

August 10, 2009  
Sacramento

August 12, 2009  
Diamond Bar

# CLEAN ENERGY SUMMIT

California Energy Commission



The left side of the slide features a vertical stack of white icons on a blue background. From top to bottom, the icons include: a wind turbine, a smaller wind turbine, a city skyline, a car, and a large gear. The background is a gradient of light blue to white, with faint circular patterns and a green-to-yellow gradient at the bottom.

# The Clean Energy Sector

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Advisor to Chairman Karen Douglas

# Presentation

- Definition of Clean Energy Sector
- Buildings Energy and Water Use
- Renewable Energy Generation
- Clean Transportation
- Summation

# Clean Energy Sector



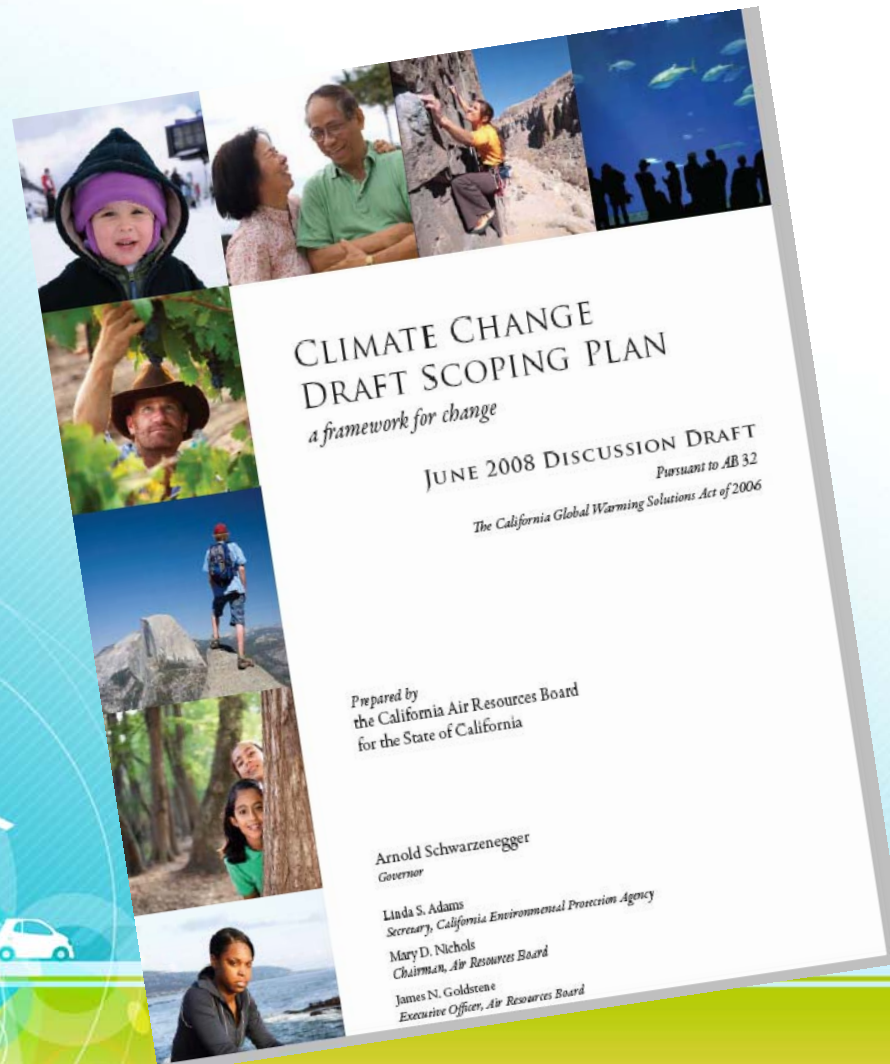
- Production, installation, operation and maintenance of products and/or technologies that reduce the environmental impact of energy infrastructure development, production and use.
- Energy in this context:
  - Electricity
  - Natural gas and alternatives
  - Transportation

