

ASME Turbo Expo 2005

Permitting Turbines A California Perspective

Air Resources Board

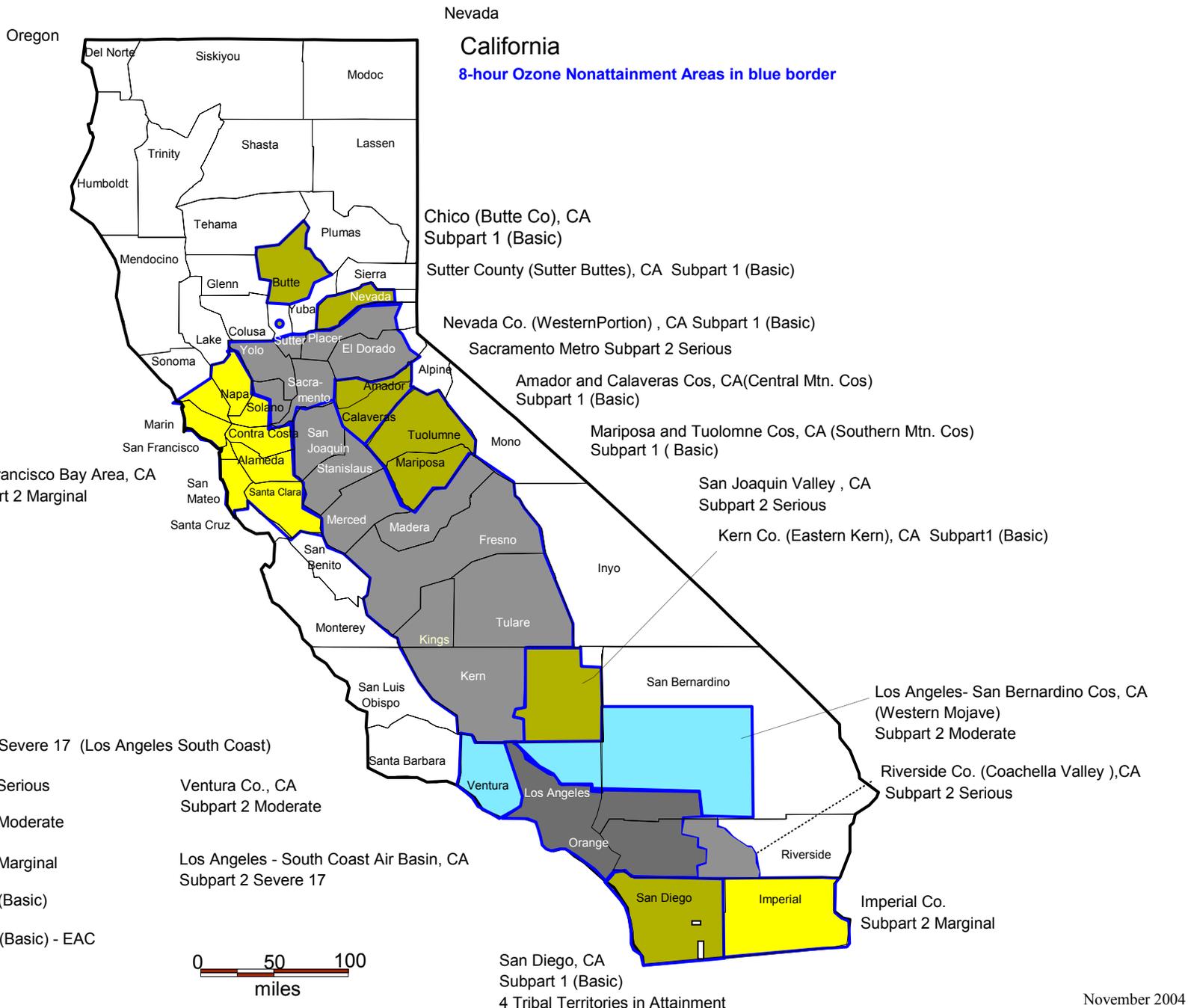
California Environmental Protection Agency



Outline

- Permitting Turbines
 - federal, State and Local Agencies Responsibilities
 - NSR/BACT
- Factors Driving Technology
 - SIP commitments
 - Cost of Offsets
- California Energy Needs
 - Changes in Generation Capacity
 - Outlook for 2005 and beyond
- Future





Courtesy of U.S. E.P.A.

