992 – 2017.

<u>**Hot Oceans**</u> Make <u>BIG Hurricanes</u> Which Move Slower, **Dumping MORE** Water



Heavy downpours are happening more frequently

A hurricane's greatest threat often is not high winds but flooding. This chart shows the frequency of two-day heavy rain events — defined as one that occurs, on average, only every five years — has been increasing in recent decades. Percent changes are compared to the period 1901 – 1960 and do not include Alaska or Hawaii.

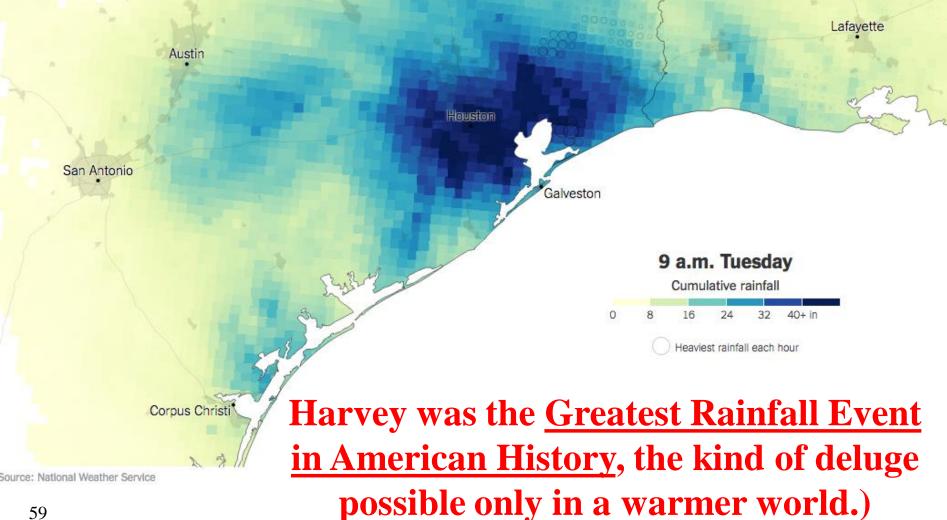




2017 Houston



Longer Heavier Storms – More Water – More Flooding



Assessing the Present and Future Probability of Hurricane Harvey's Rainfall

- We estimate, for current and future climates, the annual probability of areally averaged hurricane rain of Hurricane Harvey's magnitude by downscaling large numbers of tropical cyclones from three climate reanalyses and six climate models. For the state of Texas, we estimate that the annual probability of 500 mm of area-integrated rainfall was about 1% in the period 1981–2000 and will increase to 18% over the period 2081–2100 under Intergovernmental Panel on Climate Change (IPCC) AR5 representative concentration pathway 8.5. If the frequency of such event is increasingly linearly between these two periods, then in 2017 the annual probability would be 6%, a sixfold increase since the late 20th century.
- http://www.pnas.org/content/pnas/early/2017/11/07/1716222114.abstract.html?coll ection

Perspective on <u>Bigger</u> Big Storms:

This is Irma...

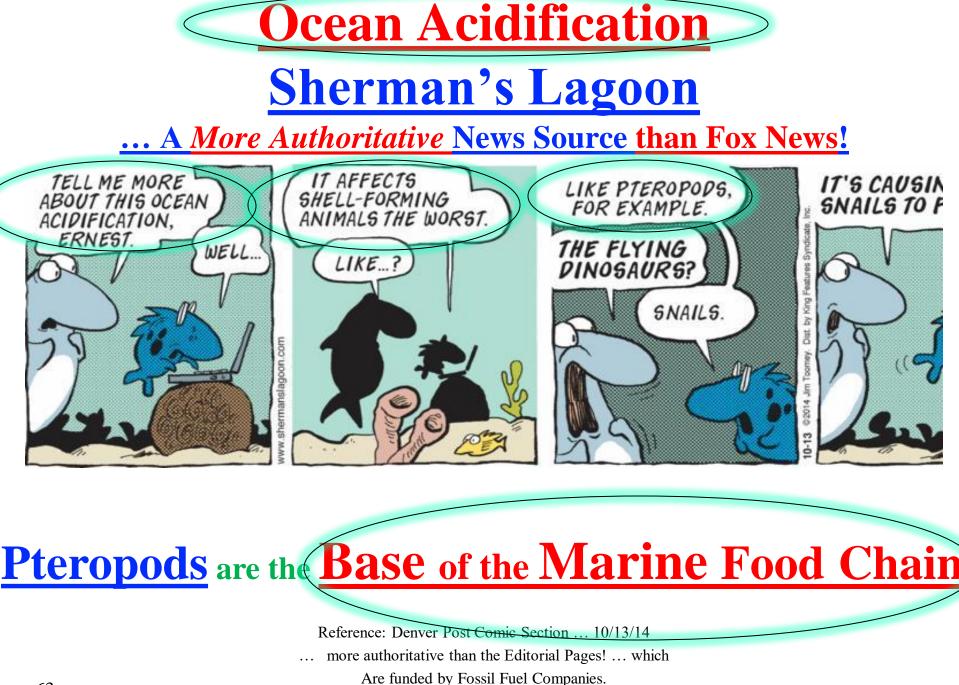
How big was Andrew in 1992?



Transitioning from *<u>Heat going Into Oceans...</u> to *<u>CO2</u> going into Oceans

- 93.4% of Global Warming goes into Oceans
- ~ 50% of CO2 goes into Oceans.

• Lets check with the Residents of Sherman's Lagoon



Pteropods (Snails) ...



Pteropods are the **Base** of the Marine Food Chain

Ocean Acidification



Reference: Denver Post Comic Section ... 10/14/14

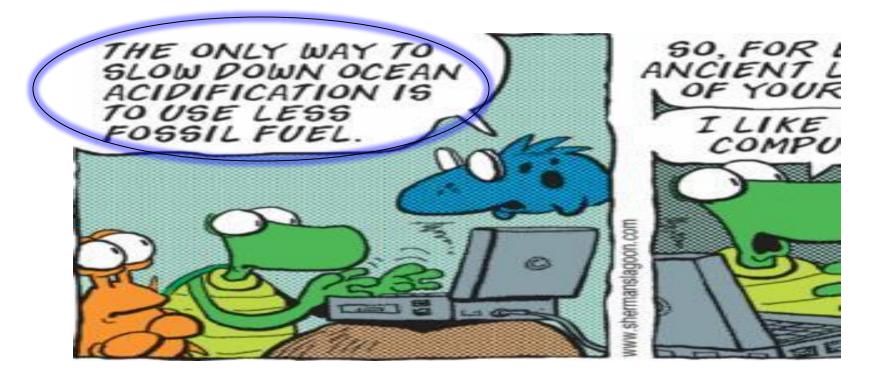


Back Underwater ...in the Lagoon



Reference: Denver Post Comic Section ... 10/15/14

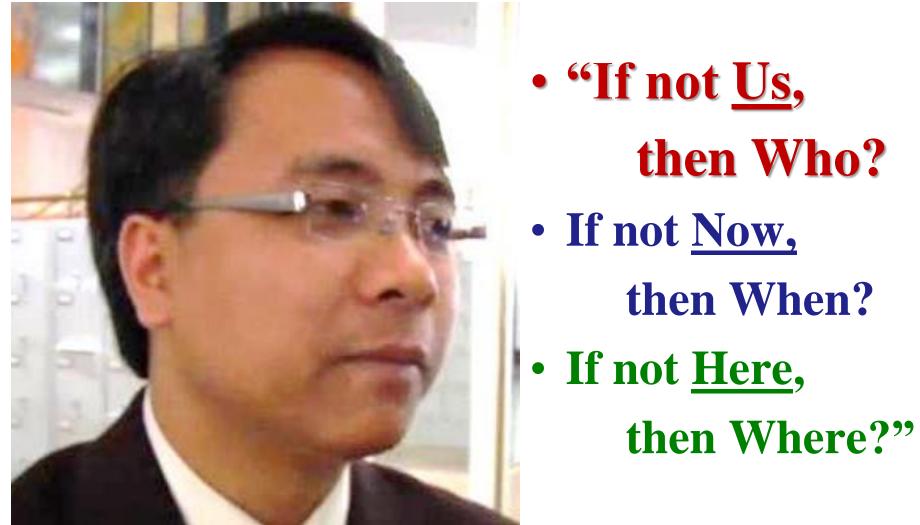
Sherman's Lagoon Conclusions:



"USE LESS FOSSIL FUEL"

<u>....But Who? ... And When? ... Where?</u>

Nadarev Sano (On <u>"Using Less Fossil Fuel"</u>)



How Bad Could Sea Level Rise Be?

- Melting Greenland Ice: 7.2 m (24 feet) of Sea Rise.
- Melting <u>Antarctic Ice Sheet</u>: 61.1 m (~200 feet) of sea rise.
- The collapse of <u>West Antarctic</u> Ice Sheet's "<u>Grounded</u> <u>Interior Reservoir</u>": sea Rise 5–6 m (17 to 20 ft).

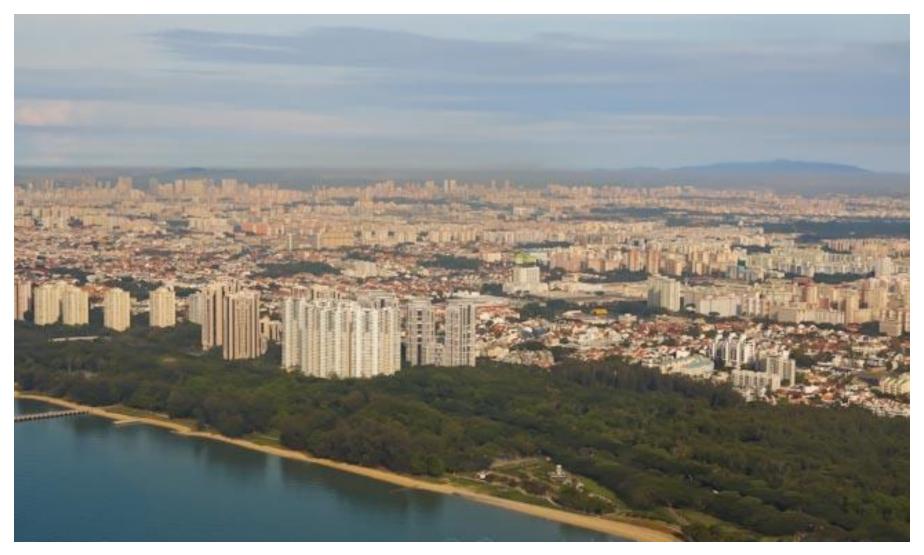
ALSO: Many Islands are basically FLAT



Some are Heavily Populated: Male, Maldives



& Singapore



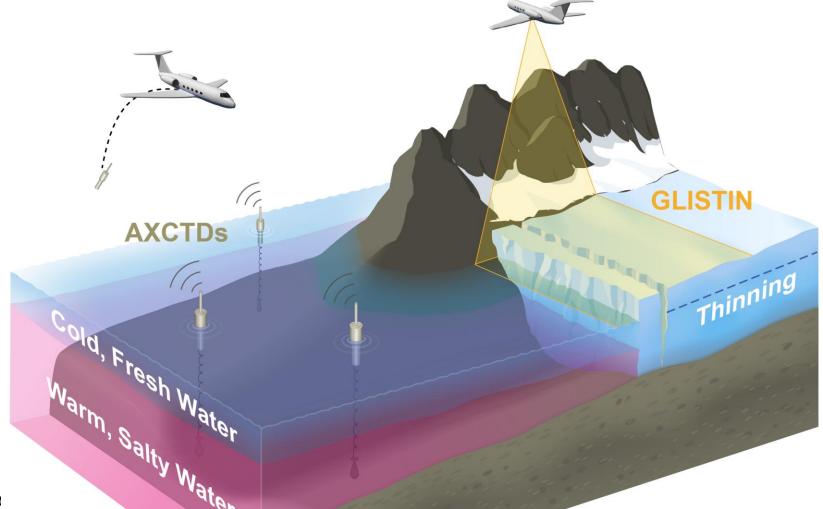
Greenland Glaciers



Glaciers Meet the Sea



Oceans Melting Greenland Mission NASA

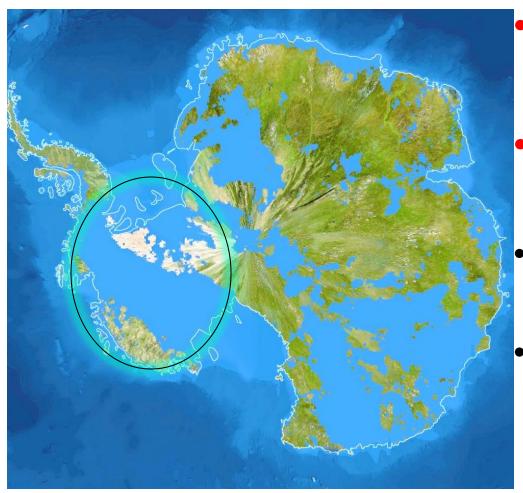


Living Next To "ICEBERG ALLEY"



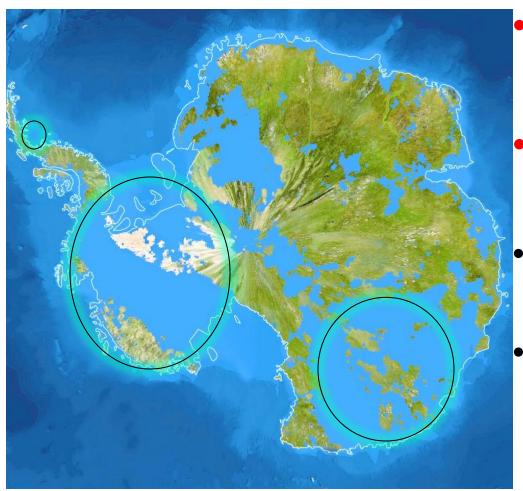
2017 Iceberg A-68 Off Antarctica The Size of Delaware

NASA – 6 / 2015: West Antarctic Melt <u>Now Past</u> "Point of No Return"



- Warmer Ocean Undercutting Ice
- <u>15 foot sea rise will</u>
 <u>happen !</u>
 - Over ~100 1000 10,000 years TBD.
 - http://time.com/96173/ant arctic-glacier-loss-isunstoppable-study-says/

NASA – 6 / 2015: West Antarctic Melt <u>Now Past</u> "Point of No Return"



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 - http://time.com/96173/ant arctic-glacier-loss-isunstoppable-study-says/

Shang Hai

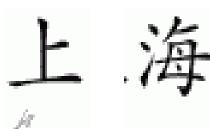


上海

Shang Hai



Shang Hai



"Above Sea"

Potential New Name: 沟



QIU



"Under Sea"

I Should Mention IEV YORK

..... & LONDON

Not Only Coastal Cities at RISK

Paris

1 11 Berlin

<u>http://ngm.nationalgeographic.com/2013/09/rising-seas/if-ice-melted-map</u> 216 ft SEA RISE

Pine Bluff, Arkansas (The New Miami), will be Renamed "Palm Bluff on the Bay"

Honolulu

San Francisco

Los Angeles San Diego

North America

The entire Atlantic seaboard would vanish, along with Florida and the Gulf Coast. In California, San Francisco's hills would become a cluster of islands and the Central Valley a giant bay. The Gulf of California would stretch north past the latitude of San Diego—not that there'd be a San Diego. Vancouver Seattle Portland

Montréal Boston

Charleston

Present-day

shoreline

Philadelphia New York Washington, D.C. Norfolk

Pine Bluf

Houston

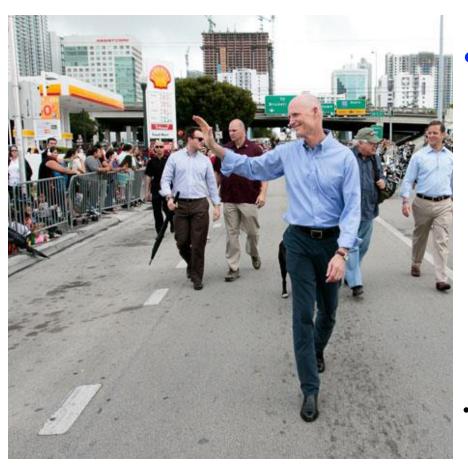
New Orleans Tampa

Havana

Veracruz Cancún

Port-au-Prince

Florida Governor Scott



ordered a **Prohibition** on the terms "climate change" and "global warming," according to former employees. http://fcir.org/2015/03/08/in-florida-officials-banterm-climate-change/

•<u>http://ngm.nationalgeographic.com/013/09/rising-seas/if-ice-</u> melted-map 216 ft SEA RISE

Who Are His Constituents? (Clearly Not Honolulu Honolulu The Citizens) San Angeles Can Digot

North America

The entire Atlantic seaboard would vanish, along with Florida and the Gulf Coast. In California, San Francisco's hills would become a cluster of islands and the Central Valley a giant bay. The Gulf of California would stretch north past the latitude of San Diego—not that there'd be a San Diego. Vancouver Scattle Portland

Washington, D.C. Norfolk

Pine Bluff

Houston

Charleston

Philadelphia New York

Montréal

Orleans Tampa

Havana

Veracruz 👝 🥻

Cancún

ami

Port-au-Prince

Halifax

Boston

Present-day

shoreline

Trump's Dept. of Energy ... and EPA have Joined Scott... Removing all Climate Info from the WEB and

From All Public Literature.



Total Melt: 216 ft Sea Level Rise

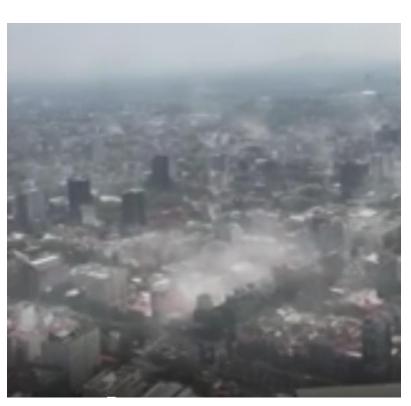
378







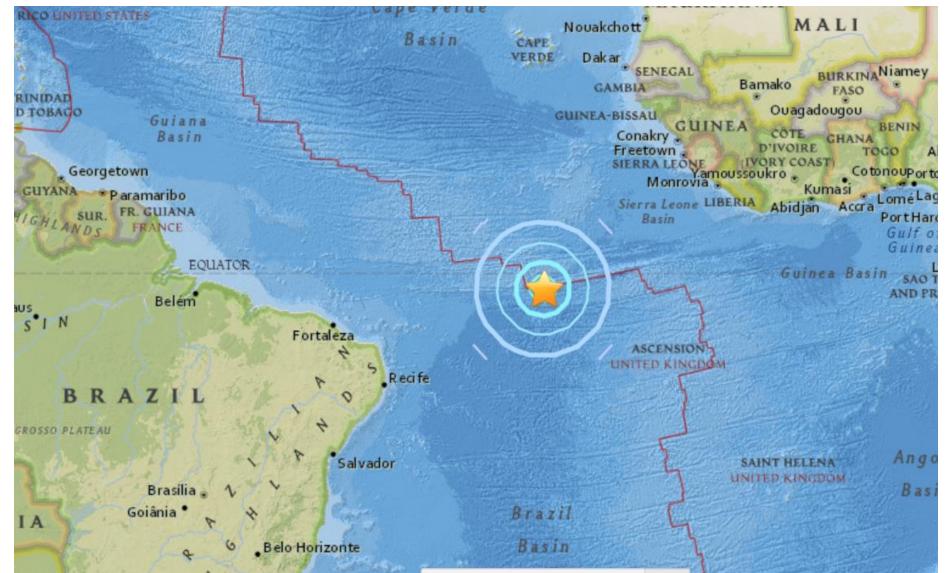
What Other Climate Change Effects?



