



The California ~~Power~~ Energy Crisis

Bay Area Economic Forum

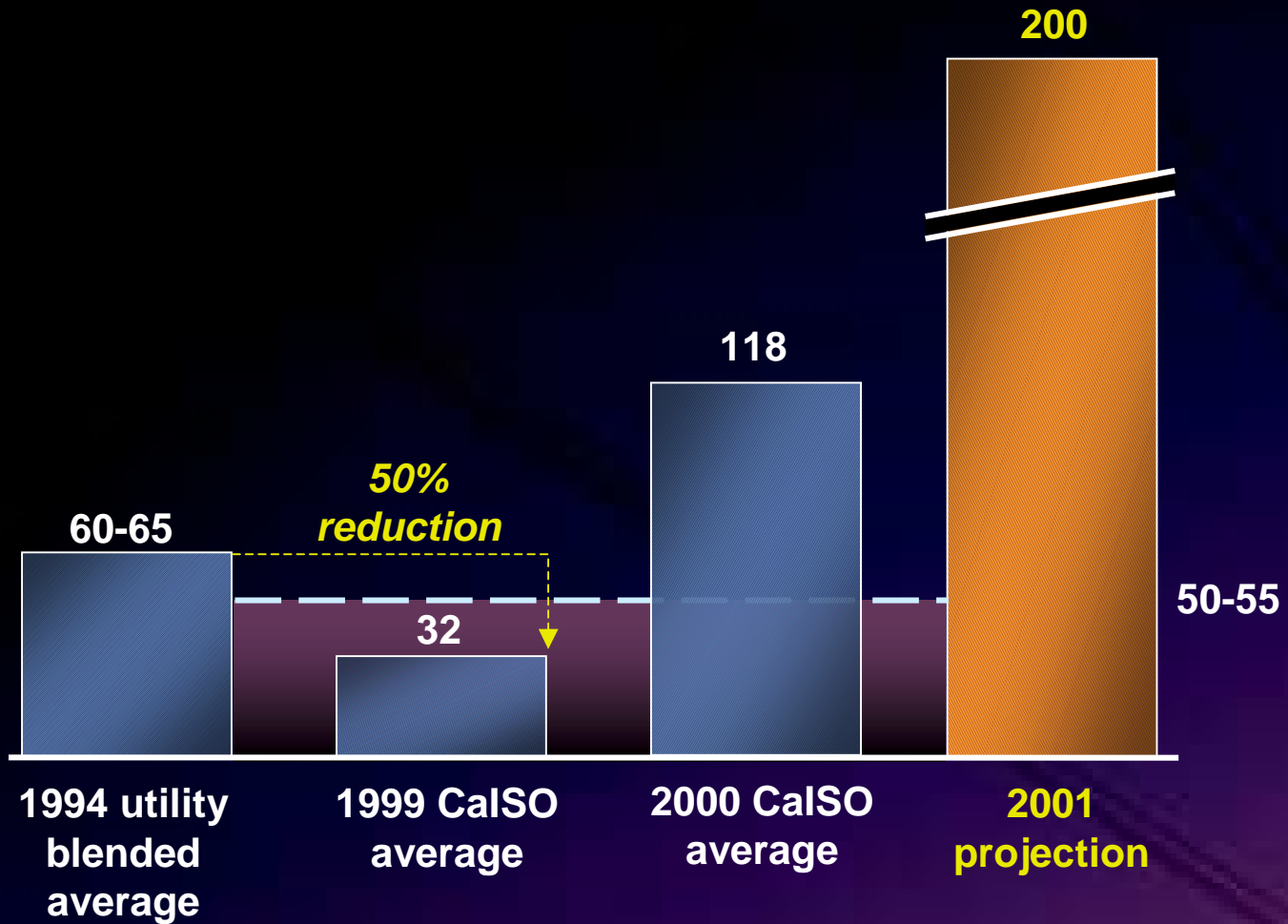
A partnership of the Bay Area Council and the
Association of Bay Area Governments

