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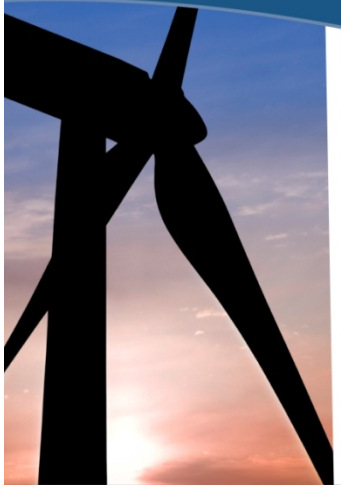
www.govenergy.gov

The Premier Energy Training Workshop
and Trade Show for Federal Agencies

A River of Energy Solutions



Duke Energy Convention Center

Cincinnati, Ohio

August 7–10, 2011

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SOLAR

MADE *EASY*

SOLAR PROJECT DEVELOPMENT

Immediate and *Long* Lasting Benefits

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Why should we care?

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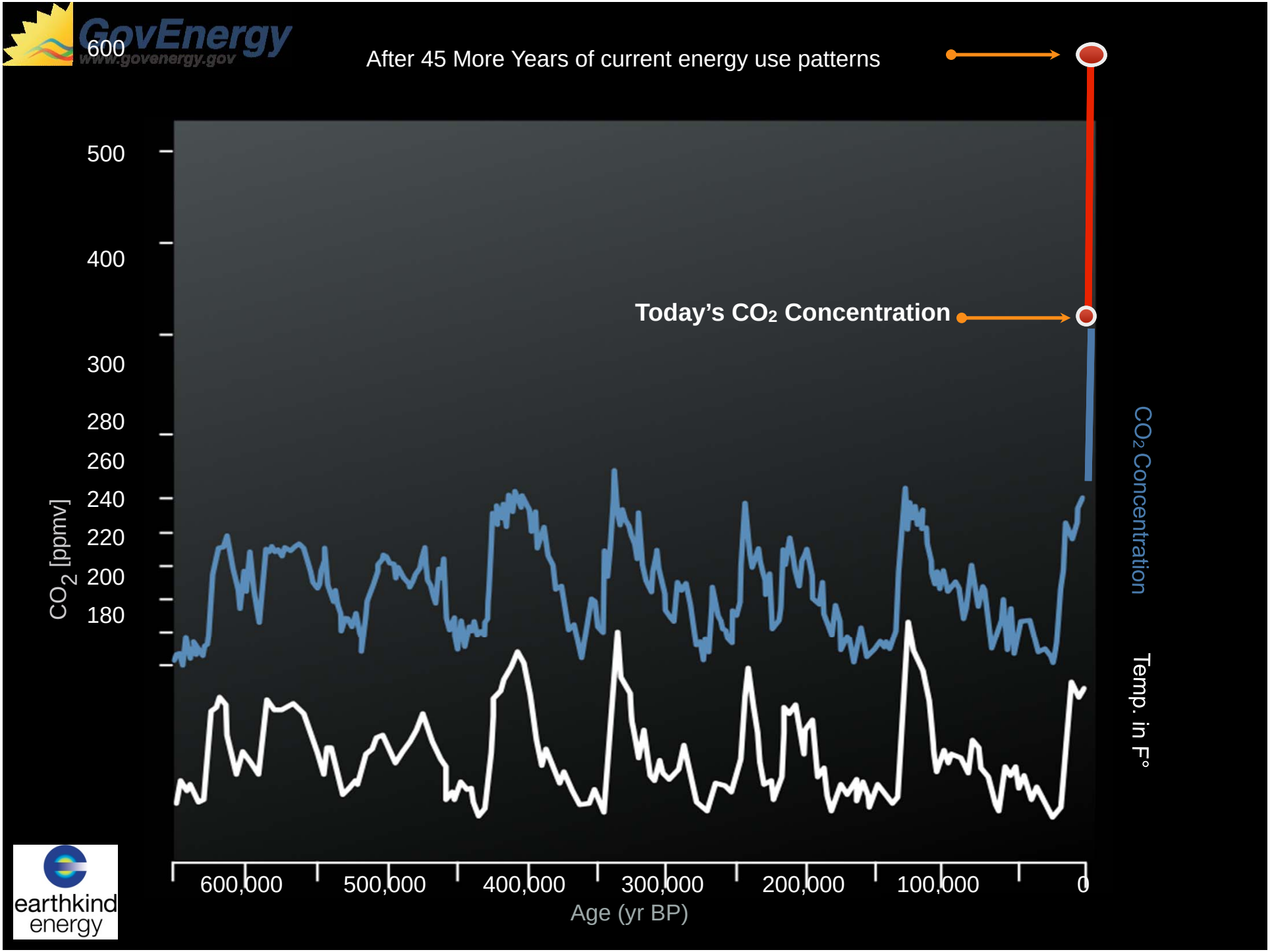
energy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After 45 More Years of current energy use patterns
Today's CO_2 Concentration
600
500
400
300
280
260
240
220
200
180
CO_2 [ppmv]
CO_2 Concentration
Temp. in F°
600,000
500,000
400,000
300,000
200,000
100,000
0
Age (yr BP)
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The Ten Hottest Years on Record

2010 2005 2009 2007 1998

2002 2003 2006 2004 2001

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May 4, 2011

277 Tornados

Where does the largest percentage of CO_2 Emissions come from in NYC?