# Clean Energy Sector

- Energy and water efficiency
- Demand response
- Renewable energy
- Electricity transmission and distribution infrastructure
- Clean vehicles
- Renewable transportation fuels

# Climate Change Scoping Plan

## A Framework for Change



# Recommended Reduction Measures

## Reductions Counted Towards 2020 Target

- Light-Duty Vehicle GHG Standards
- Energy Efficiency
- Renewables Portfolio Standard (33% by 2020)
- Low Carbon Fuel Standard
- Regional Transportation-Related GHG Targets
- Goods Movement
- Recycling and Waste (landfill methane capture)
- Million Solar Roofs
- Medium/Heavy Duty Vehicles
- High Speed Rail
- Industrial Measures
- High Global Warming Potential Gas Measures
- Sustainable Forests
- Oil and Gas Extraction and Transmission
- “Additional Reductions”

# How Big Is It?

- CA and National clean energy sector

	Clean energy businesses 2007	Clean jobs 2007	Clean job growth 1998-2007	Overall job growth 1998-2007
CA	10,209	125,390	7.7	6.7
US	68,203	770,385	9.1	3.7

Pew Charitable Trust – The Green Economy

[http://www.pewcenteronthestates.org/report\\_detail.aspx?id=528](http://www.pewcenteronthestates.org/report_detail.aspx?id=528)

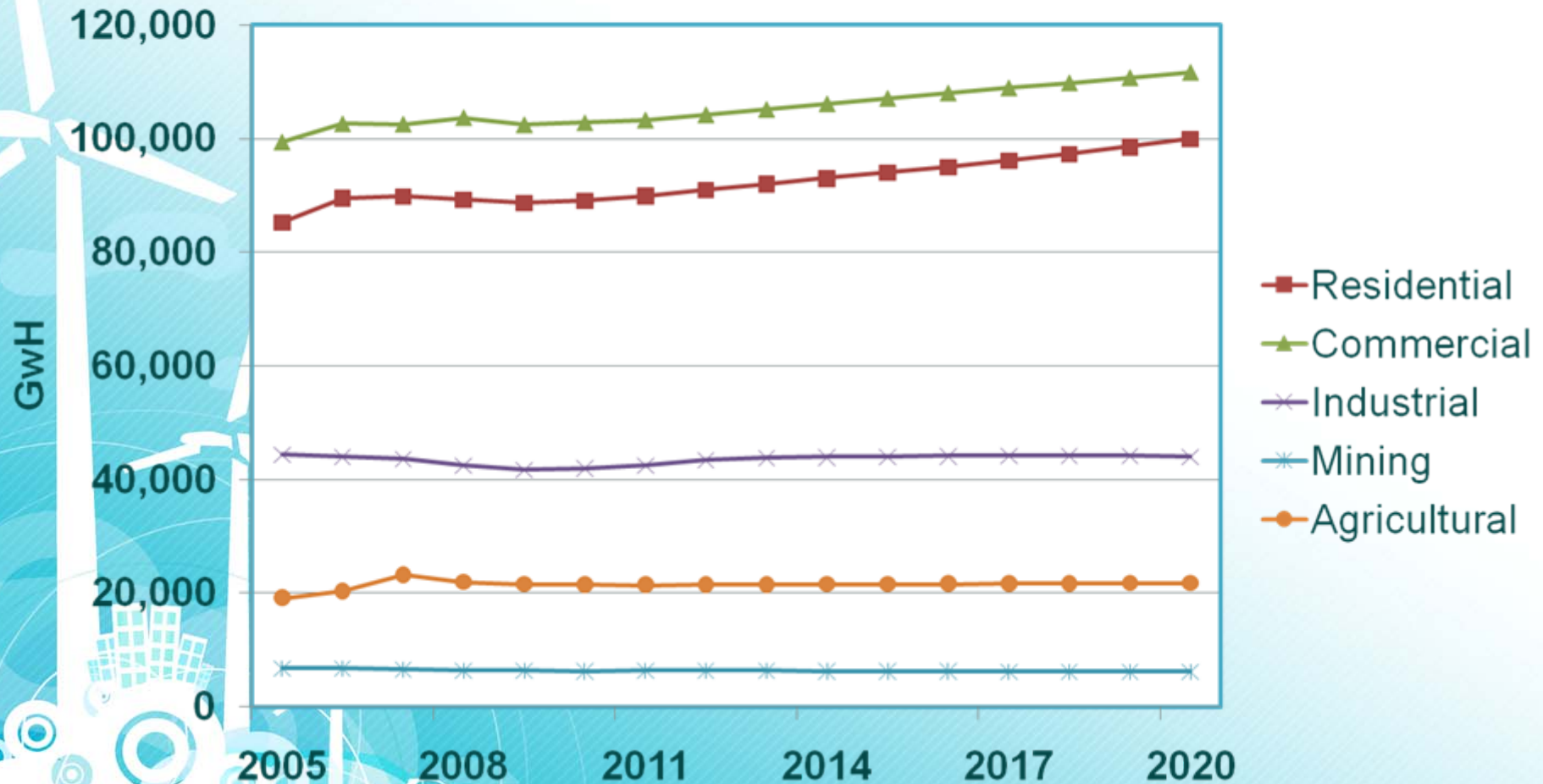
# What is Coming?

