

Aug 19th, 7:45 AM - 5:30 PM

## National Clean Energy Panel Presentations

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Tuesday, August 19th, 2008

NATIONAL CLEAN  
ENERGY SUMMIT





U.S. SENATOR  
HARRY REID

# NATIONAL CLEAN ENERGY SUMMIT



**NATIONAL CLEAN  
ENERGY SUMMIT**

# Rose McKinney James

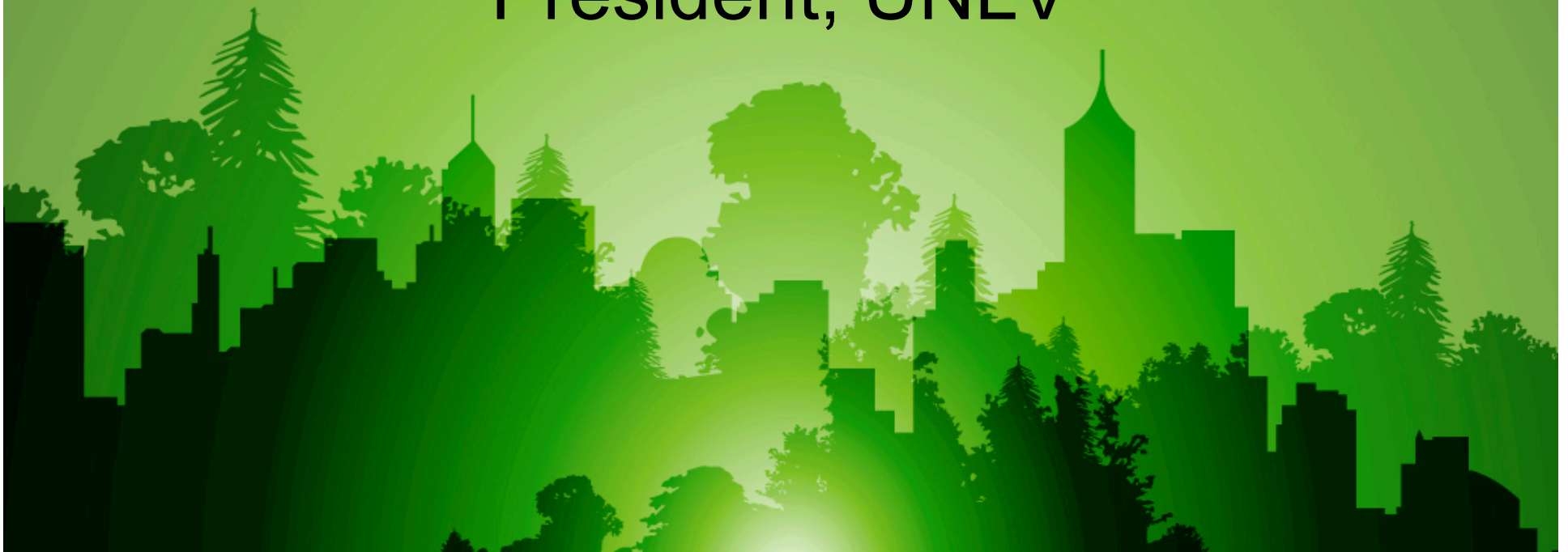
Energy Foundation





# NATIONAL CLEAN ENERGY SUMMIT

Dr. David B. Ashley  
President, UNLV





# NATIONAL CLEAN ENERGY SUMMIT

## John Podesta

President & CEO, Center for American Progress Action Fund





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**Nevada Senator Harry Reid**

United States Senate Majority Leader







U.S. SENATOR  
HARRY REID

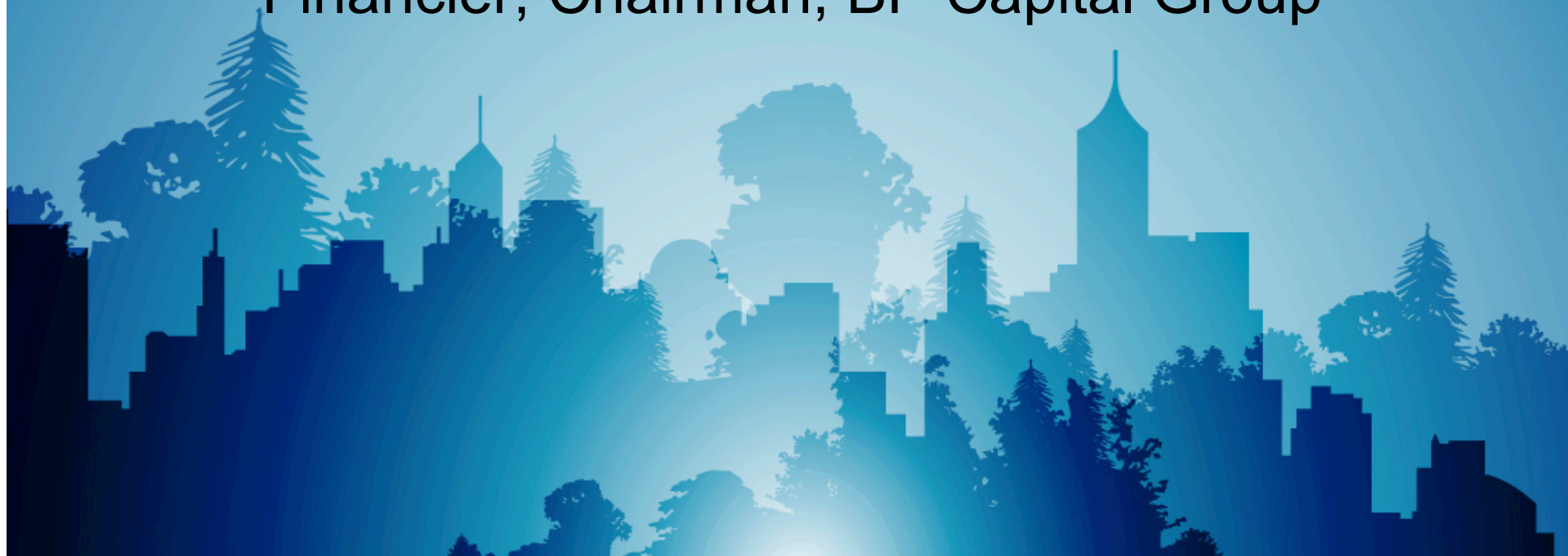
# NATIONAL CLEAN ENERGY SUMMIT



# NATIONAL CLEAN ENERGY SUMMIT

## T. Boone Pickens

Financier; Chairman, BP Capital Group







U.S. SENATOR  
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# NATIONAL CLEAN ENERGY SUMMIT



# Earning More by Using Less:

## Business, Efficiency, and Renewable Energy

- Moderator: Randolph Townsend, Nevada State Senator
- Governor Janet Napolitano, State of Arizona
- Jim Murren, President and COO, MGM Mirage
- Jon Creyts, Principal, McKinsey & Company
- Michael Yackira, President and CEO, Sierra Pacific Resources
- Rhone Resch, Executive Director, Solar Energy Industry Association

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# MGM MIRAGE™



Jim Murren - President & COO

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L A S V E G A S

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# CITYCENTER



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MGM MIRAGE™

ENERGY & ENVIRONMENTAL RESOURCES

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# ENERGY & ENVIRONMENTAL RESOURCE

## **Pilot Projects**

**Replaced 14,000 Light Fixtures in Resort Garages**

**Installed Variable Frequency Drives In Resort Central Plants**

**Savings - More Than \$5 Million & 50 Million kWh**

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# ENERGY SAVINGS AT CITYCENTER



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# ENERGY SAVINGS AT CITYCENTER

**Energy Savings = Annual Equivalent of 7,700 Homes**  
**Average Energy Performance 27% Beyond Code**  
**Co-Gen Plant Generates Nearly 1/3 CityCenter's Power**  
**50% Improvement in Lighting Energy Consumption**

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# ADVANCING THE MARKETPLACE



**90% of All Construction Waste  
Through Evergreen Recycling**

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ENERGY SUMMIT**



# ADVANCING THE MARKETPLACE



**Requiring High Design From Low Flow  
Fixtures**

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# ADVANCING THE MARKETPLACE

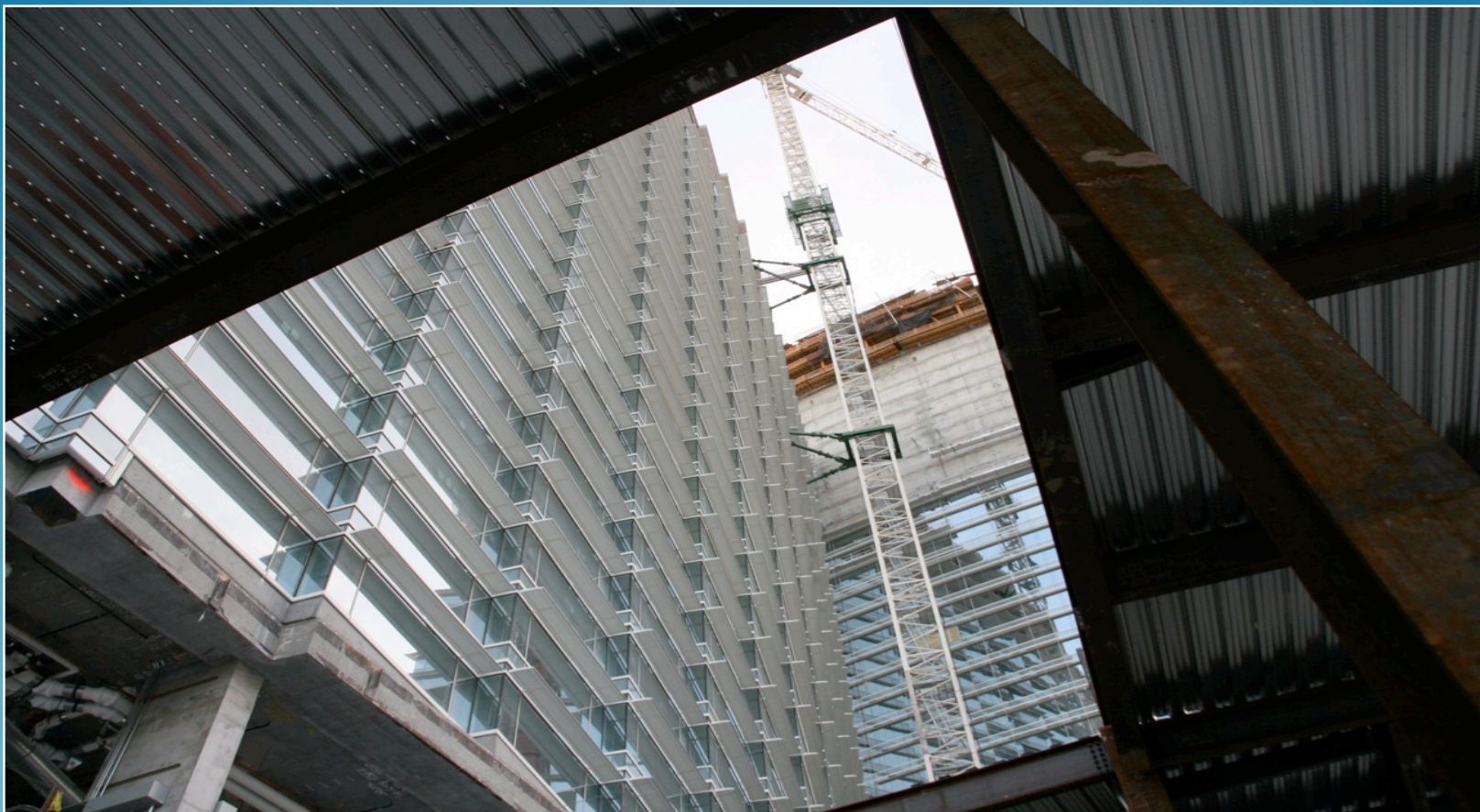


**Building Trades, Distributors, Craftsmen,  
Designers Learning Sustainable Methods at  
CityCenter**

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# ADVANCING THE MARKETPLACE



**Applying What We Learned at Our Own  
Resorts**

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# EXCALIBUR



**Implemented Cardboard Recycling Program  
& Cut Waste Removal Cost in Half**

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# MANDALAY BAY



**Convention Center Recycles 74% of  
All Waste From Trade Shows**

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# MGM GRAND LAS VEGAS



**Saved 2.6 Million kWh Over 12 Months From Installing  
Compact Fluorescent Lighting in The Parking Garage**

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# CIRCUS CIRCUS



**Cut Power Consumption 75% on The Iconic Marquee  
by Installing Cold Cathode Technology**

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# THE MIRAGE



**The Central Plant Has Saved 2.3 Million kWh Over a  
Three Month Period This Year - Enough to Power 200  
Homes**

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# MGM MIRAGE™

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# **Increasing the Energy and Carbon Productivity of the U.S. Economy**

**Jon Creyts, Principal, McKinsey & Company**

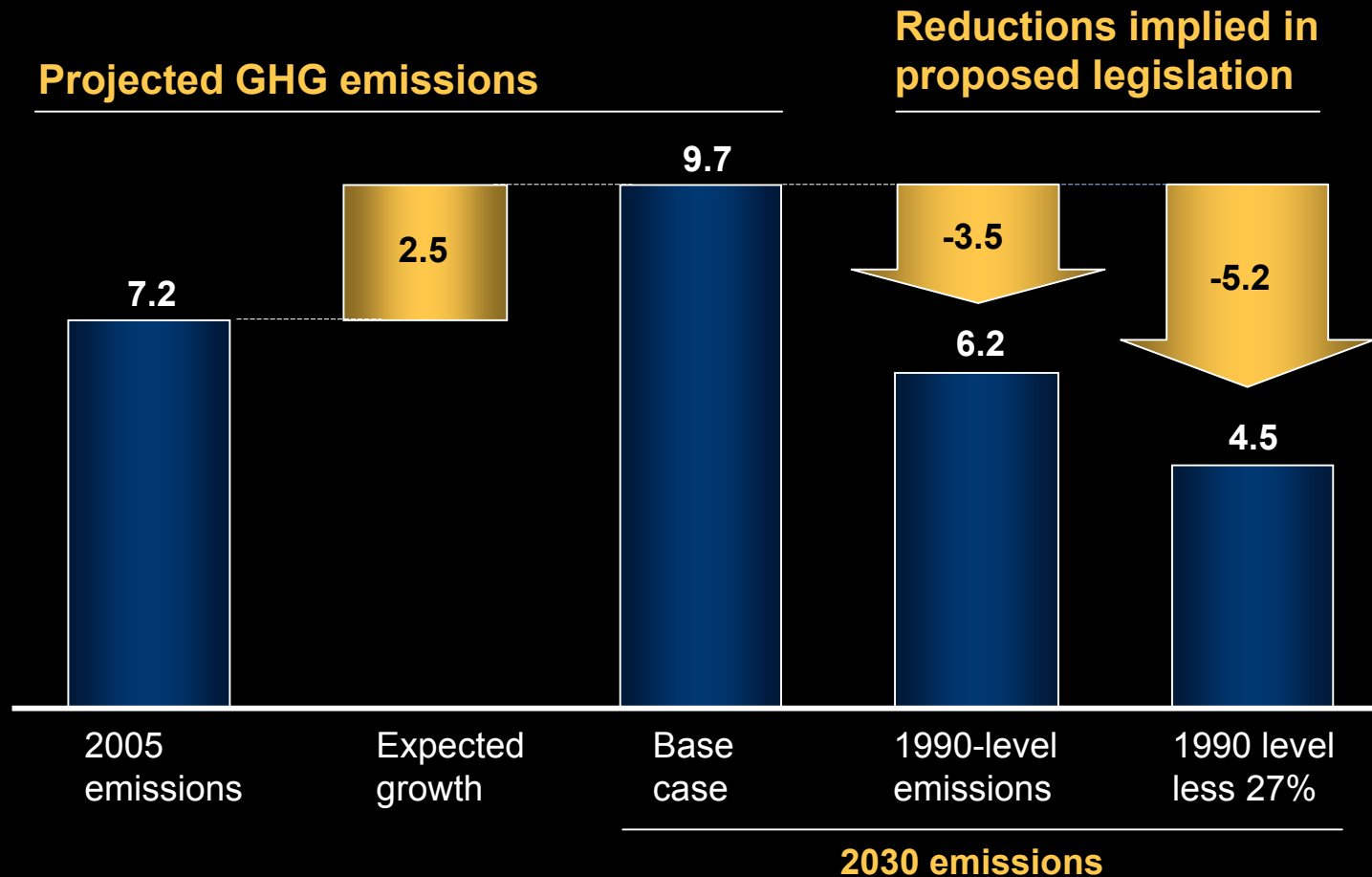
**August 19, 2008**

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# U.S. GHG emissions increasing at a time when reductions targeted

Gigatons CO<sub>2</sub>e





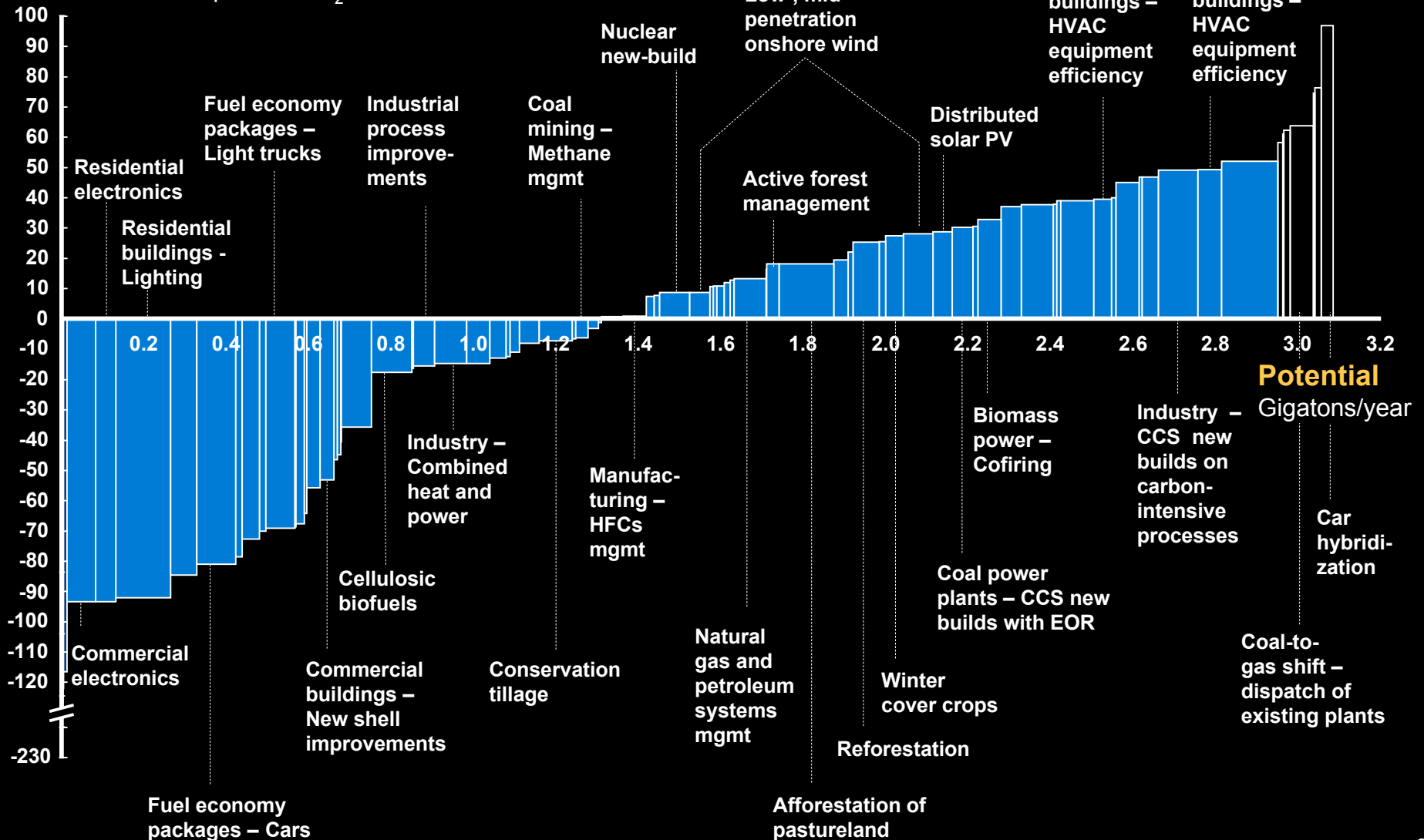
# 3.0 to 4.5 gigatons of GHG reduction possible with concerted action