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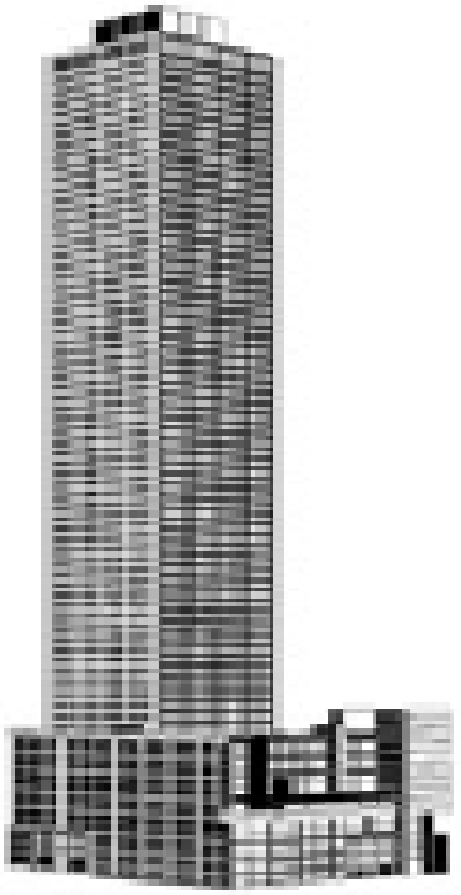


CO2 Emissions Transportation:

21%

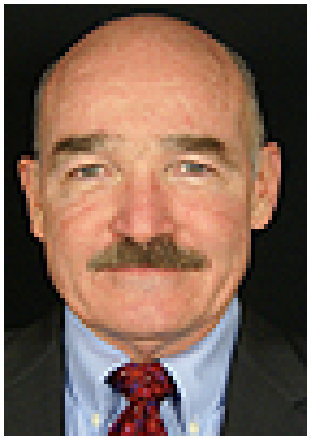
CO2 Emissions from Buildings:

79%

51%

of All NYC Buildings Emissions are from Heat and Hot Water Usage

ACORE 2010 Conference
Renewable Energy Phase II



US Navy Vice Admiral

Dennis McGinn

(Retired)

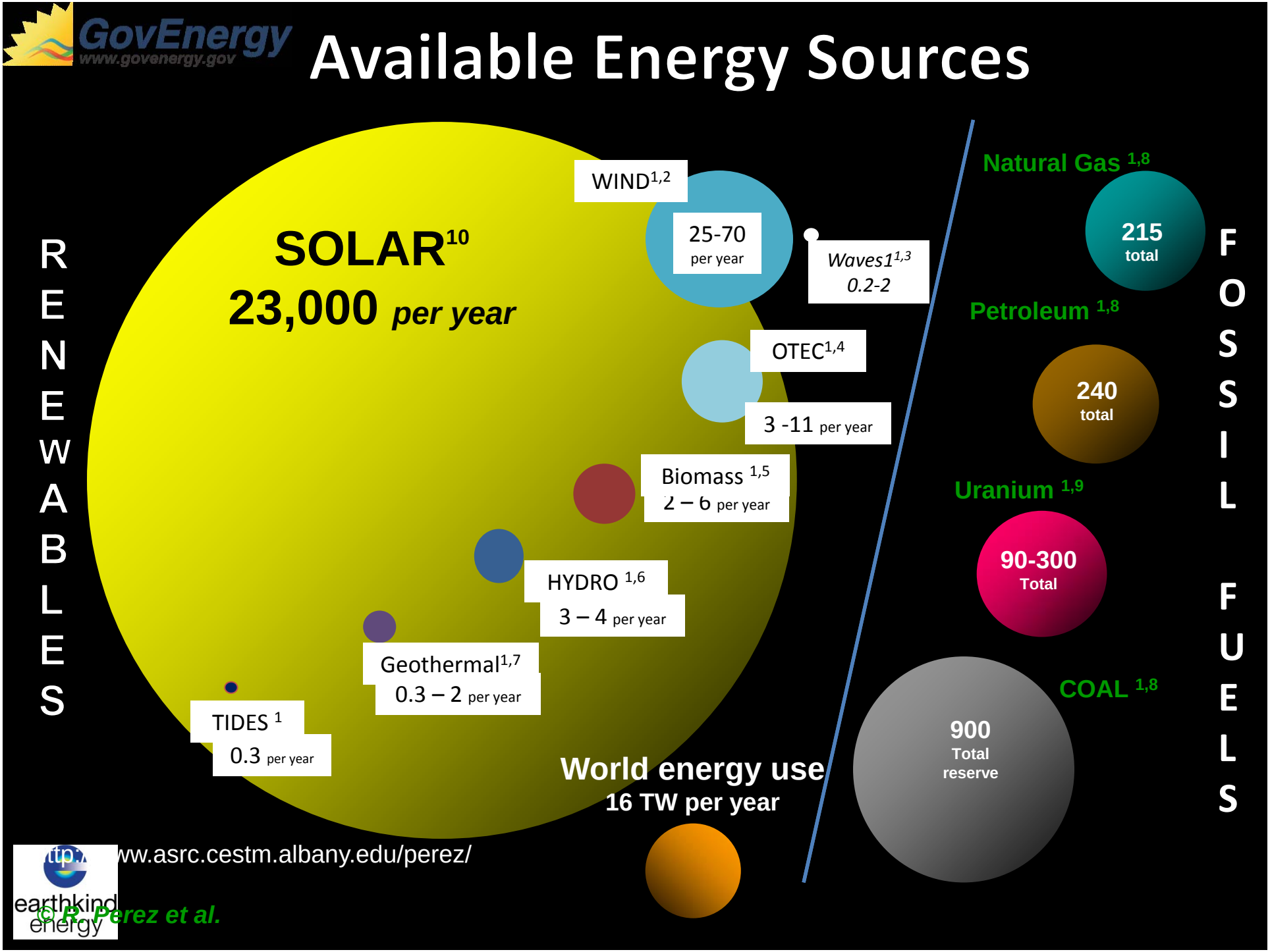
- **National Security**
- **Jobs**

“ I'D PUT MY MONEY ON THE SUN AND SOLAR ENERGY.