- Energy Generation is the largest US cleantech segment, accounting for 59 % of total US cleantech VC investment
- Energy Infrastructure is the fastest growing segment, increasing by \$273 M from 2007 to 2008.

# Clean Energy Sector Markets

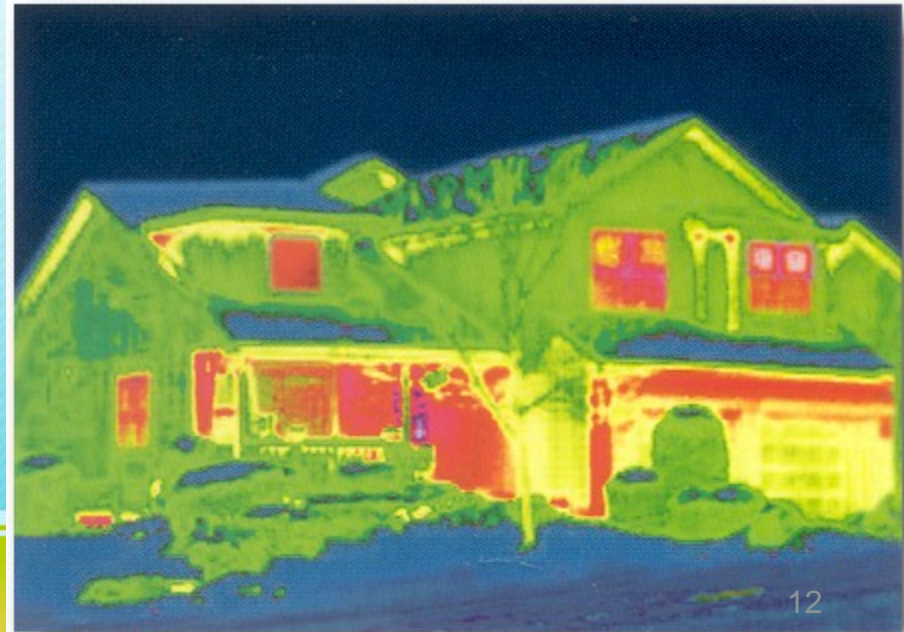


# CA Electricity Demand Forecast 2020



# Building Energy and Water Use

- 75% of CA's residential buildings and 5.25 billion square feet of commercial buildings were built before 1978's energy efficiency standards



# Water



# Urban Water Use



= 50%



= 20%



= 18%

# Building Energy and Water Efficiency Policies

- New construction Zero Net-Energy.
- Deep building retrofit.
- CA invests nearly \$1 B/yr in energy efficiency measures.
- 20% reduction of urban water use below 2005 levels by 2020
- State administered ARRA funds will invest nearly \$300 M into innovative program models.