MID-RANGE  
CASE – 2030

Abatement costs <\$50/ton

## Cost

Real 2005 dollars per ton CO<sub>2</sub>e



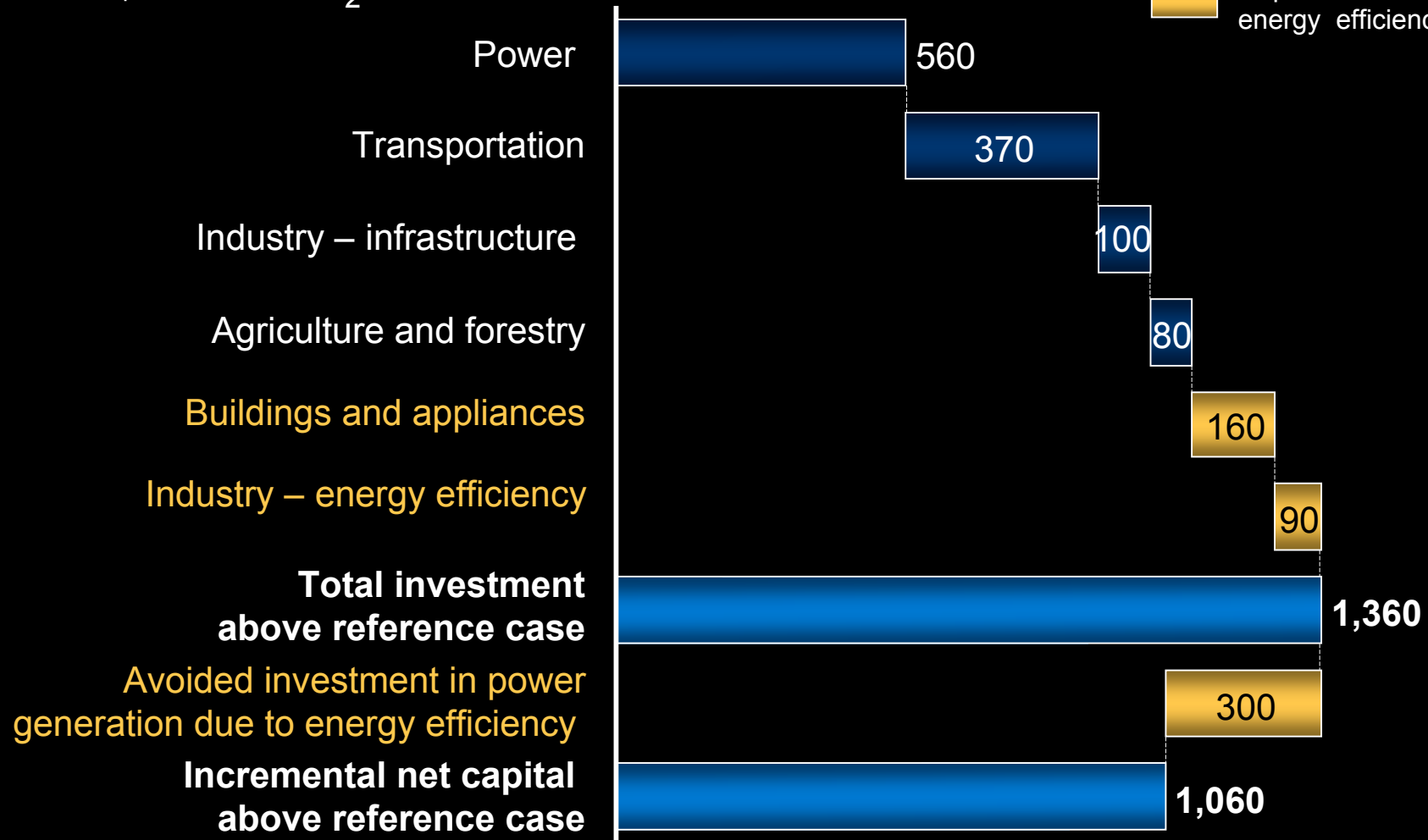


# Incremental capital investment required to unlock opportunities

Real 2005 \$ billions, cumulative through 2030;  
options <\$50/ton CO<sub>2</sub>e

MID-RANGE  
CASE – 2030

Capital flows due to  
energy efficiency

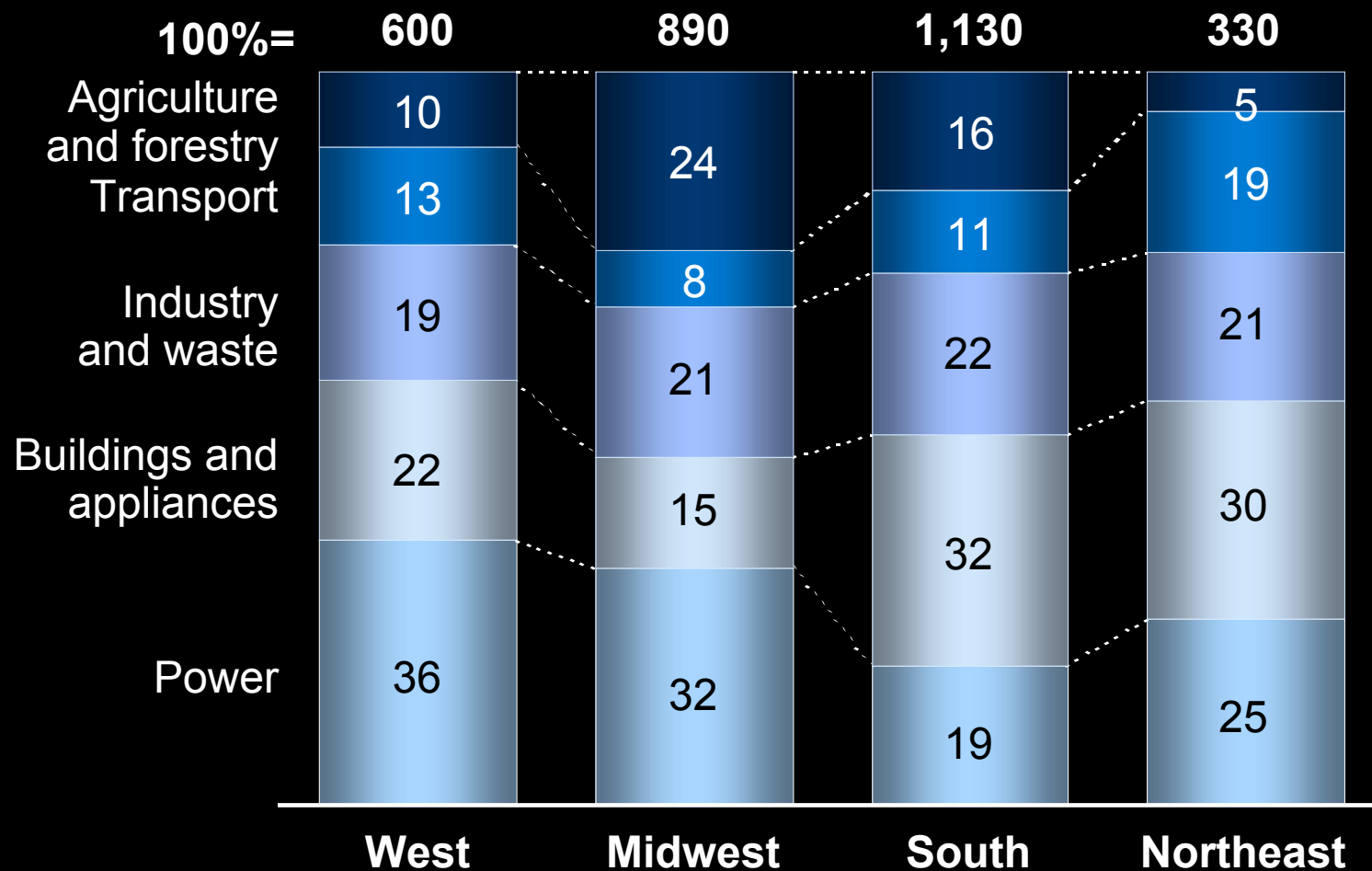




# Geographic differences in abatement potential by sector

MID-RANGE  
CASE – 2030

Percent, Megatons CO<sub>2</sub>e/year





# **Summary Conclusions (and Challenges)**

**Stimulate action through a portfolio of strong, coordinated policies to capture GHG reductions efficiently across industry sectors and geographies**

**Pursue energy efficiency and negative-cost options quickly**

**Accelerate development and deployment of a low-carbon energy infrastructure**

- **Encourage research and development of promising technologies and stimulate deployment**
- **Streamline approval and permitting procedures**





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# Nevada's Energy Outlook... **Cleaner**



**Michael W. Yackira**

*President & CEO, Sierra Pacific Resources*

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# Our Vision

To be the premier provider  
of energy for Nevada

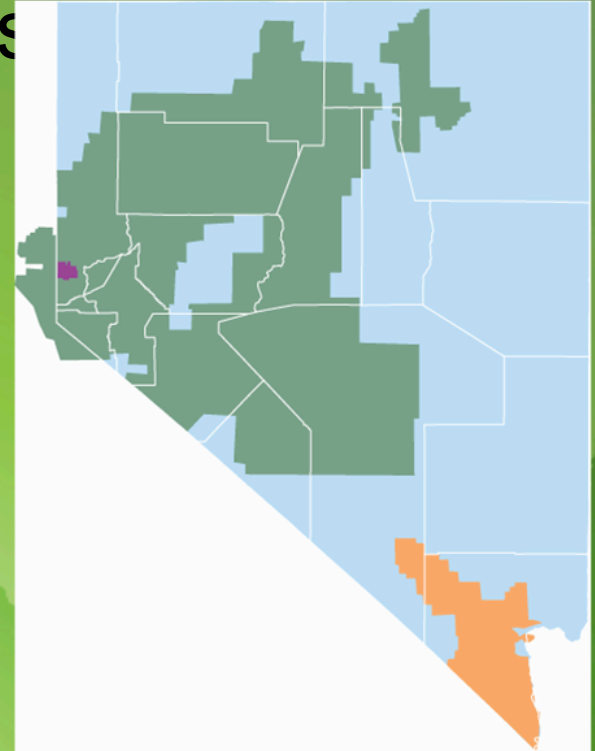


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# Nevada No. 1 in Growth

- No. 1 for 20 of 21 years
- Las Vegas, North Las Vegas & Henderson among the fastest growing cities in the U.S.



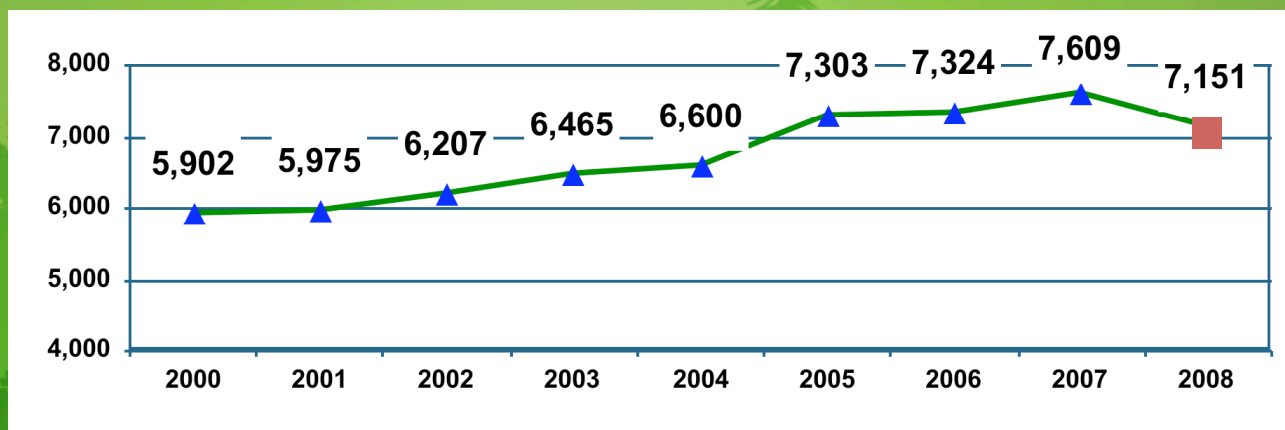
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# Growing Energy Demand



- Peak Demand to Date for 2008
  - Nevada Power: 5,504 MW
  - Sierra Pacific Power: 1,647 MW
- Record peak demand in 2007
  - Nevada Power: 5,866 MW
  - Sierra Pacific Power: 1,743 MW





# Three Part Energy Supply Strategy



- Increasing investment in energy efficiency and conservation
- Expanding renewable energy initiatives, investments
- Adding generation using clean, cutting edge technologies



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# Energy Efficiency and Conservation



- Clinton Initiative
  - \$135 million investment in energy efficiency
- Investments in Energy Efficiency and Customer-Owned Renewable Energy
  - 2001 -- \$2 million
  - 2008 -- \$60 to \$80 million
- Reduced energy usage by 500 million kWh savings in 2007/2008
- Part of portfolio standard

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# Energy Efficiency

- Wide range of programs
  - 5 Million CFLs
  - Lighting and appliances
  - Hotel/motel retrofits
  - Refrigerator recycling
  - Air conditioning
  - Large commercial retrofits



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# Customer Installed Renewable Generation



- SolarGenerations
  - 270 projects installed
  - 1.5 million watts
  - \$150,000 rebate – Legislative Counsel Bureau
- Coming Sept. 2008
  - HydroGenerations
  - WindGenerations




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# Shining Light on Conservation



Nevada Power.  
More power to you.



Looks funny.  
**Saves** money.

ENERGY STAR® qualified compact fluorescent lamps use at least two-thirds less energy than standard light bulbs, generate 70 percent less heat and last up to 10 times longer. For more bright ideas, visit [nevadapower.com/conserve](http://nevadapower.com/conserve).

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# Renewable Energy



- Among most progressive statutory requirement for renewables in U.S.
- Approximately 1,000 MW of renewable capacity expected to be on-line by 2012
- 20% by 2015
  - 1% solar
  - Up to one-quarter from energy efficiency



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# Geothermal Partnership

- Joint ownership agreement
- Ormat
- 30 MW geothermal plant
- 1st such joint effort by utility and developer
- Nevada geothermal potential high



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# Waste Heat Recovery



- Compression station waste heat
  - First in Nevada
- Partners are Ormat, Kern River
- Nevada Power ownership





# Nevada Solar One

- 64 MW
- Largest since 1991
- Solar thermal
  - Mirrors heat fluid to create steam



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# Photovoltaic Power



- Nellis Air Base
- Largest PV in North America
- 14 MW
  - PV converts sunlight directly to energy





# Wind Energy

- Proposed joint development
- RES Americas
- China Mountain in NE Nevada
- 200 MW



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# Leading the Way

- UNR Curriculum
- UNLV
- Springs Preserve
- Educating All



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# Nevada's Energy Outlook... **Cleaner**



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# Putting the Sun to Work for America

Rhone Resch  
President

Solar Energy Industries Association

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# Introduction to SEIA

## **National trade association for solar companies**

- Over 600 member companies
- Members include all solar technologies
- Represent over 60,000 people employed by solar
- 14 state and regional chapters

## **Strategic Objectives**

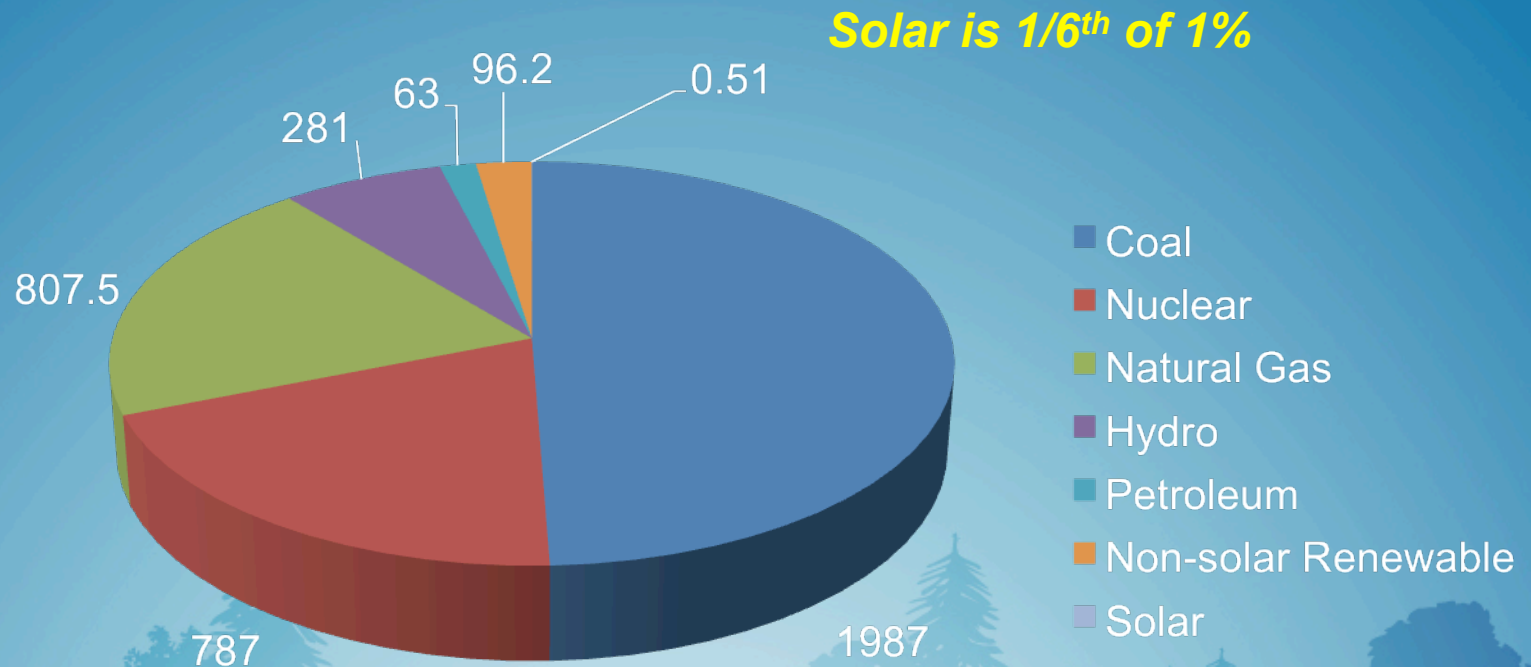
- Expand Markets
- Strengthen R&D
- Remove Market Barriers
- Improve Education and Outreach

**We Represent Solar's Interests in Washington**

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# Electricity Generation in the U.S.



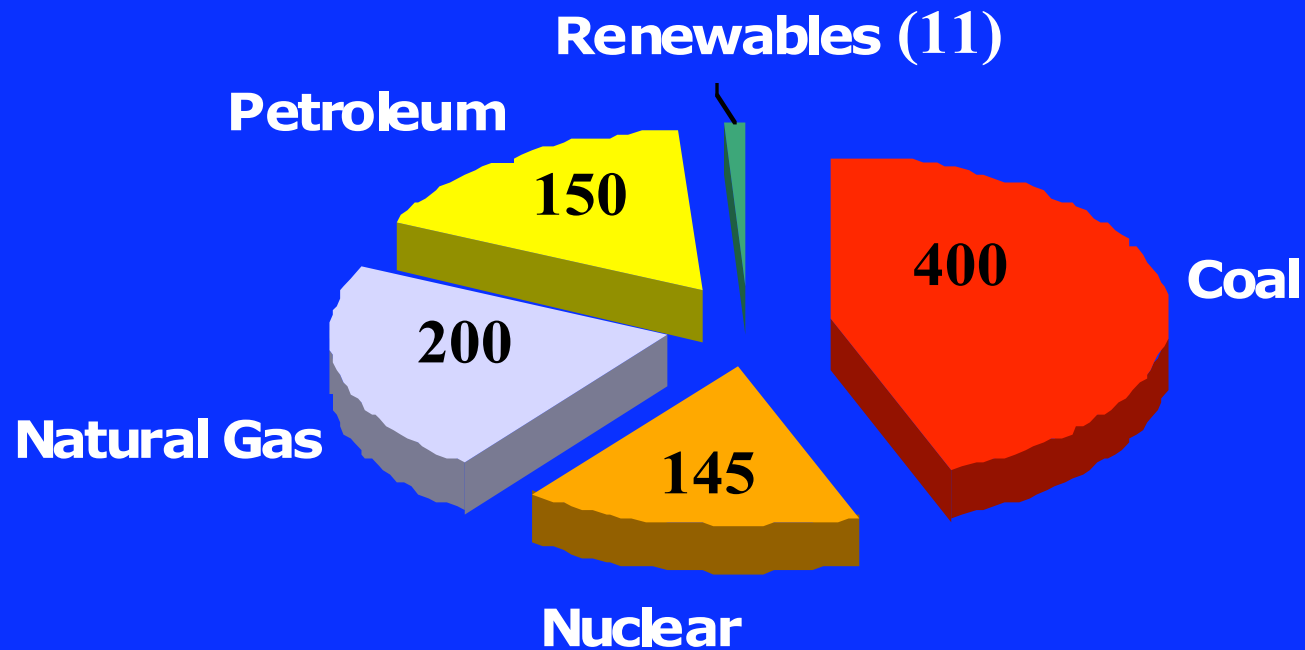
In billion kilowatt hours

Source: EIA, Electric Power Monthly, released September 10, 2007

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# Federal Support for Energy Sources 1943-1999 \$Billions