WHAT A SOURCE OF POWER!

I HOPE WE DON'T HAVE TO WAIT TILL OIL AND COAL RUN OUT BEFORE WE TACKLE THAT.“

-THOMAS EDISON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Available Energy Sources
RENEWABLES
FOSSIL FUELS
SOLAR[10]
23,000 per year
WIND[1,2]
25-70
per year
Waves1[1,3]
0.2-2
OTEC[1,4]
3 -11 per year
Biomass [1,5]
2 – 6 per year
HYDRO [1,6]
3 – 4 per year
Geothermal[1,7]
0.3 – 2 per year
TIDES [1]
0.3 per year
Natural Gas [1,8]
215
total
Petroleum [1,8]
240
total
Uranium [1,9]
90-300
Total
COAL [1,8]
900
Total
reserve
World energy use
16 TW per year
http://www.asrc.cestm.albany.edu/perez/
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Commercial water heating prices

Energy source	Fuel price/therm	Approximate efficiency (%)	Levelized cost/therm (price x efficiency)
Electricity	$ 3.43	98	$ 3.49
Fuel oil	$ 2.04	78	$ 2.61
Natural gas	$ 1.15	78	$ 1.47
Solar thermal (no incentives, small system)	n/a	70	$ 1.62

Sources: Conventional energy source prices for 2010 from EIA. Solar estimate from California Center for Sustainable Energy, based on residential systems installed in California through early 2009, not inflation adjusted.

AltaTerra
RESEARCH NETWORK

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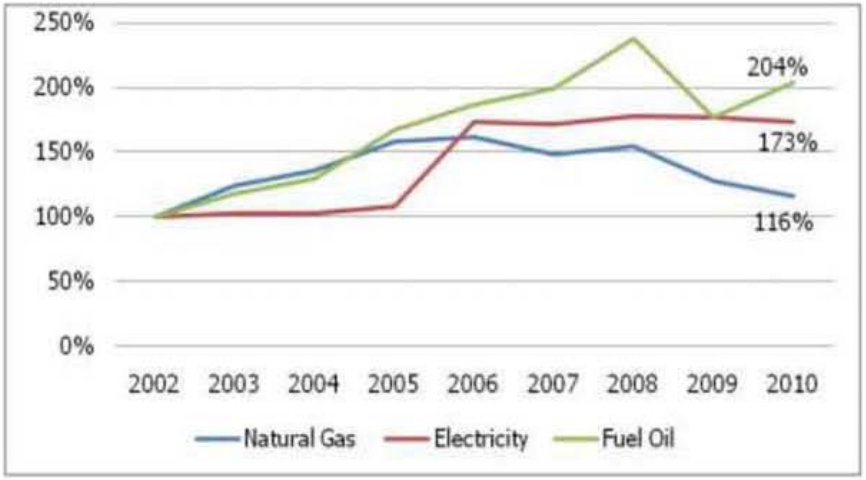
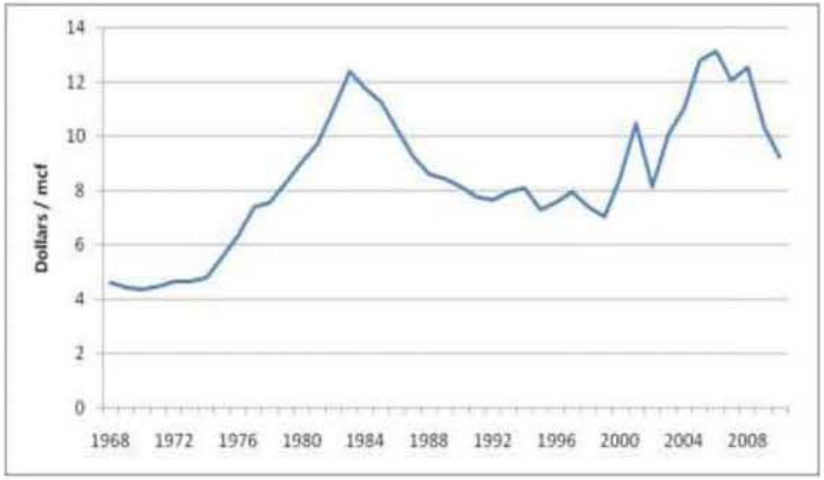
Hedging against volatile energy prices

Relative Commercial Real Energy Prices: 2002–2010



Commercial End-User Natural Gas Prices: 1967–2010 ($/mcf)



Source: AltaTerra Research analysis of data from EIA. Prices relative to energy source, adjusted for inflation.

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Environmental Responsibility

- More organizations with energy reduction or renewable energy goals
- Federal and military renewable energy goals
  - Federal facilities must receive 7.5% of energy from RE by 2013
  - Military facilities must receive 25% of energy from RE by 2025
- 70 companies participating in EPA Green Power Program
- 50%+ of colleges have signed Presidents' Climate Commitment

Green Building Certifications

Leadership in Energy and Environmental Design	Energy Star for commercial buildings
Points-based rating system for environmentally responsible buildings.	Energy performance benchmarking tool. Buildings with 75+ points eligible for certification
10 points available for SWH – one for each 3.5% increase in EE	SWH reduces energy use and helps buildings to qualify for certification
5 ft^2 billion+ of commercial building space by April 2009	9,000+ commercial buildings by end of 2009

By harnessing the power of the sun, Frito-Lay can do what's best for the planet and the business, and obtain LEED certification along the way.