2017 Mexico City

- https://www.theguardian.co m/world/2016/oct/16/climat
 e-change-triggersearthquakes-tsunamisvolcanoes
- http://www.newsweek.com/ nepal-earthquake-couldhave-been-manmadedisaster-climate-changebrings-326017

November 30, 2017 (Today) Mid-Atlantic Ridge: 6.7



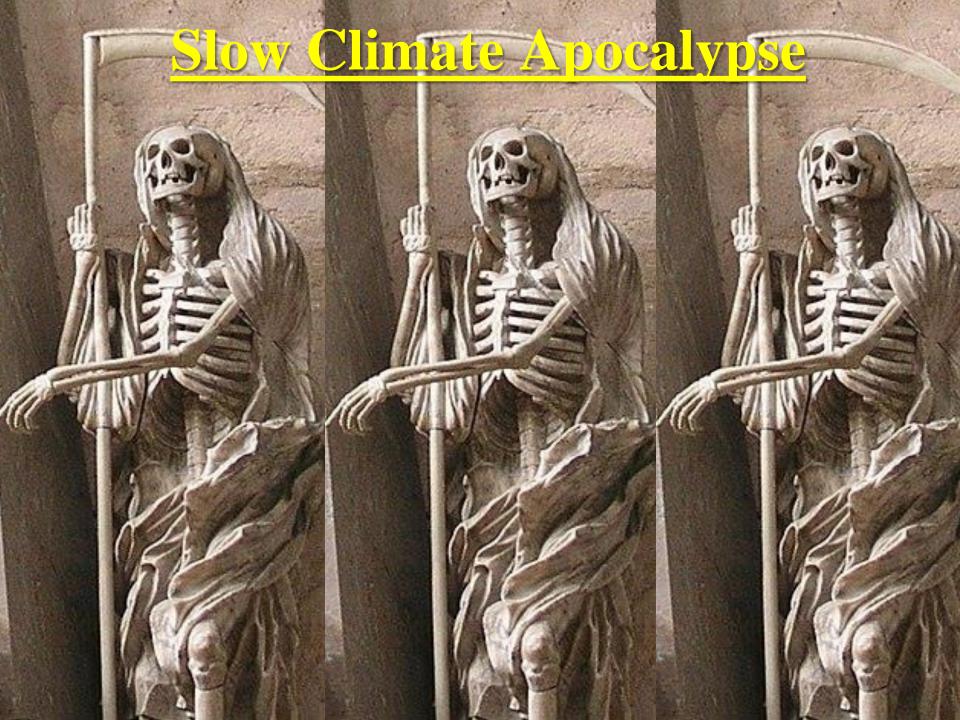
Tsunamis are a part of the Package



Summary of Climate Risks



- Sea Acidification
 - Plankton Cuts O2 production 50%
 - Pteropods Kills Sea Food Chain
- Warm Sea: Much Stronger Storms
- Slower Weather Movements
 - Longer Droughts Famine
 - Longer Storms / More Floods
 - More Air Moisture: FLOODS !
- Ice Melts / Surface Water Pressure
 Seas Rise, Refugees, Civil Unrest
 - Earth Crust Distortions Earthquakes



"Slow" is the Key Word... But only Slow on a Human Thought Scale. It is Blazing Fast on a Geological Time Scale

- It May make it Seem Unimportant ... and Deferrable/Dismissable to Humans
- But, that Conclusion risks Condemning Mankind and All Other Parts of Nature.



The "Social Diseases" of Denial / Deferra ARE NOT "Ethical"





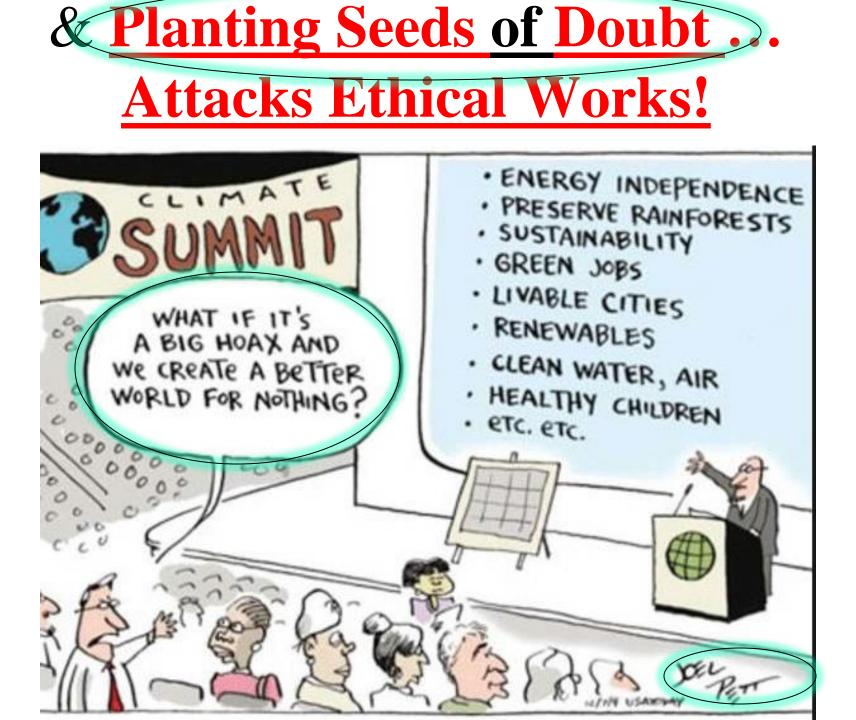
Our H. I. S. Leadership: Their Mantra: Of the Rich, By the Rich, For the Rich



The Upside?



"Yes, the planet got destroyed. But for a beautiful moment in time we created a lot of value for shareholders." "Small Upside for BIG DOWNSIDE !

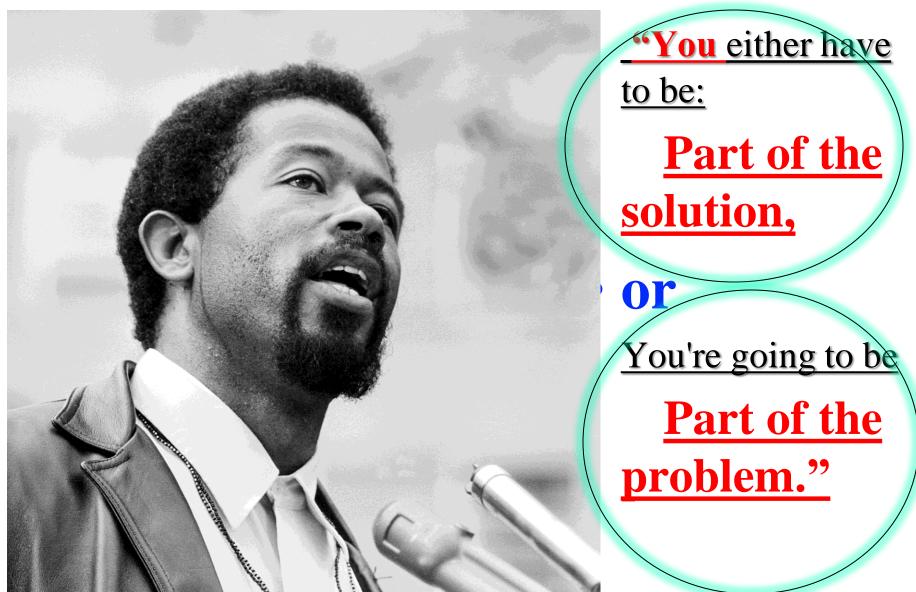




Somewhere we must make it clear that we are concerned about the survival of the world.

DR. MARTIN LUTHER KING, JR

Eldridge Cleaver – 1960's





• Business as Usual (BAU) is the Common Problem

Business As Usual means VESTED INTERESTS!

Vested Interests Propel UnEthical Activities... AGAINST THE "COMMONS"!



• There is <u>NO Greater Civil Right</u> than the <u>Right to a Livable Planet</u>

• It is a Foundational Civil Right

Motivations for My Actions: Grandkids

Kaylee

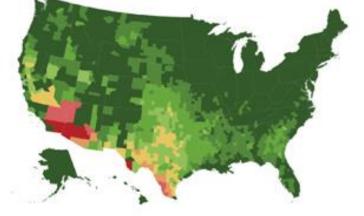
These are mine ... All are important!

FAST

Jackson

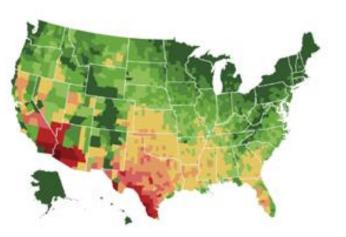


Shealyn

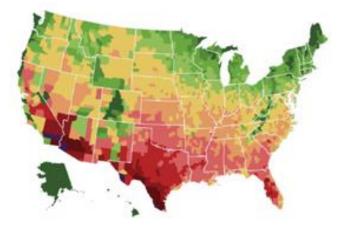








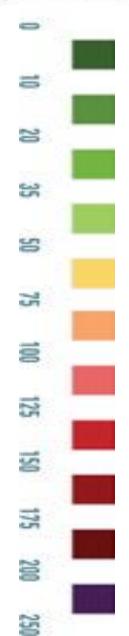






Heat Map Key:

Average Days Per Year Over 95°





An Ethical PLEA from Santa ...

Whose Whole Life is Dedicated to Children

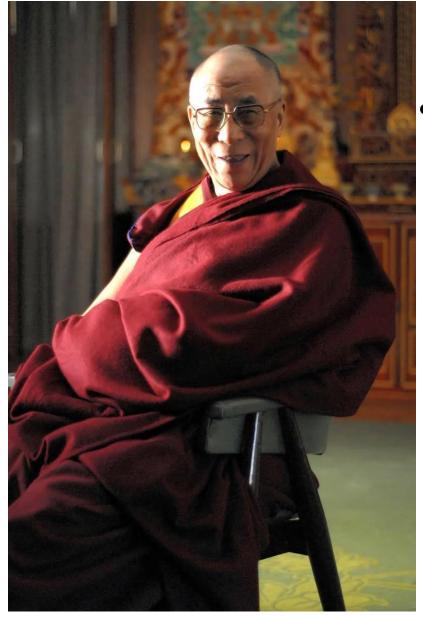
Now, Part of Ethics is:





i.e. Connecting Actions to Values

Dalai Lama

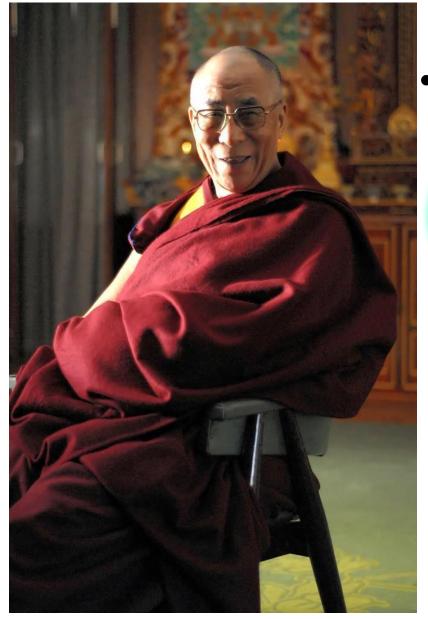




Responsibility to

... preserve and tend to the Environment in which we all live."

An INCONVENIENT Truth





Perspective on Climate Action

Responsibilities

- Individual Citizens Personal Action & Advocacy
- <u>Governments</u> (<u>Collective</u> "Citizens") Local /State/ Fed
- <u>Corporations</u> (<u>Collective</u> "Citizens")

• <u>Religious Organizations</u> <u>and NGOs</u> (<u>Collective</u> "Citizens")

Perspective on Climate Action



- Individual Citizens Action & Advocacy
 - Personal Action : "Net Zero Carbon" Lifestyle
 - <u>Advocacy</u>: Exercise of Democratic Duties (Vote, *Petition*, *Testify, Canvas, Demonstrate, Boycott*) to affect...
- <u>Governments</u> (<u>Collective</u> "Citizens") Local/State/Fed

• <u>Corporations</u> (<u>Collective</u> "Citizens")

• <u>Religious Organizations</u> <u>and NGOs</u> (<u>Collective</u> "Citizens")

Perspective on Climate Action

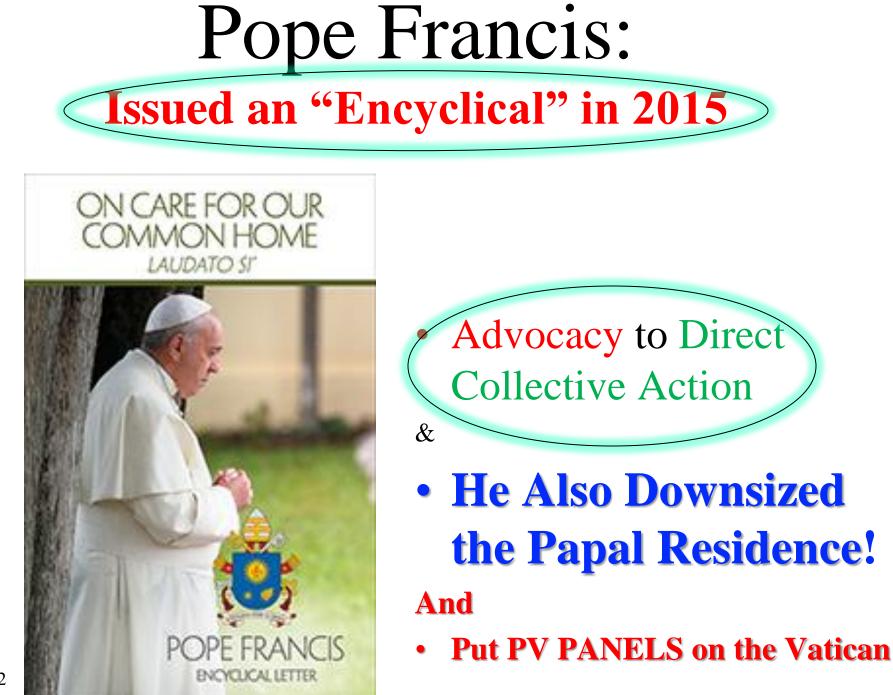
Responsibilities

- Individuals as part of Collectives MUST act BOTH:
 - <u>As Individuals Personally</u>: "Net Zero Carbon" Lifestyle &
 - With / Through Others: Advocacy: Exercise Democratic Duties (Vote, Petition, Testify, Canvas, Demonstrate) to affect...
- <u>Governments</u> (<u>Collective</u> "Citizens") Local/State/Fed
 - Green Policy Formulation Legislation
 - Facilitation & Strict Enforcement
 - Carbon Clean Agencies / Operations
- <u>Corporations</u> (<u>Collective</u> "Citizens")
 - Products
 - Operations / Processes
- <u>Religious Organizations</u> <u>and NGOs</u> (<u>Collective</u> "Citizens")

Talking with a Master of Advocacy

Bill McKibben 350.ORG



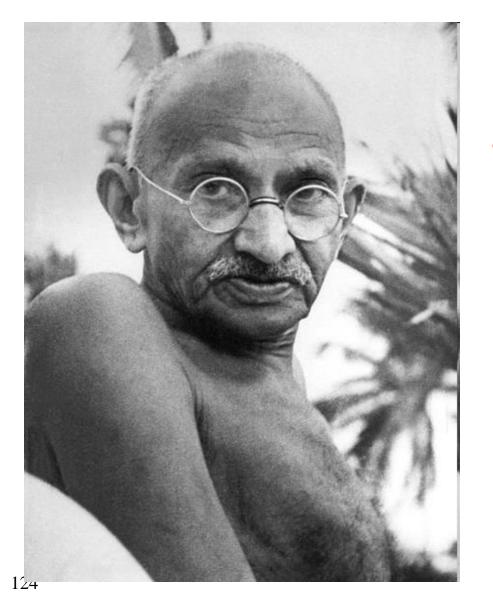


Nelson Mandela on *Individual* Action:



 "You can never have an impact on society if you have not changed yourself."

Mohandas Karamchand Gandhi



 "Be The Change You Want to See In the World".

Eleanor Roosevelt



 "One's Philosophy is Not Best Expressed in Words; it is Expressed in the Choices One Makes...

and the Choices we

make are ultimately

Our Responsibility."

Will We Be Proud <u>Later</u>... of the Choices We Make Today?





Paul Hawken



 "Do what needs to be done,

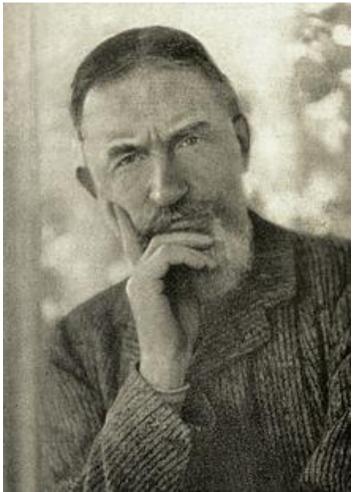
and

• *"Check to see if it was Impossible ...*

Only After

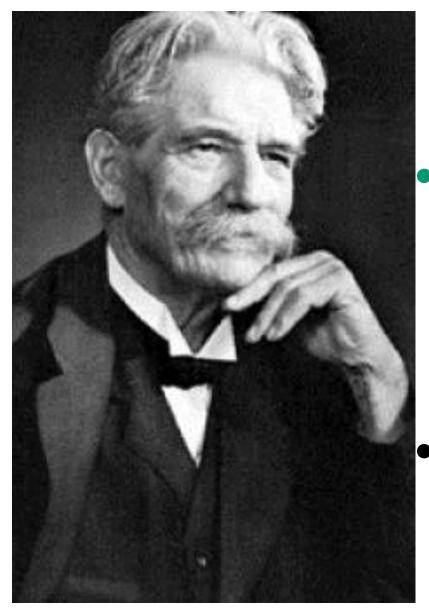
you are Done".

George Bernard Shaw



"People who say it cannot be done should not interrupt those who are doing it."

Albert Schweitzer



"Example is **Not** the **main thing** in influencing others.

• <u>"It is the Only thing</u>"

OK, ... But, you say ...