Source: Renewable Energy Policy Project



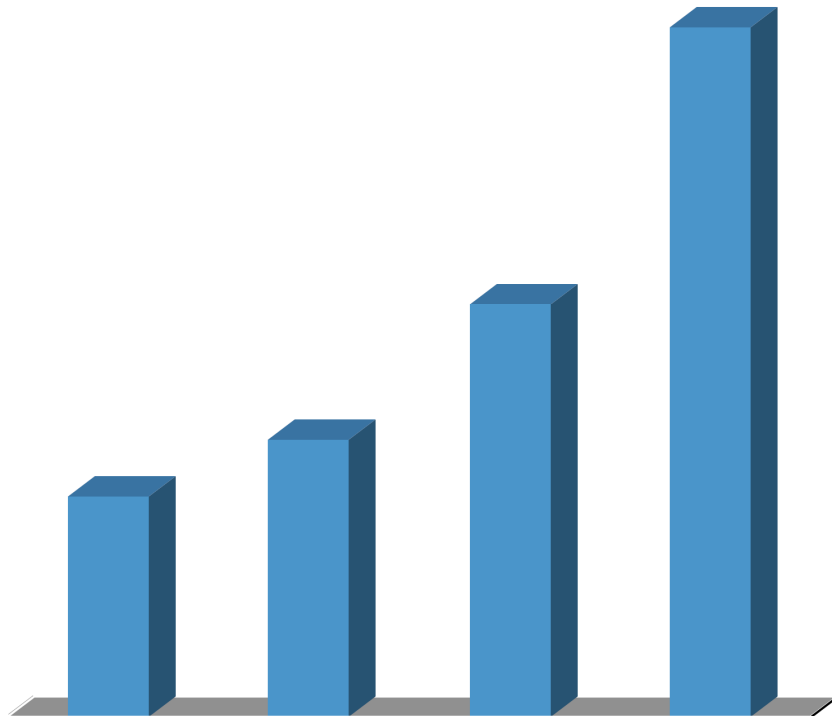
# Solar Water Heating Getting Hot



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# Solar Water Heating



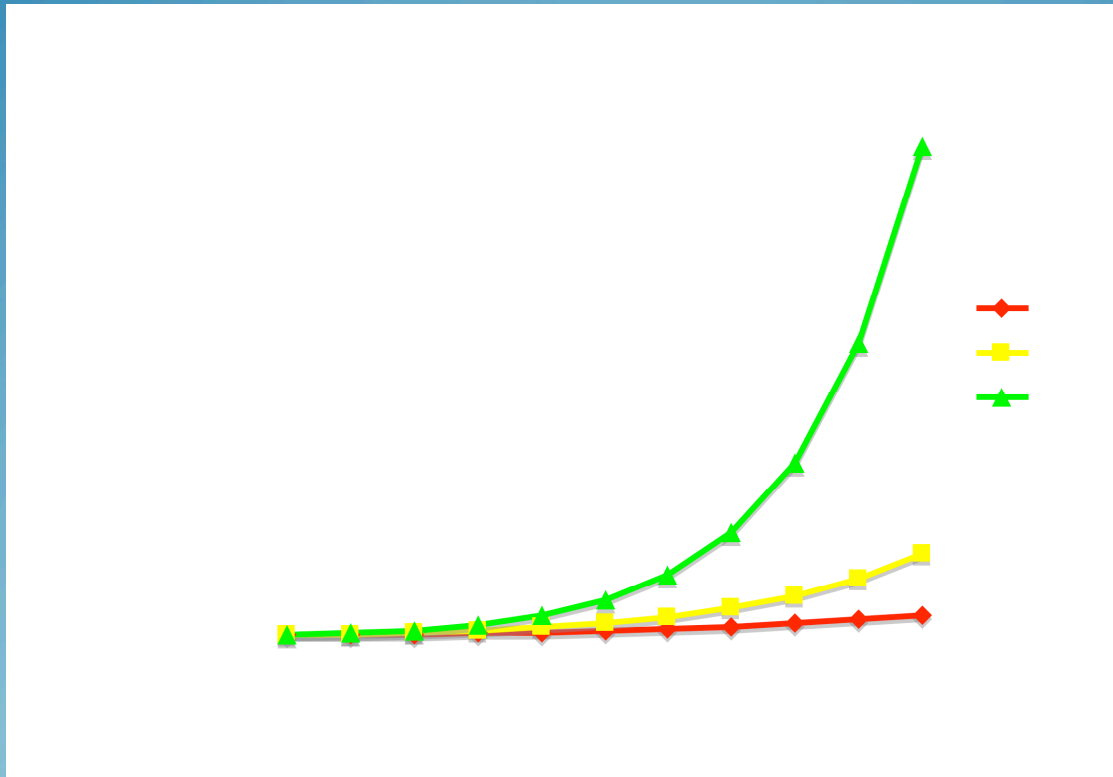
- Germany 120,000
- China >350,000



# Solar Water Heating

2.5 Million Installations/Yr

Displaces 1/3 of  
LNG imports



430,000 Installations/Yr

115,000 Installations/Yr

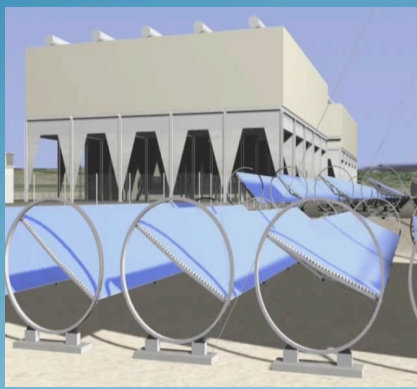
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# Concentrating Solar Power (CSP) Technologies Expanding



Trough



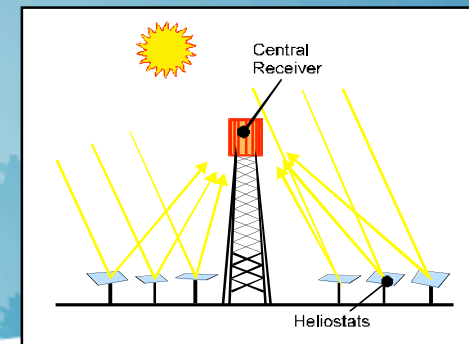
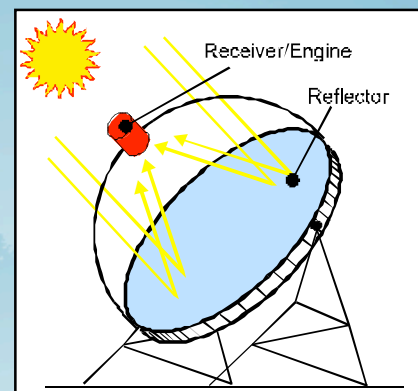
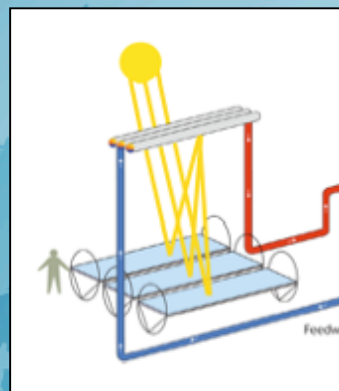
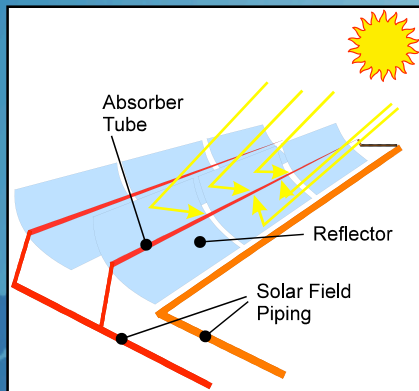
Linear Fresnel



Dishes



Tower



Utility scale power plants intermediate and base load power

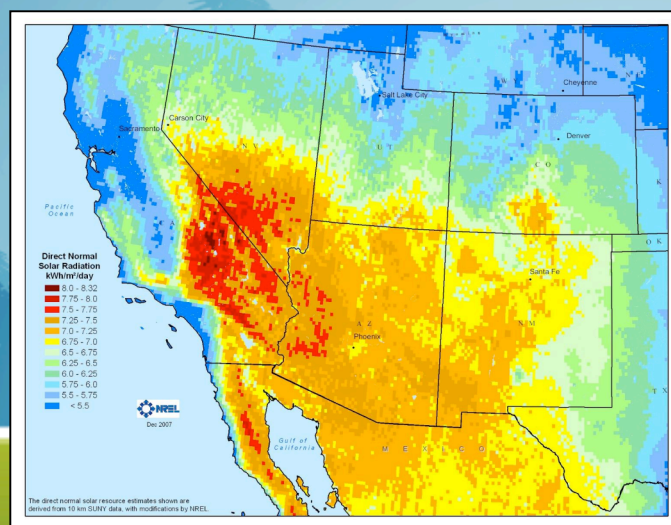
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# World Class Solar Resources

- Resource base could provide more than 10X current U.S. electricity capacity
- Majority of land controlled by Federal government
- Less than 2% of the land dedicated to cropland and grazing could provide all of our electricity
- Need access to transmission, policy certainty

Direct-Normal Solar Resource for the Southwest U.S.



Potential Solar Generation Capacity by State

State	Land Area (mi <sup>2</sup> )	Solar Capacity (MW)	Solar Generation Capacity GWh
AZ	13,613	1,742,461	4,121,268
CA	6,278	803,647	1,900,786
CO	6,232	797,758	1,886,858
NV	11,090	1,419,480	3,357,355
NM	20,356	2,605,585	6,162,729
TX	6,374	815,880	1,929,719
UT	23,288	2,980,823	7,050,242
Total	87,232	11,165,633	26,408,956

Source: NREL (2007).

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# Photovoltaics (PV)

Residential



Commercial



- Applications and markets are evolving very rapidly

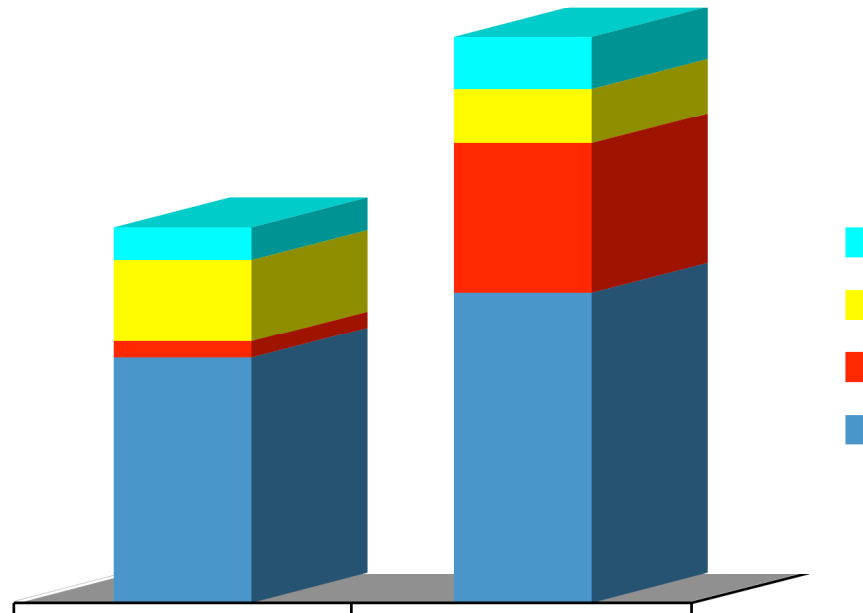
Utility-scale

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# Global PV Demand

MW

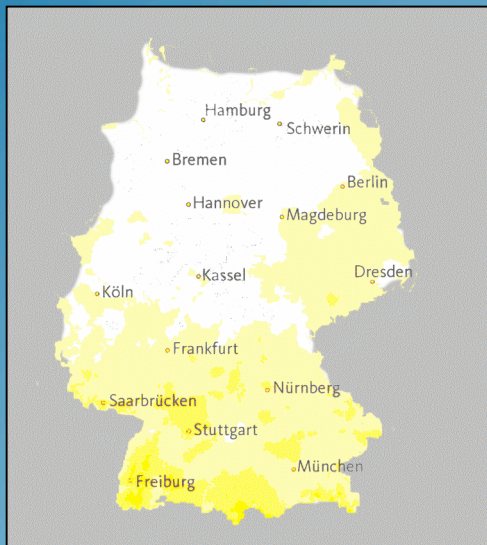


Source: Solar Buzz

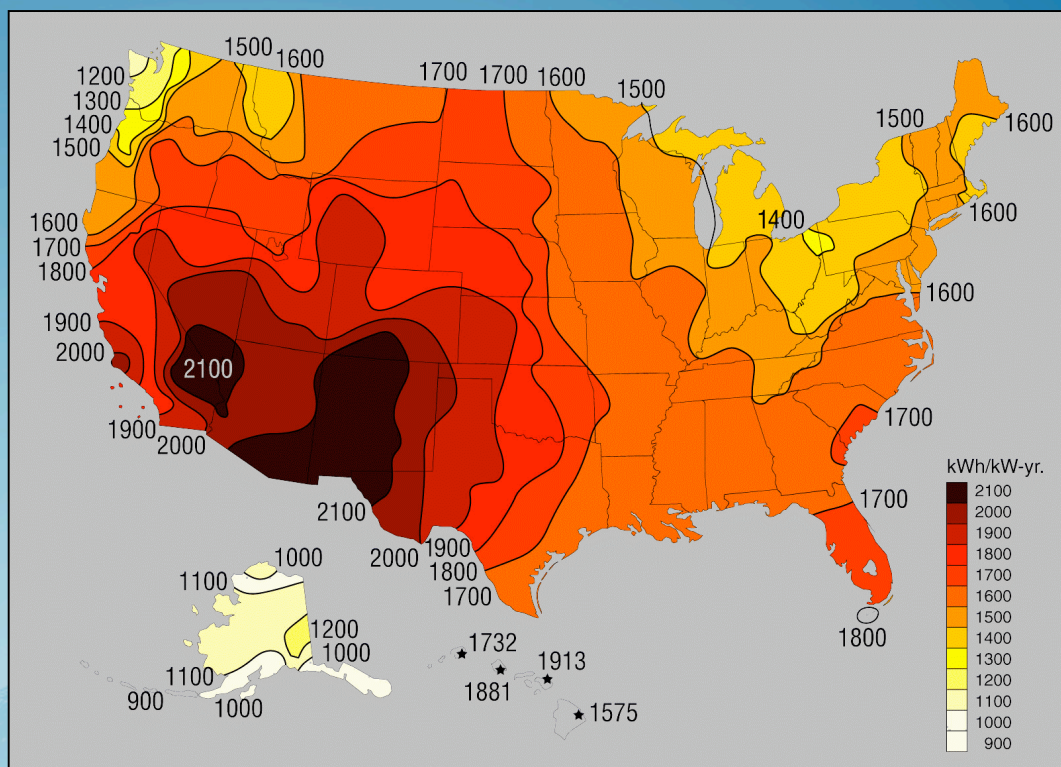
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# The Giant of Solar



Source: SEIA

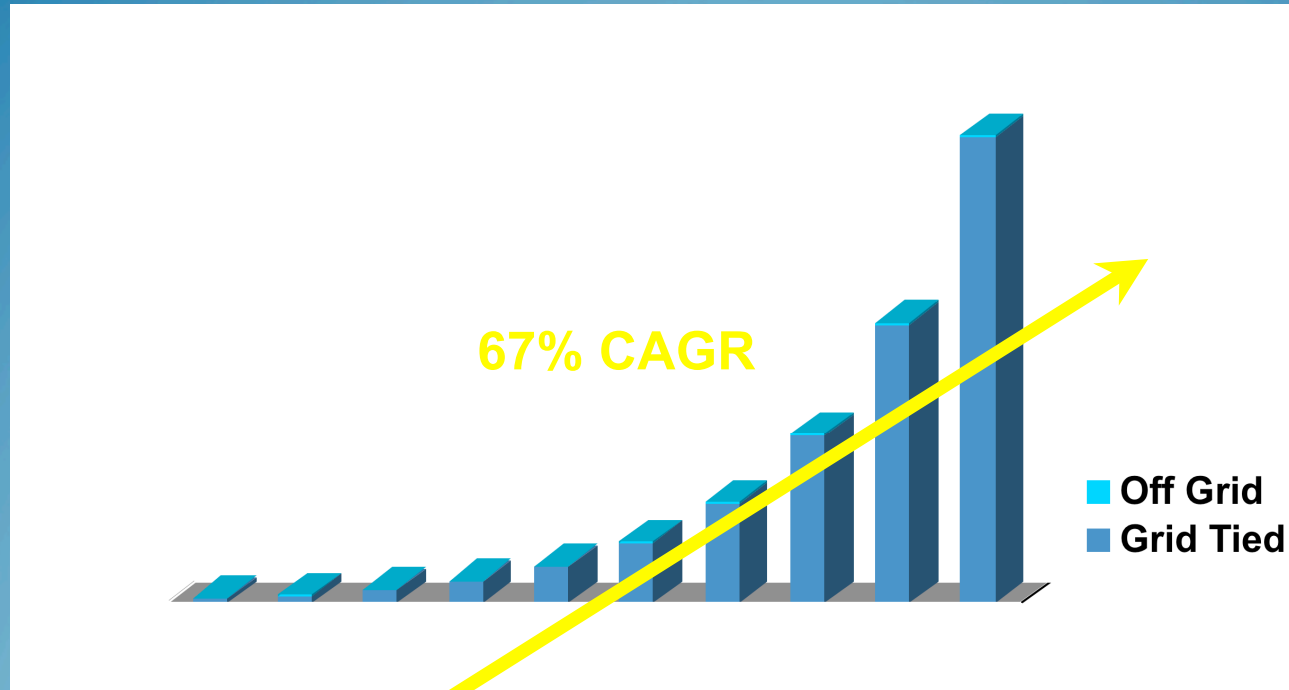


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# US Market Demand Forecast

MW



Displaces  
3 Tcf/Yr  
(75% of our offshore  
production)

Source: PVNews, SEIA

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# Federal Policy Support

- Long term extension of the investment tax credits (ITC) for solar
- National renewable electricity standard with solar carve out
- Carbon cap and trade legislation that allows full access to market mechanisms for renewable energy
- Solar Rights Act (H.R. 2848, S. 1016)
- Renewable Energy Development Act (S. 2076)



# State Policy Support

- Establish consistent interconnection standards
- Adopt retail net metering rules
- Create time-based rates
- Enact a Renewable Portfolio Standard – with a solar carve-out
- Eliminate restrictive covenants
- Grant property tax exemption to solar energy equipment
- Approve new transmission lines



# Summary

- US solar resources are large and inexhaustible
- Solar is an economic engine
- Solar can eliminate the need for all non-NA natural gas imports
- The robust solar markets of Germany and Spain are a product of their national policies
- Only long-term federal policies will transform the US market into the largest in the world
- Congress must pass a long-term extension and expansion of the Investment Tax Credits



# Nellis Air Force Base – 14 MW



Source: SunPower



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# Boulder City – 64 MW



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Thank You

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# The Clean Energy Economy

- Moderator: Steve Colwell, Executive Director, Sea Change Foundation
- Congresswoman Hilda Solis, U.S. Representative, 32<sup>nd</sup> District of California
- Dina Titus, Nevada State Senator
- Dan Reicher, Director for Climate Change and Energy Initiatives, Google.org
- Edward Mazria, Founder of Architecture 2030

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**RE < C**

**Enhanced Geothermal Systems**  
**August 19, 2008**

Not for Distribution

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*“The Future is Not What  
It Used to Be.”*

Paul Valery  
French Writer

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APRIL 3, 2006

www.time.com AOL Keyword: TIME

SPECIAL REPORT GLOBAL WARMING

# TIME

**BE  
WORRIED.  
BE **VERY**  
WORRIED.**

Climate change isn't some vague future problem—it's already damaging the planet at an alarming pace. Here's how it affects you, your kids and their kids as well

**EARTH AT THE **TIPPING POINT****

**HOW IT THREATENS YOUR **HEALTH****

**HOW **CHINA & INDIA** CAN HELP  
SAVE THE WORLD—OR DESTROY IT**

**THE CLIMATE **CRUSADERS****



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**The  
Economist**

JANUARY 27/28 - FEBRUARY 2ND 2007 [www.economist.com](http://www.economist.com)

Shake-up in Big Pharma  
China's space blast  
Europe's rotating slump  
Serbia's encouraging election  
Hating Hillary Clinton

