



CEC Joint Committee Workshop on Natural Gas Activities

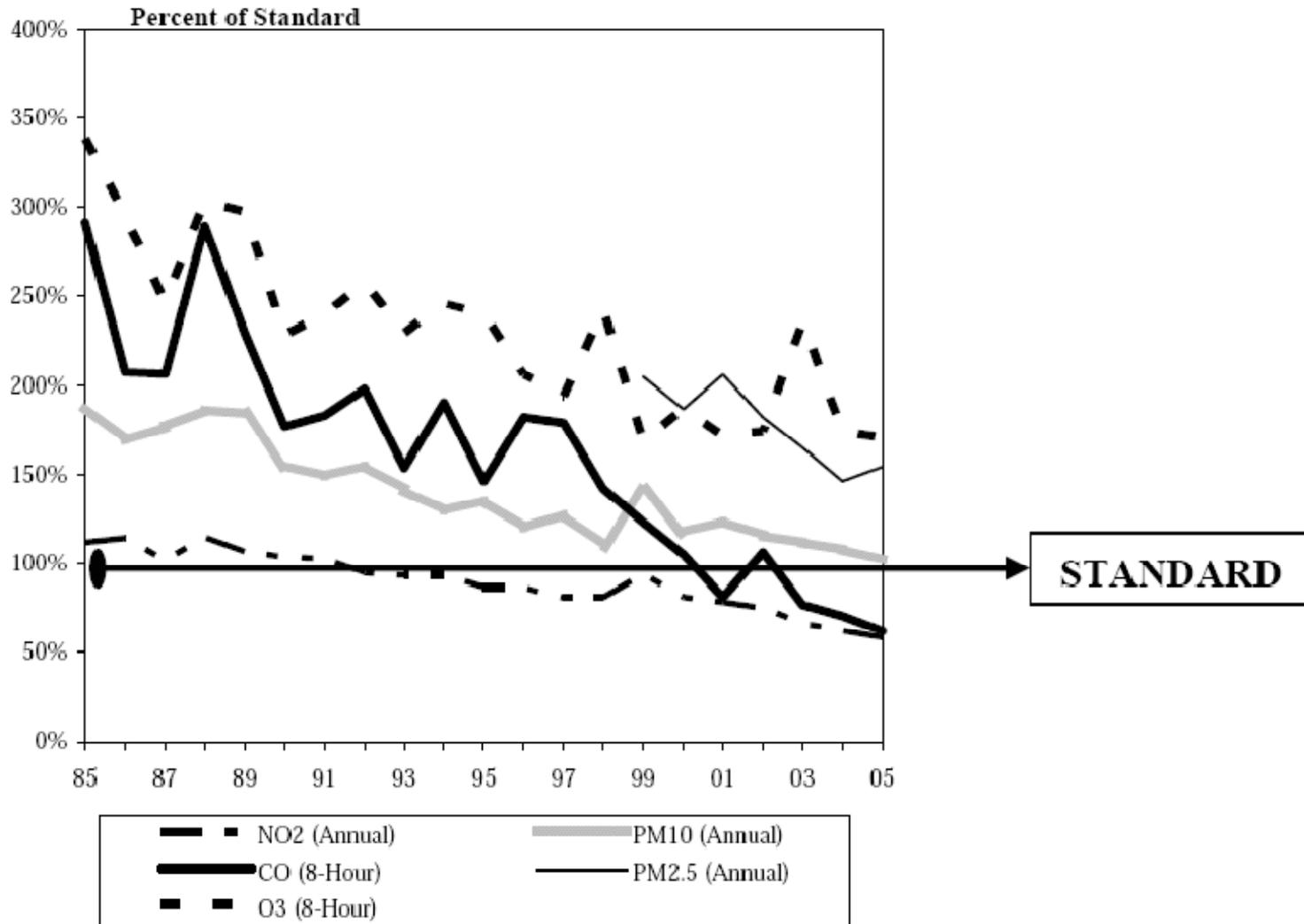


Martin Kay