April 2001



THE PROBLEM

\$/MWh



Unserved load
GWh

—

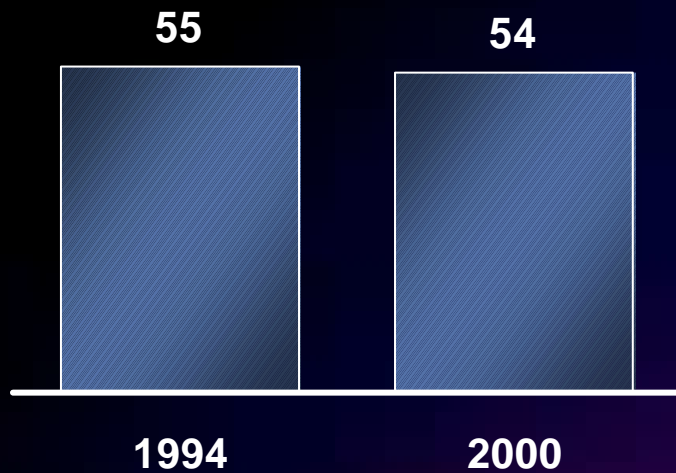
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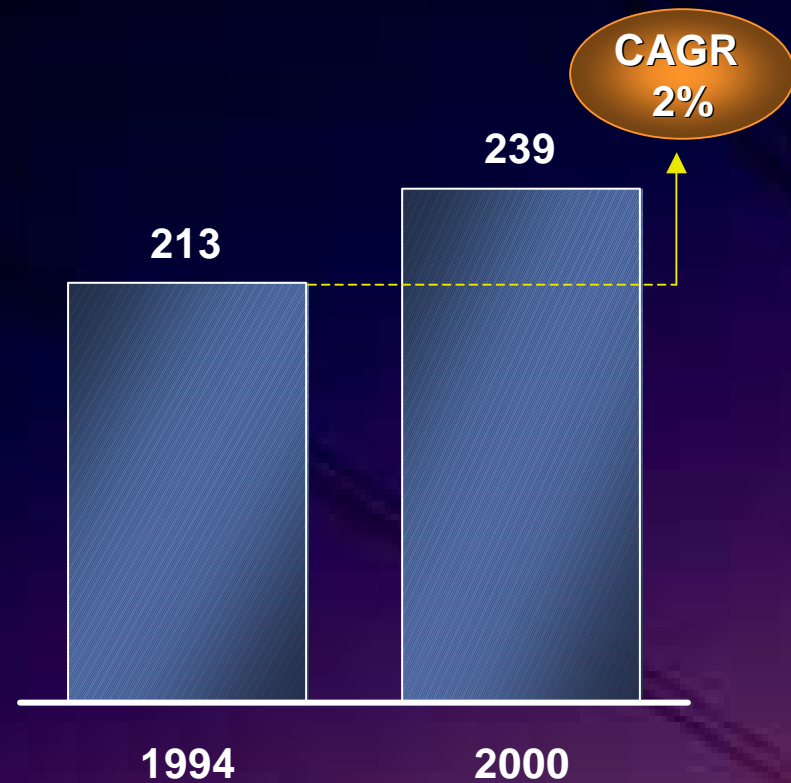
100-500