State Nonattainment Area Classification OZONE



-  *Extreme*
-  *Severe*
-  *Serious*
-  *Moderate*
-  *Nonattainment*
-  *Attainment*
-  *Unclassified*



Permitting Responsibilities

- ARB provides technical assistance and is the oversight agency for 35 air districts in California.
- Stationary source permitting responsibilities rest with each air district.
- Electrical generation > 50 MW requires a California Energy Commission license.



Turbine Permitting Federal vs. California

Sources in California are required to comply with both federal and State requirements:

- Federal: NSR / PSD / NESHAPS / NSPS / Acid Rain / Title V
- State: NSR / Health Risk Assessment / Ambient Air Quality Impact Analysis



2005 BEST AVAILABLE CONTROL TECHNOLOGY

- NO_x: 2 ppmvd* (combined cycle/cogeneration)
2.5 - 3 ppmvd (simple cycle)
- CO: 2 - 4 ppmvd*
- VOC: 2 ppmvd*
- SO_x and PM₁₀: Use of natural gas with sulfur content <100 grains/DSCF

*at 15% O₂



Factors Driving Technology

- SIP Commitments
- Offsets
- OEM Competition



SIP Commitments

- Many Areas nonattainment for Ozone and Particulate Matter
- 2007 SIP plans being developed
- “Low hanging fruit has been picked”
- Zero and near zero technologies needed



District Retrofit Requirements

- San Joaquin Valley Unified APCD
Rule 4703 (4-25-02)
Existing Turbines >10 MW meet 3-5 PPM NO_x
- South Coast AQMD
Rule 2009 (5/11/2001)
RECLAIM Power Producing Facilities Meet
BARCT by 2003/2004



Offsets

- Creative methods to obtain offsets:
 - interdistrict and interpollutant trading
 - create from stationary, mobile and agricultural sources
- Cost for offsets is increasing; at times greater than cost for control