South Coast Air Quality Management District
May 14, 2009

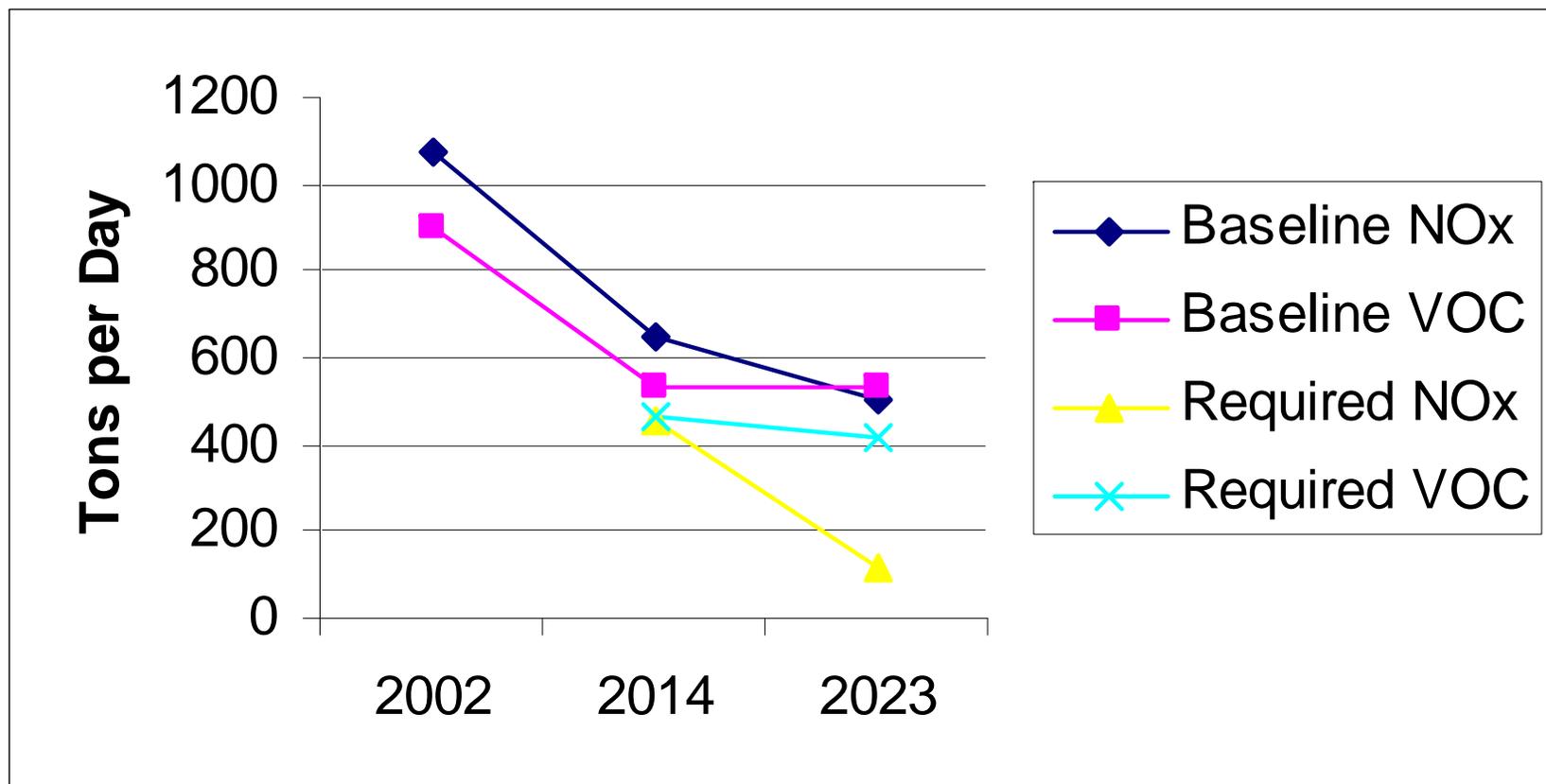
South Coast Air Quality Management District