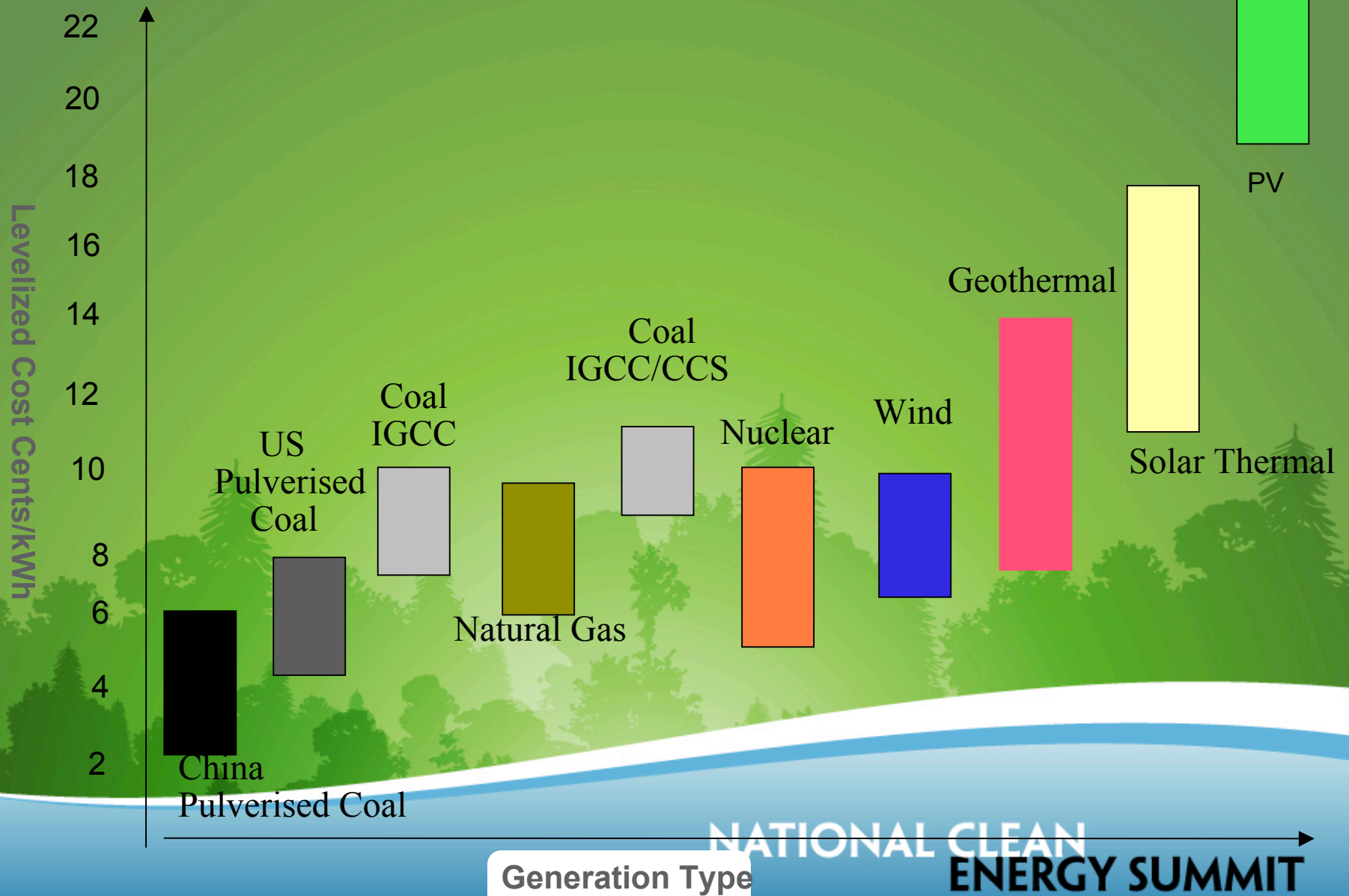


## The greening of America

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# RE<C: The Challenge



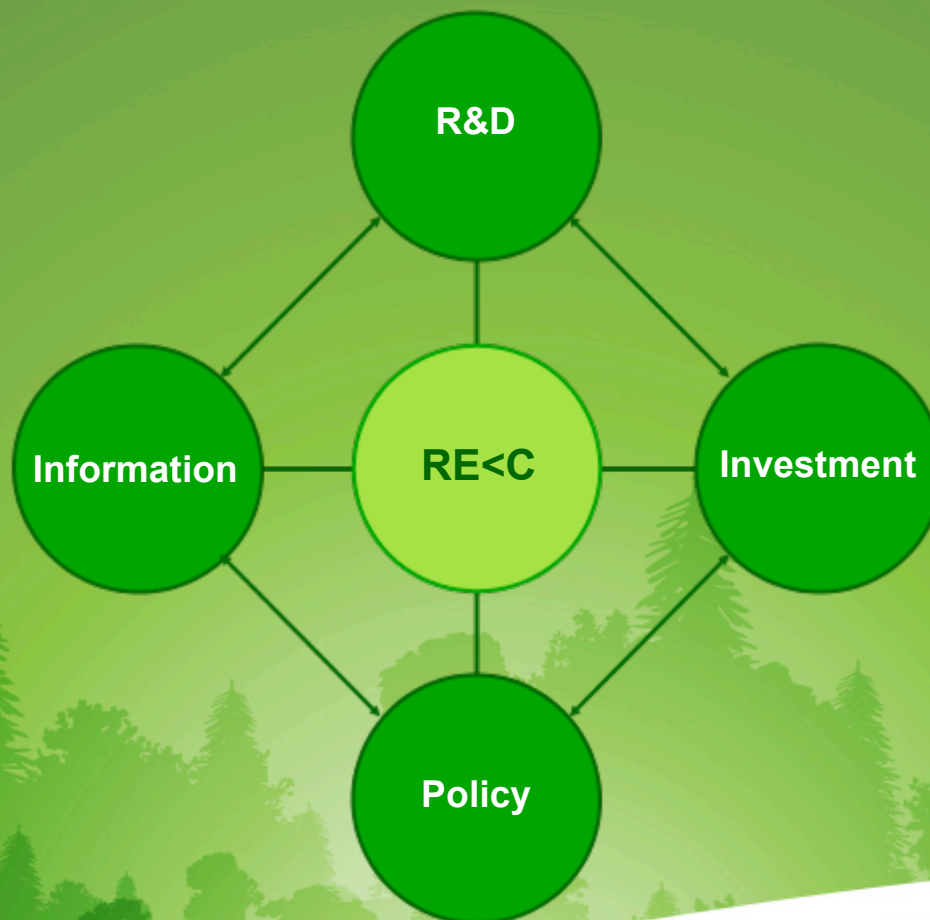


## RE<C: Response

- Launched December 2007
- Overall Goal: to make electricity produced from renewable sources cheaper than electricity produced from coal.
- Specific Objective: Google will develop 1 Gigawatt (1000 megawatts) of renewable generating capacity – enough to power a city the size of San Francisco – that is cheaper than coal. And we will do so in years and not decades.
- Initial Focus:
  - Concentrating solar power
  - Advanced wind power
  - Enhanced geothermal systems (EGS)
  - Electricity transmission & storage



## RE<C: Tools



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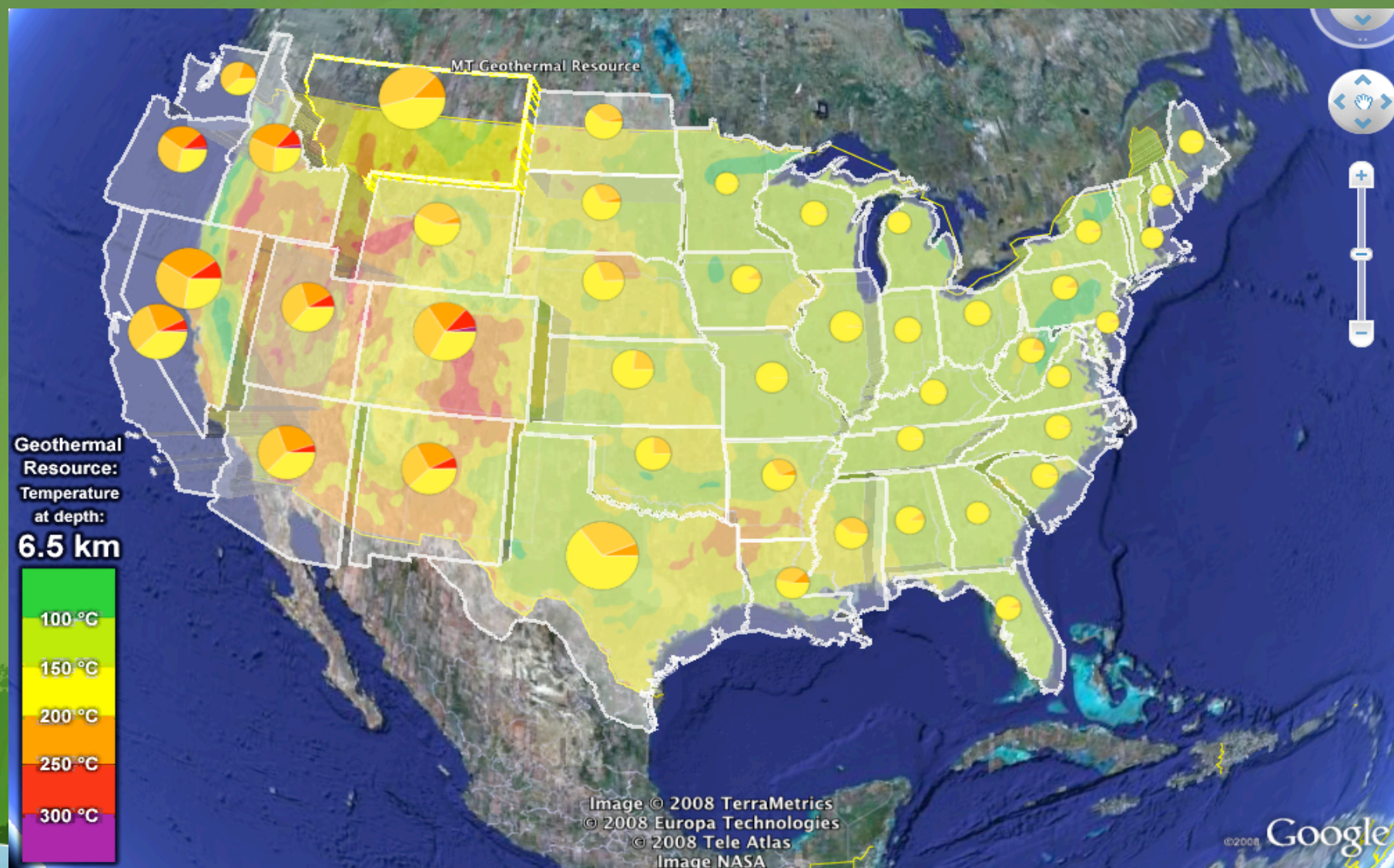


- Play .mov

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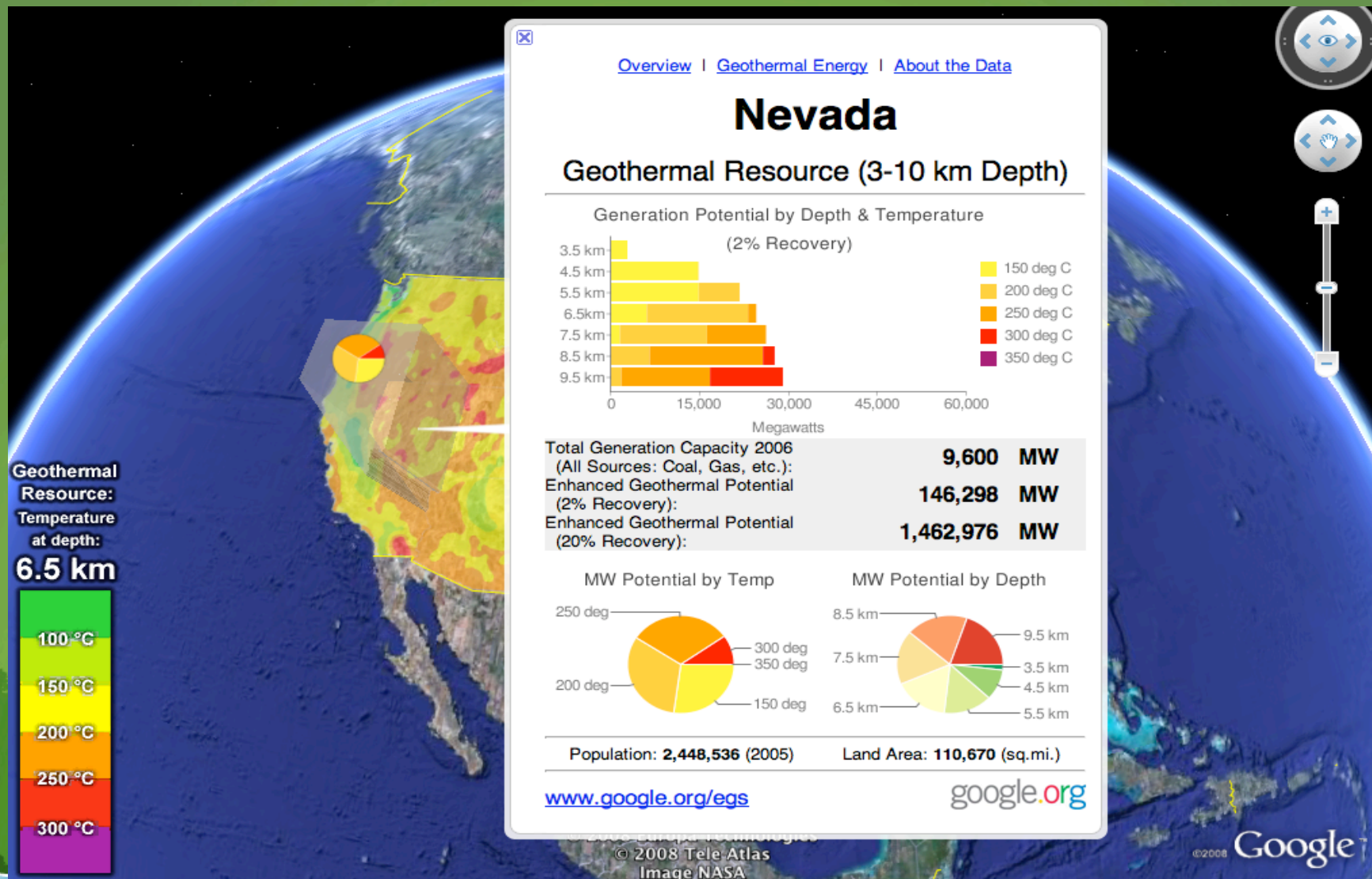
# EGS Generation Potential (3-10 km)



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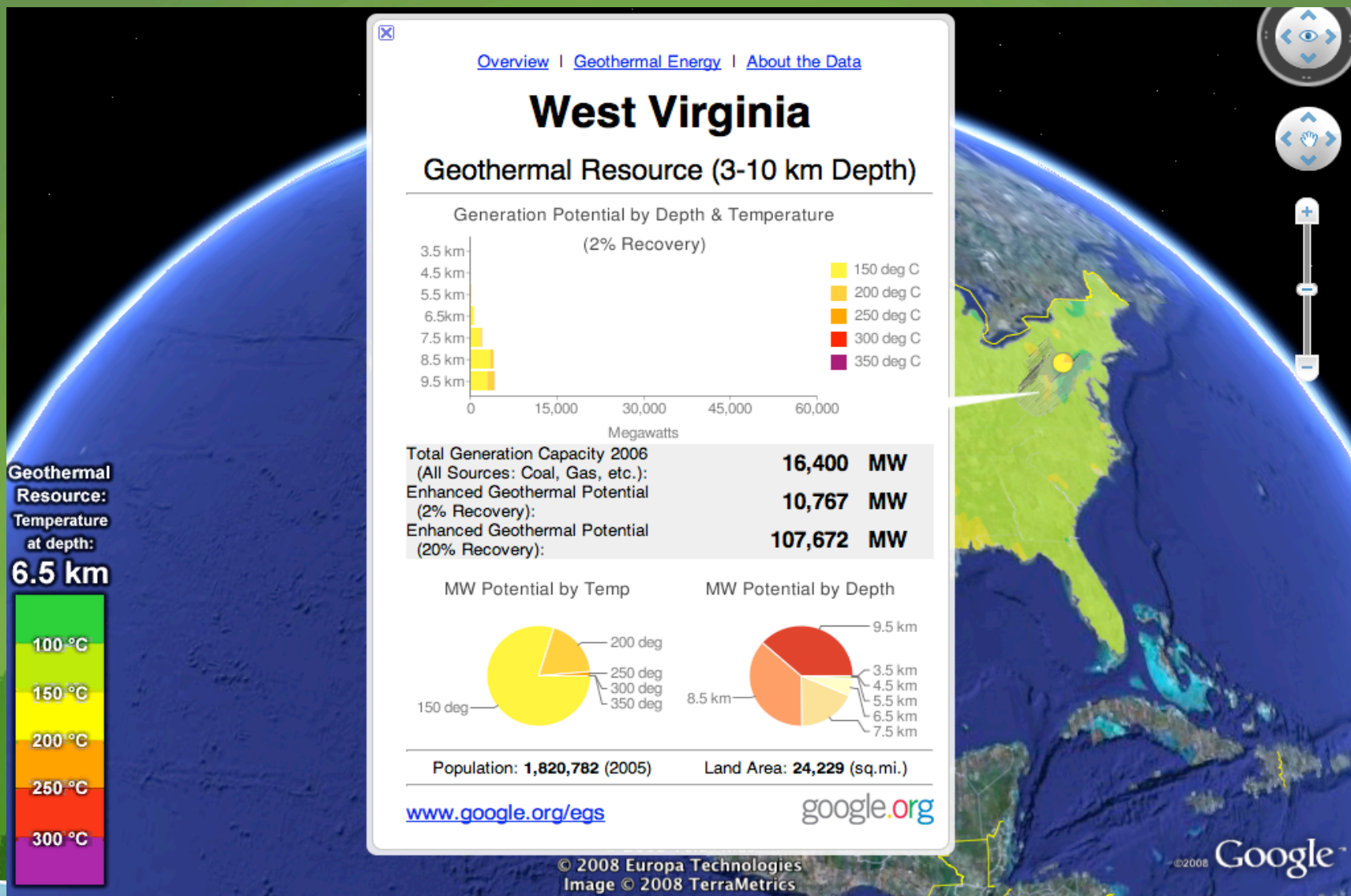
# Geothermal Resource (3-10 km): Nevada



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# Geothermal Resource (3-10 km): West Virginia

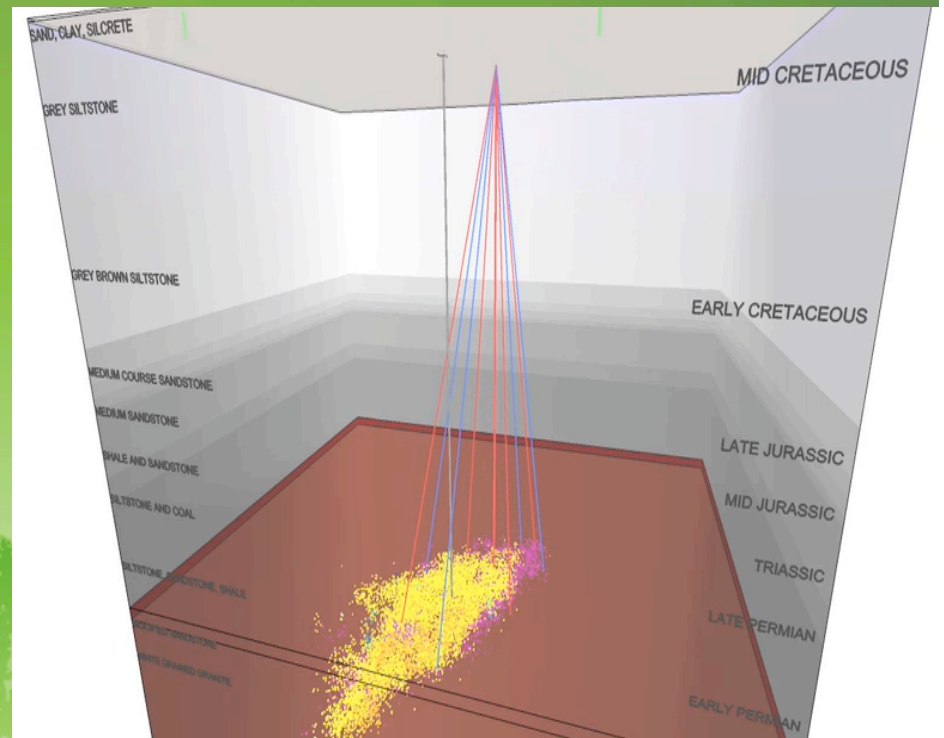


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# Why EGS?

- Clean, renewable, 24/7 energy resource that could meet thousands of times global needs
  - Complements intermittent wind and solar
  - Could be the “killer app” of the energy world
- Ubiquitous global resource
  - All 50 US States
  - Europe, Russia, and Japan
  - India and China
- Systems scalable to > 1,000 MW
- Could be Cheaper than Coal
- Potential for CO2 Sequestration



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# Today's Announcement

- \$10.7 million in investments and grants to advance EGS
  - \$6.25 million investment in AltaRock Energy
  - \$4.0 million investment in Potter Drilling
  - \$489,521 grant to Southern Methodist University Geothermal Laboratory
- Google Information Tools
  - Google Earth Layer of US Geothermal Resources by Temp, Depth, MW, and State
  - SketchUp Animation of Cooper Basin Australia EGS System
  - YouTube introduction to EGS featuring Dr. Steve Chu and Dr. Jefferson Tester
- National Policy Agenda
  - Dramatically expanded national R&D program
  - Reliable long term tax credits
  - National Renewable Portfolio Standard
  - Improved siting, leasing, and permitting

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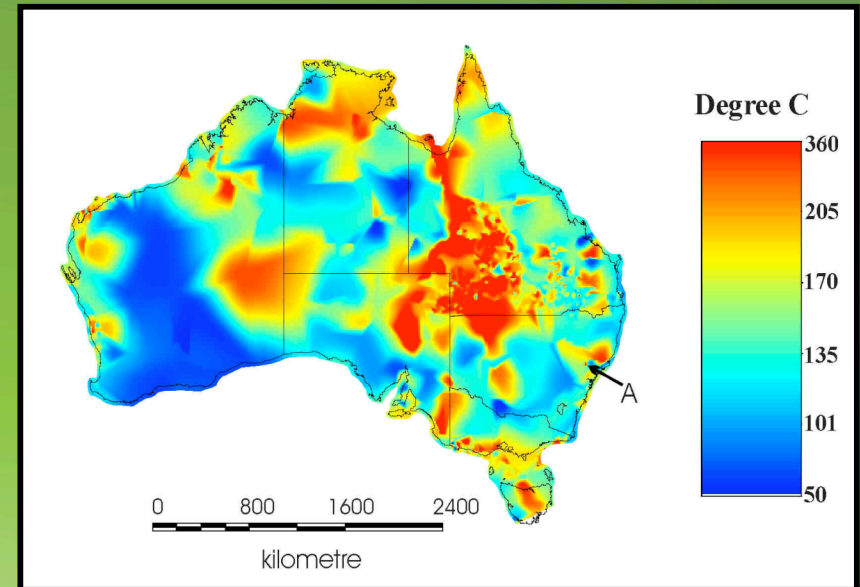
# Australia: Leading the Commercial EGS Race

- Strong Policy Leadership

- National RPS - 20% by 2020<sup>†</sup>
- Aus. \$50 million federal deep drilling fund
- Tradable REC's up to Aus. \$0.065/kWh

- Burgeoning EGS Industry

- 33 EGS exploration and development firms
  - 8 EGS firms drilling as of March 2008
- Strong policy support has spurred over Aus. \$853 million in private commitments since 2000



Total Australian Grid: ~47,700 MW  
Not for Distribution

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# Turning things around in Washington

**WON**   **LOST**



Renewable tax credit extensions



National renewable portfolio standard



Renewables transmission legislation



National energy efficiency standard



Significant federal clean energy R&D increases

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Interested in digging  
deeper?

Go to:

[www.google.org/egs](http://www.google.org/egs)

**EGS - It's Hot!**

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U.S. SENATOR  
HARRY REID

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Now, it's personal...