CALIFORNIA SUPPLY AND DEMAND 1994-2000

Nameplate generation capacity
GW

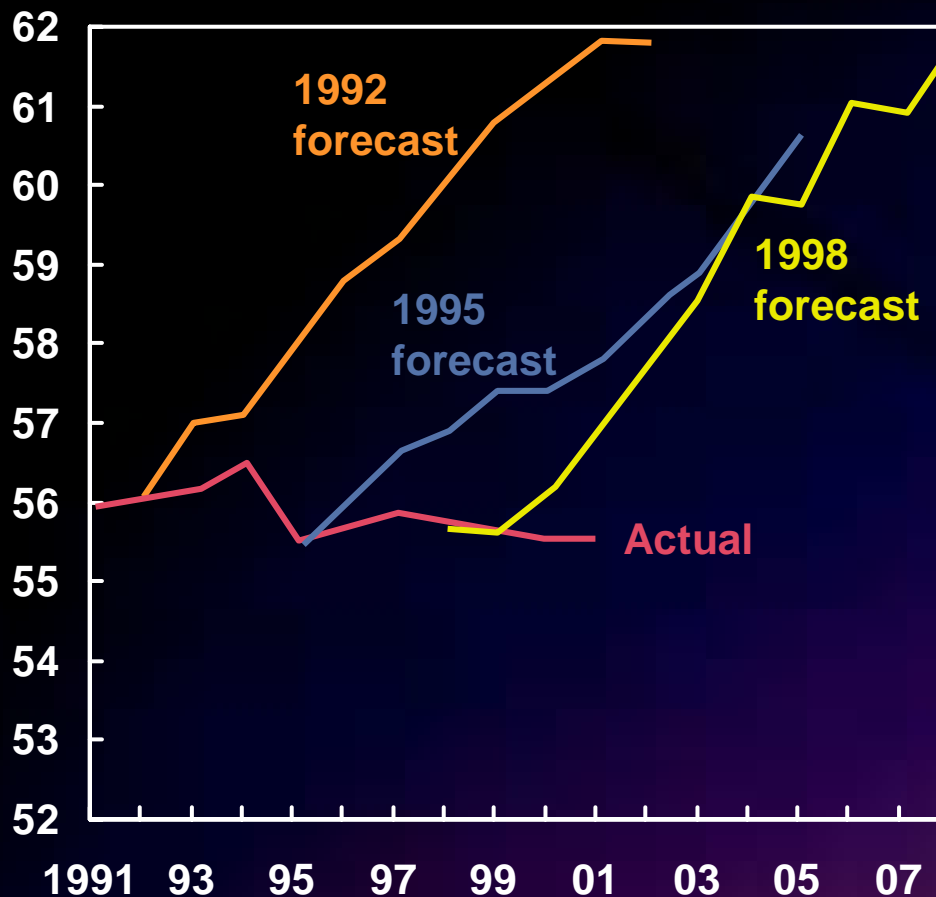


Total retail sales
TWh



NEW SUPPLY WAS NEVER BUILT

California nameplate capacity
Gigawatts

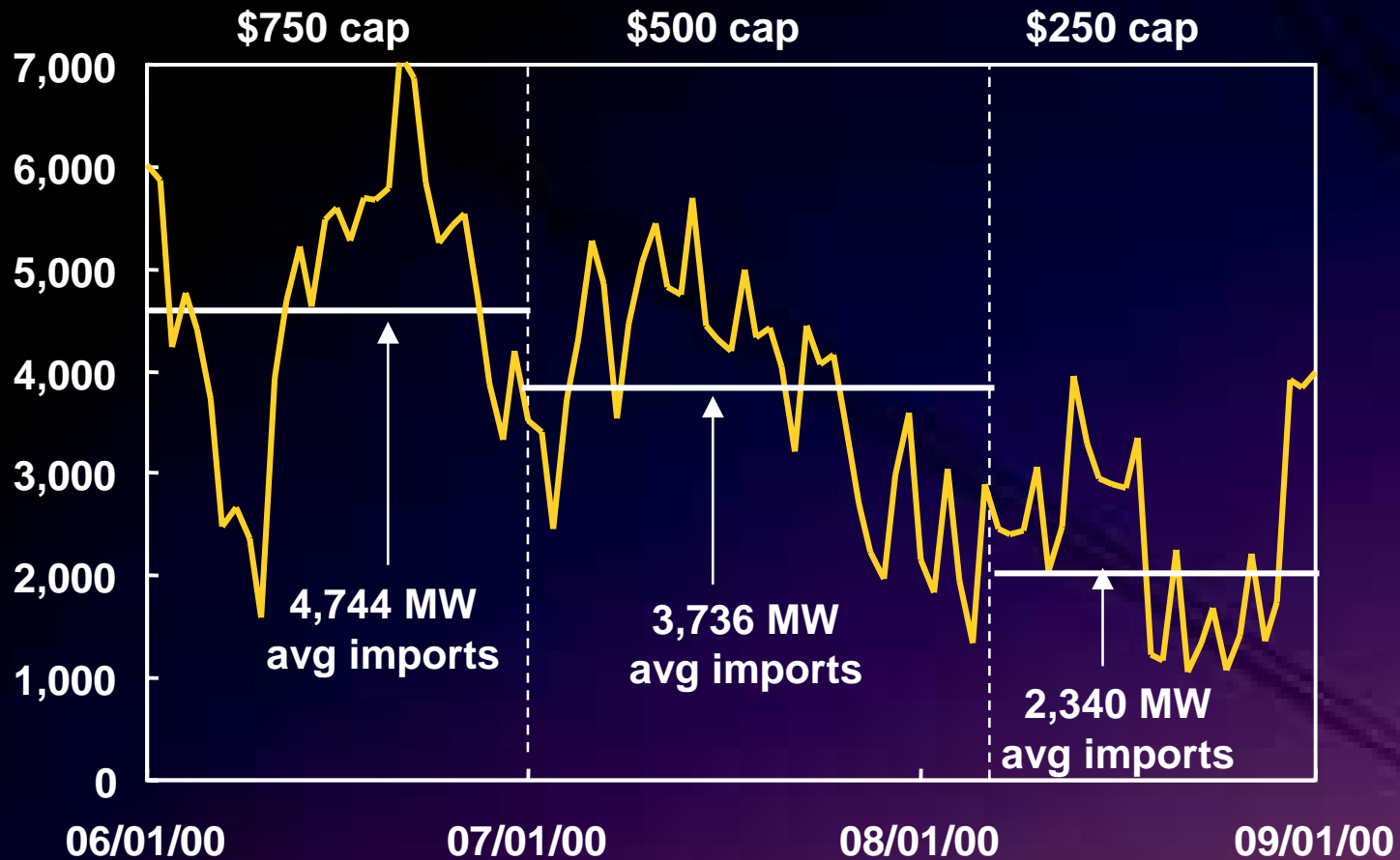


Why?

- High regulatory uncertainty and ever-changing rules
- Arduous permitting process with numerous stakeholders takes twice as long as other U.S. locations
- No forward market to signal future need or to allow project sponsors to hedge price risks

PRICE CAPS DROVE IMPORTS AWAY

Average peak hour net imports to California
MW



DRIVERS OF HIGH CALIFORNIA GAS PRICE