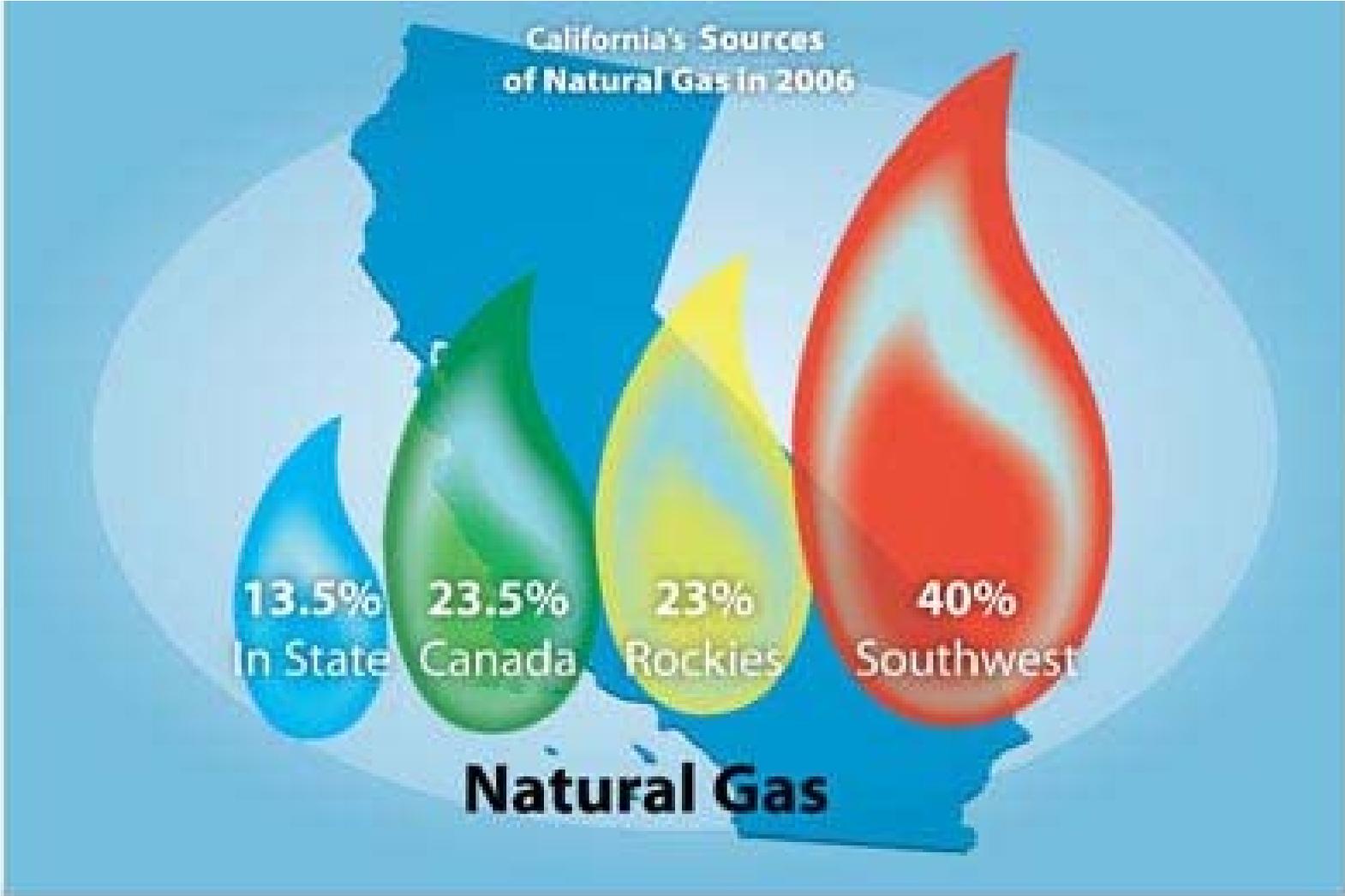
- Air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties
- Area of 10,743 square miles
- Over 16 million people
- Responsible for:
 - Controlling air pollution emissions, primarily from stationary sources
 - Air Quality Management Plan – to attain federal and state ambient air quality standards