Edward Mazria AIA  
Architecture 2030

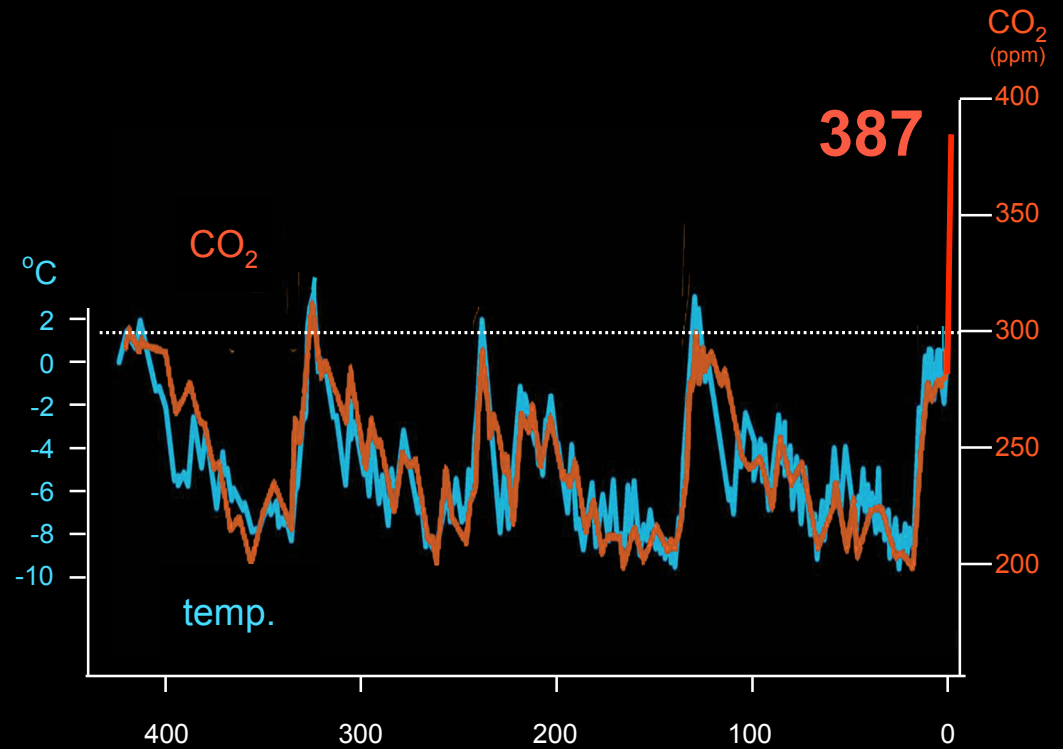


copyright 2030 inc.



We have a  
problem:

We're off the  
charts.

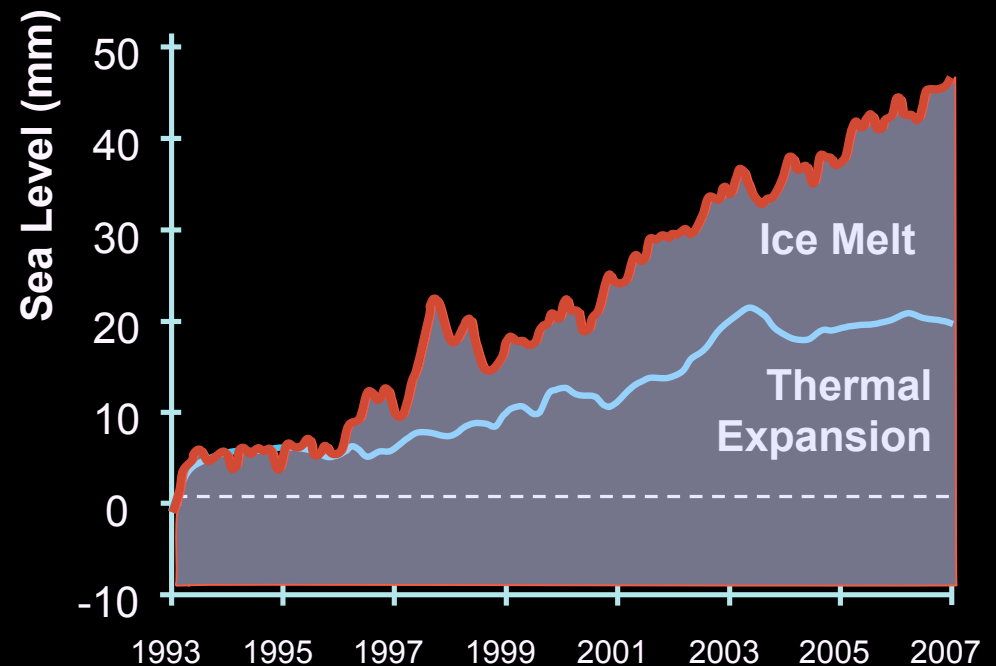


Global Temperature & CO<sub>2</sub>  
(450,000 years) Source: UN IPCC



What's this  
mean for the US?

53% of all  
Americans live in  
and around  
coastal cities and  
towns.



## SEA LEVEL RISE

Source: Josh Willis, NASA JPL

copyright 2030 inc.





Point Pleasant  
Bay Head

Population  
19,306  
1,238

Point Pleasant, NJ

Sea level: Google Earth / USGS  
copyright 2030 inc.





Point Pleasant, NJ  
1 meter

Sea level: Google Earth / USGS  
copyright 2030 inc.





©2007 Google™

Hampton, VA

	Population
Hampton	146,137
Newport News	180,150

Sea level: Google Earth / USGS

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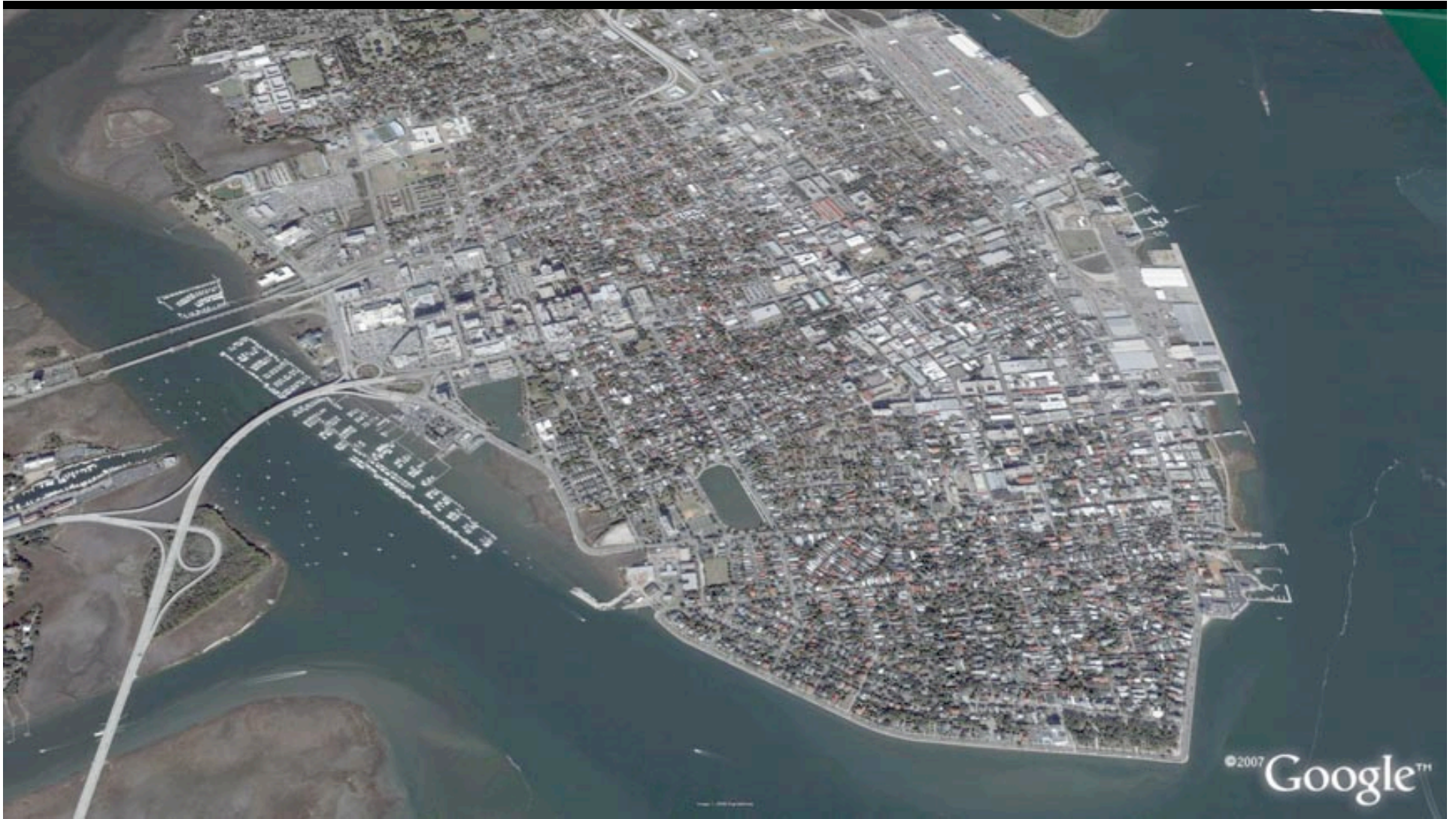
© 2007 Google™

Hampton, VA  
1 meter

Sea level: Google Earth / USGS

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© 2007 Google™

Charleston, SC

Sea level: Google Earth / NOAA

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© 2008 2030, Inc.  
© 2007 Google™

Charleston, SC  
1 meter

Sea level: Google Earth / NOAA

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© 2008 2030, Inc.  
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Charleston, SC  
1.5 meters

Sea level: Google Earth / NOAA

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Hollywood, FL

Hollywood

Population  
139,357

Copyright 2010 Google Earth LLC





© 2020, Inc.  
Google™

Hollywood, FL  
1 meter

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Google Earth™ / USGS FIDARS





Miami Beach

Miami Beach

Population  
87,933

Sea level: Google Earth / IHRCS  
copyright 2030 inc.





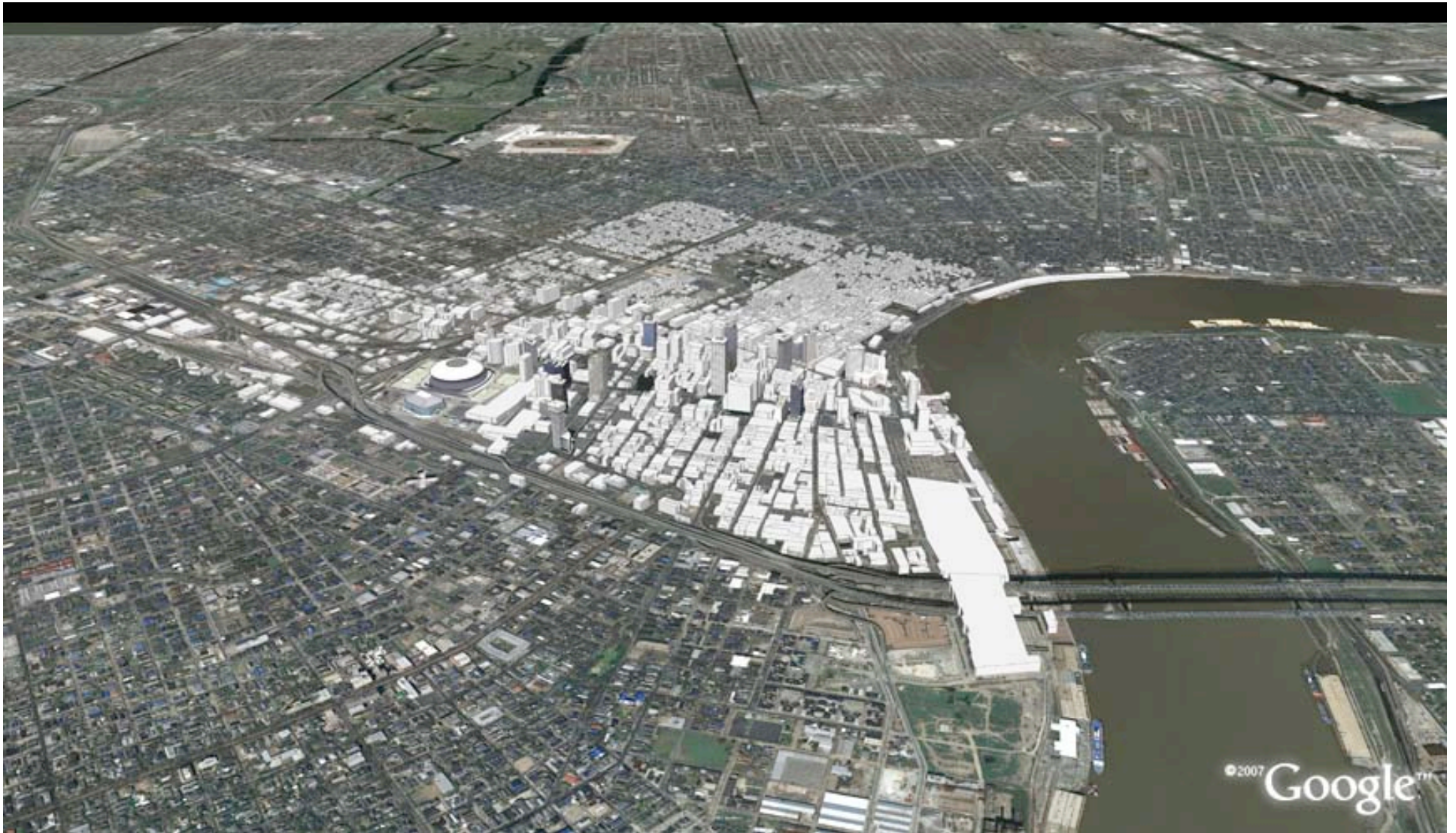
© 2007 2030, Inc.

© 2007 Google™

Miami Beach  
1 meter

Sea level: Google Earth / IHRCS  
copyright 2030 inc.





© 2007 Google™

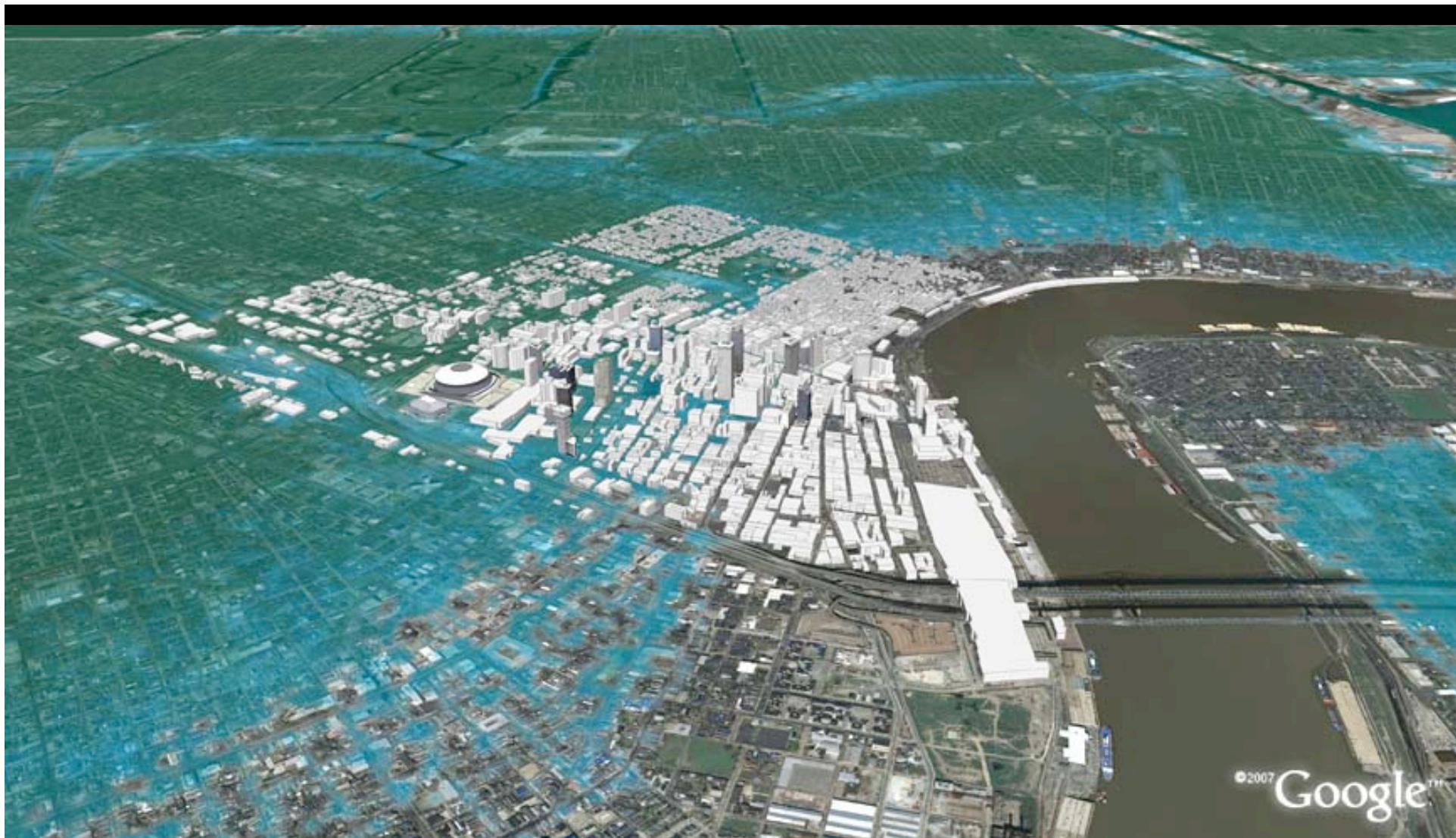
New Orleans

Population  
Unknown

New Orleans

Sea level: Google Earth / USGS  
copyright 2030 inc.





New Orleans  
1 meter

Sea level: Google Earth / USGS  
copyright 2030 inc.





Foster City  
San Mateo

Population
28,803
92,482

Foster City / San Mateo

Sea level: Google Earth / USGS / BCDC  
copyright 2030 inc.





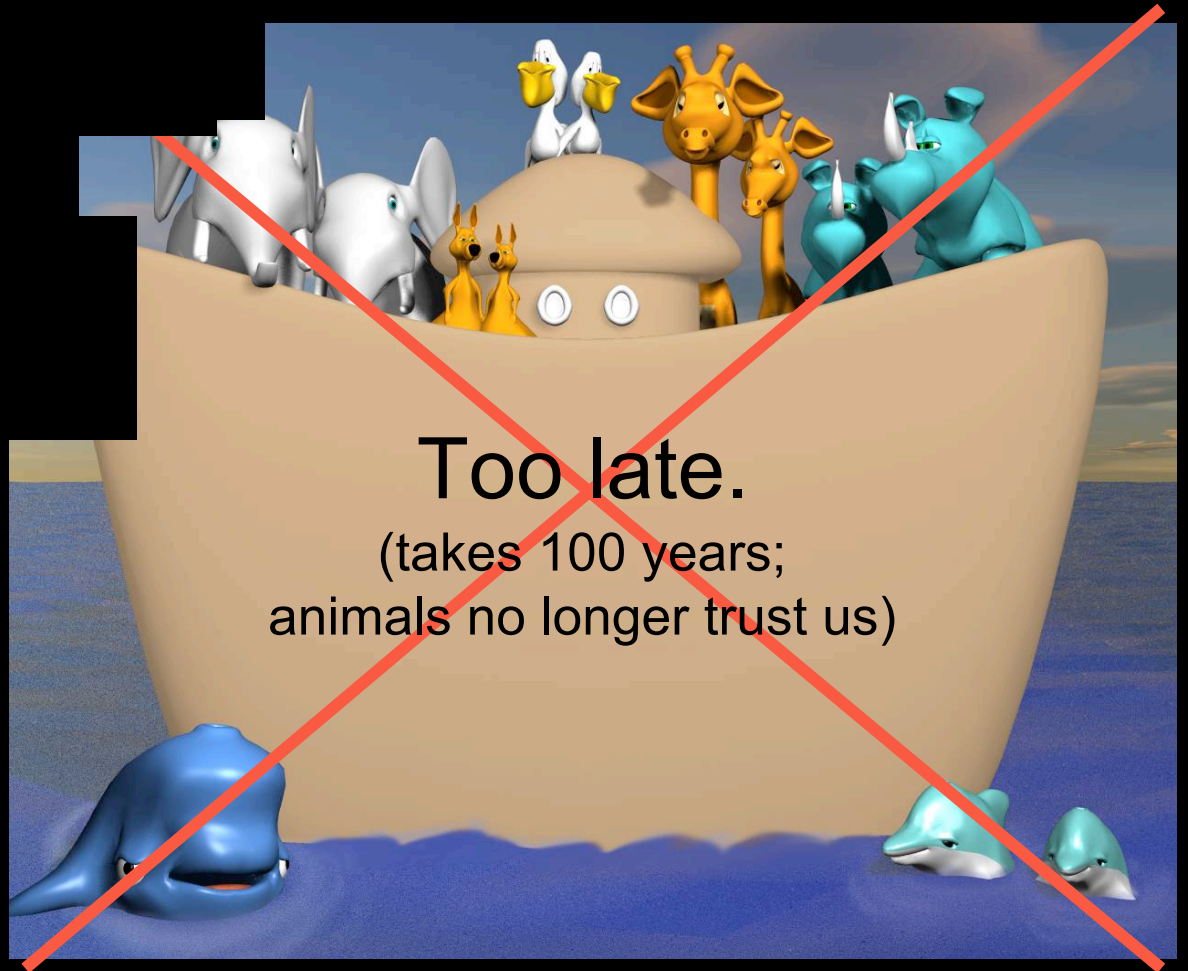
Foster City / San Mateo  
1 meter

Sea level: Google Earth / USGS / BCDC  
copyright 2030 inc.



Who's the  
Culprit?