- George Guck, Frito-Lay

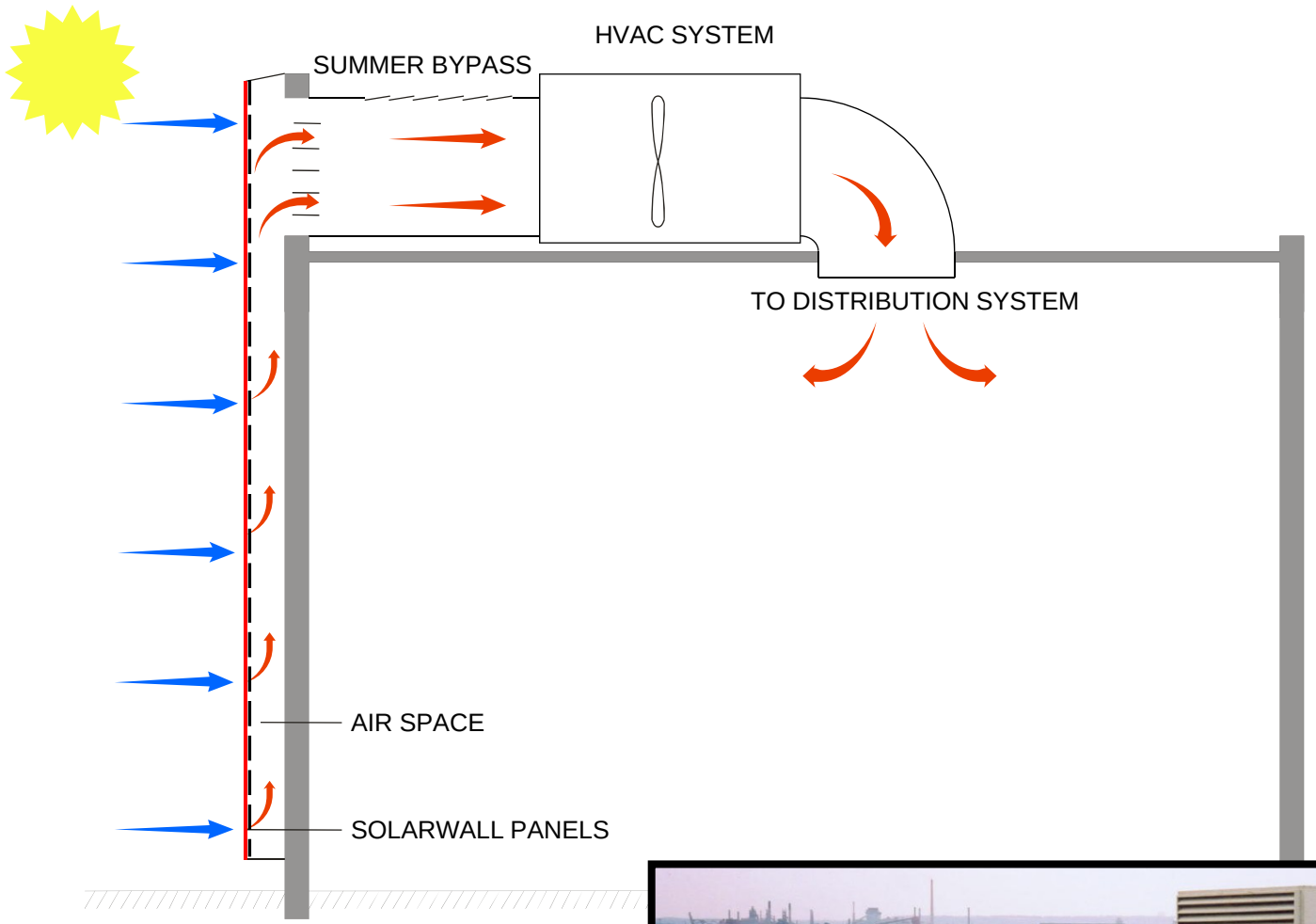
Solar Air Heating

Distribution Centers

Municipal Offices & Retail

Solar Wall

HVAC Pre-Heat



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Browse SolarWall® Case Studies by Location on Google Maps

SolarWall systems have been installed in thousands of applications around the world. Browse our case studies using Google Maps below. Other ways to view our case studies in a **dynamic table** (http://solarwall.com/en/case-histories/search-and-filter-cases.php) or **browse by category** (http://solarwall.com/en/case-histories.php) .

Legend: = SolarWall System = SolarWall Crop / Process Drying System = SolarWall PV/T System

Case Categories: **SolarDuct** (http://solarwall.com/en/case-histories.php#system) | **SolarWall** (http://solarwall.com/en/case-histories.php?dgp=1) | **SolarWall Agriculture & Process Drying** (http://solarwall.com/en/case-histories.php?dgp=62) | **SolarWall PV/T** (http://solarwall.com/en/case-histories.php?dgp=76)

Fort Drum

4 MWs Solar Air Heating

2,000 TONS of CO2

per Year

Fort Drum

Largest collection of solar air heated buildings in the world

- **50 SolarWall® heating systems installed on 27 buildings**
- **110,000 square feet (10,220 m2) of SolarWall® panels**
- **300,000 cfm (510,000 m3/h) of air heated with 99 fans**
- **Fuel savings of 44,000 million BTU/h (46,000 GJ) per year**

Best Solar Hot Water Opportunities

- Use large amounts of hot water
- Relatively Consistent Hot Water Demand
- High water heating Cost
- Water Temperature 100 – 180^0 F
- Good Solar Resource
- Available Space on Roof or Ground
- Use hot water mostly when sun is shining
  (or able to site larger storage capacity)