Maximum Pollutant Concentrations as Percent of Federal Standards

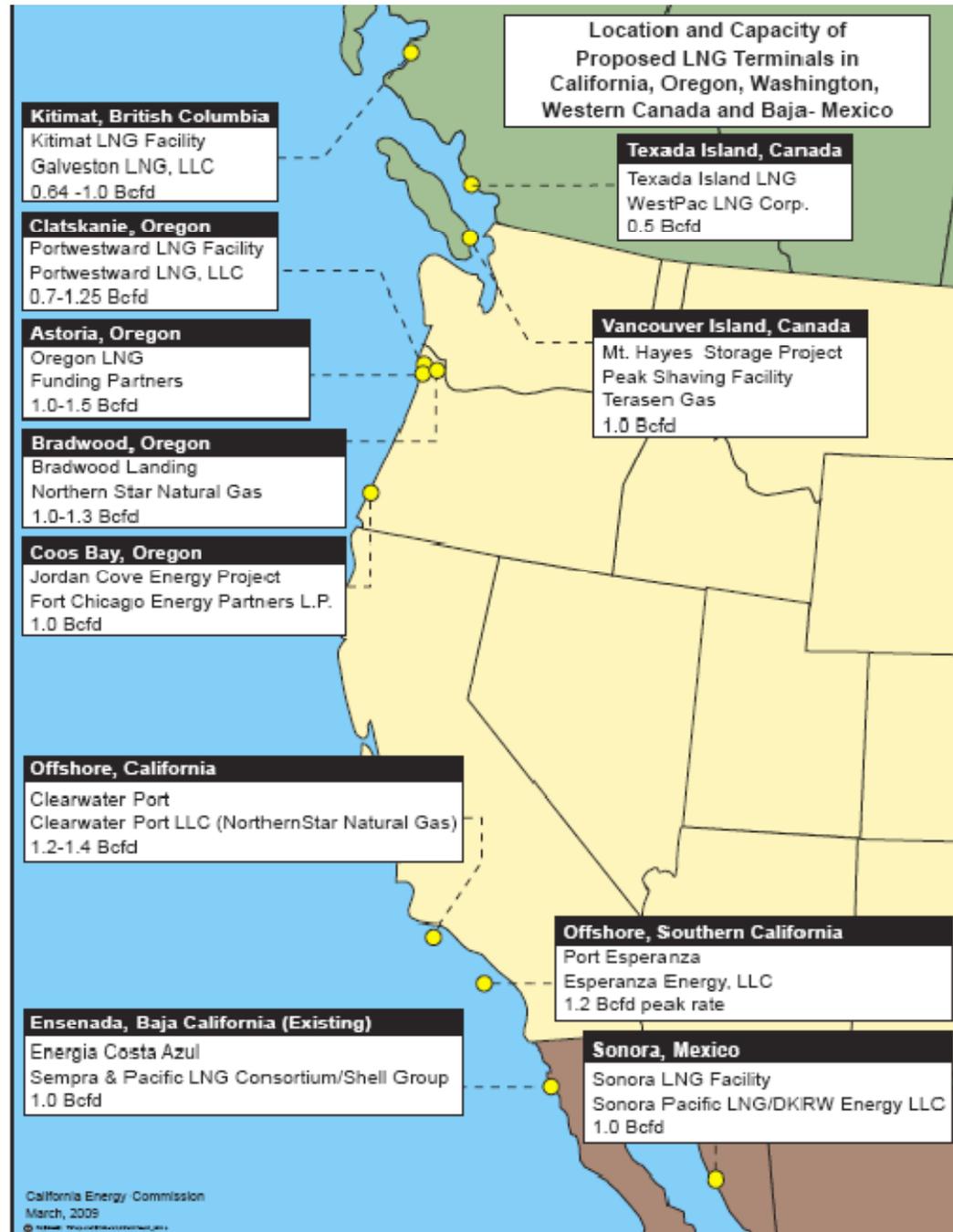


NOx and VOC Baseline Emissions and Emission Reductions Needed to Achieve the PM2.5 and Ozone Standards