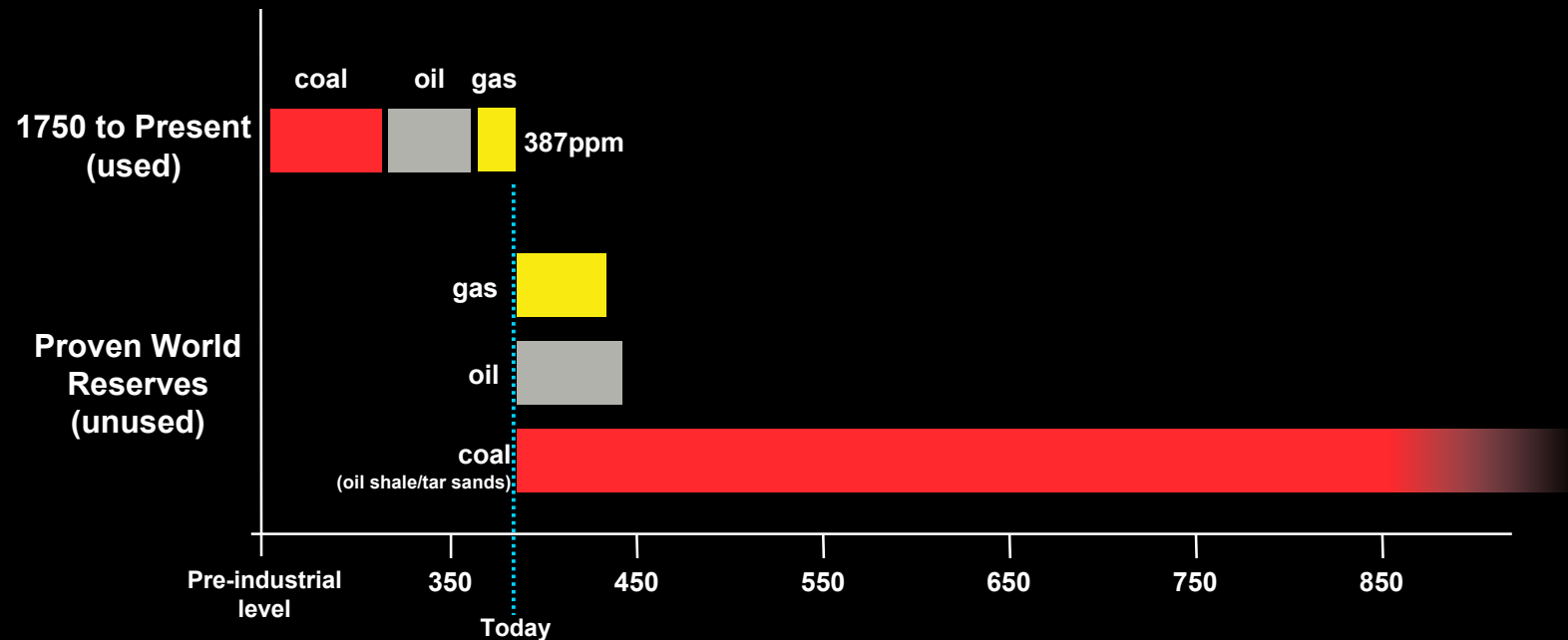
Supply





# Who's the Culprit?

## Supply



### FOSSIL FUEL RESOURCES & CO2 EMISSIONS (ppm)

Source: Architecture 2030; Adapted from J. Hansen et al: Dangerous human-made interference with climate, 2007



Who's the  
Culprit?

Supply



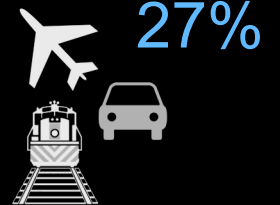


# Who's the Culprit?

Demand

US Energy  
Consumption

Buildings  
**48%**



Transportation



Industry

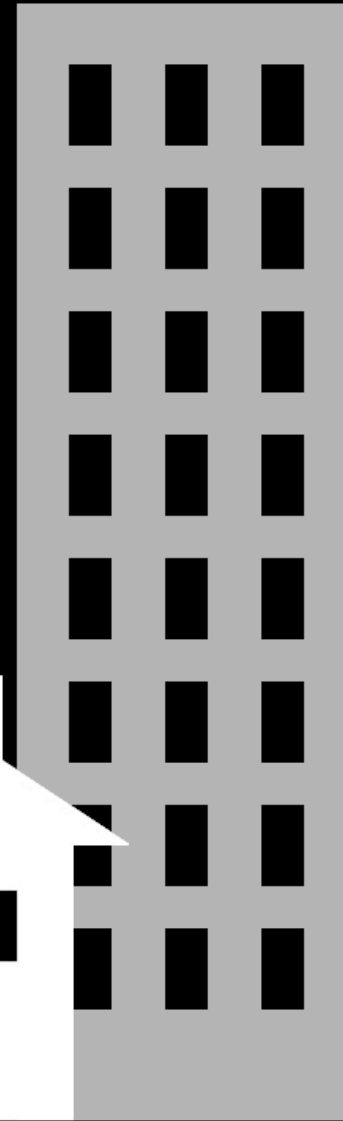



# Who's the Culprit?


## Demand

## US Electricity Consumption

Buildings  
**76%**



 1%  
Transportation

 25%  
Industry



# The 2030 Challenge

New Buildings & Major Renovations - 50%

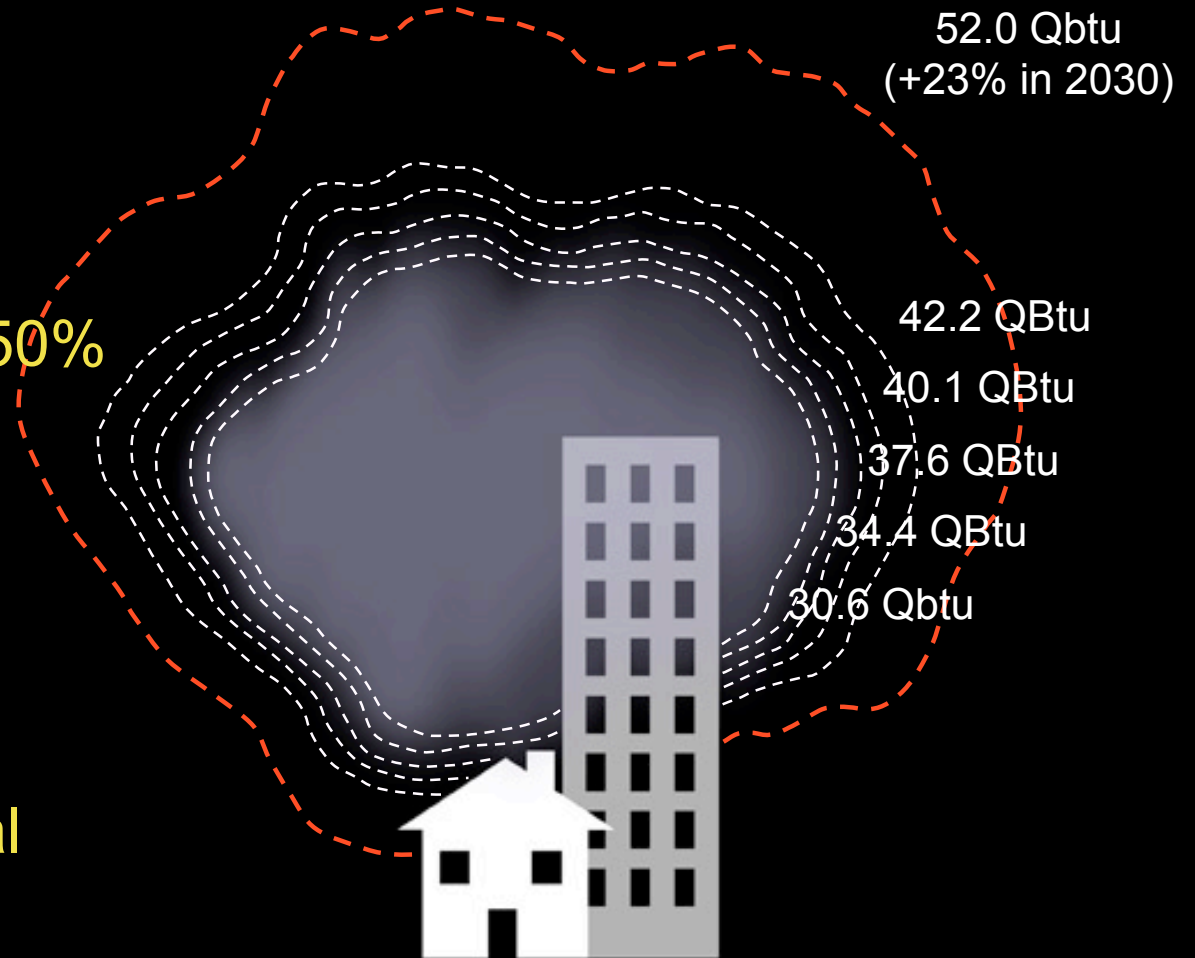
2010 - 60%

2015 - 70%

2020 - 80%

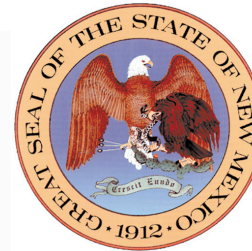
2025 - 90%

2030 - Carbon Neutral  
(no fossil fuel energy to operate)





# Support for the 2030 Challenge:



U.S.  
Conference of Mayors  
2030 °Challenge



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Published February 5, 2008 10:11 AM

# California to Require Net-Zero-Energy Buildings

Every two years, the California Energy Commission (CEC) releases an Integrated Energy Policy Report in which it makes recommendations for energy policy in the state, including changes to Title 24, the energy efficiency portion of the building codes. In its 2007 report, CEC recommends adjusting Title 24 to require net-zero-energy performance in residential buildings by 2020 and in commercial buildings by 2030.



# How do we meet the 2030 Challenge?





# 1. Design, planning & innovation



## 2. Add technology



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A photograph of a solar power plant, also known as a solar tower or CSP (Concentrated Solar Power) plant. The image shows a long, curved row of heliostats (mirrors) mounted on a metal frame. The mirrors are reflecting the bright sunlight, which is visible in the upper left corner of the frame. The sun is low in the sky, creating a strong glare. The heliostats are arranged in a way that they all point towards a central receiver (not visible in the image). The overall scene is a vast, open landscape under a clear sky.

# 3. Purchase renewable energy

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# How much will it cost?

It will save consumers money.



# How much will it cost?

## Estimated Annual Cost Savings

2030 Challenge - 50% Reduction Target\*

First Cost	\$2,000
------------	---------

---

Annual Amortized Cost (7%, 30 year mortgage)	\$211
---	-------

---

Annual Utility Bill Savings	\$723
-----------------------------	-------

---

<b>Homeowner Savings Each Year</b>	<b>\$512</b>
------------------------------------	--------------

\* Estimated cost increase relative to a standard home, Greensburg Kansas: \$0.00 - \$2.00 per sq. ft. - 50% below the regional average energy consumption (30% below IECC 2003).

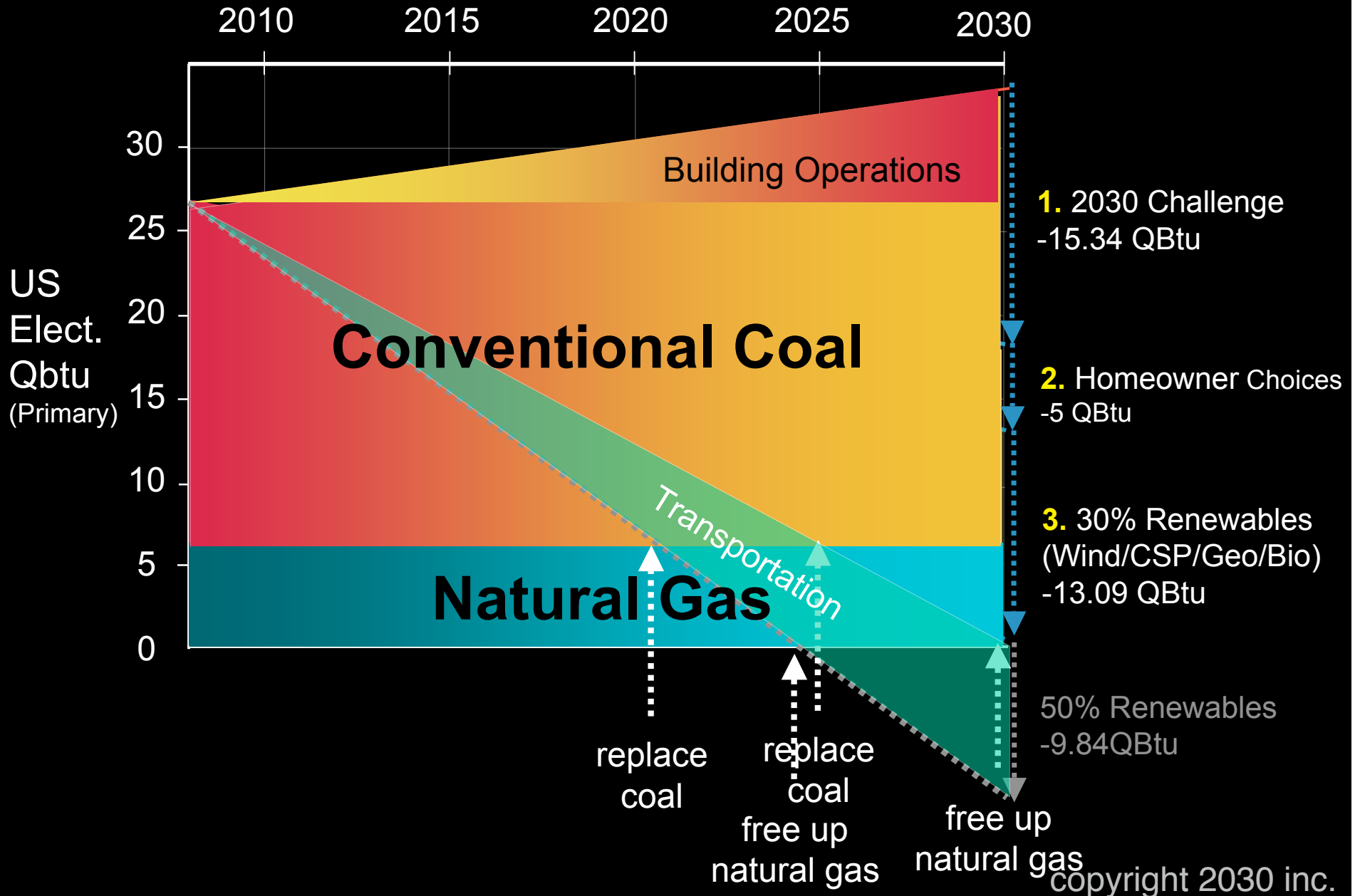


# What needs to be done?

## Implement the 2030 Blueprint



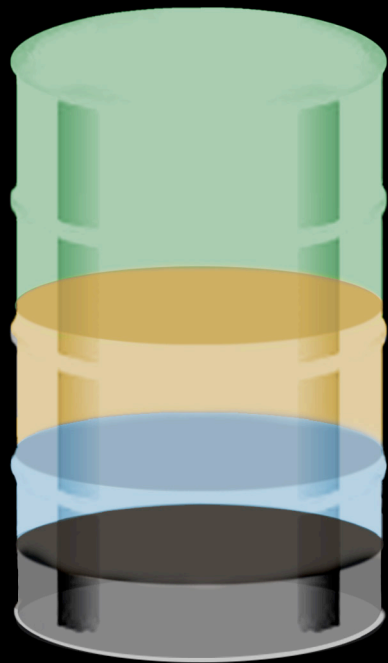
# 2030 Blueprint





# 2030

2.45 Qbtu  
(1.09 million barrels / day)



Imported

## 89%

Freed up oil & gas  
(buildings ~ 3.25 Qbtu)

Transportation

9.84 QBtu



50% Renewables  
-9.84QBtu

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# How do we implement the 2030 Blueprint?

Why efficiency?



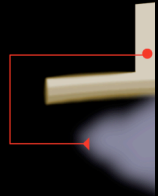
# 1 Qbtu (delivered)

Coal  
\$122 billion

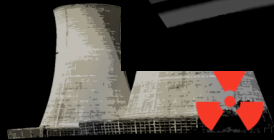


**EXPENSIVE, DIRTY.**

Efficiency  
~~\$42 billion~~  
\$256 billion



Nuclear  
\$222 billion



**EXPENSIVE, TOO LATE.  
CHEAP, READY TO GO.**

**TOO EXPENSIVE, TOO LATE.**

Efficiency  
\$42 billion



**\$42.1 BILLION** \$\$\$\$\$

copyright 2030 inc.



# US Investment?

\$21.6 billion in building energy efficiency each year for five years to:

- Stimulate building construction
- Create over 1 million new permanent jobs
- Save consumers \$127 billion
- Distribute the \$\$\$ throughout the US, *and* across all industries...



3





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The background of the slide features a stylized landscape. The top half is a gradient of green and blue, with a bright blue wavy line separating it from the lower half. The lower half is a solid blue gradient. At the bottom, there is a dark blue silhouette of a city skyline with various buildings and trees.

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## Robert E. Rubin

Chairman of the Executive Committee of the  
Board of Citigroup Inc.





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# Restoring American Leadership:

## Jobs, Growth, Communities, and Trade

- Moderator: Danny Thompson, Executive Secretary-Treasurer, Nevada State AFL-CIO
- Somer Hollingsworth, President and CEO, Nevada Development Authority
- Ian Rogoff, Chairman and Trustee, Nevada Institute for Renewable Energy Commercialization
- Van Jones, Senior Fellow, Center for American Progress Action Fund and Founder & President, Green for All
- Fred Redmond, Vice President, United Steelworkers





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***Somer Hollingsworth***

***National Clean Energy Summit  
August 19, 2008***

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# The NDA

- **Not-for-profit 501(c)6**
- **Founded in 1956**
  - **S.N.I.F. - Southern Nevada Industrial Foundation**
- **Supported by 400 business and individual members, State and local government and educational institutions**



# NDA Mission

The Nevada Development Authority shall attract, retain and expand the business base to enhance the overall ***socioeconomic*** development of Southern Nevada.

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# **The NDA**

## **TARGET INDUSTRIES**

- **Technology**
- **Life Sciences**
- **Renewable Energy**

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# **The NDA**

**October 2005**

**- Former President Bill Clinton  
keynote speaker at NDA annual  
meeting**

- Wake-up call for Southern  
Nevada**

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***Fast forward three years later:***  
**Nevada is the No. 1 state in the nation in solar watts per capita, and solar as a percentage of retail sales.**

**Goal.....to be solar capital of the U.S. and the world**

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# State Legislation

- **State mandate for Nevada Power to acquire power from renewable sources - 20% by 2015**



# **Renewable & Energy Storage Abatements**

- **50% abatement for up to 10 years on real and personal property for qualified energy companies**
- **A partial abatement of sales/use tax on capital equipment purchases**



# **Clean Energy Is Good For Everyone**

- **Bring municipalities into clean energy movement**
- **Land usage – sale or lease**
- **Joint venture**
- **Purchase of solar**



# Clean Energy Is Good For Everyone

- Las Vegas won a World Leadership Award in London, England for their innovative Alternative Fuel program – December 2007.
- Competition that celebrates the very best in modern city leadership – over 400 cities from around the world were in competition.
- Alternative Fuel Program received top honors in the transportation category.
  - 90% of the City's fleet of nearly 1,500 vehicles operates on a variety of alternative fuels – **WITHIN THE NEXT SIX MONTHS THE CITY OF LAS VEGAS' FLEET WILL BE 100% ALTERNATIVELY FUELED!**
- Las Vegas was first city in the world to construct/operate a Hydrogen Energy Station that generated electric power from a stand alone 50 Kw fuel cell that also produced hydrogen fuel.



# Since October 2005....

(Up and running)

- ***Nevada Solar One***

- 64 MW on 350 acres in Boulder City

- ***Nellis PV (SunPower Corp.)***

- 15 MW on 110 acres at Nellis



# Since October 2005.....

(Up and running)

- ***Ausra Manufacturing LLC***

- 136,000 s.f. highly automated (robotic) solar thermal component manufacturing facility

- ***Biodiesel of Las Vegas***

- 100 million gallon Biodiesel plant

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# Since October 2005....

(In the pipeline)

- ***BrightSource Energy***
  - 200+ MW on 1,000+ acres
  - Concentrating sun power tower technology
- ***Solar Millennium LLC***
  - 100-200 MW power plant on 480 acres
- ***El Dorado Energy PV***
  - 165 MW on 400 acres

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# LEED Certified Projects (Completed)

PROJECT NAME	OWNER	CITY	LEED RATING
Desert Living Center	Springs Preserve	Las Vegas	Platinum
ORIGEN Experience	Springs Preserve	Las Vegas	Platinum
Molasky Corporate Center	Molasky Group	Las Vegas	Gold
Palazzo	Las Vegas Sands Corp.	Las Vegas	Silver
Regional Animal Campus	Animal Foundation	Las Vegas	Silver
Tate Snyder Kimsey Architects Design Studio	Tate Snyder Kimsey	Henderson	Certified
Miley Achievement Center	Clark County School District	Las Vegas	Certified
Telecommunications Building	College of Southern Nevada	North Las Vegas	Certified

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U.S. Green Building Council – Nevada Chapter



# **Kermit The Frog Said..... “It Ain’t Easy Being Green”**

- There are nearly 100 LEED registered projects listed for Nevada.



# Needs

- **Renewable Energy Tax Credit must pass**
- **State and local government**
  - **invest in clean energy**
  - **incentives for companies to grow**
  - **legislation to encourage clean energy**
- **Make permitting simple and fast**
- **In Nevada, Federal mandate BLM within six months have comprehensive plan to set aside land for clean energy**





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# Nevada Institute for Renewable Energy Commercialization (NIREC)

Transforming Scientific Research Into Viable Renewable  
Energy Business Solutions



National Clean Energy Summit  
Ian Rogoff, NIREC Chairman  
19 August 2008

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# Nevada Institute for Renewable Energy Commercialization (NIREC)

## APPROACH

Integrate researchers, experienced entrepreneurs, business executives and venture capital to identify and fund viable, cost-effective renewable energy solutions.