"What to Do? ...

and How?"

Principles of Personal Sustainability -Home Based

Think of Your House

as a Soaring "Energy Eagle"

Glide Path

&

Catching Lift

Thermal Glide Path

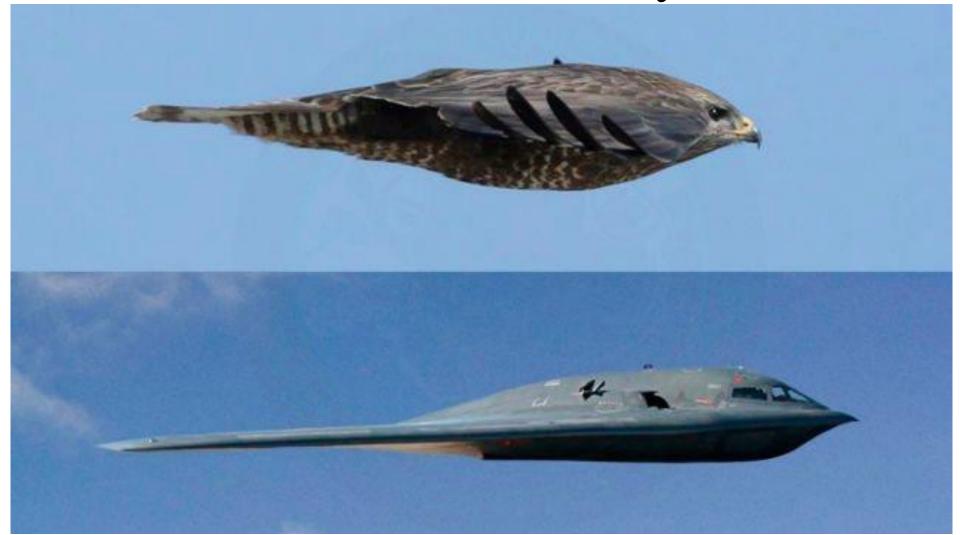
X

Catching Thermal Lift

BIOMIMICRY:

Make Your House Soar Like An "Energy Eagle"

More Biomimicry



By Being Efficient!

Thermal Glide Path ("Passive House")

&

Catching Thermal Lift ("Passive Solar" & PV...)

... and Seals Swim Efficient / Streamlined



Seals Also have GREAT COATS



... as do Polar Bears



If you want to keep your Heat... Get a Good Coat: INSULATE! (to Cover Your Climate Butt)





My Building Operations Energy Approach







- <u>As Electricity</u>: Photovoltaics (PV)
- As Daylight: Sun tunnels / Sky Lights / Windows
- <u>As Heating</u> Passive Solar
- For Cooking Sun Ovens
- <u>As Food</u>: Photosynthesis
- For Transportation P.V. into Electric Car



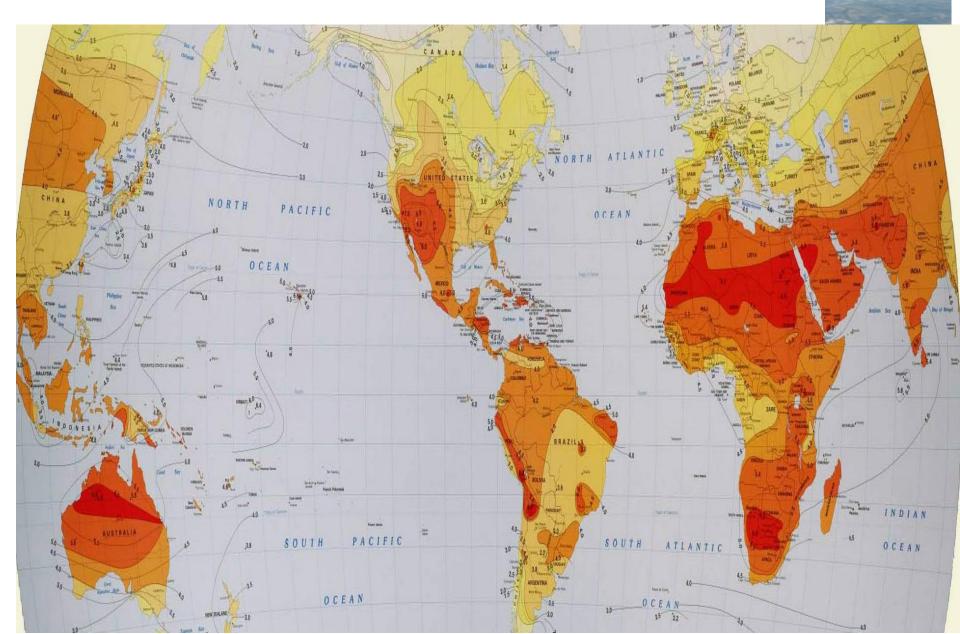
Jimmy Carter - May 3, 1978 @ SERI in Golden, Colorado



- <u>"Nobody Can Embargo</u>
 <u>Sunlight.</u>
- <u>"No Cartel controls the</u> <u>Sun.</u>
- "Its Energy Will Not Run Out."



World Solar Resources

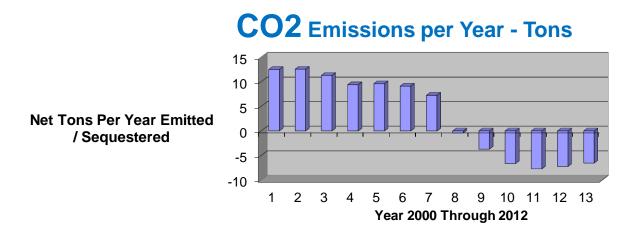


Even More Important than Catching: **Keeping** Your Energy



- Seal Air Leaks in Your House
- <u>Super-Insulate</u> Your House All 6 Sides
- <u>Air Lock Doors</u> (Vestibules) Stop Drafts
- Efficient Windows
- Efficient Furnaces / Water Heaters
- Efficient Appliances
- <u>Efficient</u> LED Lighting
- <u>White/Light Walls</u> Reduce Lighting Need.
- Seasonal Clothing Choices. 147

Preview of **RESULTS**: <u>My **Home's**</u> Carbon Emissions



2001: 12 Tons of CO₂ Emissions 2007: 0 (ZERO) Tons ... Breaking Thru "Net 0" 2011: MINUS 7 Tons Carbon – Energy Positive 2015: Still Energy Positive – ALSO POWERING CARS and FOOD Production

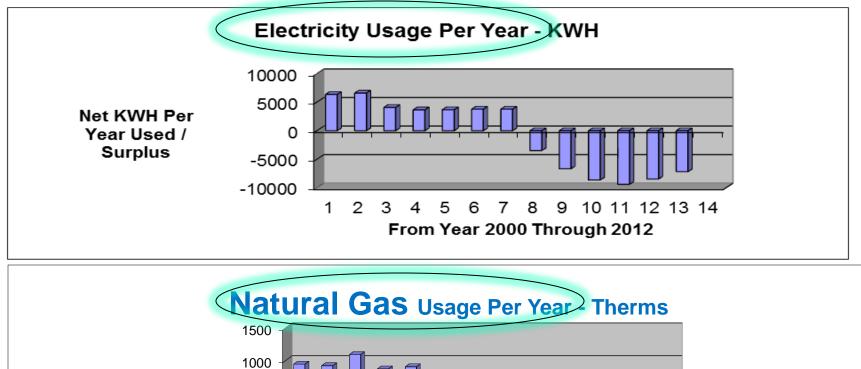
What Does This Carbon Footprint Represent?

- Home **Operational Energy** for:
 - Natural Gas and
 - **Electricity** Including Powering Cars
- It <u>Does NOT</u> include the <u>Embodied</u>
 <u>Energy</u> in Building the Home and it's components and appliances.



- for:
 - Natural Gas and
 - **Electricity** Including Powering Cars
- It <u>Does NOT</u> include the <u>Embodied</u> <u>Energy</u> in Building the Home and it's components and appliances.

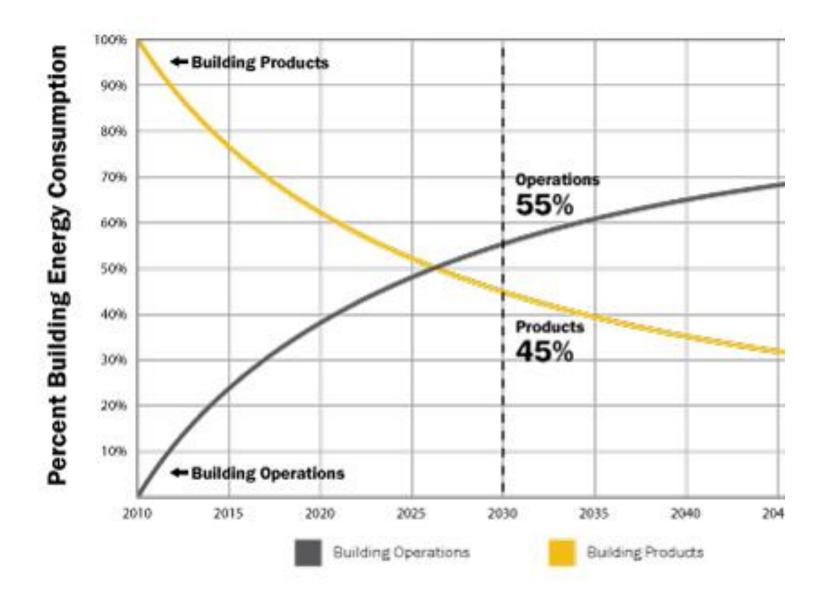
Separating <u>Operational</u> Energies: **Electricity & Natural Gas**



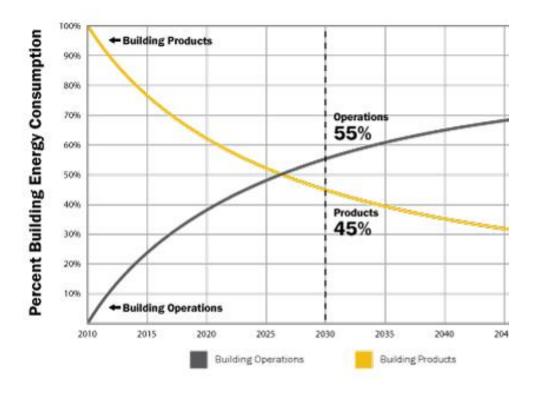
Annual Usage $1000 \\ 500 \\ 0 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ Years 2000 through 2012$

I Did These Things as "<u>Nibble Jobs</u>"

Embodied vs Operational Energy



Lesson From This Last Figure



• Building A New "Green" House IS NOT Being GREEN!

•15Fix Up An Old House Instead! <u>An "Orphan House</u>



- <u>"ADOPT"</u> an existing
 - Orphan House

Transform it with Adopted

Orphan Materials



• Operate it well below "Net Zero" with Sur

My "Orphanage " Energy/Carbon <u>Home Approach</u> • <u>Adopt</u> an existing <u>Orphan House</u> (The <u>Embodied Energy is already a "Sunken</u> Energy/Carbon Cost")

ORPHANAGI

• **Transform** it with

Orphan Materials

(<u>Embodied Energy - also a "Sunken Energy/ Carbon</u> <u>Cost")</u>

•55 Operate it well **below "Net Zero"** with **Sunshine**.

Sources: Orphan Houses & Materials

- Orphan Houses:
 - Realtors (MLS), Tax Auctions, Foreclosures, Craig'
 List, FSBOs, ...
- Orphan Materials:
 - Habitat For Humanity's "Re-Stores"
 - Lowes ("Cull" Lumber and Miss-ordered Doors & Windows)
 - "Extra Building Supplies" 53rd Av, Denver
 - **Dumpsters**
 - "Buds" I-70 North Frontage, Denver East Side
 - "The Window Guy" Denver on East 50thAve.
 - Home Depot... sometimes but potentially made useless.





Sources: Orphan Houses & Materials

• Orphan Houses:

- Realtors (MLS), Tax Auctions, Foreclosures, Craig'
 List, FSBOs, OR THE HOME YOU ARE IN !!!
- Orphan Materials:
 - Habitat For Humanity's "Re-Stores"
 - Lowes ("Cull" Lumber and Miss-ordered Doors & Windows)
 - "Extra Building Supplies" 53rd Av, Denver
 - **Dumpsters**
 - "Buds" I-70 North Frontage, Denver East Side
 - "The Window Guy" Denver on East 50thAve.
 - Home Depot... sometimes but potentially made useless.





LOWES "Cull Lumber" in Cull Rack



LOWES "Miss-Orders" in cart...and in a Rack in the Door/Window Aisles



Old Commercial SIP Garage Roof Insulation – Found in a <u>Dumpster</u>.





•My <u>Building Operations</u> Energy Approach

•Catch It

.....and Keep It!



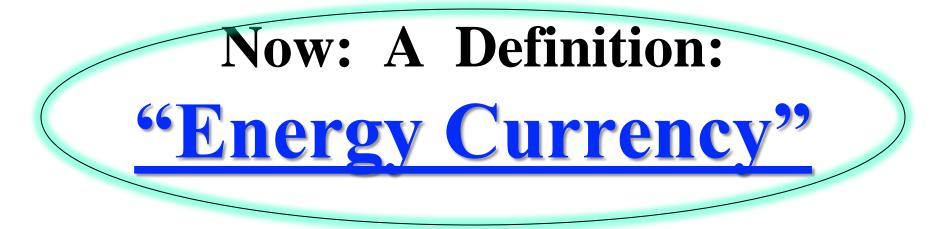
• **Embodied Energy** Minimization:

Orphanage for Both:

- Initial Structure &
- Materials for Upgrades
- **Operational Energy** Approach:







The Kind of Energy You "Spend"

to power a:

PROCESS

or an

APPLICATION.



- Grid Power (Fossil Based)
- Gasoline / Diesel
- Natural Gas / Propane
- Coal
- Photo Voltaic Electricity
- Passive Solar for heat
- Daylight for Lighting
- Bio Fuels Solid (wood) & Liquid
- Thermal Water Solar Thermal Panels
- Wind or Hydro Power

Non-Renewable Energy Currencies

Renewable Energy Currencies



- Grid Power (Fossil)
- Gasoline / Diesel
- Natural Gas / Propane

Have First Cost,

Recurring Costs &

- Coal <u>Enduring Environmental Consequences</u>
- Photo Voltaic Electricity
- Passive Solar
- Daylight
- Bio Fuels Solid & Liquid
- Thermal Water Solar Thermal Panels
- Wind or Water Power



- Grid Power (Fossil)
- Gasoline / Diesel
- Natural Gas / Propane
- Coal
- Photo Voltaic Electricity
- Passive Solar
- Daylight
- Bio Fuels Solid & Liquid
- Thermal Water Solar Thermal Panels
- Wind or Water Power

Have First Cost,

Recurring Costs &

Recurring Bad Consequences

Have First Cost

— Recurring <u>Dividends</u> & <u>Avoided Consequences</u>

BUT... "Intermittency?", You Ask

"Energy Currencies" (& Banks)

- Grid Electricity
- Gasoline / Diesel
- Natural Gas / Propane Non-Renewable Energy Currencies
- Coal
- Photo Voltaic Electricity
- Passive Solar
- Daylight
- Bio Fuels Solid & Liquid
- Thermal Water Solar Thermal Panels
- Wind Power
- Thermal Mass Trombe Walls, Phase Change Materials, Climate Battery, Rock Boxes, Water
- Esoteric Springs, Compressed Air, Net Metering, Hot Salts, Flywheels, Batteries,
- White Color Light Conservation

Renewable Energy Currencies



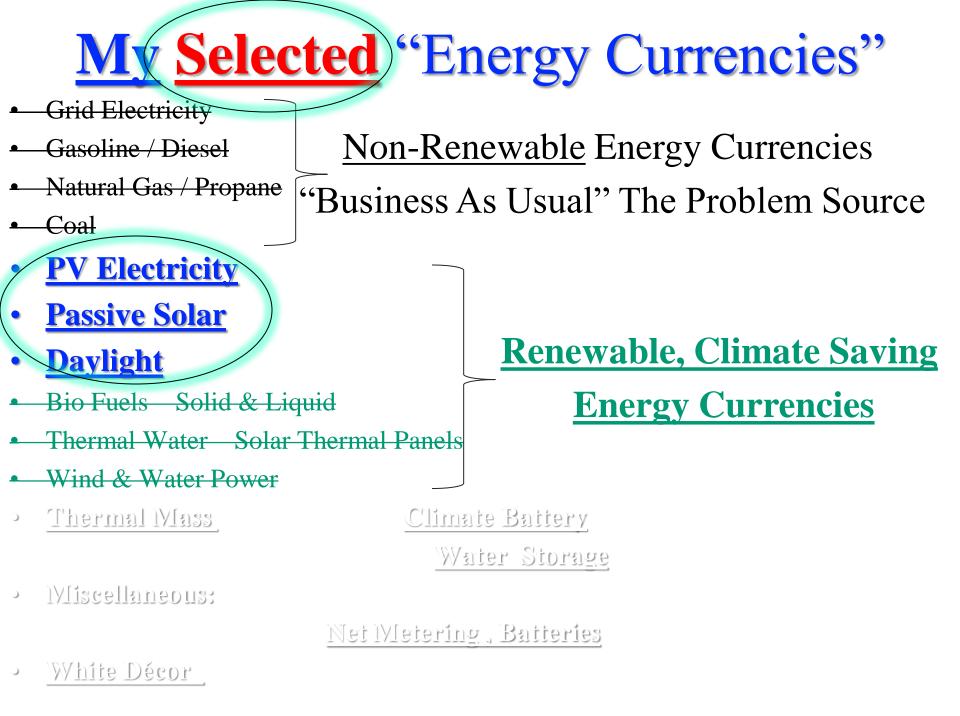
"Energy Banks" IE: Ways to **Store** Energy

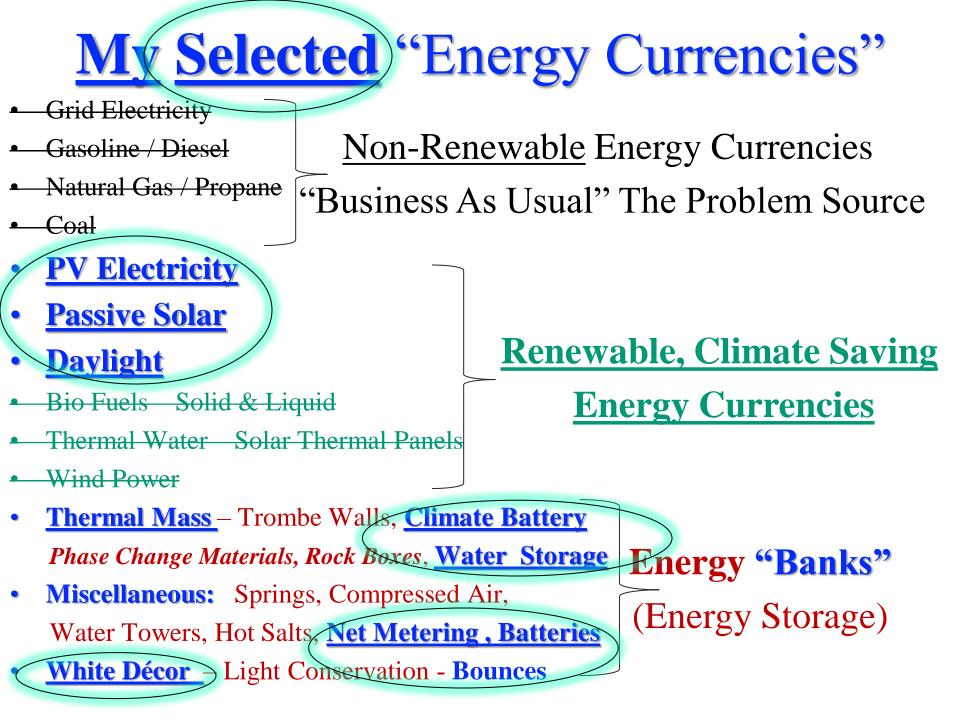
Energy Applications

- <u>Eleven APPLICATIONS</u> for Your Energy "Currencies"
 - Lighting
 - Cooking
 - Space Heating
 - Space Cooling
 - Water Heating
 - Home Ventilation
 - Clothes Drying
 - Appliances / Entertainment
 - Transportation
 - Food Production / Food Transport
 - Lawn Mowing

Energy Applications & Considerations

- <u>Eleven APPLICATIONS</u> for Your "Energy Currencies"
 - Lighting
 - Cooking
 - Space Heating
 - Space Cooling
 - Water Heating
 - Home Ventilation
 - Clothes Drying
 - Appliances / Entertainment
 - Transportation
 - Food Production / Food Transport
 - Lawn Mowing
- **Fungibility** Can the Energy Currency be Widely Applied?
- 17 **Surplus Viability** Can you Store or Share Energy surpluses with others?