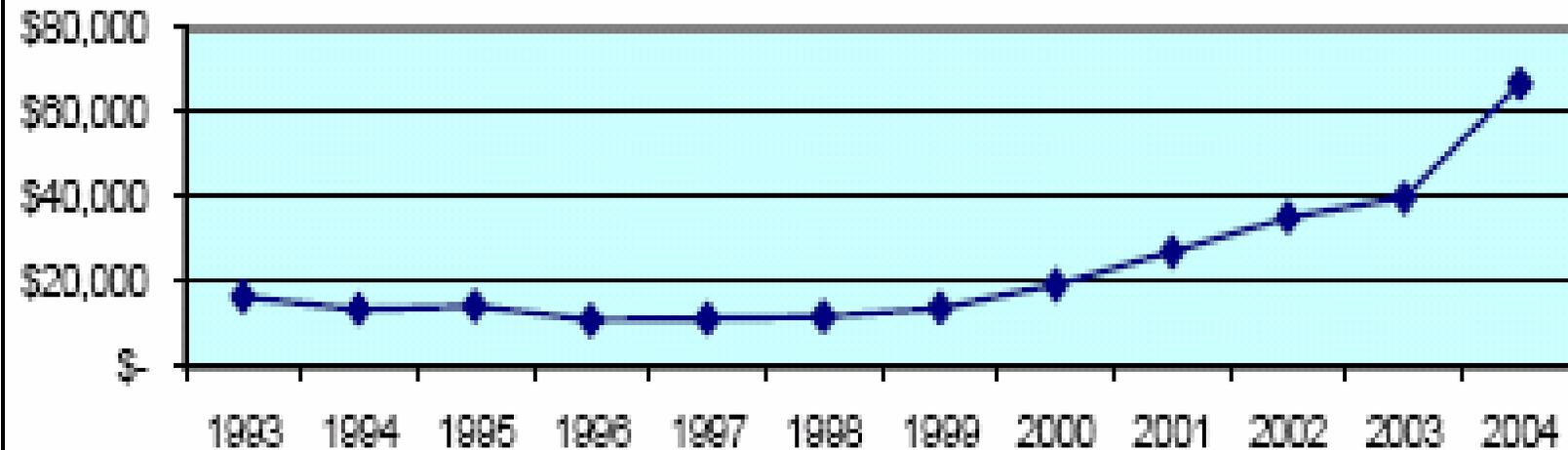
2004 Cost of Offsets

	NO_x	HC	PM10	CO	SO_x
Average	\$66,798	\$10,792	\$73,584	\$15,597	\$25,461
Median	\$48,767	\$7,014	\$30,022	\$11,058	\$39,139
High	\$210,000	\$70,000	\$153,425	\$32,877	\$41,644
Low	\$10,500	\$550	\$300	\$200	\$1,000