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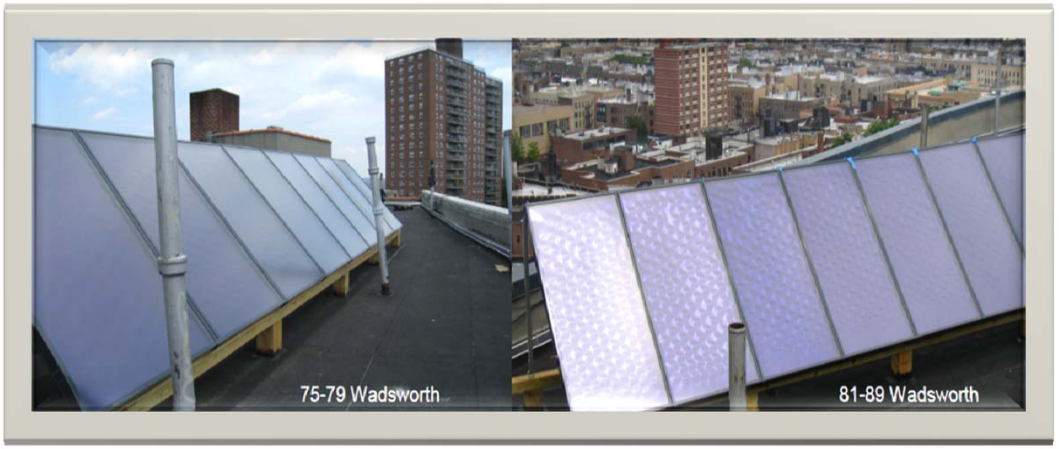
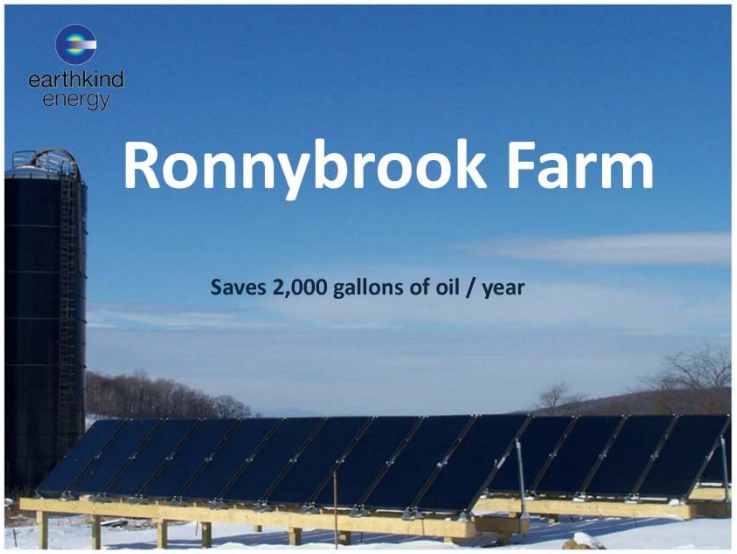
State U of NY @ Binghamton

Wadsworth Terrace Multi-family Housing

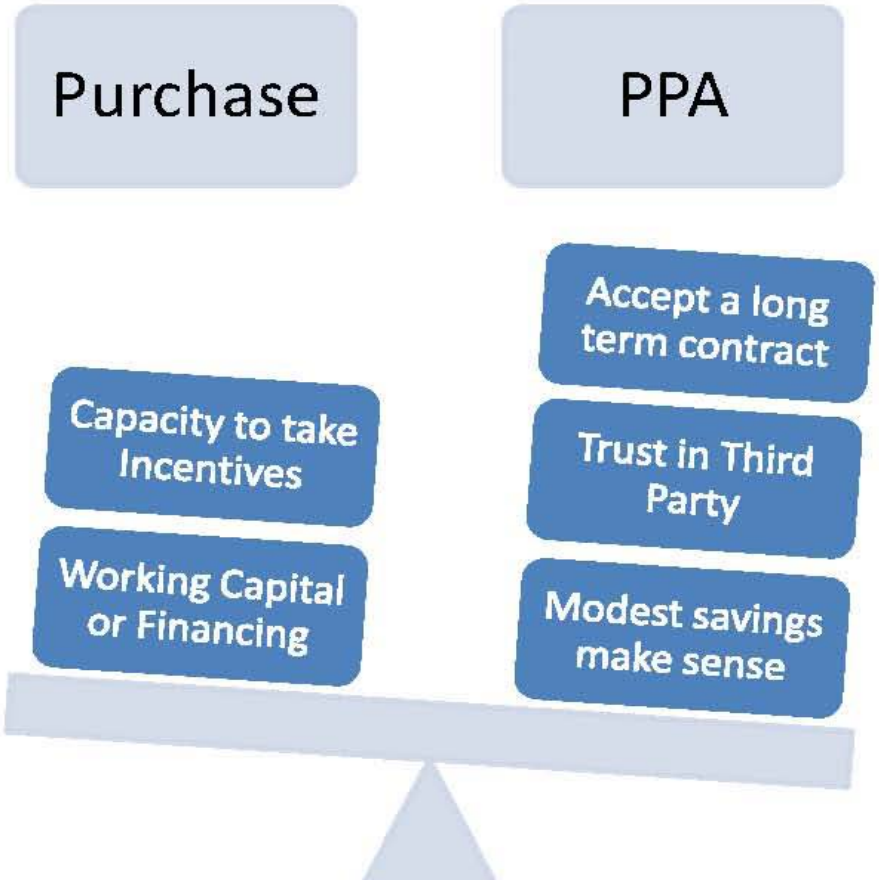


Benedictine Hospital



Armed Forces Reserve Center, Mt. Carmel, TN

Type of System: Solar Hot Water for domestic and radiant floor
Size: 36 Flat Plate Collectors with Radiant Floor system