Summary of My Guiding Principles

For Energy Usage

• Transform:

- An Old Orphan House,
- Using Orphan Materials
- <u>To Utilize (Little) Select Renewable Operational Energy</u> <u>Currencies, "Catching and Keeping":</u>
 - PV Electricity
 - Passive Solar
 - Daylight

And Employ Energy Banks as Time Buffers Between

Supply and Use:

- Thermal Masses: Water, Soil (Climate Battery),
- Electrical Batteries / Net Metering
- 173– White Decor







PRACTICE Of Personal Sustainability - Home Based

The DOING of IT... Aligning Actions with Values!

NOV

Energy Currencies Applied to the Applications:

Application

– Lighting

– Cooking

-1Food

Energy Currency Selection

- Space Cooling Solar PV Powered Evap Cool, HeatPump, Venting
- Water Heating Solar PV Powered Heat Pump Water Heater
- Ventilation Solar PV Powered Energy Recovery Ventilator
- Appliances
 Solar PV Powered (Energy Star) Appliances
- Transport Solar PV Powered Electric Car Tesla/Volt/PlugPrius
- Lawn Mowing Solar PV Powered ELECTRIC MOWER
 - Passive (Daylight) & Solar PV w LED @ Night
 - Passive (Sun Ovens) & Solar PV- Electric Range
- Space Heating Passive Space Heating & Solar PV Pwr & Mini-Splt
- Clothes Drying Passive Solar Indoor Clothes Line (Sun Space)
 - Passive Solar Garden/Vineyard/Orchard/Preserving

Part of the Solar Photovoltaic Array



- 48 Panels
- 9900 watts

Lighting – Passive Solar Lighting 7 Large <u>"SUN TUNNELS"</u> (14" & 22")



Day Lighting – Inside View



- Complement With
 LEDs (PV Pwd) for Night
- White Paint
 - Avoid "Interior Darkerators"

- "White Paint is to Lighting

as Insulation is to

Heating /Cooling"

Cooking - Passive - Sun Ovens



- 360 Deg. F in Summer
and
- 300 Deg. F in Winter.

Space Heating – <u>Passive Solar Heat</u>

(will cover this transformation in a minute)



Water Heater: "Heat Pump" - PV Powered "Solar Hot Water – the PV WAY"



Note: High Efficiency *Backup* Furnace in Background ... now operating at 3% of engineered heating load.

Cooling – PV Powered - Evaporative



If home is insulated well, there is little cooling load.

Soon to be replaced by a PV Powered "MINI- SPLIT" Heat Pump On Order Now.

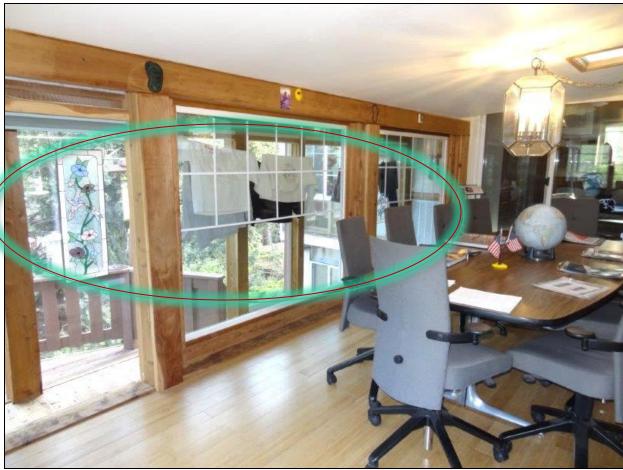


Efficient Appliances – PV Powered



- "Energy Star" Fridge
- LED TVs
- LED lighting
- Efficient Motors

Clothes Dryer - Passive Solar



• Located In Home's Solar Heating "Pre-Heater" Which is itself an added "Enclosed Porch"

Clothes Dryer – Side View



A "Walk In" Indoor **"Passive** Solar **Clothes Dryer**"

 It is also: Passive Solar Furnace Pre-heater.

Food Production: Solar Powered



- Grape Arbor: 12 vines
- 12 Dwarf Fruit Trees
- Over 20 Veggies
- 4 Kinds of **Berries**
- Local Foods
 Delivered by foot
- Soils amended with
 Bio-Char, Alpaca Poo

Food Preservation: Solar Powered



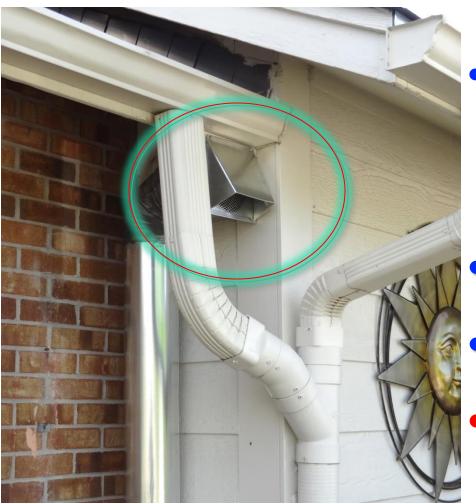
- Passive Solar Heating Plenum doubles as:
 - **"Solar Food**
 - **Dehydrator**"
- Grapes become
 Raisins
- Pumpkins become
 Pumpkin Chips.
- Etc.

"Grapes Become Raisins"



- Pumpkins become pumpkin chips
- Kale dries for Kale Chips
- Grapes Become Raisins
- Etc.
- ALL PASSIVE SOLAR POWERED

Ventilation – PV Powered

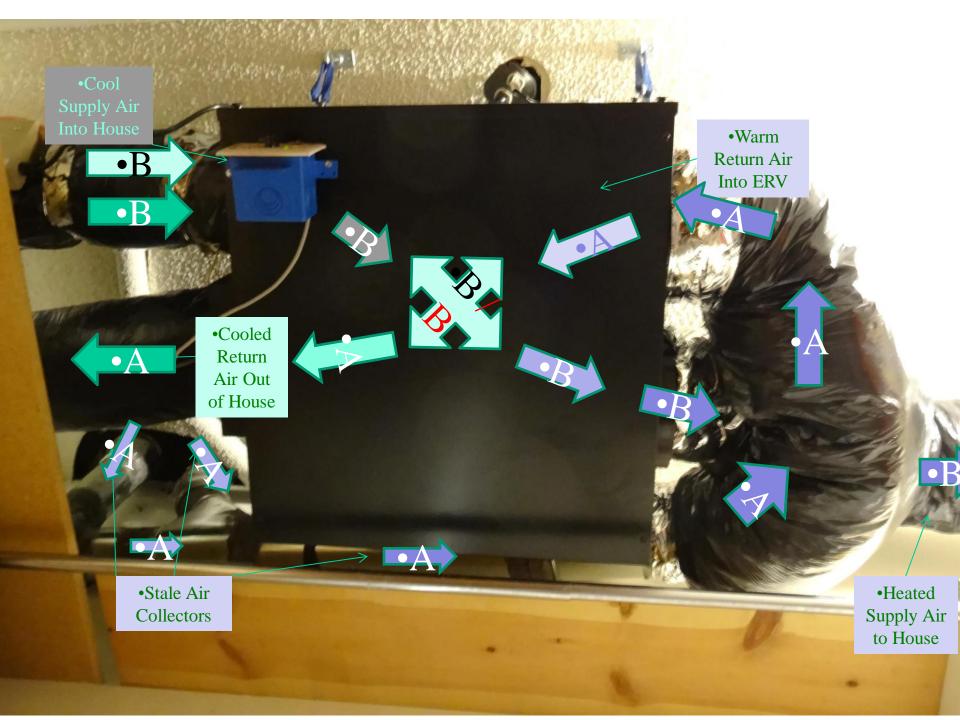


 Energy Recovery Ventilation (ERV)

- Fresh Air In ...
- Stale Air Out ...
- Energy stays in!

ERV: The Working Outside View





Transportation: <u>Use The **Right Tool** for the Job</u> <u>Do Not just ASSUME you must BURN GAS or Deisel.</u>

- Walk
- Hike
- Bike
- Shared Rides
- Solar Powered Electric Car
- Monster Equipment Movers

Travel By Foot, When Appropriate



Transportation – Pedal Powered



"Eycle Recycled Cycles" Adopt an Orphan Wheel

Transportation: Shared Rides



¹⁹⁶Car Pooling & Hitch Hiking Qualify

Transportation?











Powered By Sunshine ... <u>Thanks to PV!</u>)

Hybrid Transportation (Pedal & Gas, My 1st Serial Hybrid)



There Once Was A Myth about Electric Cars ...

...That they were just for "Golf Carts and Nerd Mobiles"

Then a Super-Nerd from South Africa made one "Car of the Year - 2013" and GM made one "Car of the Year – 2017"

MYTH DEBUNKED: Tesla Model X, With **0** Emissions, <u>While Towing</u> an Alfa Romeo, <u>Beats</u> An Alfa Romeo



And it is a.... 155 MPH 4WD SUV!

Transportation – PV Powered Charger



 GE Level 2 Car Charger – 240 Volts / 30 Amps

... and HOME's Battery Backup in the Insulated Cabinet. Transportation – Big Loads Only... Only for <u>Building Materials</u> Scavenged for Home Energy Conversion and <u>Bike Museum Displays</u> – Less than 500 miles per year... and loaned to Friends Doing Home Energy Conversion Construction.



Quick Quiz:

What Motto to say, when you see this Eagle?



Returning to the phrase **Keep It**?

In the Motto:

"Catch it

and Keep It"

<u>Think</u> "Long Shallow Glide Path"

ie: Very Low Heat Loss Rate.

Seal & Insulate the Envelope

• Seal & Insulate

- Insulate
- Insulate
- Insulate



Seal & Insulate the Envelope

• Seal & Insulate

- Insulate
- Insulate
- Insulate
- & Insulate Some More



President Obama - 2010



"INSULATION

IS SEXY"

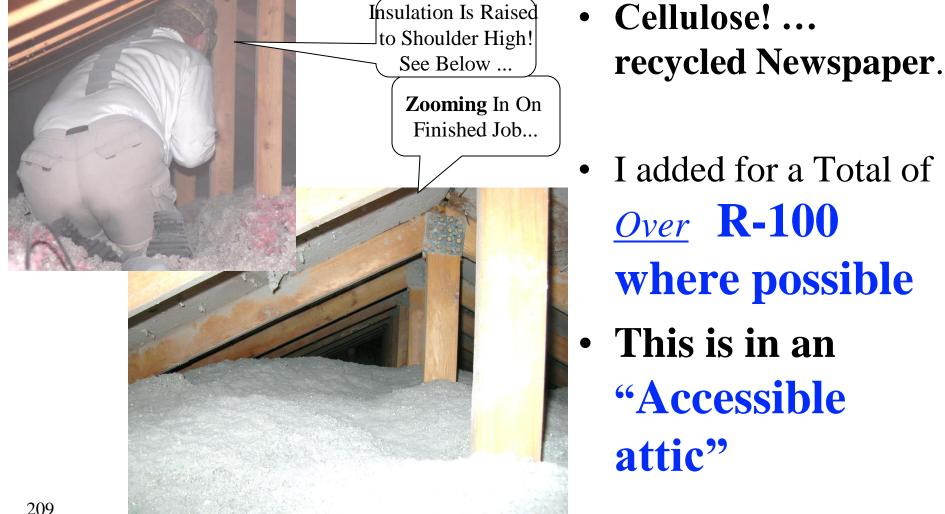
Personal Insulation – Your 1st & 2nd



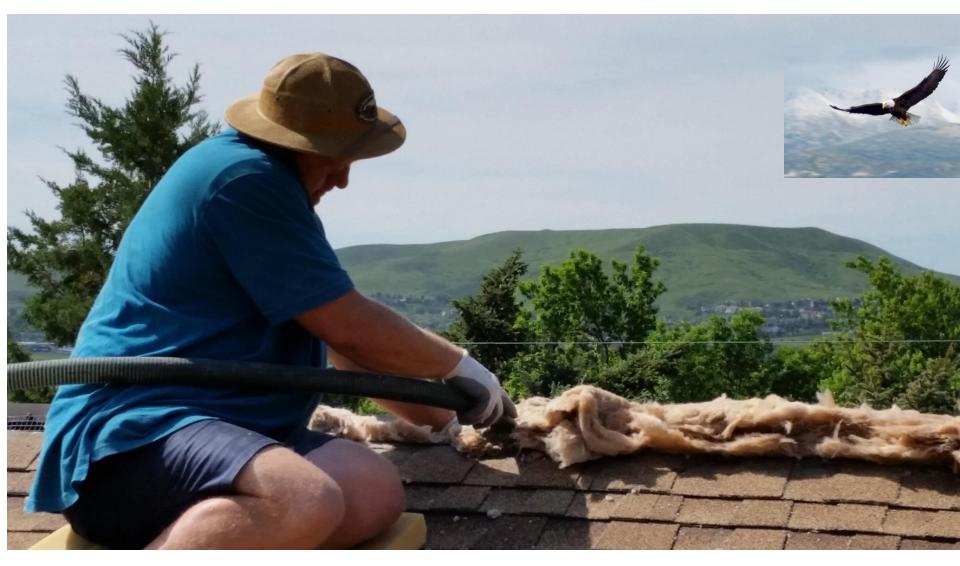
- Adjust your 1. Clothing; **2. Bed** Cover Layers ...
 - and your
 - Thermostat

to the Season.

Adding Insulation To The Attic... Your *Third Thermal Envelope*

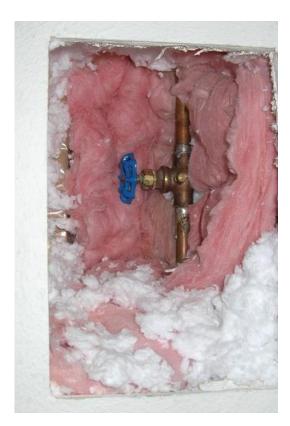


Inaccessible Attic



Insulation: Fill Unfilled <u>Mid-Wall Cavities</u>





•Blown Fiberglass Fill below grade

Interior Upgrade of Existing Walls:



- Line with Poly-Iso Foam Insulation
 - Finish with Wood Paneling.

Finished North Bedroom



Were R-9 walls

• Now <u>~R-60 Walls</u>

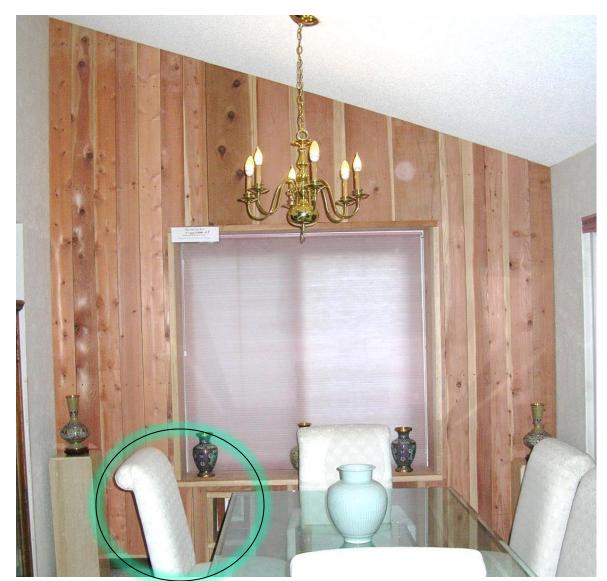
• <u>Wall Heat Loss</u> <u>Reduced By ~85%</u>

Dining Room Wall - in Progress

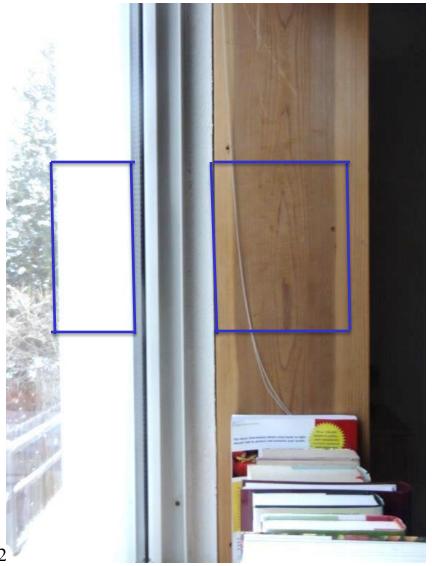


- 7.5 inches of Poly-Iso foam boards added & Sealed with "Great Stuff" Spray Foam
- Finally, Reconditioned
 "Cull" Redwood 2 by 6
 lumber applied as
 "Ship Lap" Paneling.

Dining Room Wall Upgrade from R-9 to R-104.



R-104 Dining Room Wall Profile



- Original **R-9**
- "Tube Filled" to **R-14**
- Layered Inside with Poly-ISO to **R-68**
- Layered Outside: R- 104

Was 5.5 inches thick ...
 Now 22 Inches Thick!

Insulate Garage Wall to Kitchen



²Add R-42 of Poly-Iso Sheet Insulation

Framed the Perimeter with 2 x 8





All Electricals Framed in Place



Exterior Insulation Wrap?