Source: California Energy Commission



So. California LNG Projects

	Capacity Bcf/day	% of SoCalGas Demand*	Project Status
Energia Costa Azul, Sempra/Shell, Baja CA	1.0	40%	Completed
Energia Costa Azul, Sempra/Shell, Baja CA	1.6 Expansion	60%	Planned
Clearwater, Oxnard	1.2	48%	Permits pending
Esperanza, Los Angeles	1.2	48%	Planned
Total	4.8	196%	

*Southern California Gas Co. Usage: 2.5 bcf/day

Wobbe Index

- = $\frac{\text{Higher heating value (Btu/scf)}}{(\text{Specific Gravity})^{1/2}}$
- As WI increases:
 - Heat input rate increases
 - For most burners, air flow doesn't increase with WI
 - Air/fuel ratio decreases
 - Exception: equipment with closed-loop AFR control and oxygen sensors



Gas Quality Comparison

	System Average	California Production*	Potential LNGs
• Heating Value(Btu/cf)	1020	1007 - 1150	1063 – 1166
• Wobbe Index:	1332	1283 – 1431	1373 – 1446
• Carbon Dioxide:	1.25%	.09 – 3.00%	Trace
• Air (N ₂ , O ₂):	0.7%	.12 – 3.15%	Trace
• Total Inerts:	1.95%	.34 – 4.00%	Trace
• Methane:	95.4%	84 – 99%	83.2 – 91.2%
• Ethane:	2.1%	.13 – 10%	4.3 – 13.2%
• C3+:	0.5%	.02 – 7.1%	2.2 – 5.0%
• C6+:	Trace	Trace - .48%	Trace
• Methane Number	100	68 – 107	71 - 97