\$/MMBtu



INCREASES IN PRODUCTION COSTS

ESTIMATE

\$/MWh

December 1999

Natural gas at
\$2.56/MMBtu

31.0

NOx credits at
\$1.0/lb.

0.9

Other variable
costs

1.0

Total variable
cost of
production

32.9

December 2000

Natural gas at
\$16.56/MMBtu

199

NOx credits at
\$46.0/lb.

43

Other variable
costs

1

Total variable
cost of
production

243

CALIFORNIA GAS INJECTION

Peak storage volume
Bcf



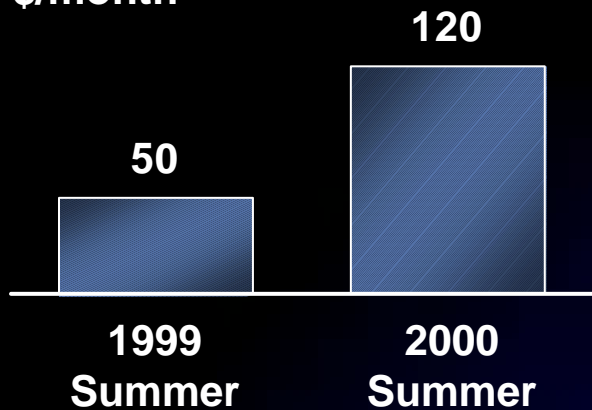
Gas injection period
Months



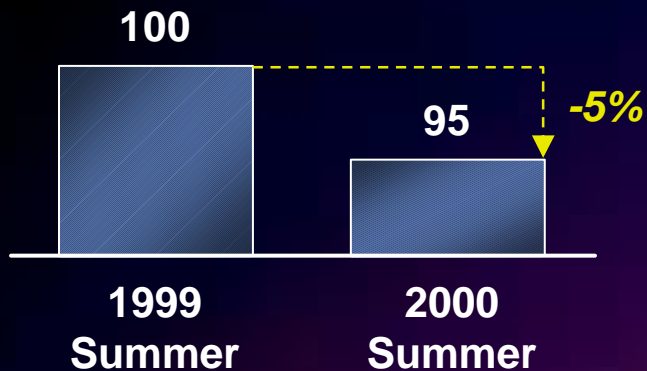
Low storage volume and shorter injection period were driven by high demand from generators