Layering up Foam Insulation Over Brick







Speculara Scale www.eestime.com and the state of the set of the se VUID1

G

N-ADIS

N-ADIS





N-ADIE

BIGA-Wigluv

SIGA-Wigluv

www.siga.ch

SIGA-Wigluv SIGA-Wigh

EIW-A

SIGA-WIS

SIGA-Wigiuv

SIGA-Wigluy GA-Wigluv

GA-Wigluv

SIGA-Wigluv

VIGLUV

siga-wight

Nigluv

Wigluv

Wiglu

VUIDIW-A

SIGA-Wigluv SIGA-W

Wigluv



Exterior Over Brick

- Framing
- Foam Board Insulation
- Spray Foam Seams
- Oriented Strand Board (OSB)
- Air Seal Taping
- Building Wrap
- Finish Siding (Metal in this Instance).



East Exterior Wall: <u>Wrap Over Frame</u>





Exterior Wall: Outer Insulating Wrap

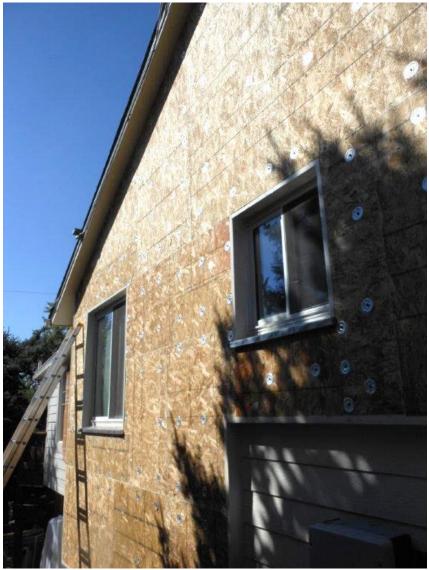






- Siding Removed and Saved
- **Border built** of *Recycled 2x6* Redwood Deck – 30- yr. old.
- **R-38 Poly-iso** "Surplus" **Insulation** Applied: Wrapped and Re-sided

Exterior Wall **Insulating** Wrap Cont.





Finished East Wall



- Window SILLS
 WRAPPED WITH
 Hand Formed
 Aluminum
 Flashing.
- Old Siding Reapplied.
- Electrical and PV Recessed on Old Wall Surface.

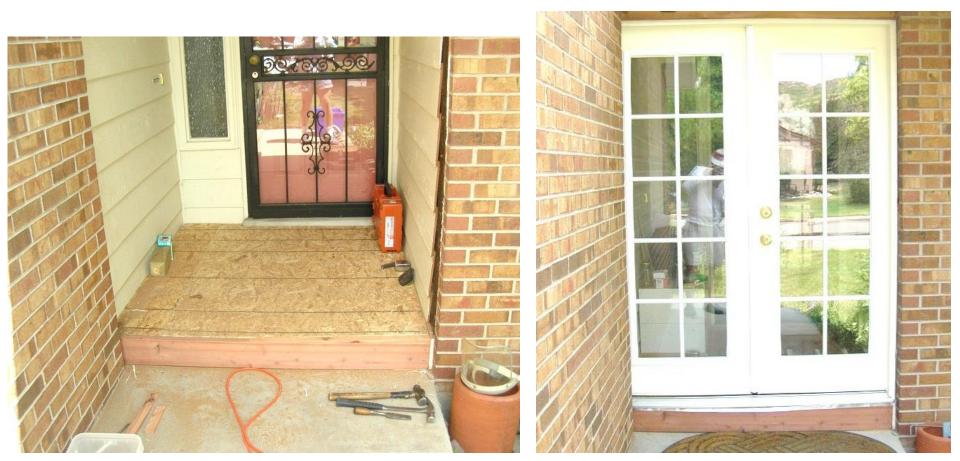
Foundation Insulation - Exterior



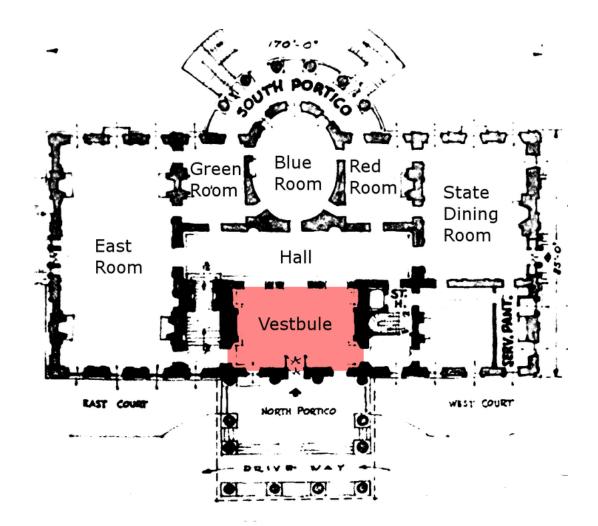
Insulate Cantilevers - Builders Often Miss



Insulate Doorways – **Added 8 "Air Lock" Entries** *Like in Space Shuttles and Submarines* ... and "Vestibules" in Victorian Homes.



Air Locks: A Patriotic Tradition 1600 Pennsylvania Ave.



HOW TO **"Catch It"** in the Phrase:

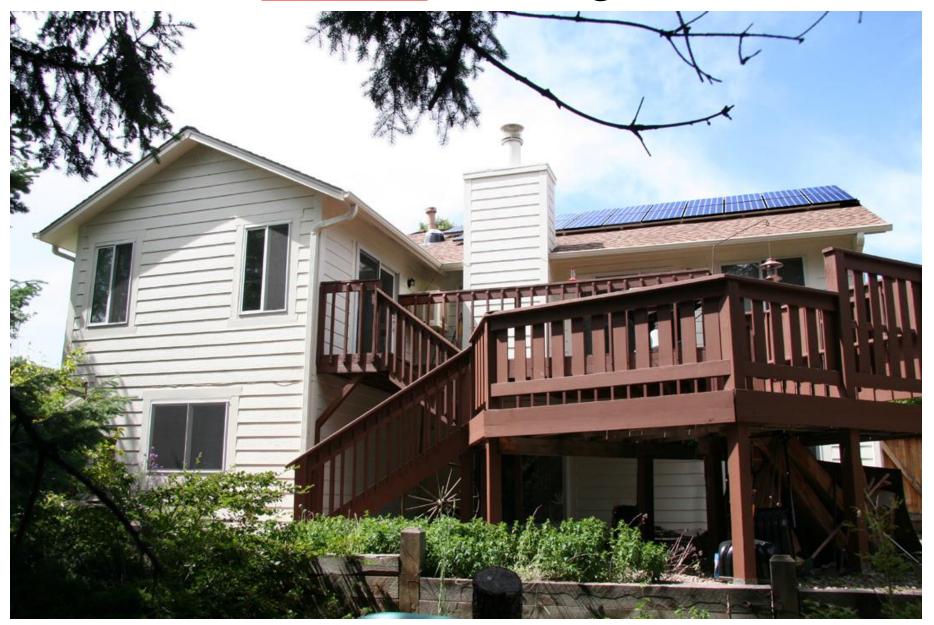
and Keep It"

"Catch it

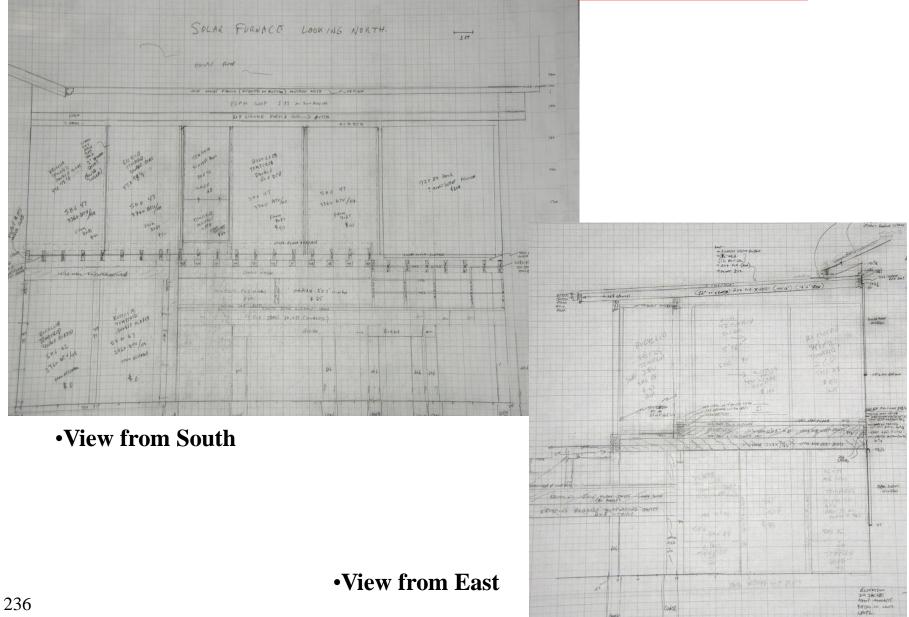


Like A Soaring Eagle Catching a "Thermal" for Free Elevation... Bio-Mimicry

South Side **Before** Adding Passive Solar



Draw a Plan, Get a Permit



Remove Rotten Old Upper Deck & Cold Drafty Fireplace



Add More Airlocks/Vestibules/Sun Rooms

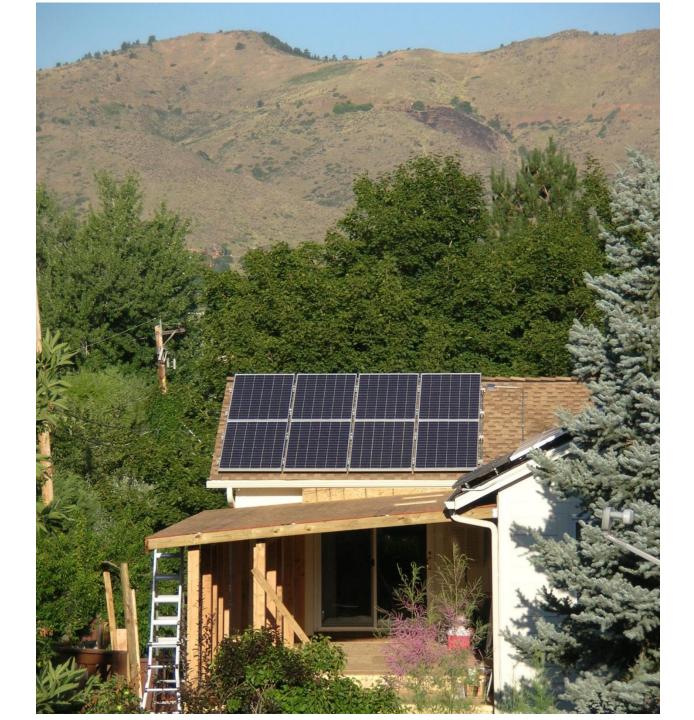


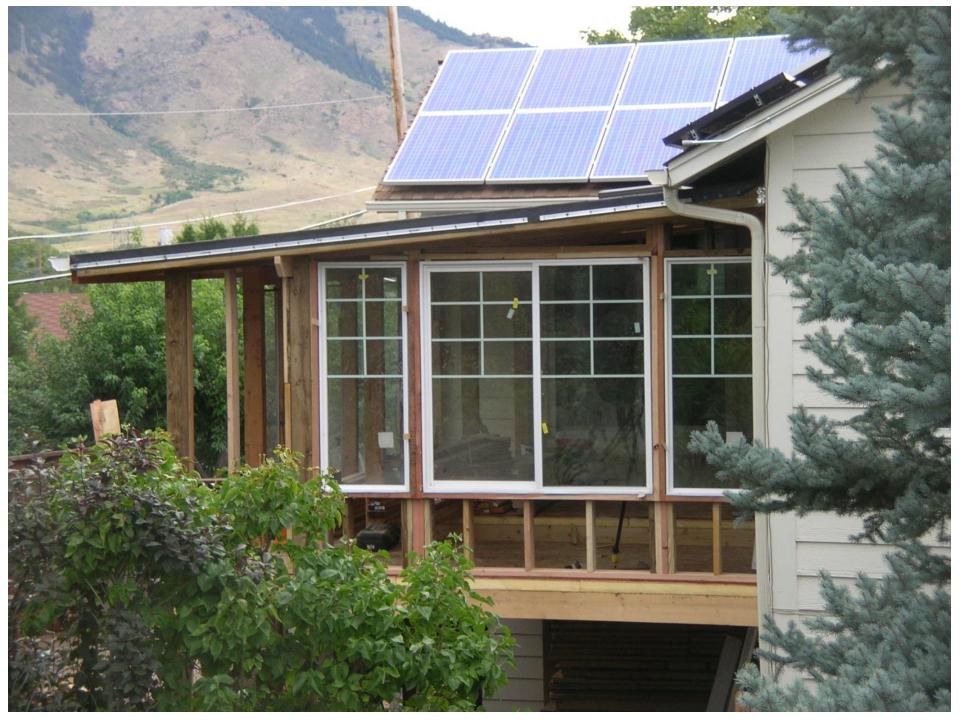
All the Lumber is "Cull" from LOWES.

 <u>75% or</u> <u>greater</u> <u>discount!</u>









"Maui Room"



•<u>Air Lock Entry</u> to "Maui" Sunroom – Itself an Airlock Entry to the House –2009 view.



Lower Level Workshop – Passive Solar





- Workshop is:
 - "Passive Solar Heated",
 - "Super-Insulated", and
 - Grows Healthy Snacks for the "Workman".

 It is also an "Air-Lock" to the basement Bike Museum.

Workshop Has it's Own "Airlock"



• Thru this Door – then to outside thru the next door.





This also acts as a "Root Cellar"

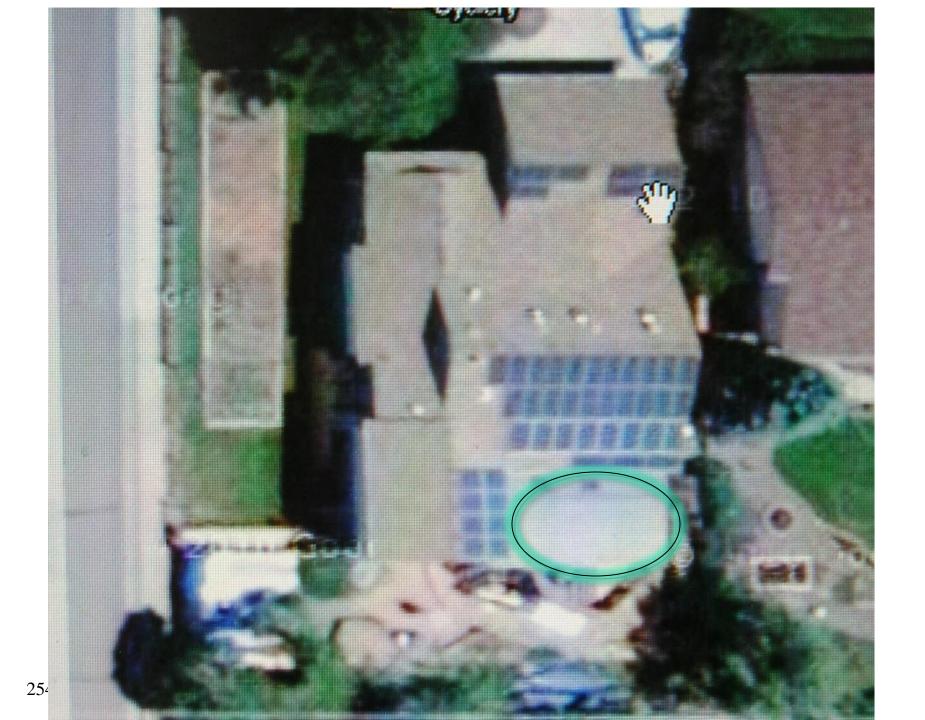
South Side Before 1st Passive Solar

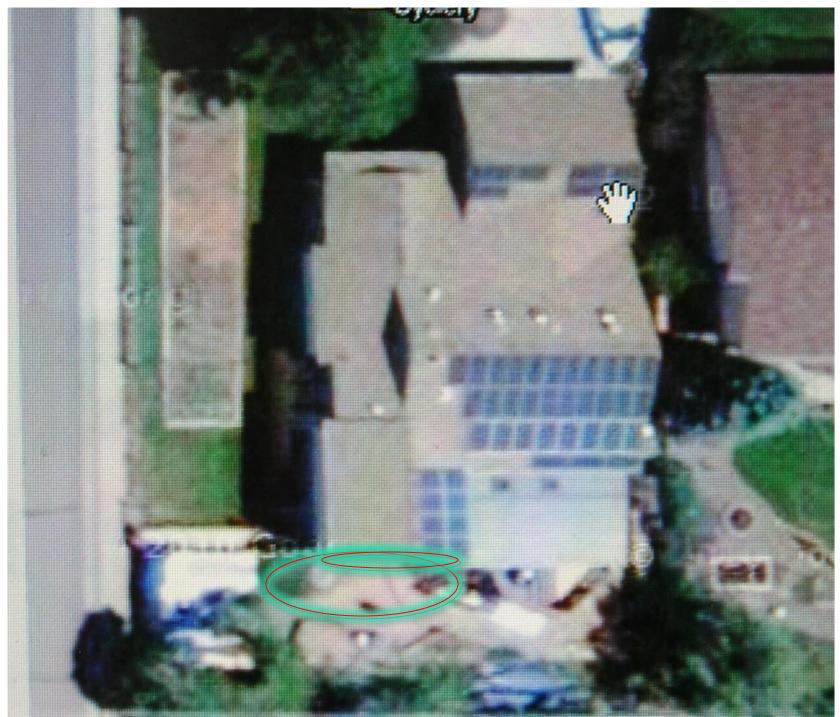


Sunroom 1 Finished – 2010 Exterior View



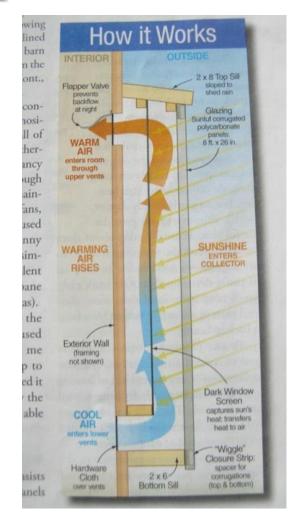






Possible Passive Solar Space Heater?