* Acceptable Under Rule 30 into SCG System



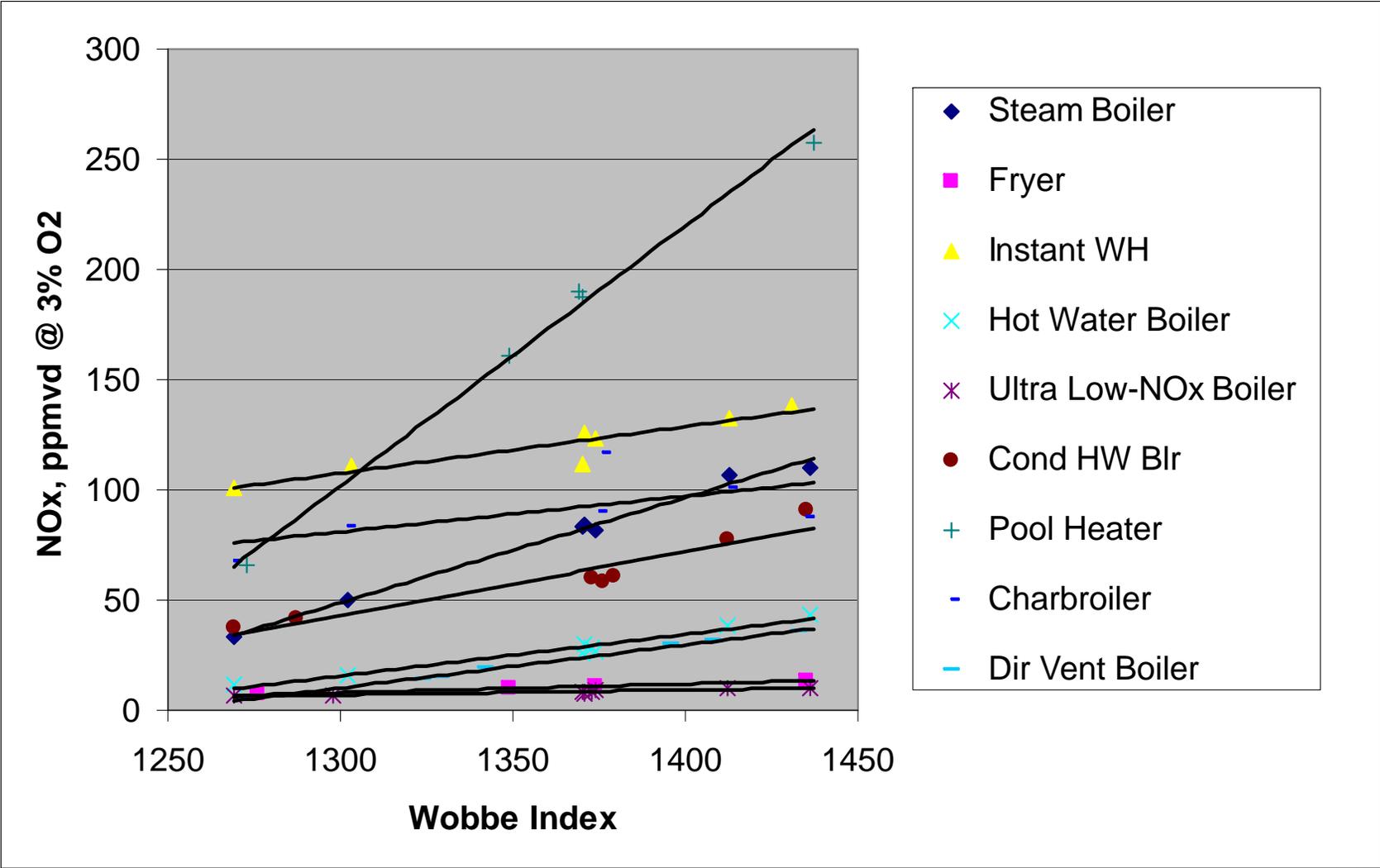
Natural Gas Interchangeability Studies

- NGC+ Interchangeability Work Group, “White Paper on Natural Gas Interchangeability and Non-Combustion End Use”, February 28, 2005
<http://www.aga.org/Kc/resourcesbydiscipline/OperationsEngineering/gasquality/0502NGINTERCHANGE.htm>
- Southern California Gas Company Gas Quality Studies
<http://www.socalgas.com/business/gasQuality/>

Natural Gas Interchangeability Studies (cont.)

- California Energy Commission
 - Appliance testing by Lawrence Berkeley National Laboratory (in progress)
 - Industrial burner testing by Gas Technology Institute (in progress)
- San Diego County APCD/San Diego Gas & Electric LNG rollout testing

Effects of Natural Gas Wobbe Index on NOx Emission from Various Sensitive Devices