Purchase
PPA
Capacity to take Incentives
Working Capital or Financing
Accept a long term contract
Trust in Third Party
Modest savings make sense

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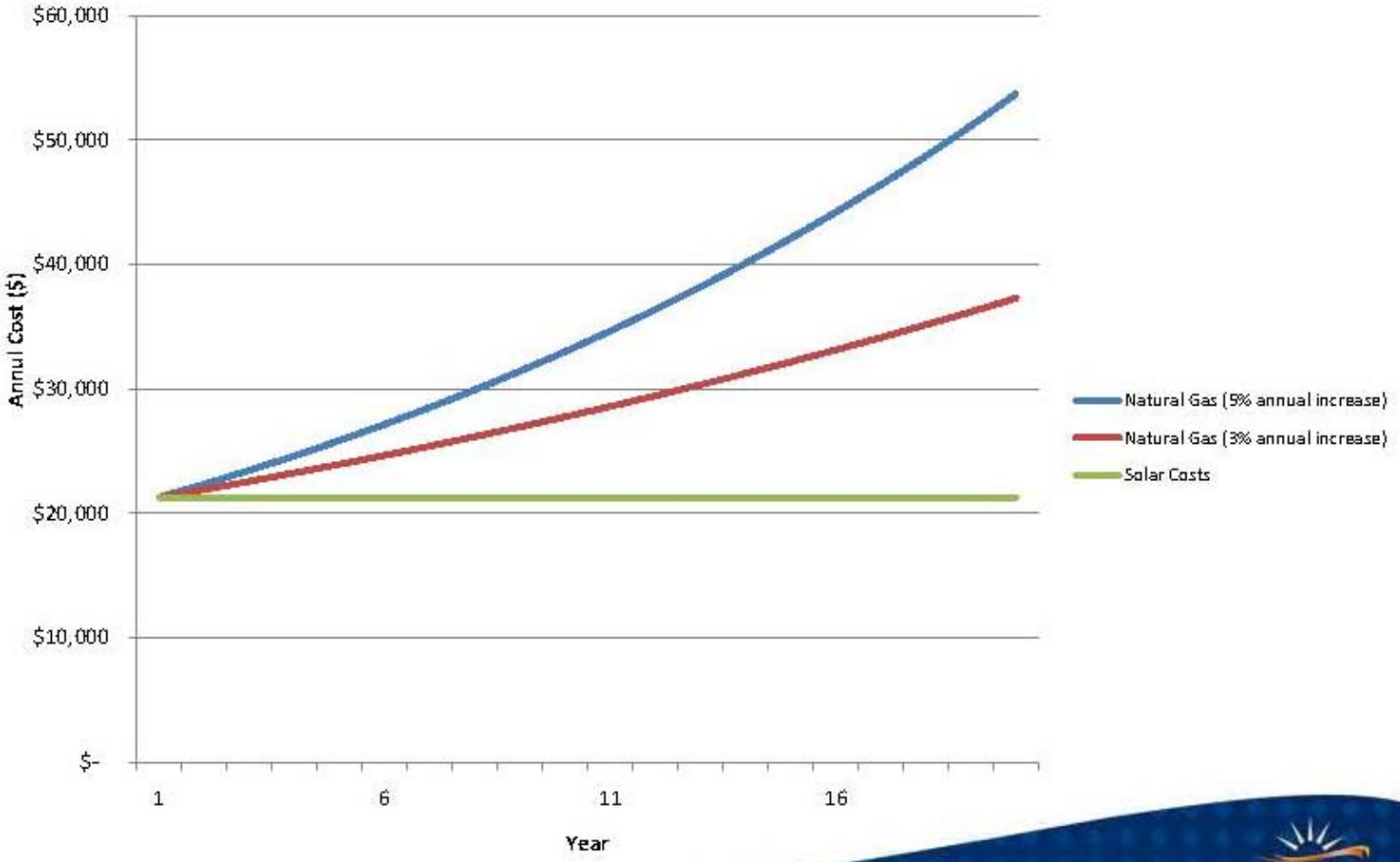
Savings of Solar vs Natural Gas

Based on Given Amount of Hot Water



FLS ENERGY

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Camp Lejeune Barracks & Housing
Jacksonville, NC

- 900 Homes
- $6 million Capital Investment
- 12 year PPA
- 20 percent lower than the cost of purchasing the electricity off the grid.

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Hyatt Regency Scottsdale Resort and Spa

"One of the nations largest solar hot water systems built for a hotel"

- 12,000 SF hot water solar system installed on the ballroom roof and 3,000 SF on the main hotel roof
- 20,000 gallon thermal energy storage tank
- The system generates 52,600 therms or 526 million BTUs of heat
- More than 156 metric tons of carbon dioxide will be offset (greenhouse gases)
- Installed in 2 phases over 2 years