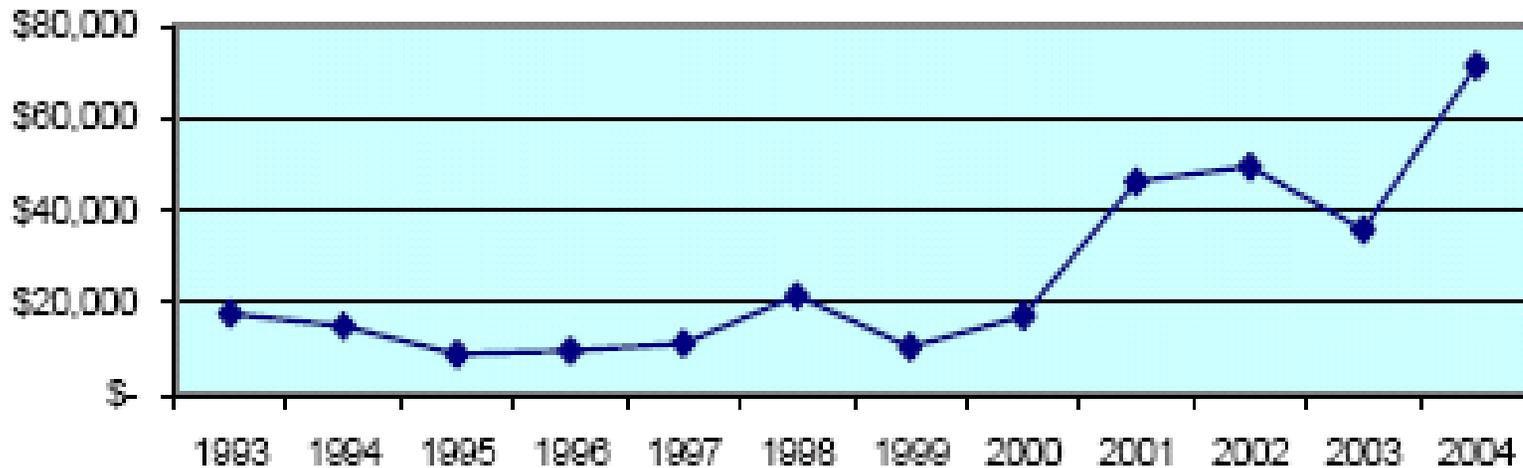
NOx Cost of Offsets Trend

Average Cost of NOx Offsets Per Transaction in \$/Ton
1993-2004



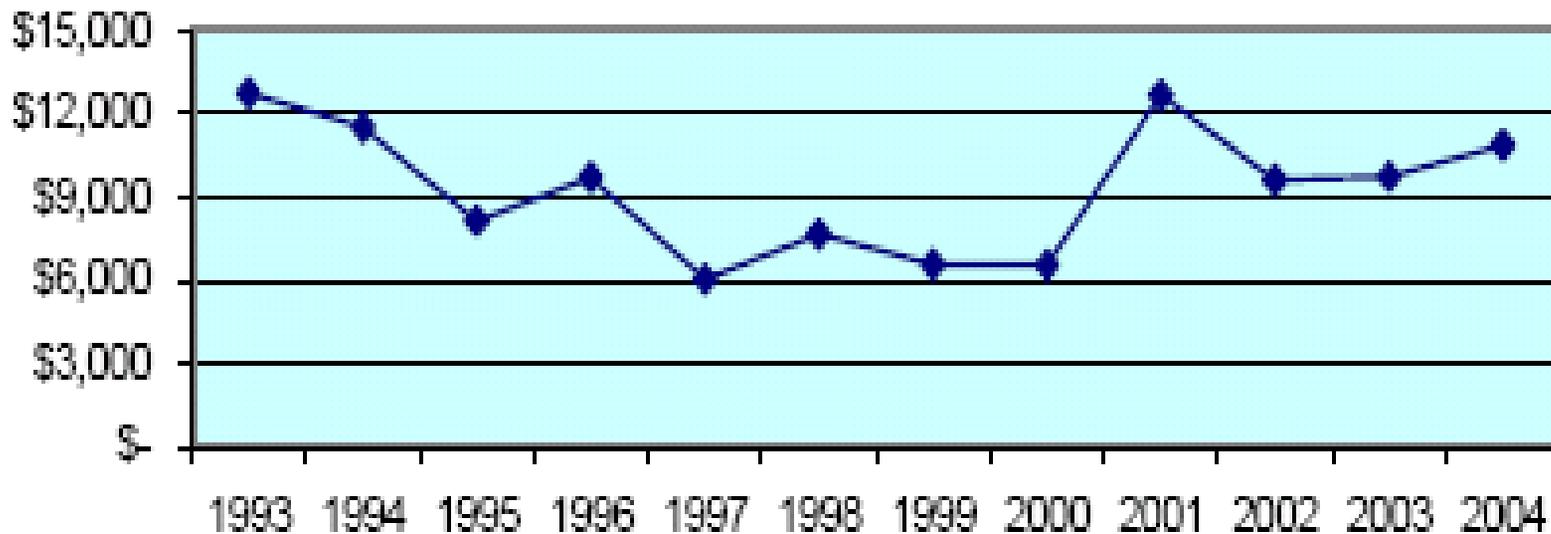
PM10 Cost of Offsets Trend

Average Cost of PM10 Offsets Per Transaction in \$/Ton
1993-2004



VOC Cost of Offsets Trend

Average Cost of HC Offsets Per Transaction in \$/Ton
1993-2004



CHANGES IN STATE-WIDE GENERATION CAPACITY

Year	Approved	Operational	Moth-balled	Retired	Net Change
1996-2005	43,550	12,752	(1,205)	(5,208)	6,339
2006	805	3,101		(2,385)	716
2007	0	366			366
2008	0	709			709
2009	0	205			205
2010	0	198			198
Subtotal	805	4,579	0	(2,385)	2,194
TOTAL	44,355	17,331	(1,205)	(7,593)	8,533



Electricity Outlook Summer 2005 and Beyond

“Demand growth and retirements will result in more severe reserve inadequacies in 2006 and beyond.”

“Additional generation and aggressive efficiency actions are needed statewide.”

“Must ensure effective resource adequacy requirements implemented by 2006.”

*Staff presentation by Energy Commission, CPUC & ISO before the Senate Energy Utilities and Communications Committee, February 22, 2005.



How will California respond if there is another energy crisis?

Ideas include:

- Remove permit operating hour restrictions
- Charge mitigation fees for excess emissions
- Create State offset bank for new projects
- Authorize State and local agencies to shorten CEQA review time
- Expedite CEC Permitting Process
- Ensure environmental protection - No relief from technology
- Conservation



California Perspective

- **California has made great strides in reducing emissions from turbines**
- **Additional reductions still needed for SIP commitments**
- **Additional generation is needed to:**
 - **Replace old, dirty units**
 - **Meet current demands**
 - **Provide for growth**





The Future

- **Retrofit Dirty Units?**
- **NO_x BACT < 2 PPM ?**
- **Green House Gas (CO₂)
Limits/Controls?**



More Information

Chris Gallenstein, Air Pollution Specialist

(916) 324-8017

cgallens@arb.ca.gov

www.arb.ca.gov/energy/energy.htm