Energia Costa Azul LNG Terminal

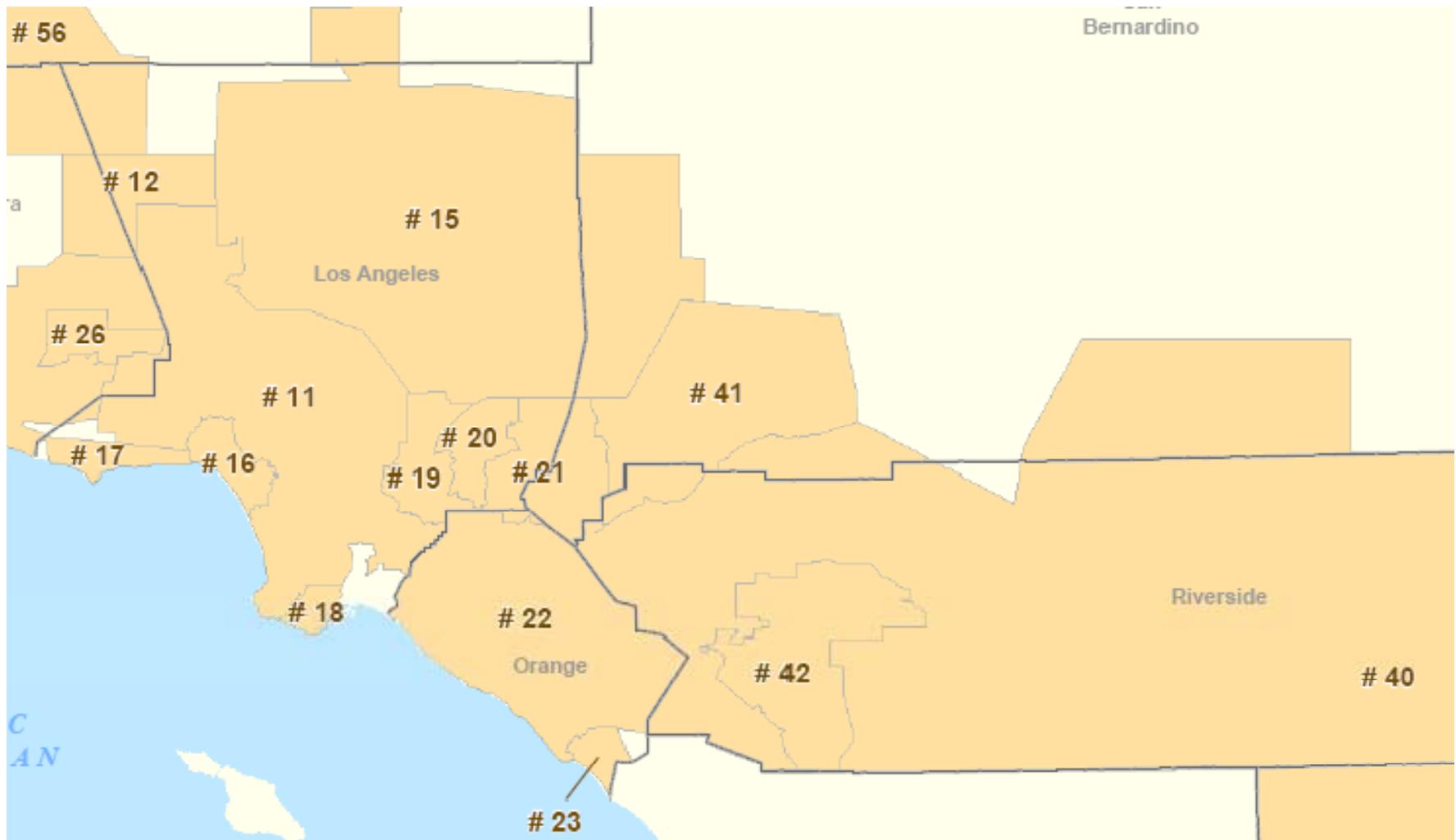


Sempra Energia Costa Azul Project Overview

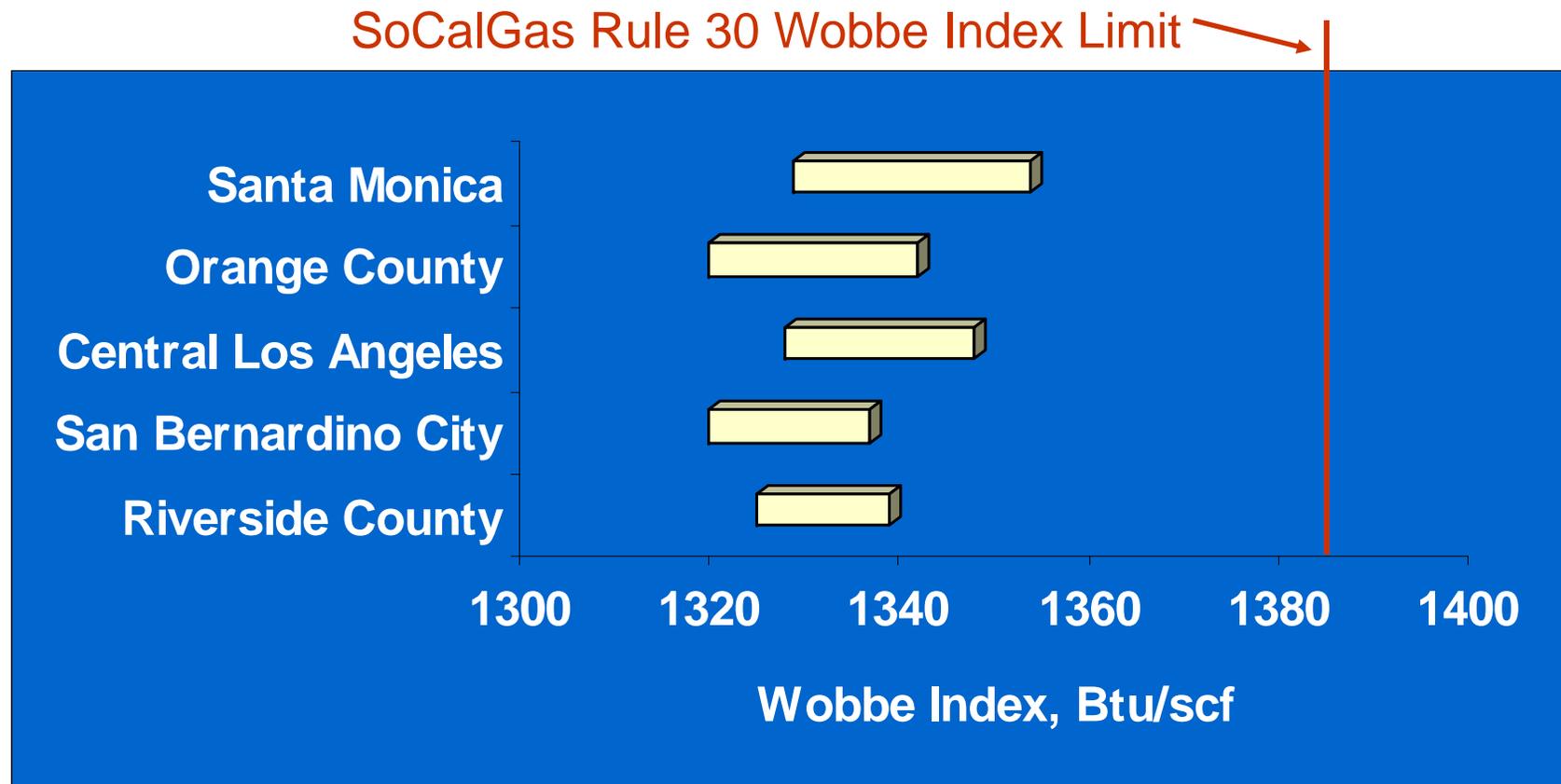
- LNG project located 14 miles north of Ensenada; 55 miles south of San Diego
- First West Coast LNG receipt facility
- Capacity of 1.0 Bcf/d
- Commissioned in May 2008
- 50% Shell (Coral Energy) and Gazprom – 50% Sempra Energy
- Source of LNG:
 - Sempra: Tangguh, Indonesia 2009
 - Shell: Sakhalin, Russia 2009
 - Spot cargos possible in meantime; depends on foreign & US prices
- Current status: no significant flows into US



SoCalGas Btu Districts



2000 – 2004 Wobbe Index Range in AQMD Area



WI in AQMD

- The amount of LNG and its effect on WI in AQMD will be variable
 - How much LNG will be delivered to the ECA terminal and not diverted to a foreign market?
 - How much will be used in Baja California and San Diego?
- Publicly available WI data are inadequate

Objectives of Proposed Rule 433 – Natural Gas Quality

- Monitor the quality (WI) of natural gas supplied to users in AQMD
- Monitor and mitigate the effects of natural gas changes on combustion equipment emissions in AQMD

Requirements of Proposed Rule 433 – Natural Gas Quality

- Historical WI data
- Gas Quality Monitoring Plan
- LNG Rollout Plan
- Annual estimate of emission impacts
- Rule adoption hearing on June 5, 2009

Thank You

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