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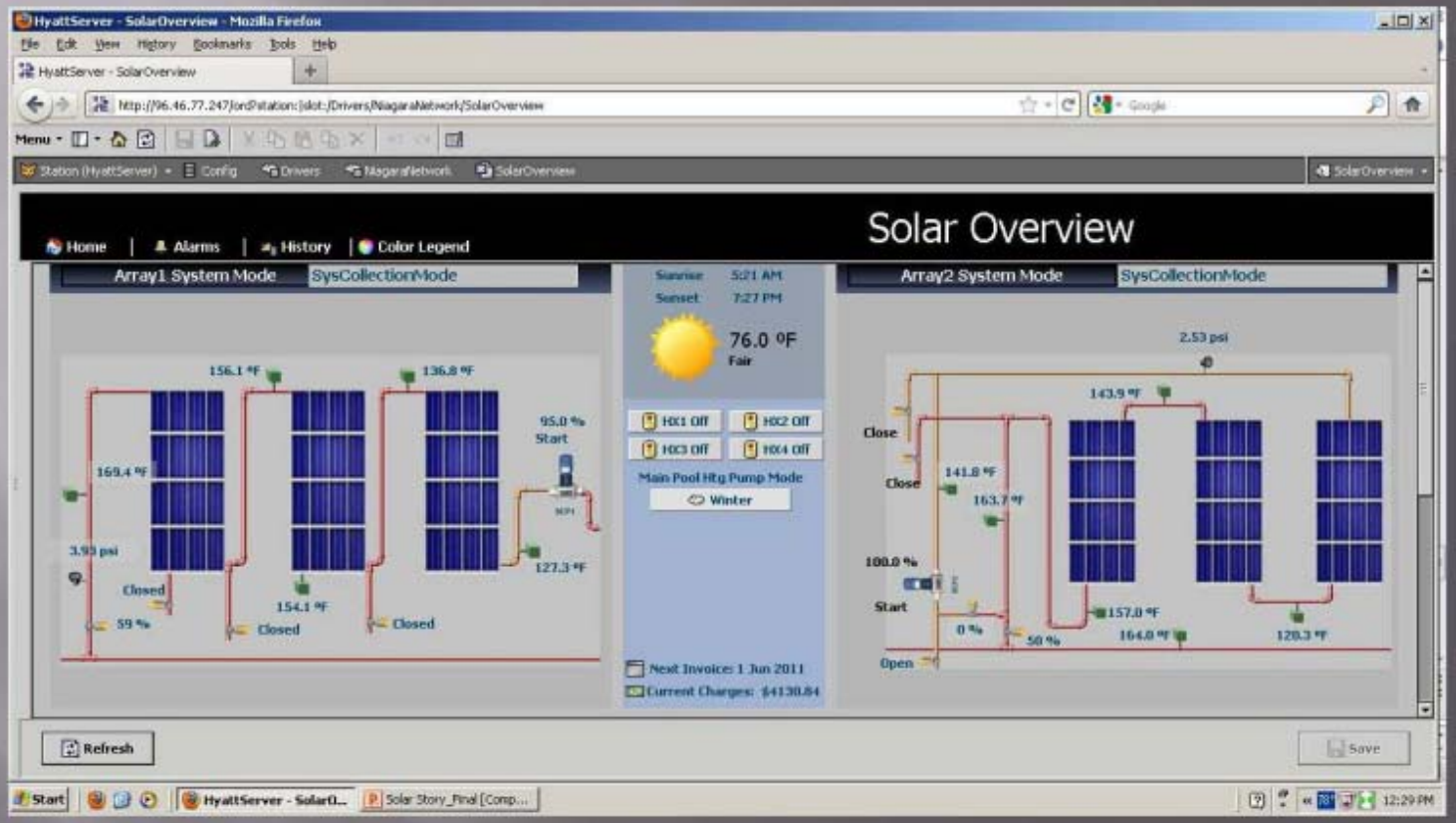
Building Automation System



Tridium BACnet open-protocol control network
This view depicts arrays 1 and 2

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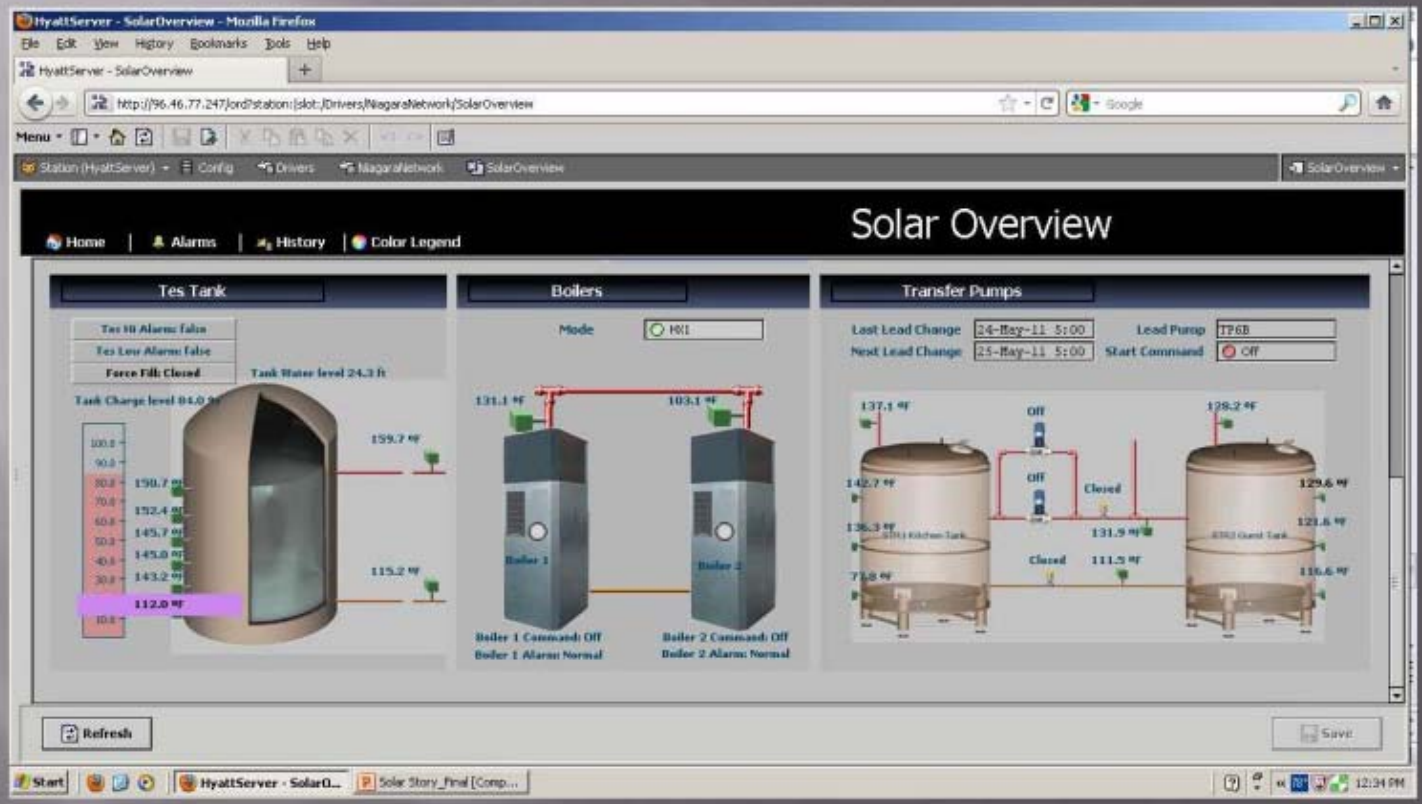
Building Automation Controls