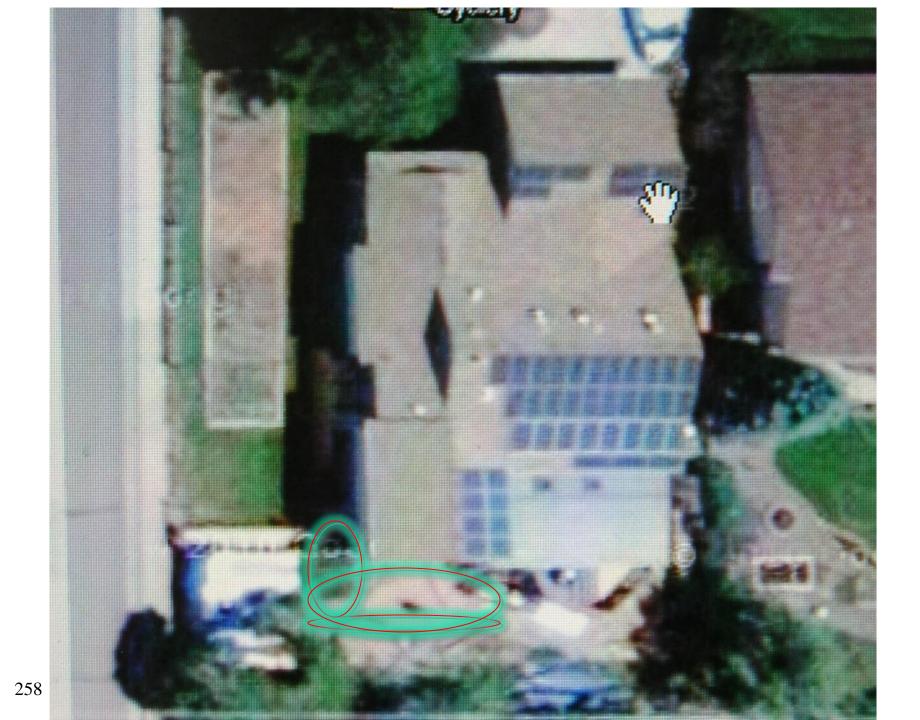




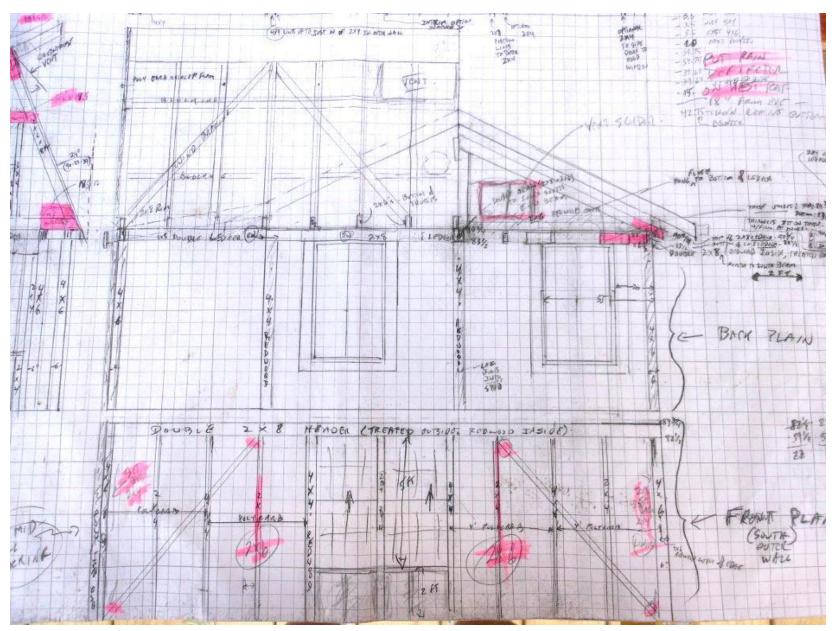
 As Shown in Mother Earth Magazine in Summer 2007.

Possible Passive Solar Space Heaters?





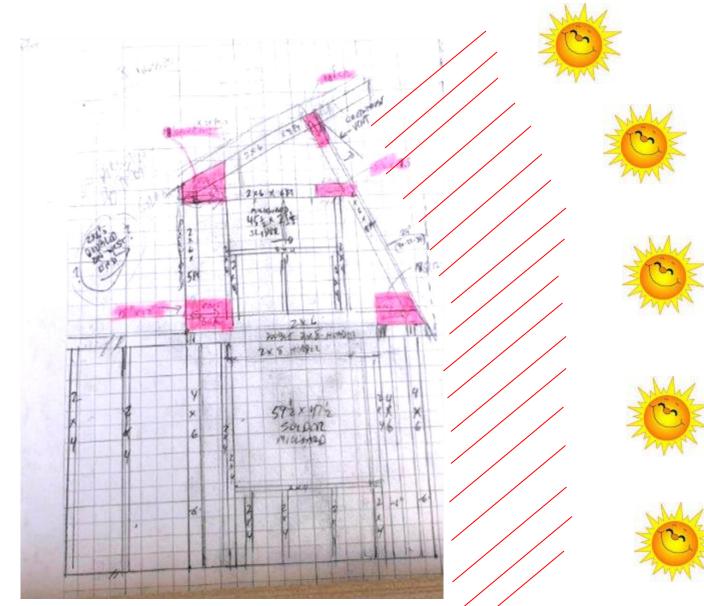
Make a **Bigger** Plan, Get Another Permit



The West Side - Before



View of West Upper 2 Levels Plan



My Mental Image of The Plan



Again: The West Side - Before

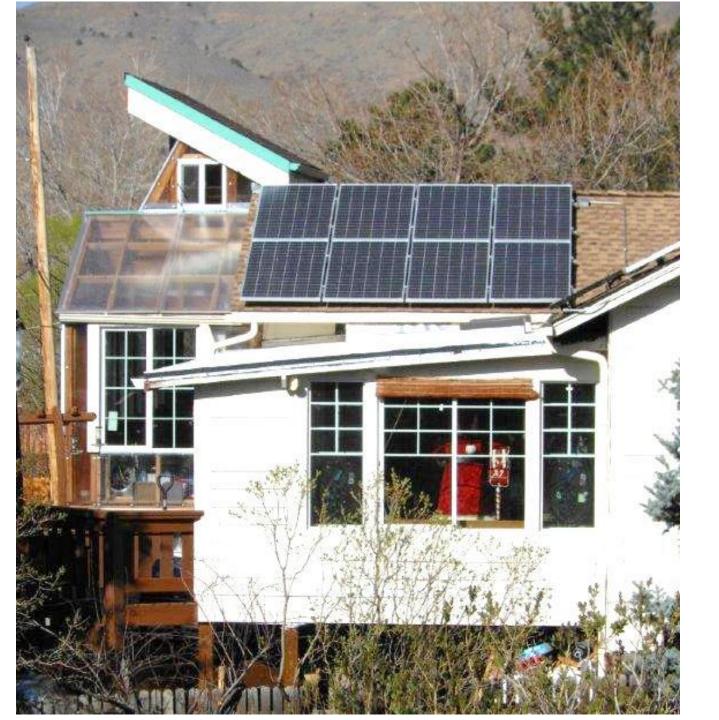


The West Side - After



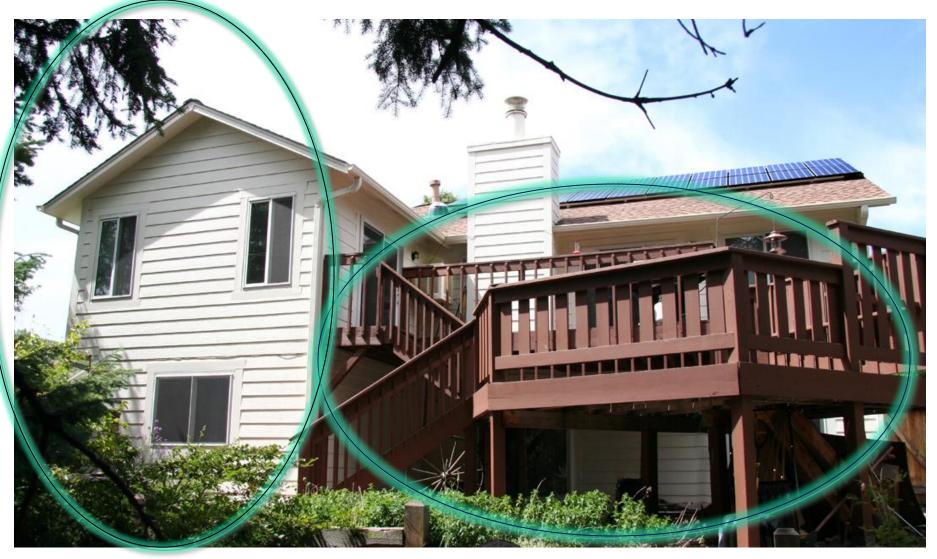
The West Side – With Final Outer Insulation & Vineyard



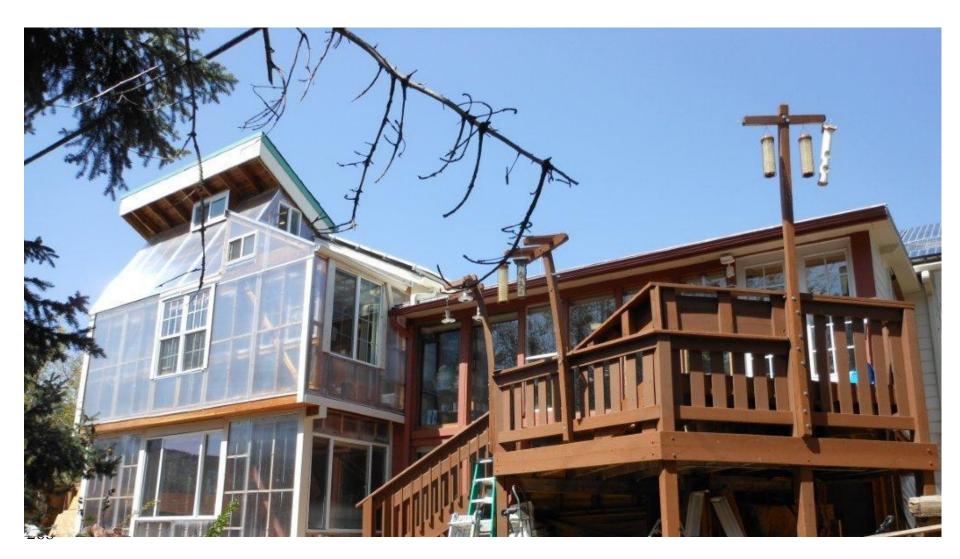


View– Of East Side -Looking West

The South Before



The South After Solar Additions



Night View

View from the South West



Street View – Before (2008)

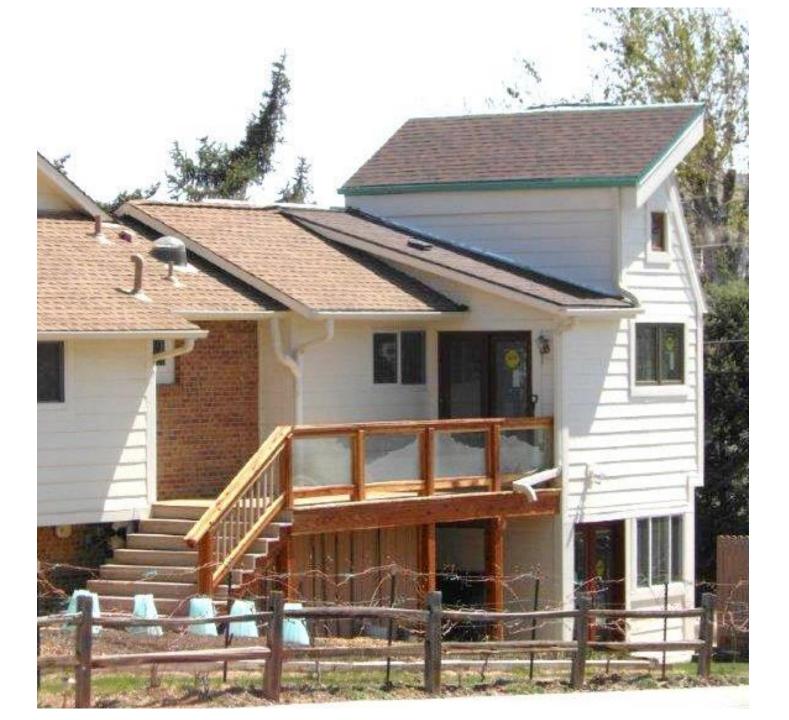


Street View - 2014



Street View – July 2015

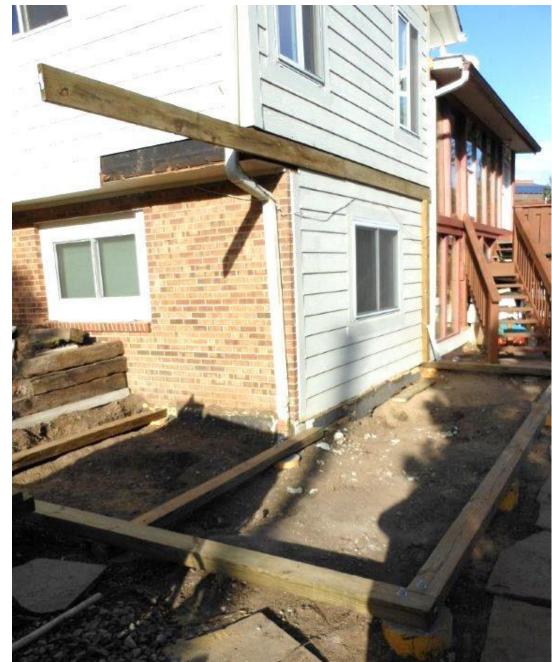






Site Prep and 17 Concrete Piers



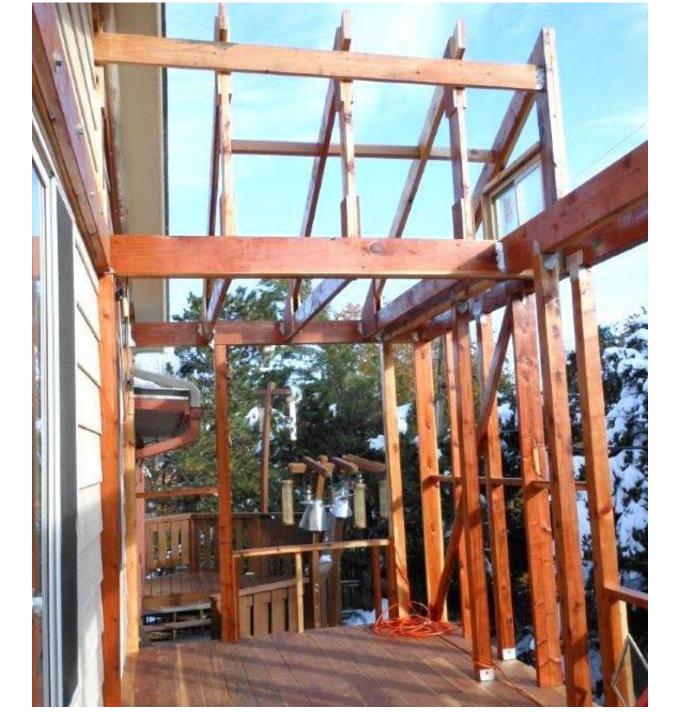


Sill and Ledger define the spaces











Site Made Trusses



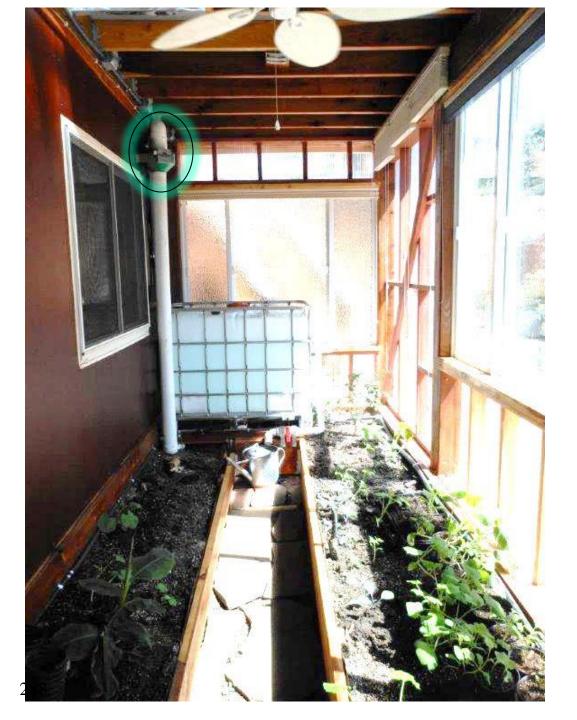






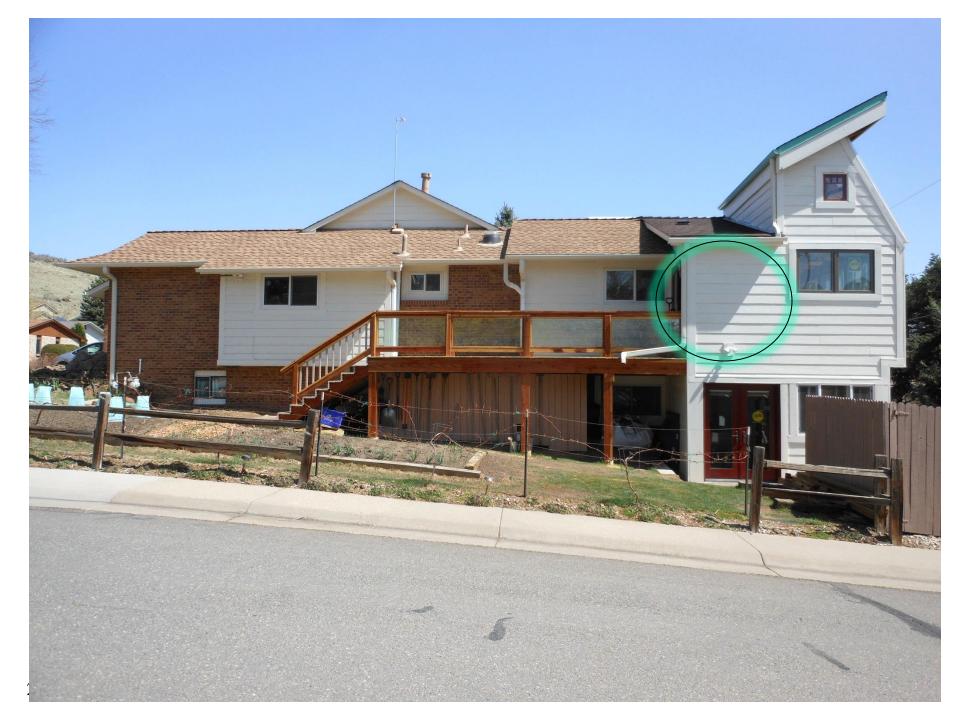
•<u>Airlock</u> to Greenhouse – •Dual Purpose: Doubles as <u>Potting</u> <u>Shed</u> – with water based <u>thermal</u> <u>storage</u>.





• Greenhouse with **PV Powered** Ceiling Fan, PV Powered "Climate Battery" for "In-ground" Energy Storage, and •Thermal Water Based **Energy Storage**







Air Lock to Passive Solar Gymnasium –

This holds Snow Shoes, Bikes, Hiking Poles, Etc.