## CAPABILITIES

-  Commercialization research
-  Business functions
-  Financing vehicles
-  Demonstration and outreach function

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# Mariah Power – Windspire

## Vertical Axis Wind Turbine



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# Commercializing Clean Energy Technology

Significant barriers exist today in the commercialization of clean energy technology

- Ambiguous research directions
- Technology trapped in labs
- Lack of commercialization know-how and funding
- Short-term ROI constraints
- Difficulty in attracting experienced entrepreneurial management teams
- Long maturation and characterization periods
- Incumbent technologies and fiscal regimes



# Commercialization Accelerators

## Why they work...

- Funded research by itself doesn't create market solutions or many jobs; commercializing technology does.
- Accelerators synthesize promising research with business skills and experience

## When they work...

- They do not try to perform basic research
- They focus in specific industries
- They focus on bringing solutions to market
- They act as a catalyst and vector



# NIREC Institutional Research Partners



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# Clean Energy

## Economic Development

- 70% of net new jobs in the past 15 years have been created by businesses less than 5 years old
- Clean energy is a high tech industry with significant job creation potential
- Clean energy skills
  - Engineering, biotech, materials science, finance
- Clean energy industrial impact
  - Manufacturing, installation and support
  - Transportation
  - Centralized and distributed power
  - Energy efficiency and storage

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# Nevada Institute for Renewable Energy Commercialization

NIREC is a public-private partnership  
uniquely designed to accelerate  
renewable energy technologies to  
commercial success.

Thank you

Ian Rogoff, NIREC

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# Governor Jon Huntsman

State of Utah







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# The Visible Hand:

**Government's Role in the Clean Energy Transformation;  
Opportunities to Accelerate Deployment of Energy Efficiency  
and Renewable Energy**

- Moderator: John Podesta, President & CEO, Center for American Progress Action Fund
- Governor Bill Ritter, State of Colorado
- Commissioner John Wellinghoff, Federal Energy Regulatory Commission
- Dr. Steven Chu, Director of the Lawrence Berkeley National Laboratory
- Dr. David Overskei, President, Decision Factors
- Jim Thoma, Senior Vice President, Manager of Energy Services, Bank of America





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- GO TO MAC FOR WELLINGHOFF PRESENTATION

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# The world's energy problem and what we can do about it

National Clean Energy Summit  
Univ. Nevada, Las Vegas  
19 August, 2008

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# The Energy Problem

- (1) The risk of adverse Climate Change.
- (2) Potential for geopolitical conflict due to escalating competition for energy resources.

Climate experts predict that there is a 50% chance that the average temperature of the world will increase by 5 ° C.

5 ° C change is the difference between our world today and the world during the last Ice Age.

- (3) Climate change may cause *Resource Wars* over water, arable land, and massive population displacement.

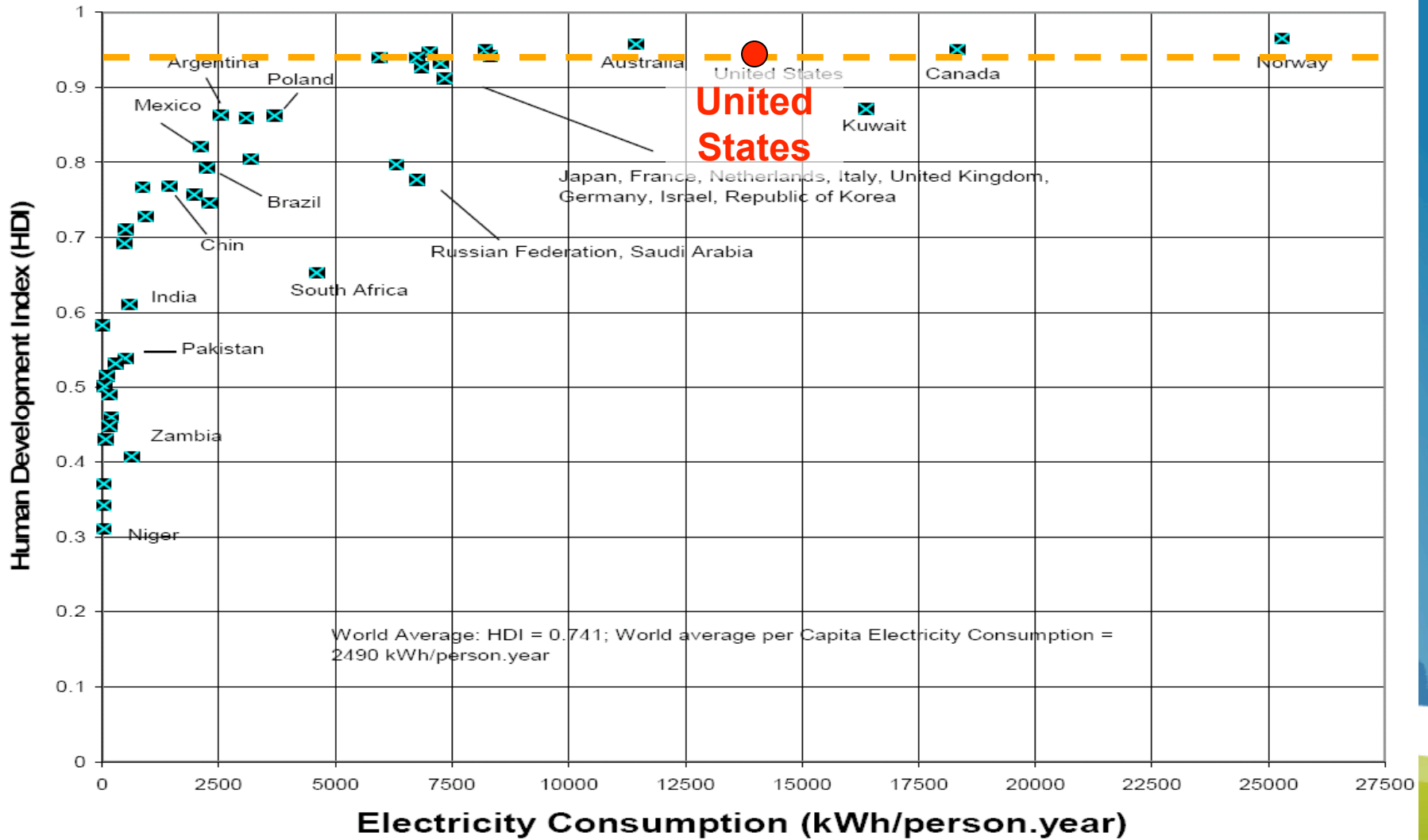


# Frequently quoted myths about energy:

1. The wealth of a country is proportional to the energy it uses.



## Human Development Index (GDP/capita, education level, health care, etc.) vs. Electricity Use



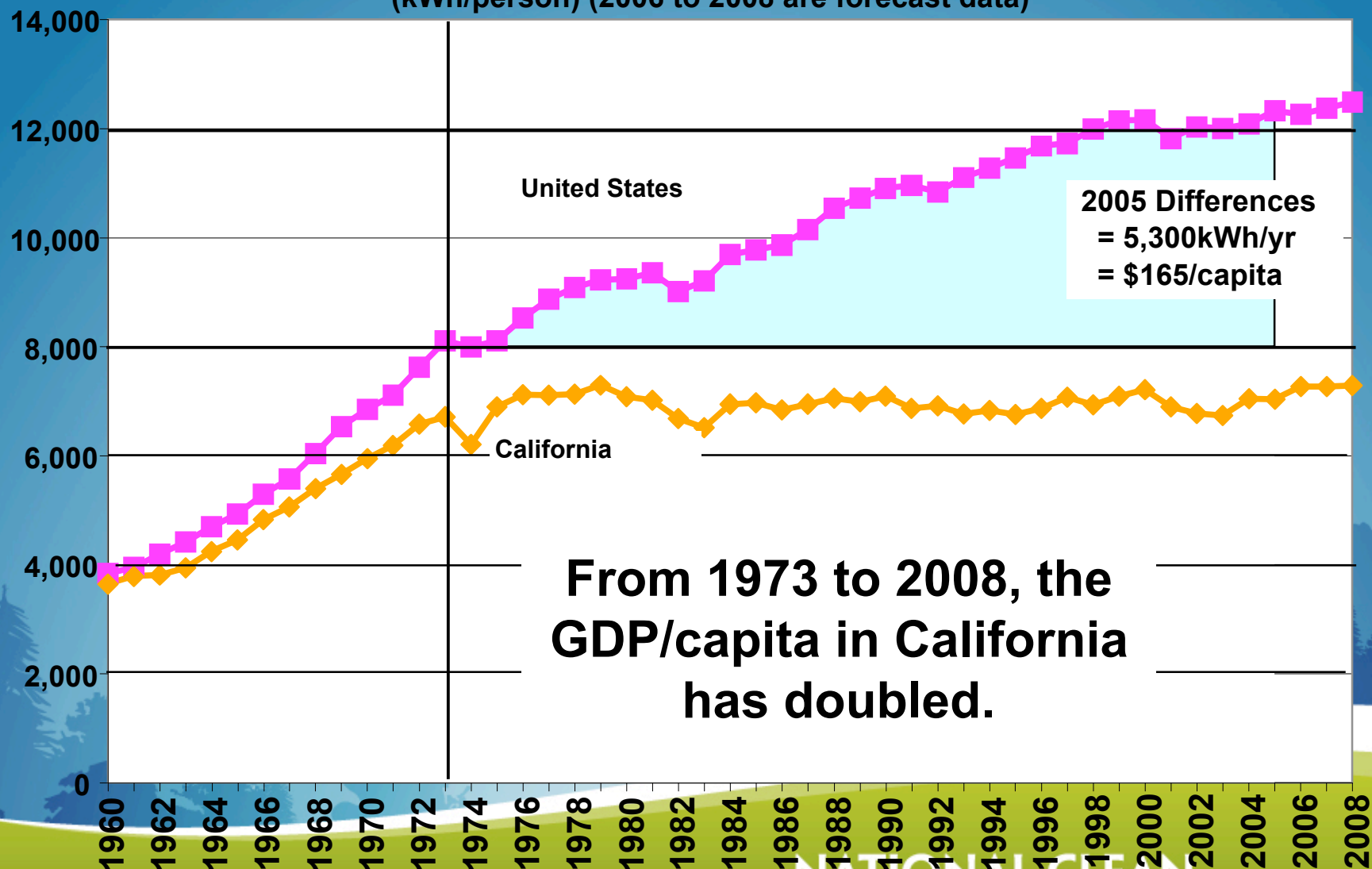
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# Electricity use per person (1960 – 2008)

Per Capita Electricity Sales (not including self-generation)

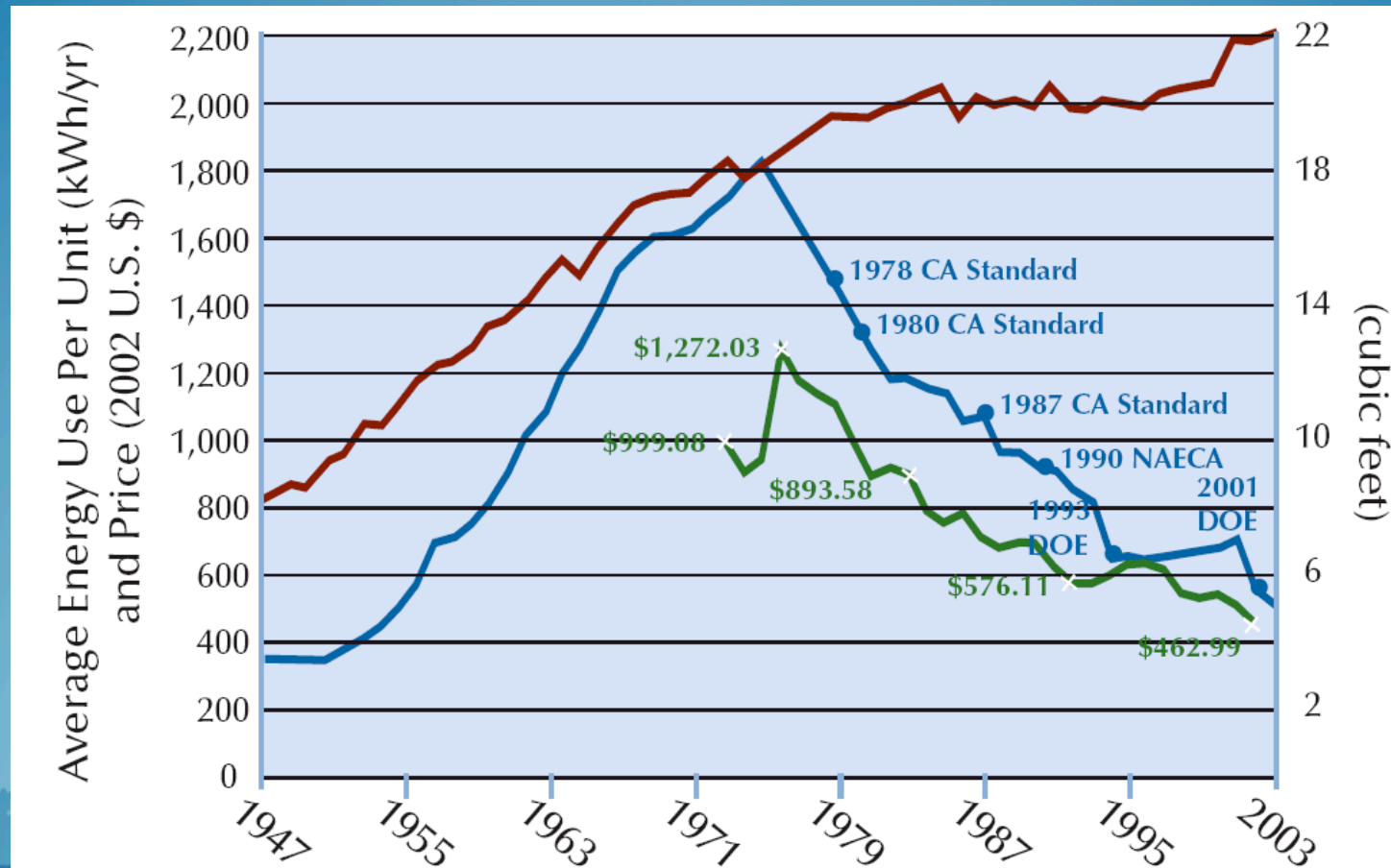
(kWh/person) (2006 to 2008 are forecast data)



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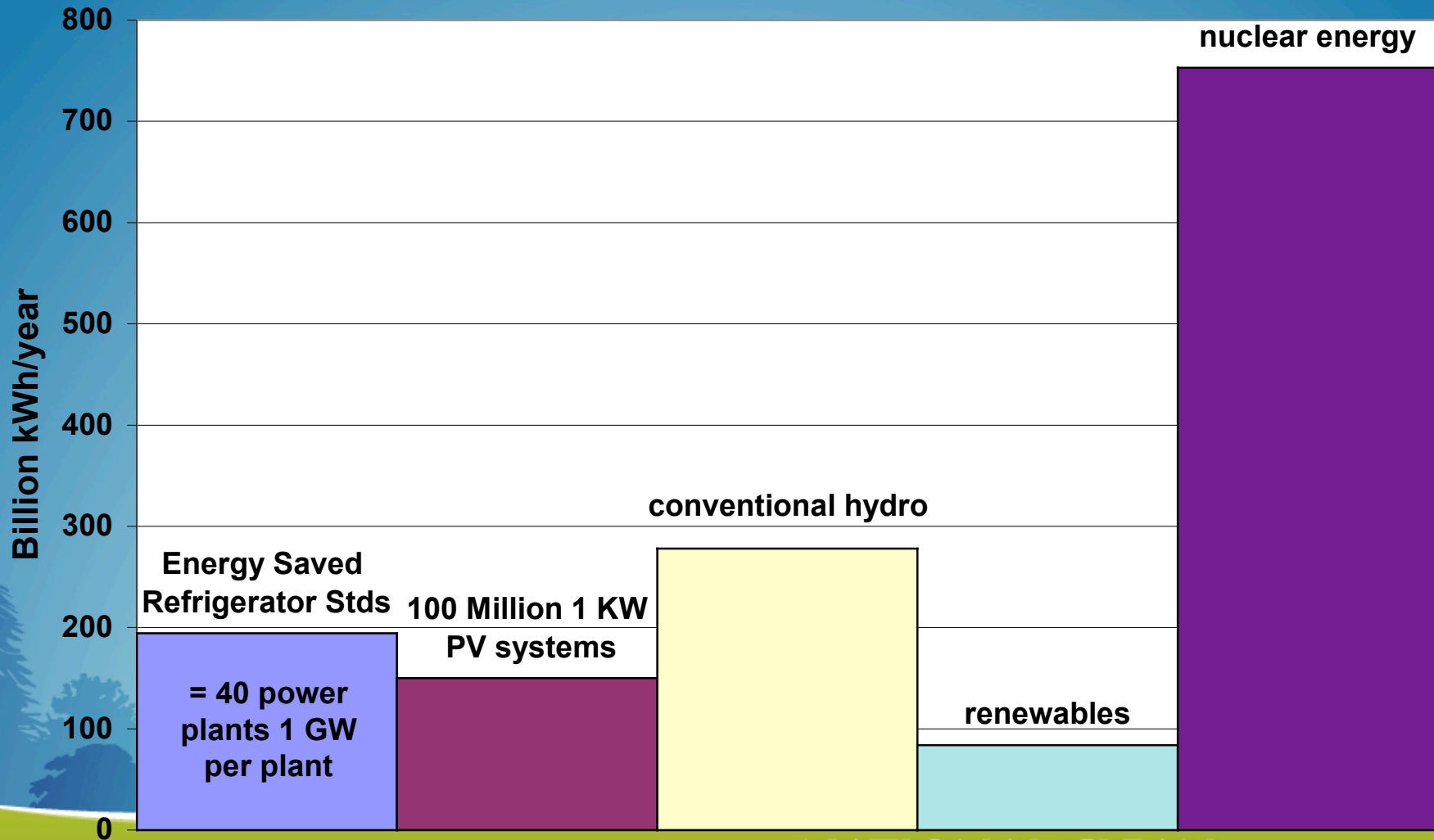
# Regulation stimulates technology: Refrigerator efficiency standards stimulated industry innovation



Regulation of consumer electronics and computers can save a similar amount of energy.



## Annual Energy Saved vs. Several Sources of Supply In the United States



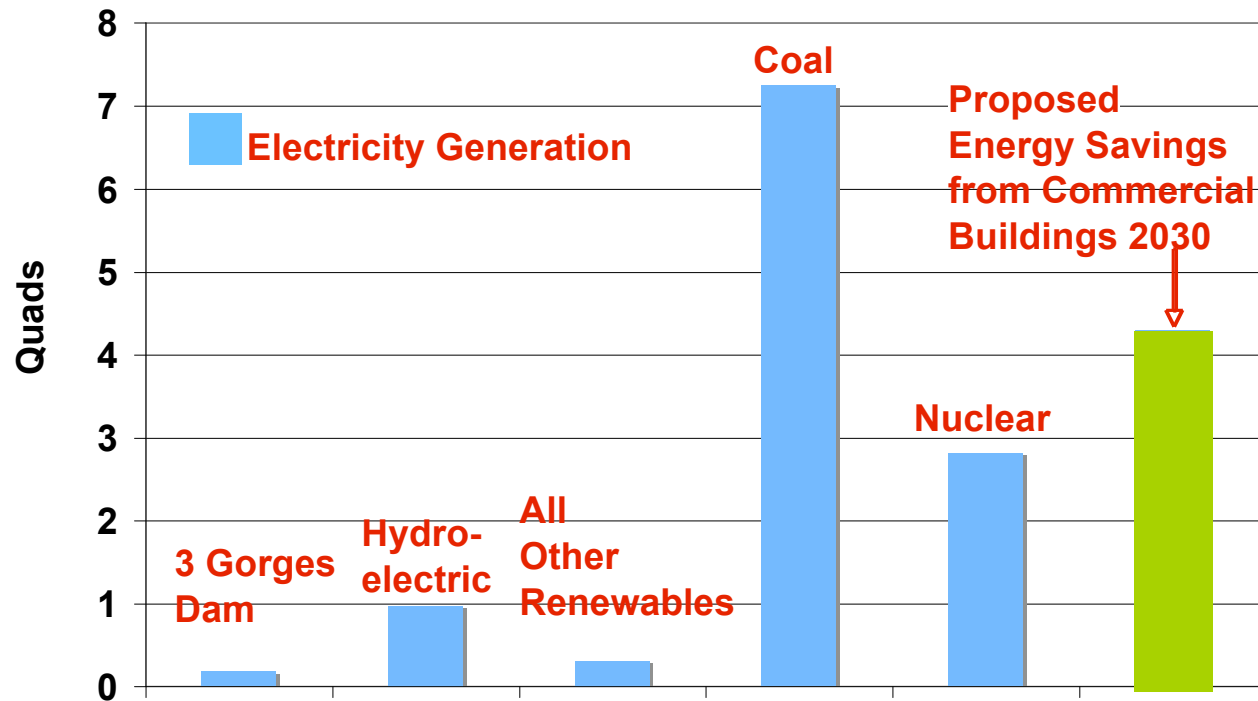
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## Buildings consume

39% of U.S. energy, produce 48% of Carbon emissions,  
Commercial building annual energy bill: \$120 billion

**A 80 - 90% reduction in energy in new commercial buildings is possible with new technologies.  
(CPUC, LBNL and United Technologies)**



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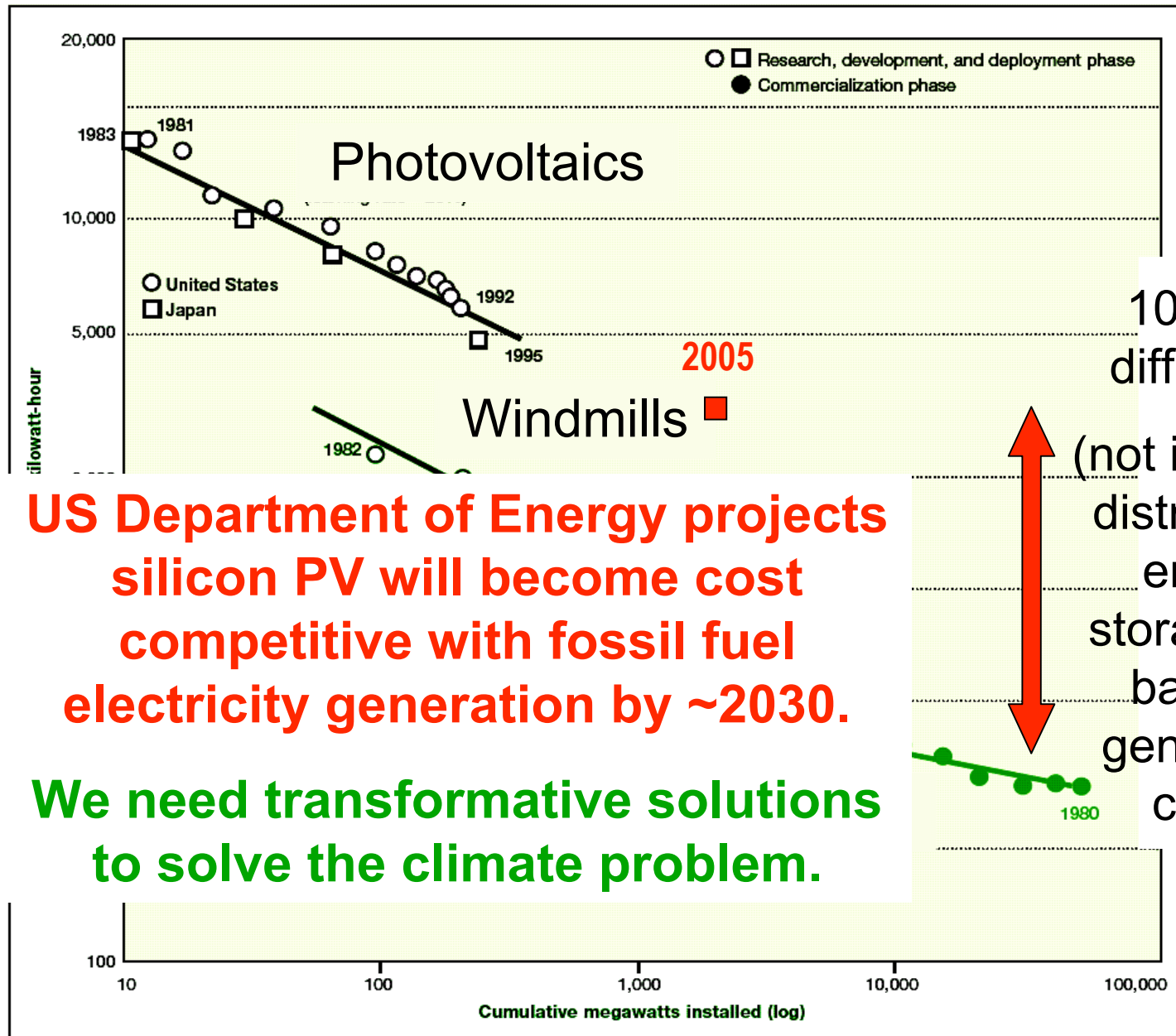
## Frequently quoted myths about energy:

1. The wealth of a country is proportional to the energy it uses.
2. We have all the technology we need to solve the energy problem. It is only a matter of political will.