NO DEMAND RESPONSE (DESPITE CLEAR DEMAND ELASTICITY)

San Diego monthly residential bill (including wires)
\$/month



San Diego electric usage
Index



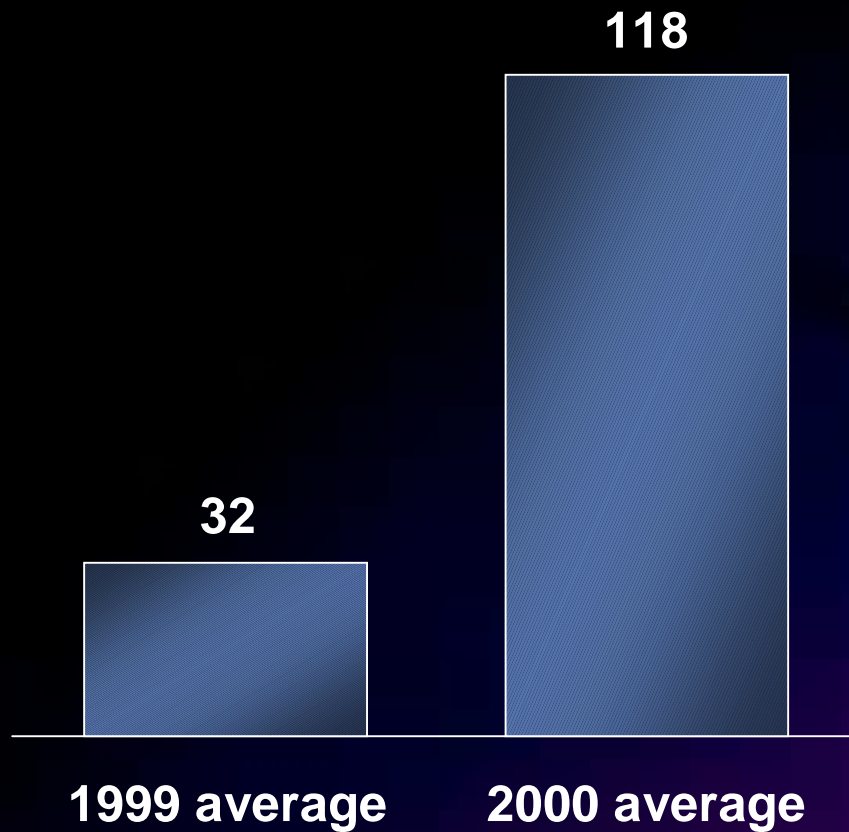
Hypothetical impact on reserve margins
Percent





WHAT CAUSED THE PROBLEM?

\$/MWh



Increased production costs (35-45%)