– [www.energy.ca.gov/recovery](http://www.energy.ca.gov/recovery)

# Building Energy and Water Efficiency Workforce Needs

- Building auditor/rater
- Commissioning agent
- Specialty contractor
- Home performance contractor
- Cost estimator

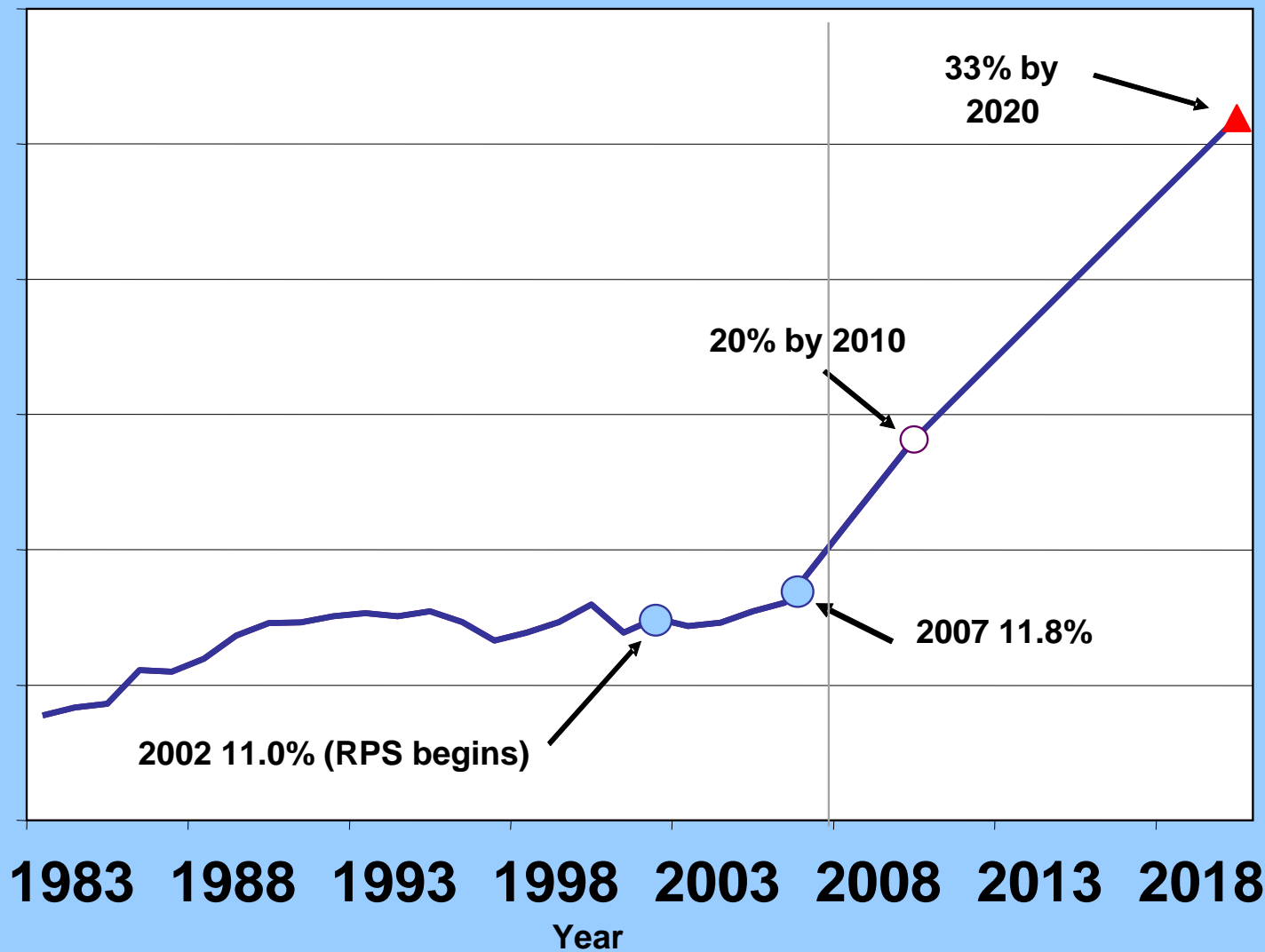


# Utility Scale Renewable Energy



- Renewable Portfolio Standard (RPS)
  - IOU must procure 20% of their electricity from renewable resources by 2010.
  - POU directed to develop same program goals.
  - Governor, CEC and CPUC adopted goal of 33% by 2020