• Note:

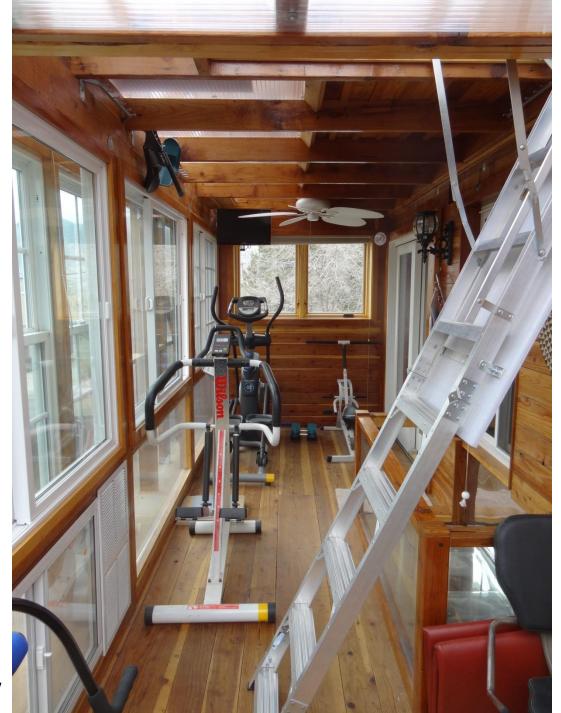
- 1. Gymnasium Room
- 2. Solar Envelope
- 3. Attic Door to Food Dehydrator (Dryer)



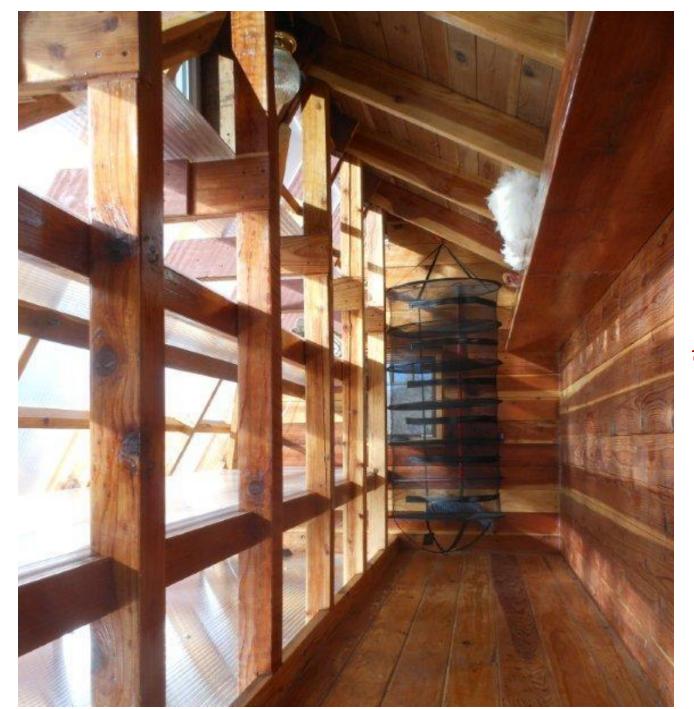
 "Envelope Wall" cavity is 40 Degrees
 Warmer than inside the Gymnasium room (100 vs 60 Degrees F) on a
 25 degree Morning.

• PV powered fan delivers this Heat to the North End of the house





Access to the Food Dehydration Center / Solar Plenum



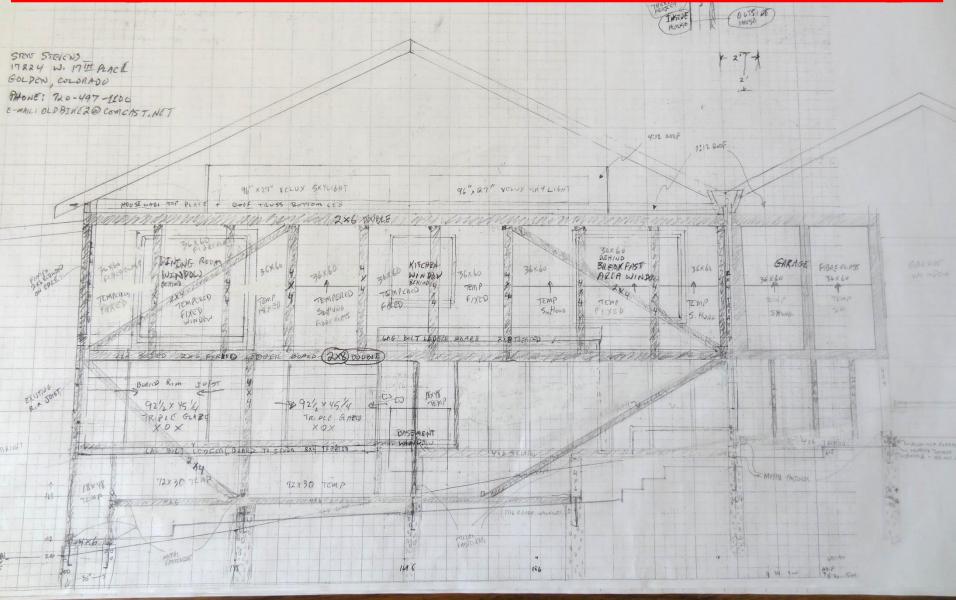
Solar Plenum is Dual Purpose acting also as the: Solar Food Dehydrator





Wrap the East with a Glass Envelope

PROFILE 02 2014 EAST WALL



Orphan Pella Fiberglass Windows -

The 11 Upper Windows – "Miss-orders" from Lowes-\$5,000 reduced to \$500 (\$45 each)

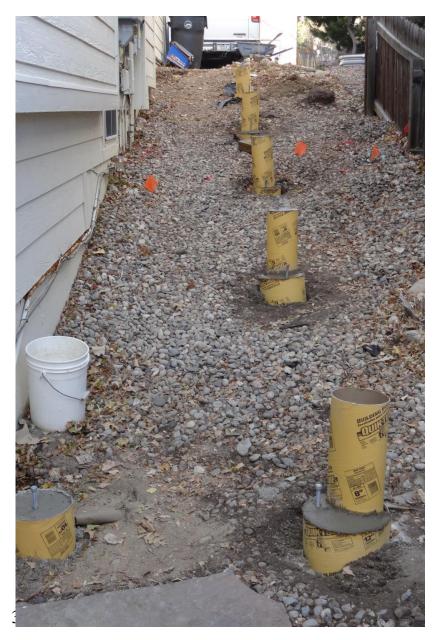


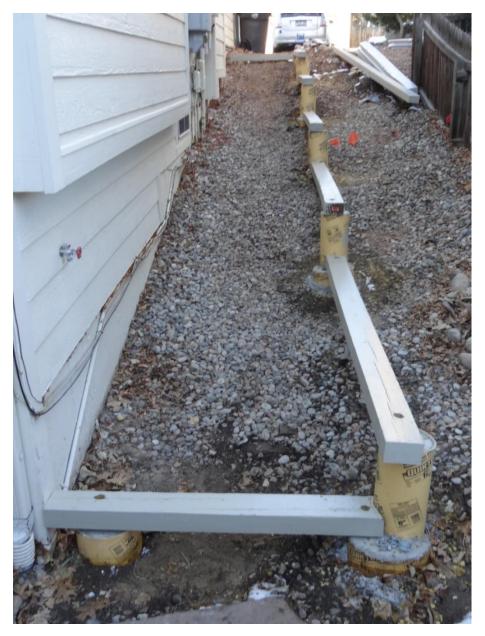




J U 4

Foundation Piers and 4x6 Sills





Rough Framing





Outside Nearly Finished Still Needing Gutters, Electrical, and **Interior Finish**

View From South







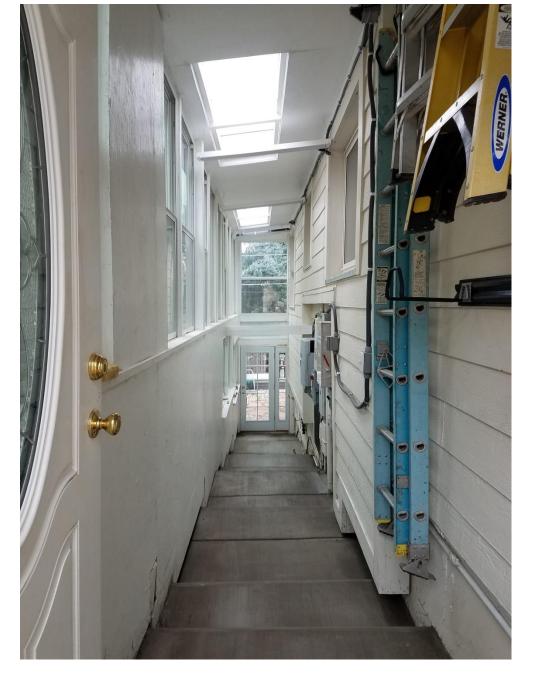
The East Promenade





East Promenade:

- 1: Insulated,
- 2: Paneled,
- 3: Painted
- 4: Wired
- 5: Floored
- 6: Lit



Night View



The Sustainable Energy Eagle Soars Over On the Way to DIA to Check Out the 2017 Solar Home Decathlon.

2017 DOE's Solar Home Decathlon Won by an "Envelope House"

1.	Swiss Team	872.910
2.	Maryland	822.683
3.	UC Berkeley/U of Denver	807.875
4.	Missouri S&T	758.315
5.	Team Alabama	757.873
6.	Northwestern	750.758
7.	Netherlands	750.275
8.	Las Vegas	748.542
9.	UC Davis	745.152
10.	Wash U - St. Louis	642.888
11.	Team Daytona Beach	532.091





Winning 2017 Solar Decathlon "Home" The "Swiss House"

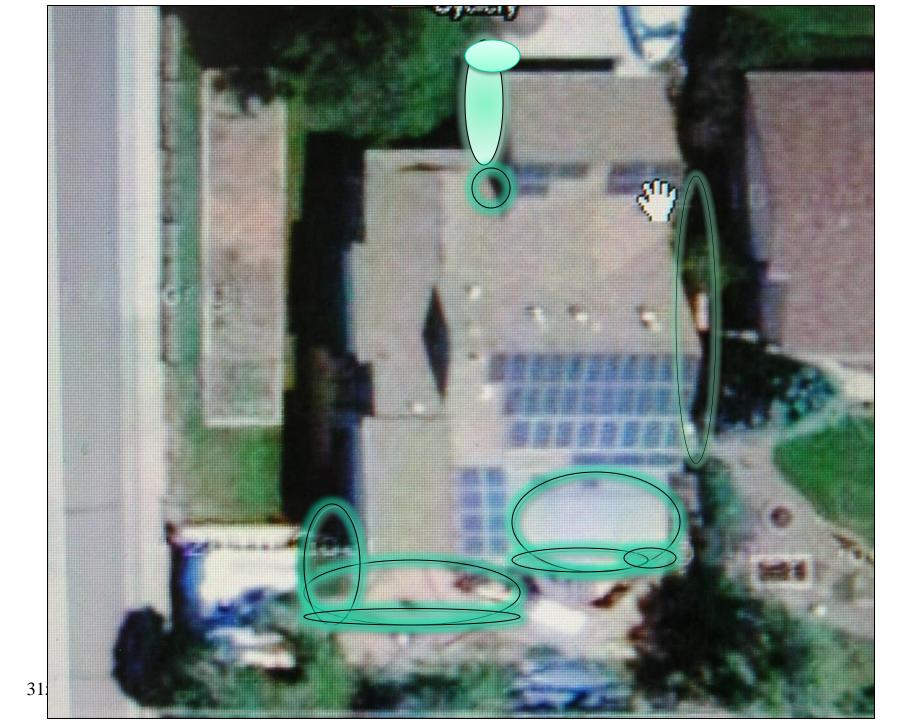


No Bedrooms... A "Community Center"

Other Examples of "Enveloping a Home"



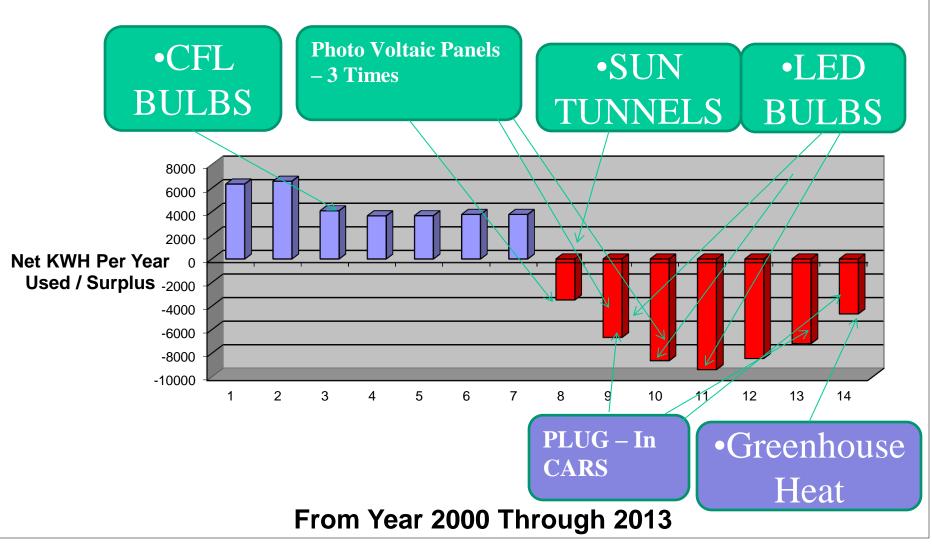
Not Legal in Most Building Codes: Bedrooms Need Direct Outside Egress

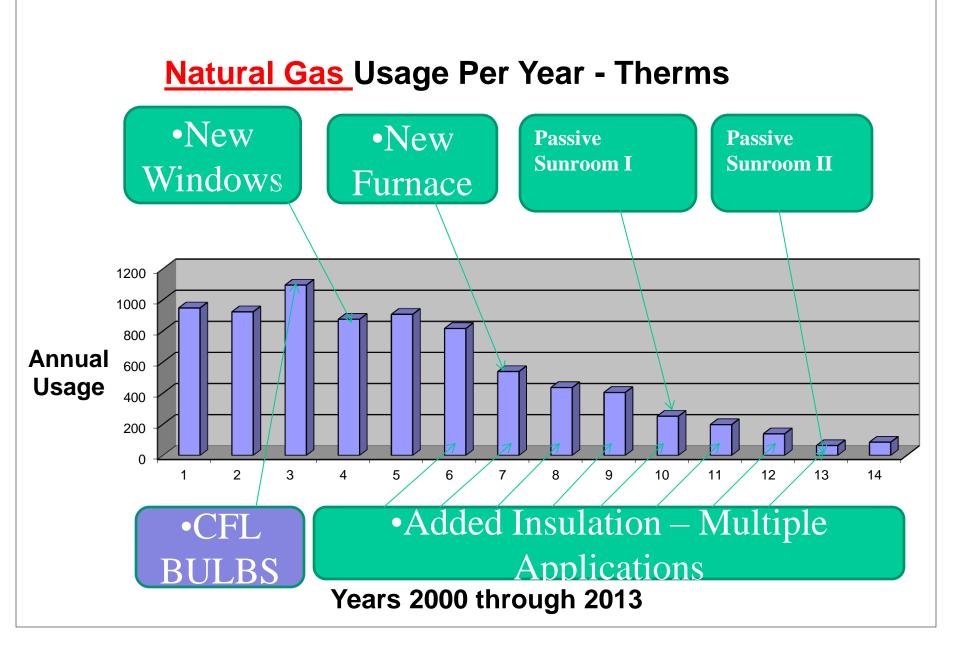


Plans Going Forward:

- Install Model: 12RLS3HY Fujitsu Mini-Split
 - Cooling: 12000 BTU; SEER 29.3
 - Heating: 16000 BTU; HSPF 13.8; EER 15.2
- Disconnect From XCEL Nat Gas Service
- Remove Old Gas Furnace (95.5 % Efficient)
- Redeploy Orphan Furnace to Good Home.
- Build Outer Front Airlock Entry
- Improve Gardening Yields
 - All Done as "Nibble Jobs"

Electricity Usage Per Year - KWH





Priority Items For Home Energy

- Get an Energy Audit XCEL subsidized
- Replace All Incandescent Bulbs With LEDs
- Seal & Add <u>Maximum</u> Insulation to Attics (R 60+ add)
- If Furnace is OLD: Replace with Highest Efficiency
- If Fit, Dig and Insulate Your Foundation (add R-25 outside)
- If Windows are Alum Framed or Single Glazed: Replace with Triple or Quad Glazed... fiberglass framed.

Priority Items For Homeowners

- Get Energy Audit XCEL subsidized
- Add <u>Maximum</u> Insulation (+Seal) Attics (R 60+ add)
- If Furnace is OLD: Replace with Highest Efficiency
- If Fit, Dig and Insulate Your Foundation (add R-25 outside)
- If Windows are Alum Framed or Single Glazed: Replace with Triple or Quad Glazed... fiberglass framed.
- If in Doubt about how much to Insulate, DO MORE!
- Consider Daylighting Velux Sun Tunnels
- Consider Solar PV if Roof Appropriate (Else Solar Garden)
- Study Your House...rim joists, walls, floors, heat duct system; Seal where there are leaks. Add insulation where you can. Consider: Air Locks / Added Efficient Sun Porches.

2012 Receiving Award for "Best Home Energy Retrofit" @ World Renewable Energy Forum



Science Guys AGREE! But...



You cannot Please Everybody All The Time

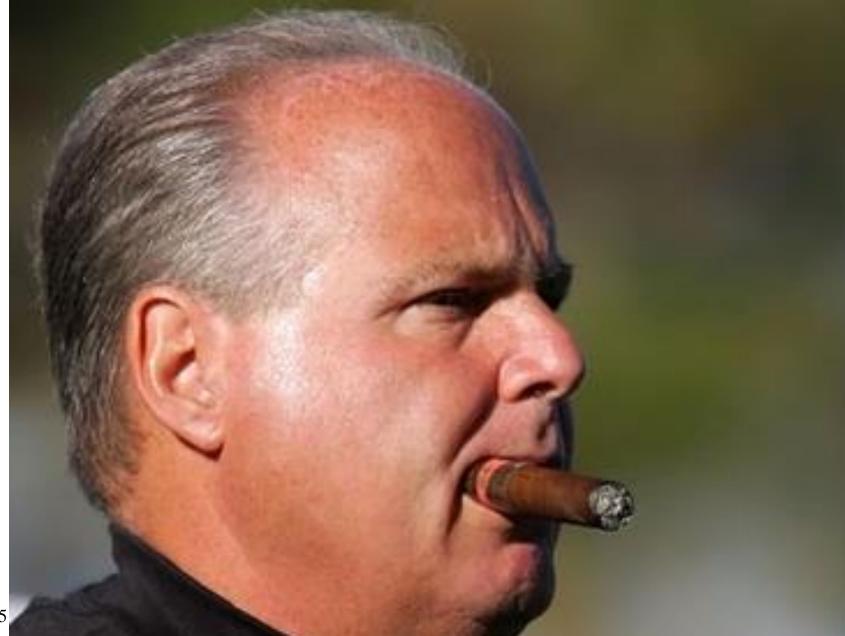


³²³He Calls Me A Lier, Socialist, & Loser

& He Just Cringes at Everything I Say



... and He Blows Smoke in My Face



Again, Motivations for My Actions

(Add Your Grandchildren's Names Also)

Jackson

FAST

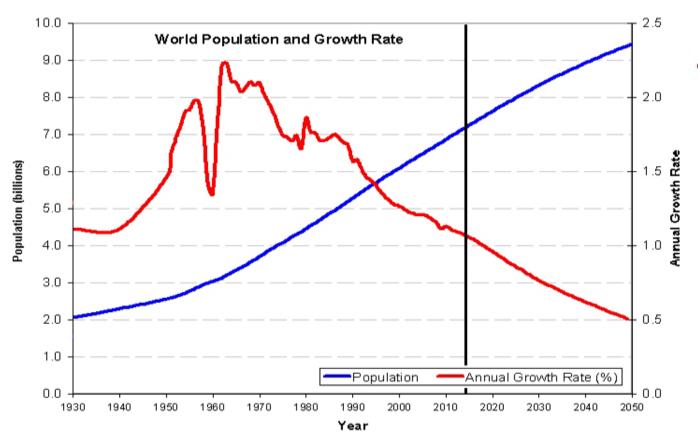
Kaylee

Shealyn

Denver

I have 3 Grandkids – not 7, 12 or 15.