This view depicts TES tank, back-up boilers and hot water tanks

Solar Hot Water

1 Solar Hot Water Collector

20 Year Generation

@ 75 Gallons Oil / year

= ~1,500 Gallons of Oil

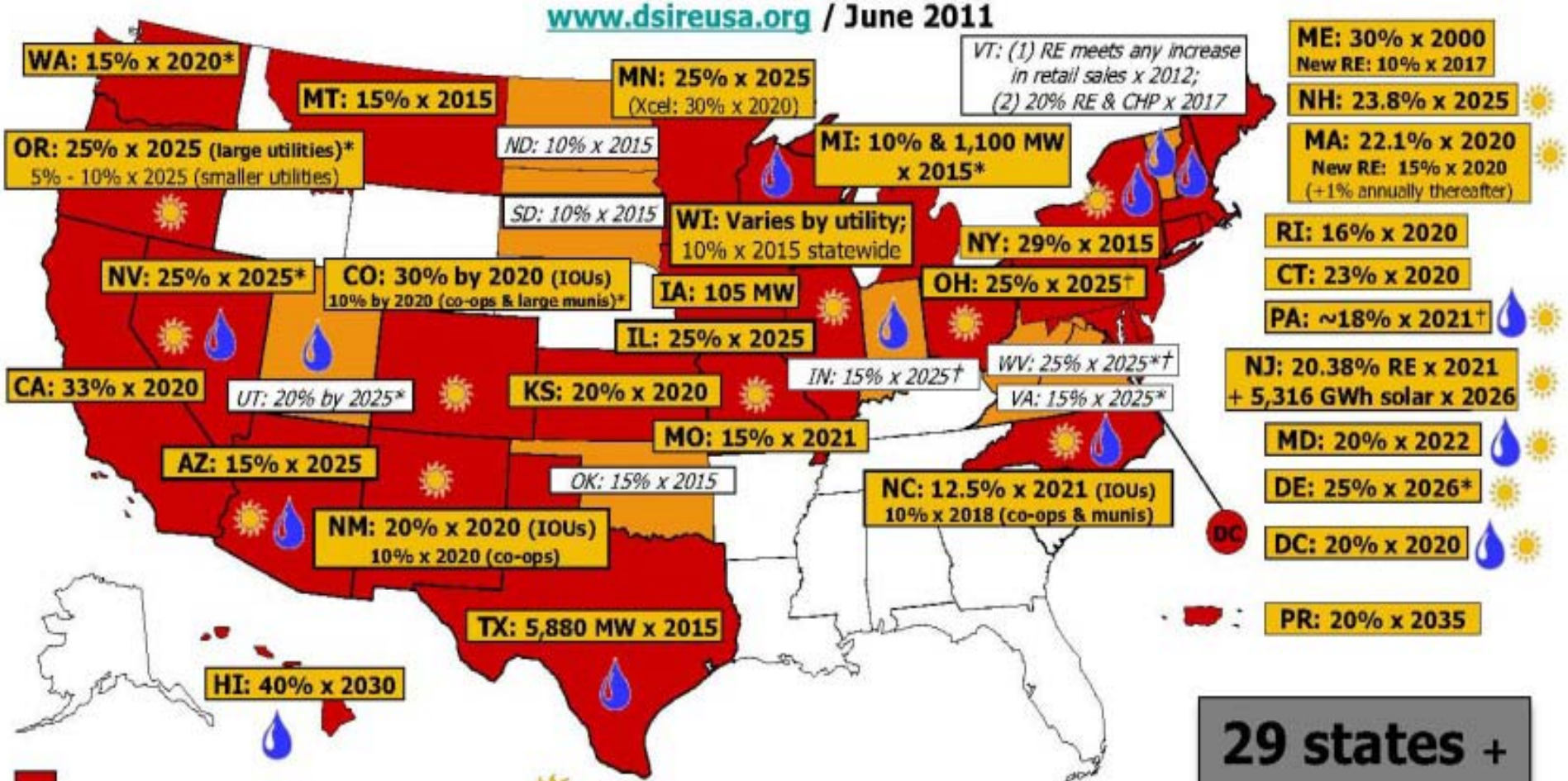
$2.67 per Gallon

for 20 Years

BEFORE Tax Credits & Other Incentives

RPS Policies

www.dsireusa.org / June 2011



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