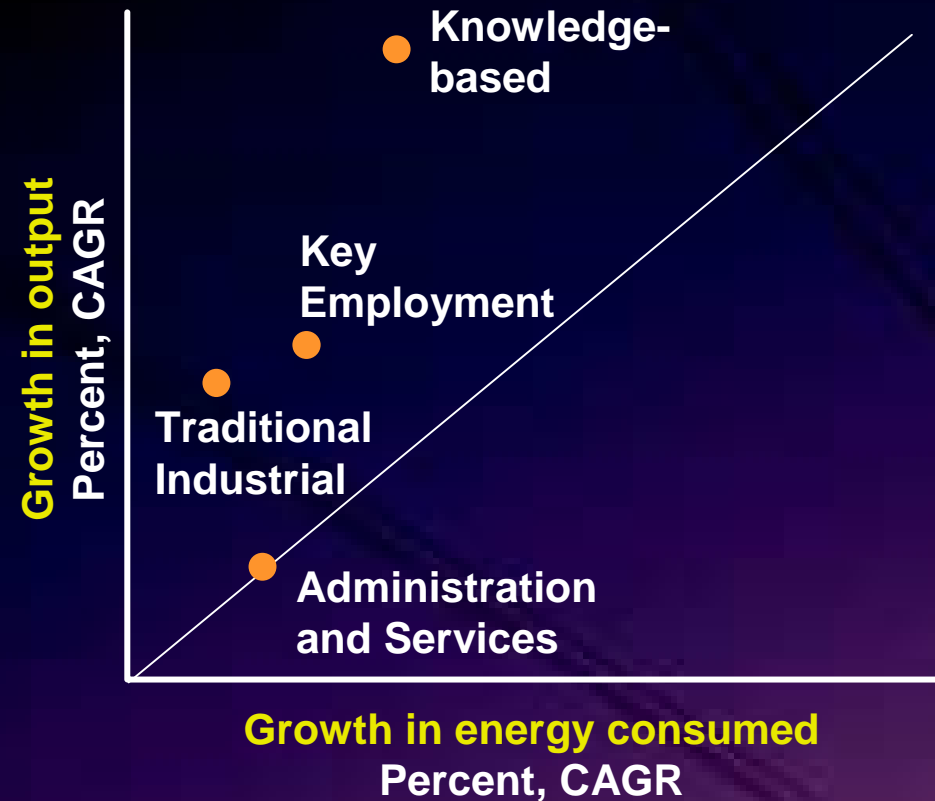
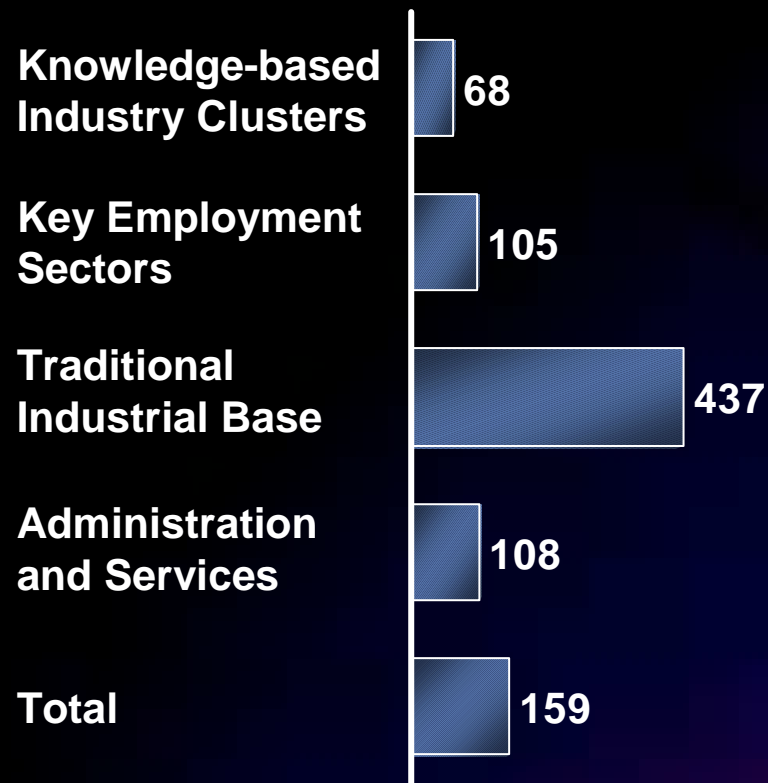
- Gas prices
- NOx credits

Market structure and conduct (55-65%)