Political will *is* necessary (e.g. a price on carbon, with *no* loopholes), but new technology can transform the energy landscape.



# Cost of electricity generation vs. installed capacity (1990 dollars / installed Megawatt hour)



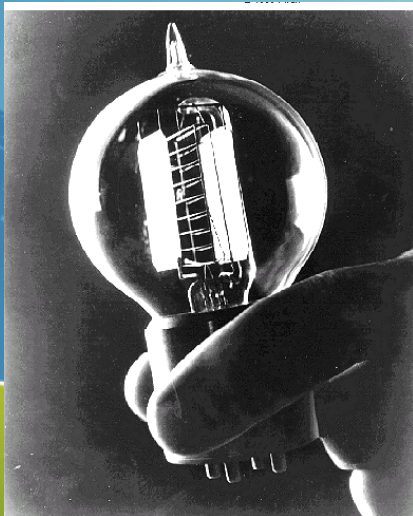
**US Department of Energy projects silicon PV will become cost competitive with fossil fuel electricity generation by ~2030.**

**We need transformative solutions to solve the climate problem.**



# What is a transformative technology?

Electronic amplification and transcontinental telephones.



- In 1914, AT&T completed the first transcontinental telephone line.
- An essential component was electronic amplification with the vacuum tube.
- Vacuum tubes required a red-hot wire to emit electrons. The tubes generated a lot of heat and burned out.

By the early 1930's it became clear that a more reliable, miniature electronic amplifier was needed.

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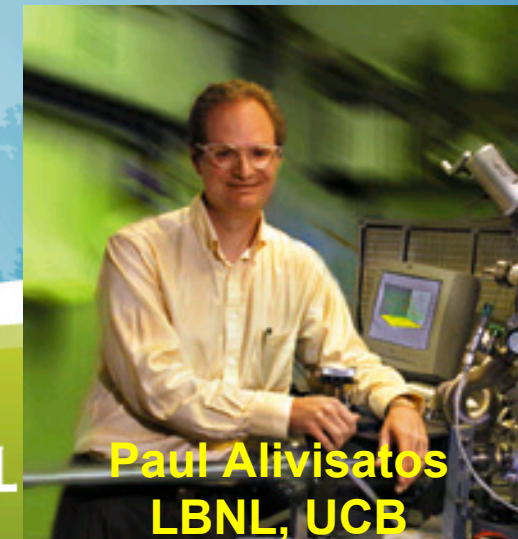
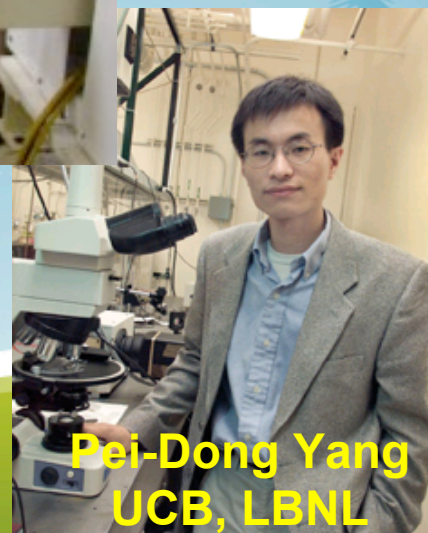
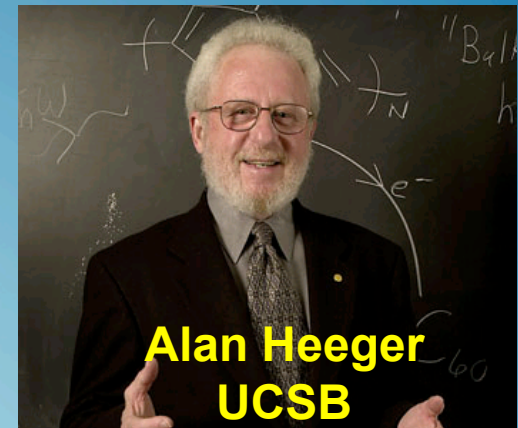
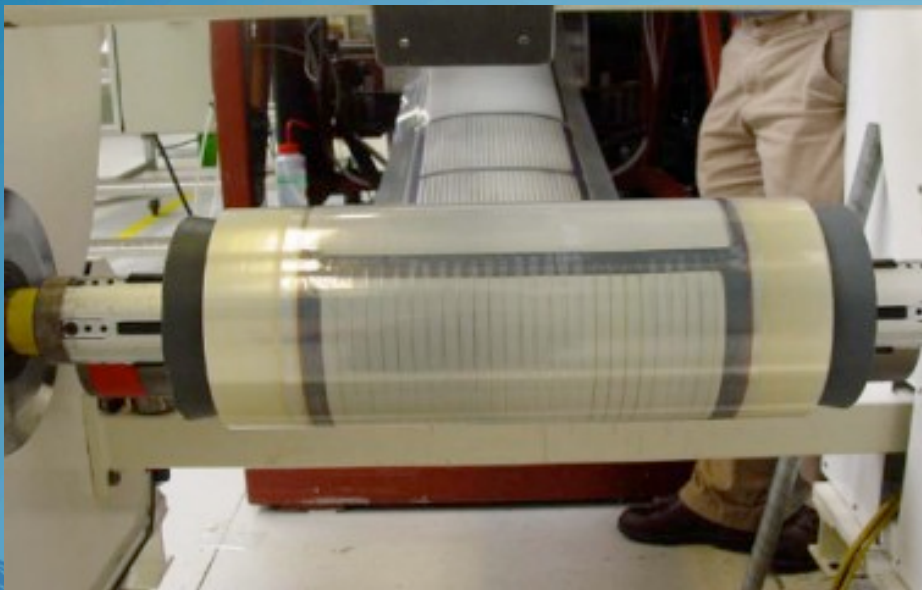
- AT&T Bell Laboratories *also* embarked on a research program to develop a solid state electronic amplifier and switch (*The Transistor*).

- This research would not have been possible without the development of a fundamentally new understanding of the atomic world (*Quantum Mechanics*) that occurred a decade before Bell Labs began their quest.





Reel-to-reel mass production of *efficient* solar cells based on rapidly developing nanotechnology may be possible.





# Sunlight to energy via Bio-mass



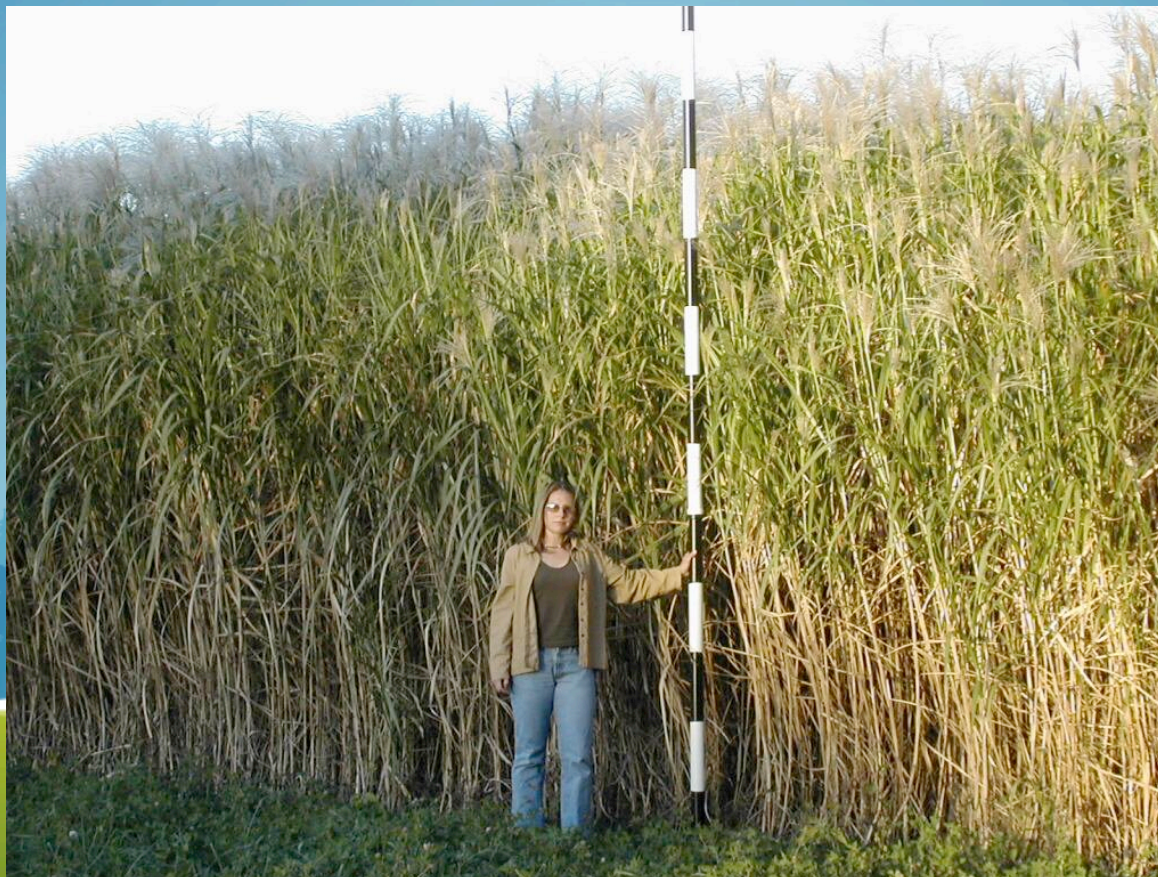
We to develop **energy** plants that can use marginal agricultural land. (More efficient use of water, sunlight, nutrients.)

Improved conversion of cellulose into fuel. New organisms for biomass conversion.



Feedstock grasses (*Miscanthus*) is a largely unimproved crop.  
Non-fertilized, non-irrigated test field at U. Illinois yielded  
**15x more ethanol / acre than corn.**

50 M acres of energy crops plus agricultural and urban wastes  
can produce **1/2** of current US consumption of gasoline.



AN  
RGY SUMMIT

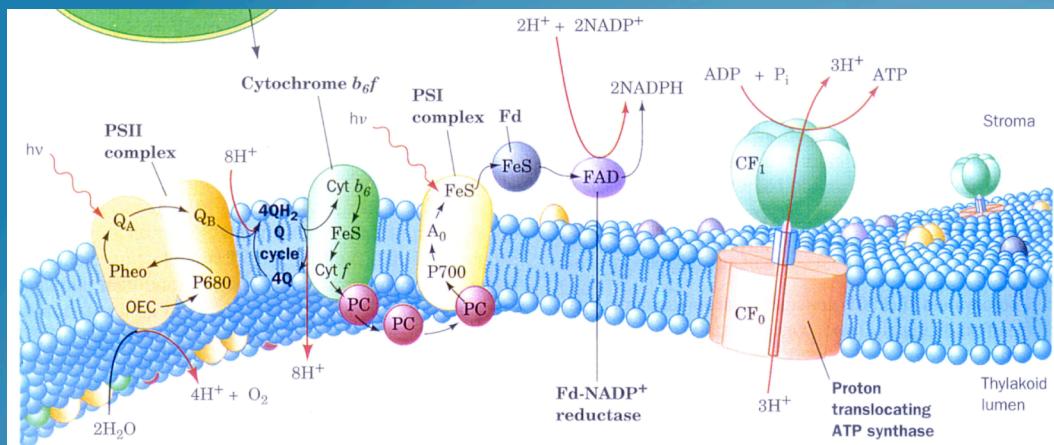


## At the Berkeley Lab:

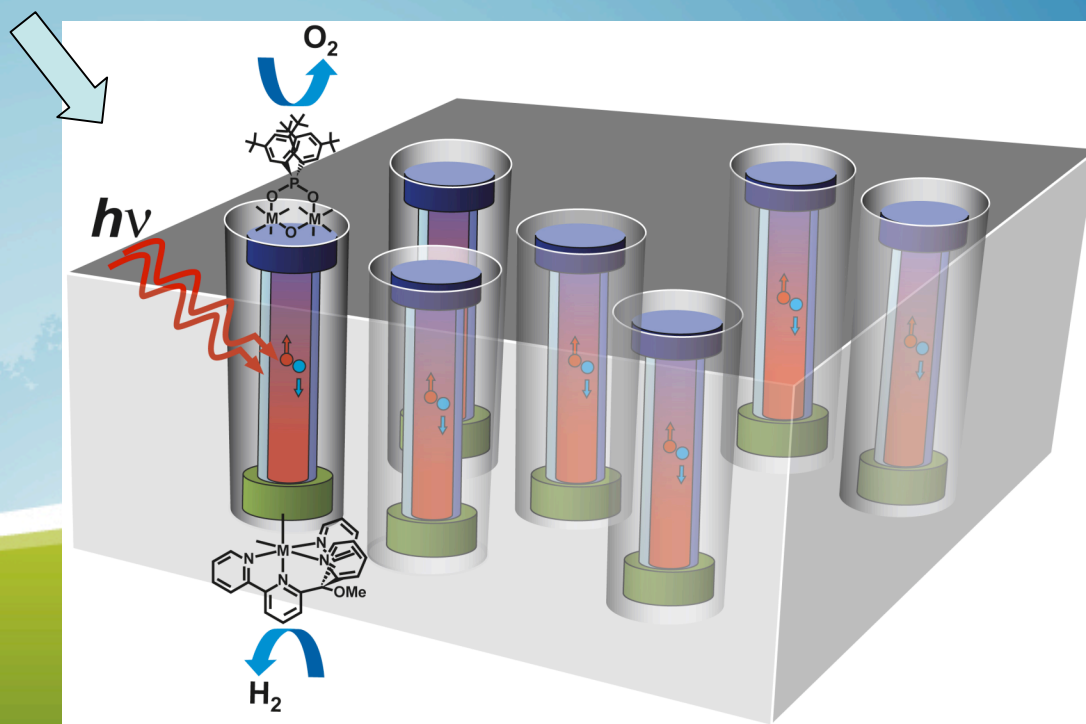
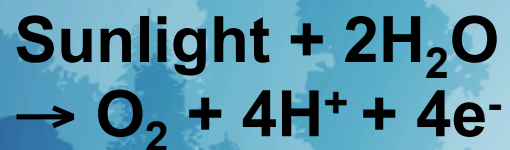
- Ionic liquids have shown dramatic improvement in the separation of lignin from cellulose.
- "Synthetic Biology" technology has been used to turn yeast into producing a gasoline-like fuel.
- Future fuels will include diesel and jet-fuel replacements.



# Lawrence Berkeley Lab Helios Artificial Photosynthesis Project

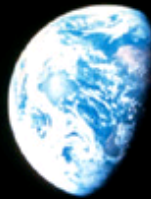


The first important step:





Earthrise from Apollo 8  
(December 24, 1968 )



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# Financing Renewable Energy Projects

Jim Thoma  
Bank of America

National Clean Energy Summit  
Cox Pavilion, University of Nevada Las Vegas  
August 19, 2008

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# Bank of America and the Environment

- Bank of America sees the business opportunities inherent in addressing global climate change.
- Bank of America has made a \$20 billion, 10-year environmental commitment.
- Bank of America:
  - Believes a defined regulatory environment with market-based mechanisms, such as cap and trade, is needed.
  - Adopted The Carbon Principles in anticipation of carbon regulation.
  - Believes in a balanced approach to satisfying growing energy needs, including investment in energy efficiency.
  - Supports renewal of the alternative energy and efficiency tax credits.
  - Supports state and local incentives.

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# Key Legislative/Regulatory Programs

- Federal tax policy
  - Section 45 production tax credit
  - Section 48 investment tax credit
  - Clean Renewable Energy Bonds (Section 54)
- Federal legislation
  - Energy Policy Act of 2005
  - Pending extenders legislation
  - Federal Energy Savings Performance Contracting (ESPC) program
- Renewable portfolio standards
- Renewable energy credit & carbon credit trading regimes
- State & local renewable energy incentives
  - California Solar Initiative
  - Utility incentive programs
- State energy efficiency programs

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# Transaction Experience

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# Tax-Exempt Financing Example

- The Douglas County School District
  - Grades K-12
  - 6,700 students
- Energy conservation measures for 11 schools and support facilities
- Equipment and improvements include:
  - New lighting systems and controls
  - Upgraded energy management system
  - New vending machine controls
  - New energy star transformer and trash compactors
  - HVAC retrofit to install two new natural gas-fired heating units
  - Replacement of exterior lighting
- \$8.2MM in savings over 15-year term



Douglas County  
SCHOOL DISTRICT  
Minden, Nevada

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**\$5,100,000**

**Tax-exempt**

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**Energy Efficiency  
Improvements for School  
Facilities**

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# Clean Renewable Energy Bonds (“CREBs”)

- Southern Nevada Water Authority received \$6.9 million CREBs allocation for four renewable energy projects
  - Sloan Distributed Small Hydropower Projects One & Two
    - 700 kilowatts, 3,200-3,300 MWhs per year.
    - Under future flow regimes, induction generator size could be increased to approximately 1.3 MWhs per year.
  - Horizon Ridge Distributed Small Hydropower Project
    - 605 kilowatts, 3,300 MWhs per year.
    - Under future conditions, up to 5,000 MWhs per year could be produced.
  - River Mountain Water Treatment Facility Distributed Solar Power Project
    - 250 kilowatts, minimum of 550,000 kWhs per year.



SOUTHERN NEVADA WATER AUTHORITY

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**Southern Nevada  
Water Authority**

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**\$6,900,000**

**Clean Renewable  
Energy Bond**

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**Hydro-Electricity  
Generation & Solar Project**



# Clean Renewable Energy Bonds (“CREBs”)

- The Las Vegas Valley Water District received a \$2.5MM CREBs allocation for constructing and equipping solar panels at the Las Vegas Springs Preserve.
  - 174 kilowatts of solar photovoltaic systems.
  - Produce a minimum of 347,276 kWhs per year.
  - Offset on-site energy requirements and reduce the need for imported power and ancillary services.
  - Solar photovoltaic systems have low-water requirements, good for Southwest desert environments.



**Las Vegas Valley  
Water District**

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**\$2,500,000**

**Clean Renewable  
Energy Bond**

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**Solar Parking  
Canopies**

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# Solar Services Contract

- Largest solar power and energy-efficient facilities program in U.S. K-12 education.
- Chevron Energy Solutions will construct and a Bank of America subsidiary will own up to five megawatts of solar photovoltaic systems.
- No district capital investment required.
- More than \$25 million in energy cost savings to the District over the life of the solar power system.
- Provides the District with budget stability and predictability through known energy costs.
- 25% reduction in the District's demand for utility power.
- Reduction of 37,500 tons of carbon dioxide emissions, equivalent to planting 400 acres of trees.



San José Unified School District

**\$17,500,000**

**Solar Services Contract**

**Solar Power and Energy  
Efficiency Project**

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U.S. SENATOR  
HARRY REID

# NATIONAL CLEAN ENERGY SUMMIT



# Mayor Michael Bloomberg

City of New York







U.S. SENATOR  
HARRY REID

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