# Renewable Portfolio Standard



# Renewable Energy Barriers

- Transmission
  - Utilities are taking up to seven to ten years to plan, permit, and construct bulk transmission projects in California
- Financing
- Local Opposition

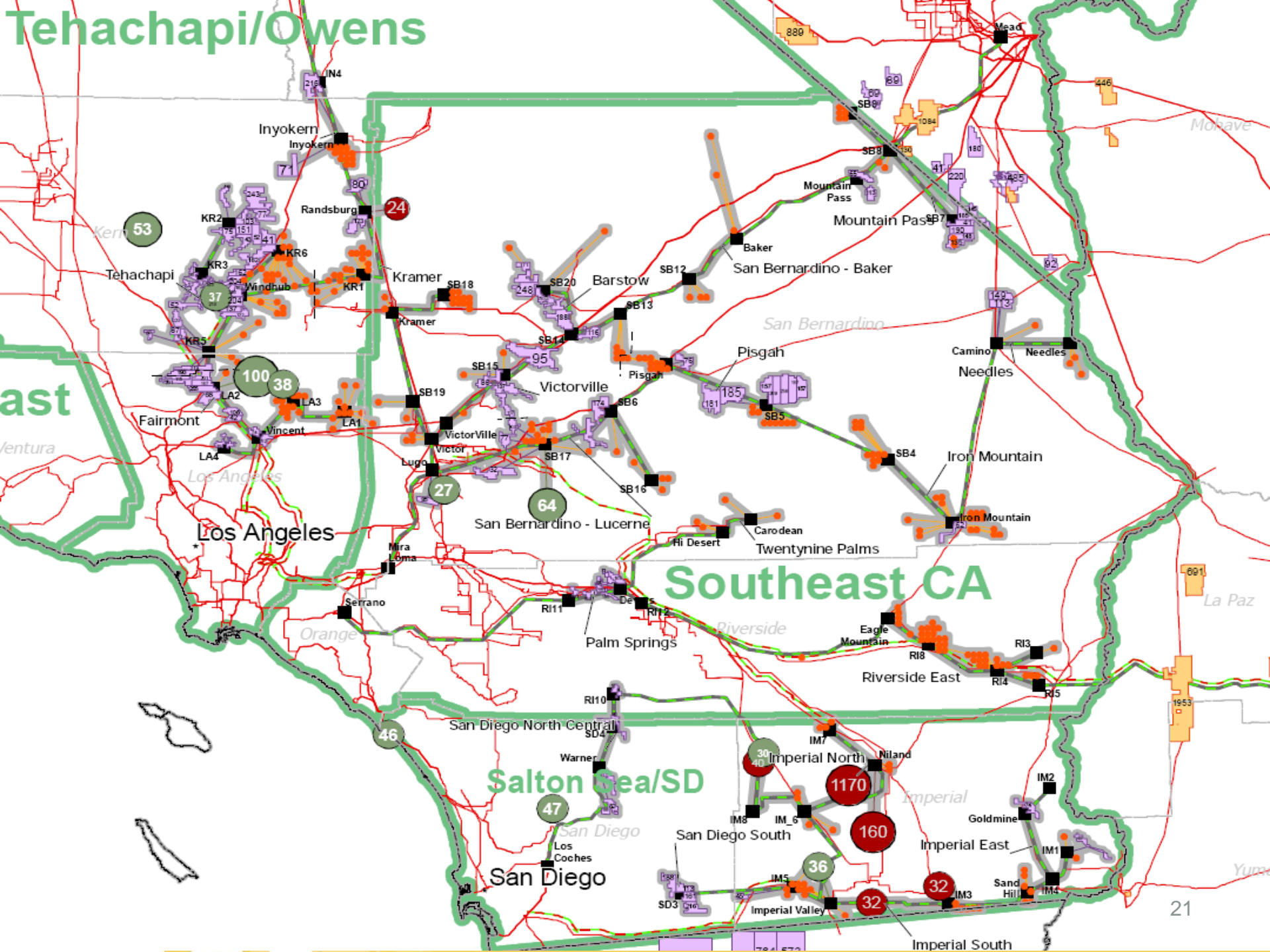


# Renewable Energy Transmission Initiative (RETI)

- Statewide initiative to:
  - Identify transmission lines needed to accommodate renewable energy goals.
  - Support future energy policy.
  - Facilitate transmission corridor designation and transmission and generation siting and permitting.

<http://www.energy.ca.gov/reti/index.html>

# Tehachapi/Owens



## Employment Rates by Energy Technology

Power Source	Construction (jobs/MW)	O&M (jobs/MW)	Total for 500MW	Factor Increase over Natural Gas
Natural gas	1.0	0.1	2460	1
Wind	2.6	0.3	5635	2.3
Geothermal	4.0	1.7	27050	1.1
Solar Electric	7.1	0.1	5370	2.2
Solar Thermal	5.7	0.2	6155	2.5
Landfill methane	3.7	2.3	36055	14.7

# Utility Scale Renewable Energy Workforce Needs

- Transmission lines
- Distribution infrastructure
- Generation (solar, wind, geothermal)
- Maintenance

# Distributed Renewable Energy

- Technologies
  - Solar photovoltaic
  - Solar hot water heater
  - Wind
  - Micro-hydro
  - Fuel cell