ENERGY EFFICIENCY OF ECONOMIC OUTPUT

Energy intensity 1999

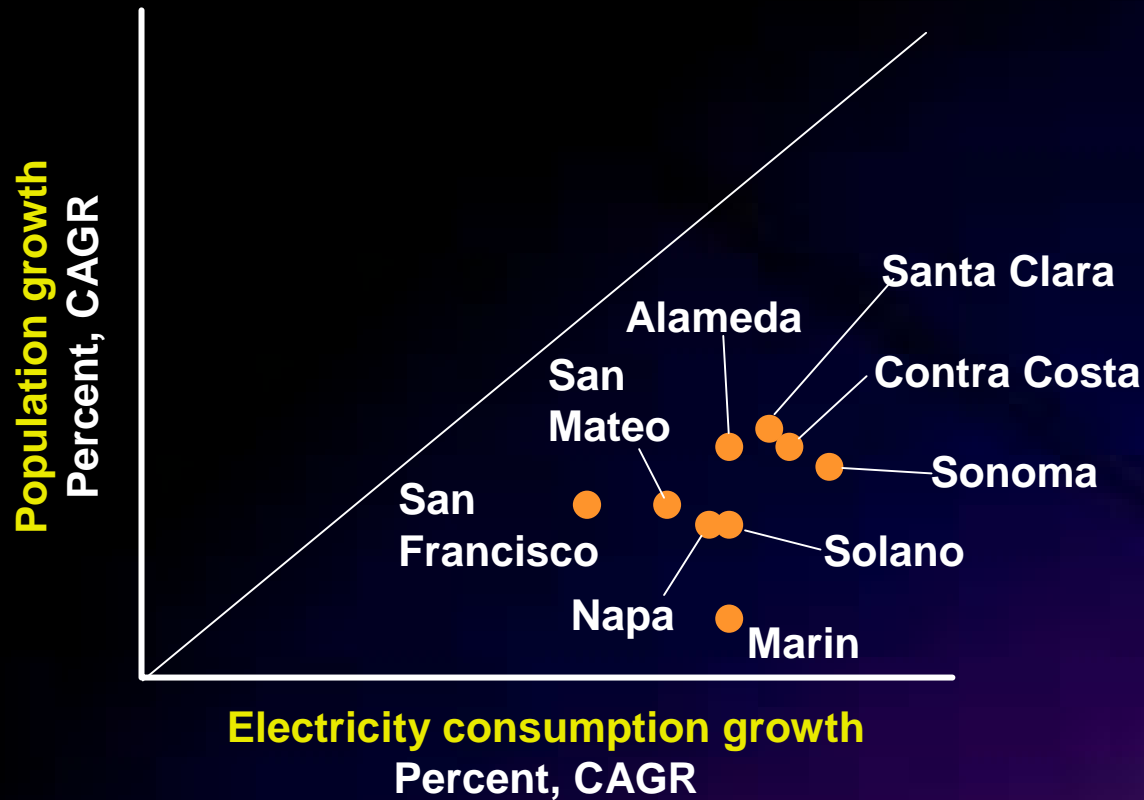
MWh equivalent/\$ millions (output)



Key groupings highly energy-efficient ...

... and have been getting more so

RESIDENTIAL CONSUMPTION GROWTH



While economic engine is **more** energy-efficient, residential consumption has grown much faster than underlying demand drivers

IMPACT OF ENERGY CRISIS BY SECTOR

Agree or strongly agree

Percentage of respondents; 100% = 512

Crisis has strongly impacted ...