Population is <u>Another Elephant in the Room</u>



World
Population
is now Over
Long Term
Sustainable
Levels

It is NOT JUST <u>YOUR</u> Carbon <u>Footprint</u> It is <u>also</u> **How Many C.FtPts. you Spawn**

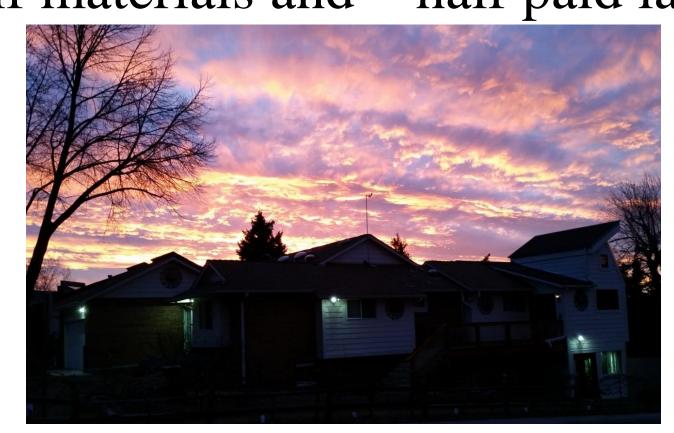


Thus We Need To: <u>Advocate for Women's Civil &</u> <u>Reproductive Rights</u>



Economics vs. Ethics ... of Personal Climate Action

My **Costs** for the 13 added rooms in 1,300 sq ft of Passive Additions was ~ \$ 47,500 ... or ~ \$ 36 per sq. ft. (~half materials and ~ half paid labor)



Other Costs – Over 14 years

- Insulation \$7,200:
 - Attic: \$3800
 - Inside Basement Walls: \$ 800
 - Below Grade Exterior: \$200
 - Inside Main Floor: \$400 Including the Wood Finish
 - Garage Ceiling: \$180
 - East Outside: \$1800
- 7 (Big) Sun Tunnels: \$ 2,250 Installed
- Heat Pump Water Heater: \$1,800 Installed.
- ERV: \$4,000 (\$2,100 was labor)
- 95.5% Efficient Furnace: \$3,200 Installed
- PV with Battery Backup: (2006/2007 prices)

Total: ~ \$ 67,000 (Plus PV) Over 16 years

(~<u>\$4000 / year</u> + PV)

- To Energy-Convert beyond Net Zero, PLUS
- Add 13 Multi- Functional Rooms 1,300 Sq Ft
- Get <u>Comfort</u> beyond Belief
- Save Transport Fuel for Life
- Save Home Fuel For Life
- Save Major Food Expense For Life
- Do My <u>DUTY</u> to Grandchildren, Country, And Nature to Use what the "Sun God" Provides!

Alternative Budget Allocations for ~ \$4,000 / year

• \$4,015 / yr. Gets 2 Packs Cigarettes / Day

• \$4,380 / yr. Gets 1 Cocktail / Day in LA

- \$2,591 / yr. Gets 2 Starbucks Grand Lattes/Day
- \$1,043 Gets a 7 day Vail Lift Ticket
- \$497 to 1,435 A 7 day Tour Pack: Den Vegas

ETHICS DO NOT REQUIRE ECONOMIC JUSTIFICATION !

- BUT, I do get a **Better R.O.I.** from a **Negative Carbon Score** than a
 - Low Golf Handicap... Or a
 - Coffee Buzz or a
 - High Bowling Average ... or a
 - Big Beer Belly,
 - Smokers Lungs,
 - DWI Tickets, Lawyers fees
 - Drug Addiction,
 - Gambling Habit at Las Vegas
 - Or MANY LESS LEGAL ACTIVITIES ...

• Personal Priorities <u>need to align</u> with Future Realities

Added 13 Multi- Functional Rooms

- Gymnasium (23 x 6.5) with built in TV
- Conference Room (25 x 10) with built in TV
- Large Workshop (13 x 19) (growing Citrus)
- Small Workshop (13 x 6) and Root Cellar
- Green House (22 x 6.5) Growing More Citrus.
- 2nd Workshop (and "Root Cellar" 6 x 13)
- Solar Food Dehydrator (Walk In 14 by 7)
- Solar Clothes Dryer (Walk In 20 by 3)
- Bike and Outdoor Sports Equipment Room (6 by 6)
- Potting Shed (6 x 8)
- 40 ft Solar Promenade.. W Tool and Elect & PV
- 8 "Air Lock" Entries...as shared functions.

Added 13 Multi- Functional Rooms

- All Officially "Enclosed Porches"
- All <u>"Unconditioned Spaces</u>"
 Not "Fossil Fuel Heated"
- Most are "Conditioning Spaces"
 - They Heat the House... when the Sun shines.
 - <u>They Buffer the House</u> When the Sun Does Not Shine.
- As "Unconditioned Spaces": Lower Tax Assessment
- Most Act As "Air Locks" Preventing Drafts.
- Some are "Air Locks on Air Locks"

Since I Don't use Tobacco, Caffeine, Alcohol, Drugs or Gamble, Play Golf

- And only 1 of these 3
 \$65 K savings was needed to Do The House Conversions...
- The other 2 of the
 \$ 65K savings could
 Buy the Tesla Model X
 with Full Autonomous
 Driving, Free Lifetime
 ³³⁸Super Charging, Etc.

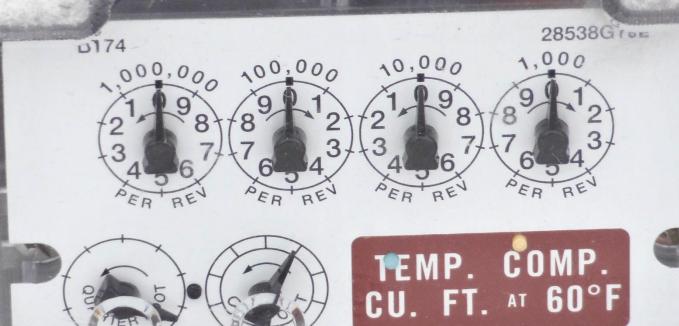




Public Service starts to Doubt the Gas Meter – Or Doubt Me ?!? And <u>Replaces</u> it – <u>Without Notice !</u> 8/28/2014!

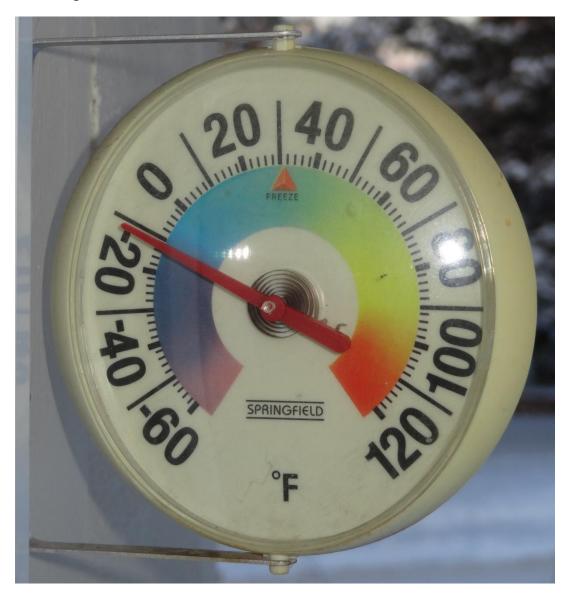


Wednesday 11/12/14 PM 64 Deg F inside / <u>Minus 3 F Outside</u>



DO NOT PAINT

Thursday Nov 13, 2014 6:30 AM



Thursday Nov 13, 2014 6:30 AM



How?



* Insulation, Sealing, Layering & * Withdrawal from "Solar Bank" of PV Electric "Currency" – to Bake a Turkey and Pumpkin Pies – Heating the House with the Waste Oven Heat.

Used Banked SURPLUS Solar Electricity To Bake Turkey and Pumpkin Pies

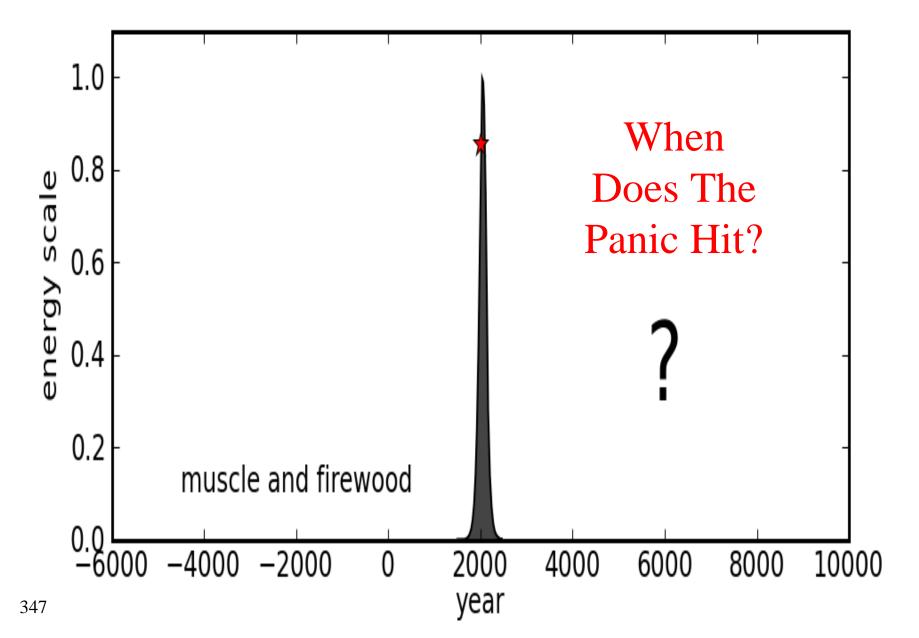


CATCH IT, AND KEEP IT

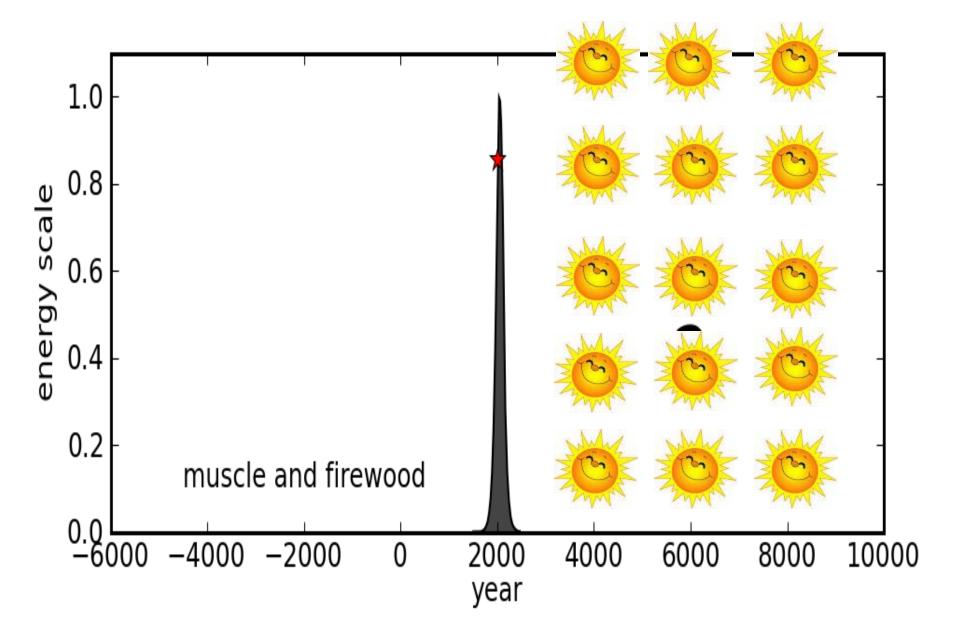
... AND SOAR !



Another Angle – Energy Security



Catch It, Damn It ! (And KEEP IT !)



"FOR THE SAKE OF OUR CHILDREN AND OUR FUTURE, WE MUST DO MORE TO COMBAT CLIMATE CHANGE.

The fact is, the 12 hottest years on record have all come in the last 15. We can choose to believe that Superstorm Sandy, and the most severe droughts in decades, and the worst wildfires some states have ever seen were all just a freak coincidence. Or we can choose to believe in the overwhelming judgment of science - AND ACT BEFORE IT'S TOO LATE."

DAVID SUZUKI

There are some things in the world we can't change -gravity, entropy, the speed of light, and our biological nature that requires clean air, clean water, clean soil, clean energy and biodiversity for our health and well being. Protecting the biosphere should be our highest priority or else we sicken and die. Other things, like capitalism, free enterprise, the economy, currency, the market, are not forces of nature, we invented them. They are not immutable and we can change them. It makes no sense to elevate economics above the biosphere.

350



- 1. There is NO Greater Civil Right than the Right to a Livable Planet
- 2. BEING <u>ETHICAL</u> <u>DOES NOT REQUIRE</u> ECONOMIC JUSTIFICATION !
- 3. <u>Thermal Glide Path (PassivHaus)</u> and Thermal Lift (Passive Solar)
- 4. "Catch it and Keep It"
- 5. Systematic Application of Low Technology High Payoff
- 6. "Insulation is Sexy"
- 7. "Adopt Orphans" Houses, Materials Low Embodied Energy
- 8. Only Patriotic Energy Policy: One Rooted in the Sun
- 9. "Cycle Recycled Cycles": Low Embodied Energy
- 10. Food Delivery "Farm to Table by Foot"- Grow Your Own
- 11. Do "Nibble Jobs"
- **‡2.** An Efficient House is a Comfortable House

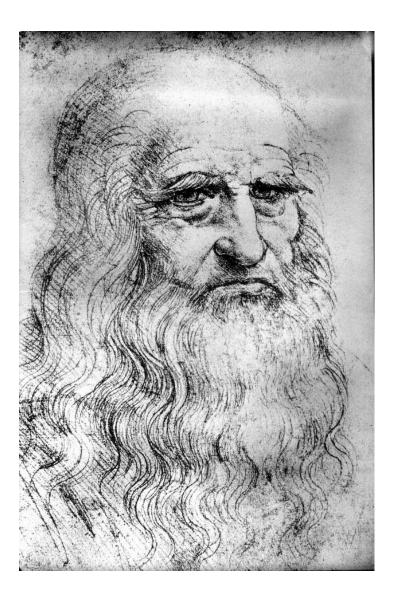


Post Scripts

Post Script 1 : Water

Related to Energy ... & As We Saw, Nature / Life / Earth / Climate in Many Ways

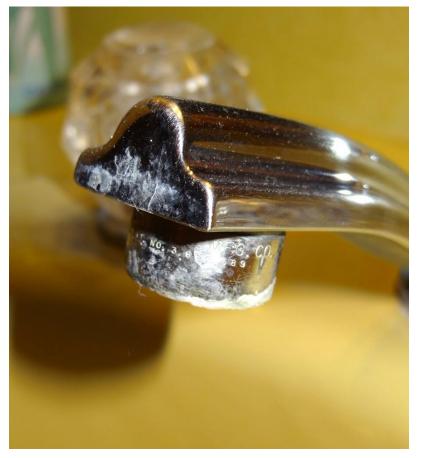
Leonardo da Vinci



"Water is the driving force of all nature."

I Add: Water is what allowed the Phanerozoic Aeon to Develop Life ... and the Holocene to Evolve Human Life

Goal: Cutting Water Use 50 %



- Always think "Less H₂O"
- Source H₂O from the Sky rather than from Rivers or Groundwater
- Use and Return H2O to its natural flow path (Just Borrow it).

Cutting "City Water" Use 50 %



- Low Flow Shower Heads
- Shorter Showers
- Low Water Toilets
- Low Flow Faucets
- *Less Lawn*, More Veggie Gardens, Grapes. Peaches
- Using Rainwater sourced from the Sky for Orchard, Gardens and Vineyard.

Source H₂O From the Sky



- Your **Downspouts** are a resource
- You have been allowed to **"Detain" but not "Retain"** rain water (Colorado). Call it:

"<u>Catch And Release</u>"...

• When you Release the "Detained" water, it can do good ... Nourishing Veggies and Fruit!

Recycled Water *Detention* Tanks



- **3** Dairy "Teat Wash" tanks: Each 275 gal
 - Total **Detainment** capacity: **825 Gal**
 - When you let it go on its way, it waters food crops as it goes.

Avoid Use of Stream Sourced Drinking Water for Outdoor plants (Chlorine/ Energy).

Distribution of **Detained** Water



- 2 inch Manifold connects to Spigot
- Pails deliver water to Fruit Trees, Grape Vines, Berries, & Veggies...
-By foot
- ... In the natural flow path.

Post Script 2:

Why Not "Solar Thermal" Hot Water For My Retrofit

What About Solar Hot Water Panels?



- <u>The "Hot Water Panel "</u>
 - Currency has LOW
 - "Fungibility score"
- <u>& Low "End to End"</u> efficiency.

 "RENEWABLE" is an Important Word.. But <u>Not A</u> <u>Magic Word</u> I will Support Solar Thermal Hot Water When Hot Water can:

- Mow my Lawn
- Power my TV
- Light my Home at Night
- Run My Cars
- Cool My Home in Summer
- Run My Energy Recovery Ventilator IN AN ENERGY RETROFIT HOME ...

I.E. When it is Fungible !!!

Alternate Title Slides:

HOW TO Fight the "SLOW Climate APOCALYPSE"

... a *Personal* Sustainable Energy Program



The Ethics, Principles and Practice of Personal Sustainability – BEYOND NET ZERO