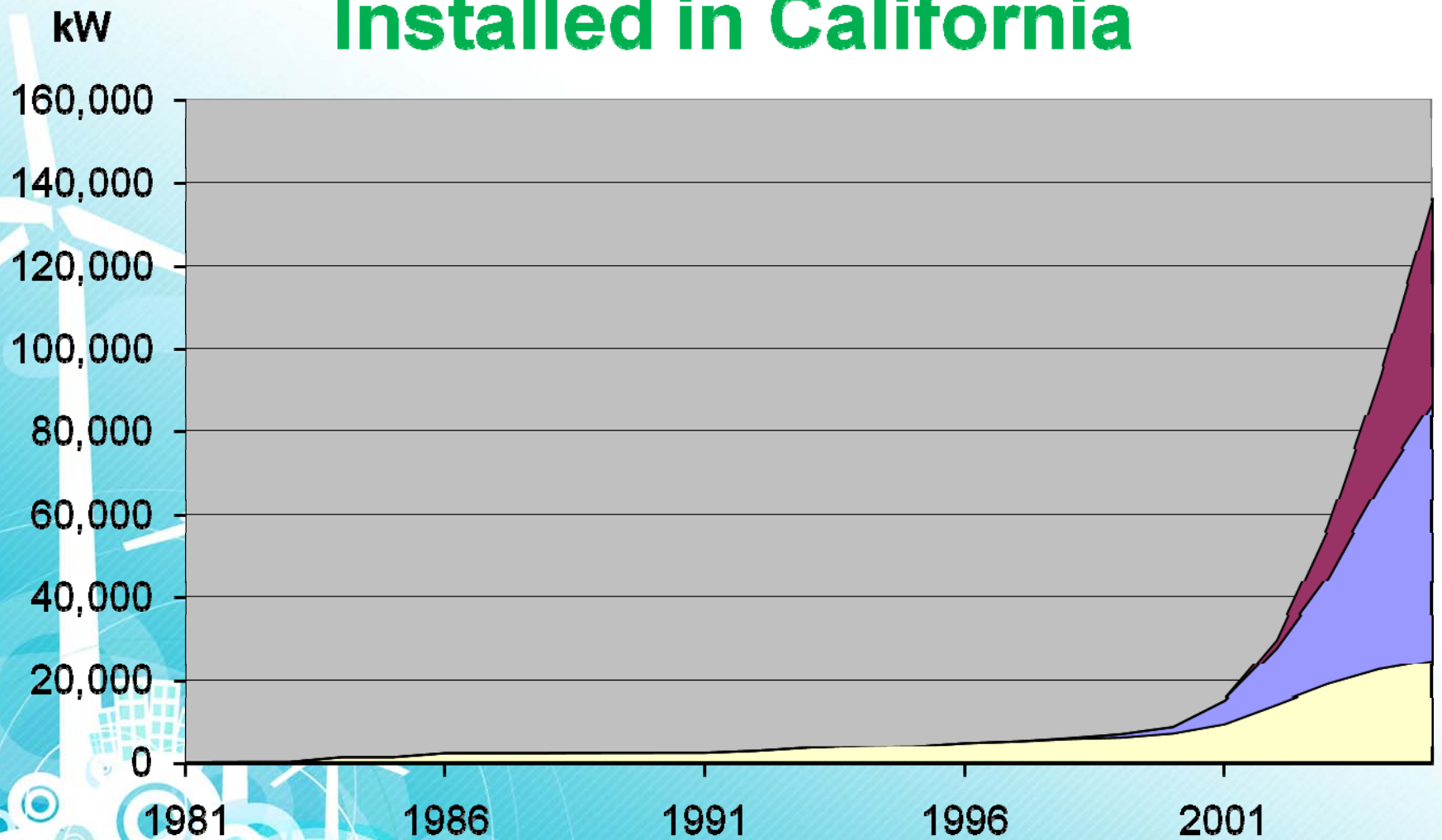
# SB 1: Million Solar Roofs

- ✓ 3000 MW goal, combined POU/IOU effort
- ✓ \$3.2 B in rebates

- ✓ Solar on 50% of new homes by end of program
- ✓ Solar Industry self-sufficient in 10 years
- ✓ For those developments of 50+ homes, builders must offer PV as option as of 1/1/2011



# Grid-Connected PV Capacity Installed in California



- The Rest of the State
- California Energy Commission
- California Public Utilities Commission

# Solar Hot Water



# Solar Hot Water Program

- \$300 M program in PG&E, SoCal Gas and SDG&E areas.
- 200,000 solar hot water heaters.
- Proposed roll-out in 2010.



# Distributed Renewable Energy Occupations

- Assessor
- Sales
- Marketing
- Designer
- Technician
- Installer



# Clean Transportation

- Transportation sector >95% dependent on a single fuel source (petroleum).
- State and the nation vulnerable to petroleum price and supply disruptions.
- Transportation responsible for 40 % GHG emissions; public health issues.

# Clean Transportation

- State Goals:
  - Increase alternative fuels to 20% of on-road transportation fuel use by 2020 and 30 % by 2030.
  - Increase efficiency of motor vehicles.
  - Reduce per capita vehicles miles traveled (VMT).

# Clean Transportation

- Alternative fuels
  - 20% of biofuels production by 2010.
  - 40% by 2020.
  - 75% by 2050.
- Low Carbon Fuel Standard
  - Reduce GHG impacts in CA's transportation fuels 10% below 2007 levels by 2020.



# Clean Transportation



- Clean Vehicles

- By 2016 vehicles in CA must be 30% more GHG efficient than those sold in 2002.
- 2009 Zero Emission Vehicle regulation update.
- AB 118 allows CEC to fund \$120 million in transportation research, development and deployment annually for 7 years.

# Clean Transportation Workforce Needs

- Fuel feedstock production.
- Alternative and renewable fuel production.
- Alternative and renewable fuel transport.
- Idle management technology.
- High-performance and low-emission vehicle technology.
- Automotive computer systems.
- Mass transit fleet conversion, servicing, and maintenance.

# Summation

- CA is a leader in clean energy sector.
- Policies and investments will allow CA to continue to lead.
- An educated and well-trained workforce is critical to attracting clean energy sector investment.
- We will not achieve any of our clean energy sector goals unless we develop the workforce.

# Thank You!

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