Industry groupings n=

Knowledge-based Industry Clusters

179

Profit margin

43

Relative competitiveness

45

Key Employment Sectors

100

47

43

Traditional Industrial Base

52

60

44

Administration and Services

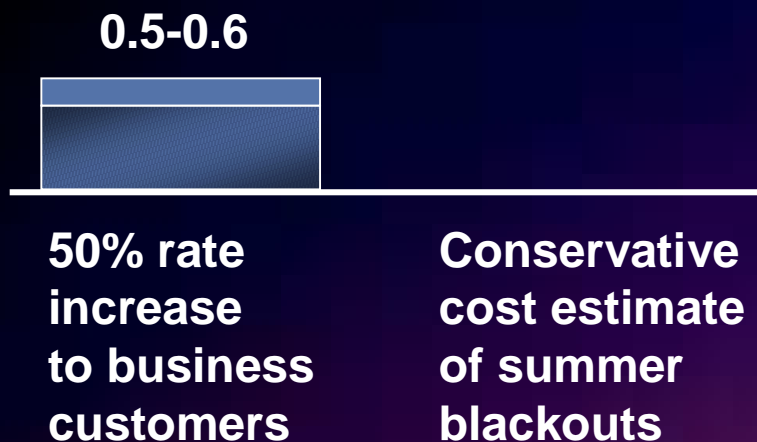
156

38

36

IMPACT ON THE BAY AREA ECONOMIC ENGINE

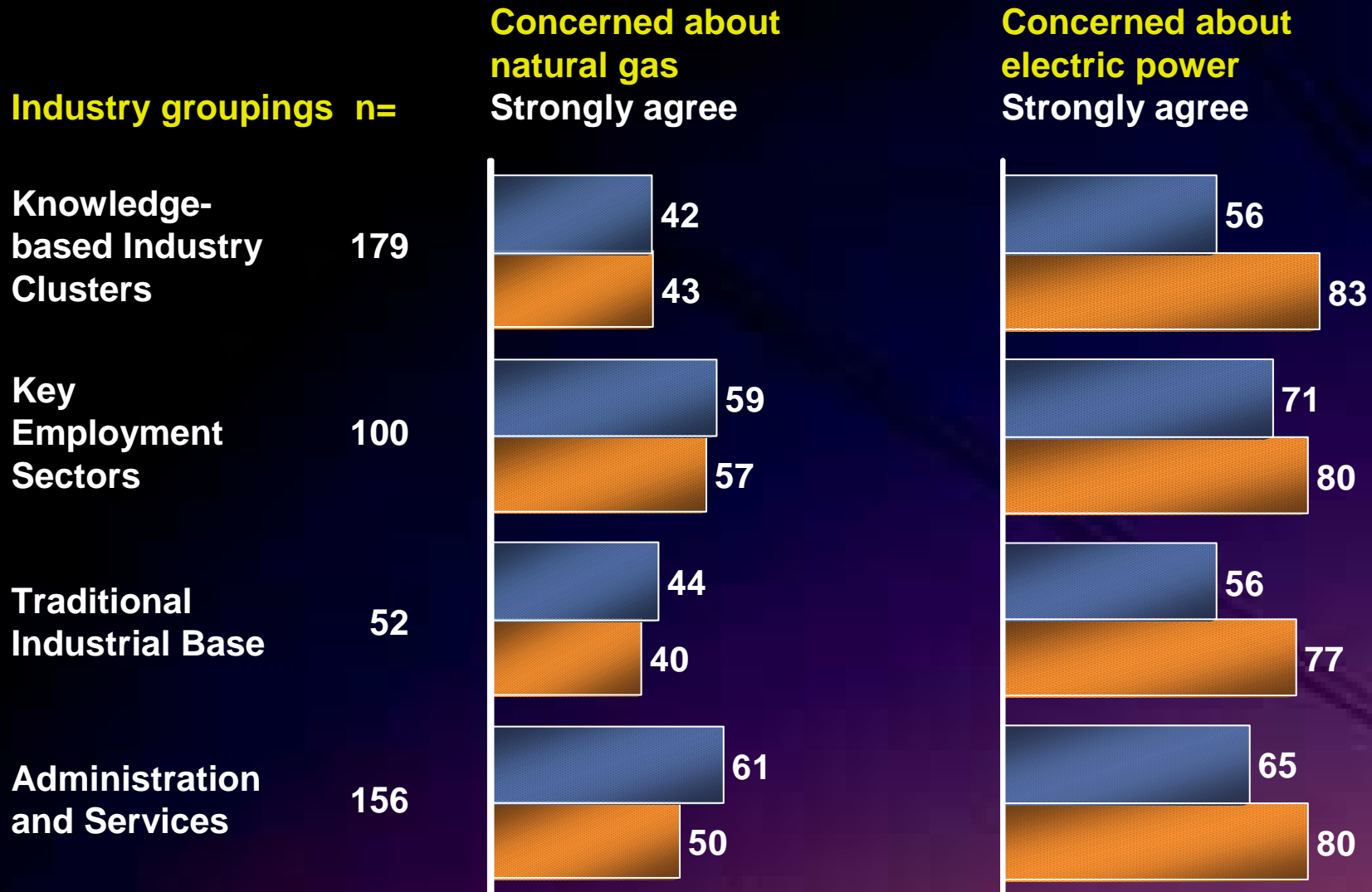
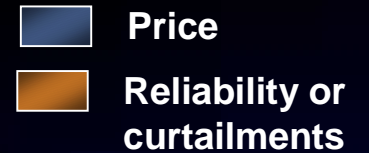
Lost output
\$ Billions



- \$0.8-1.2 billion annual reduction in disposable income
- 15,000 fewer jobs created over the next 3 years due to rate hikes

KEY CONCERNS ABOUT ENERGY CRISIS BY CLUSTER

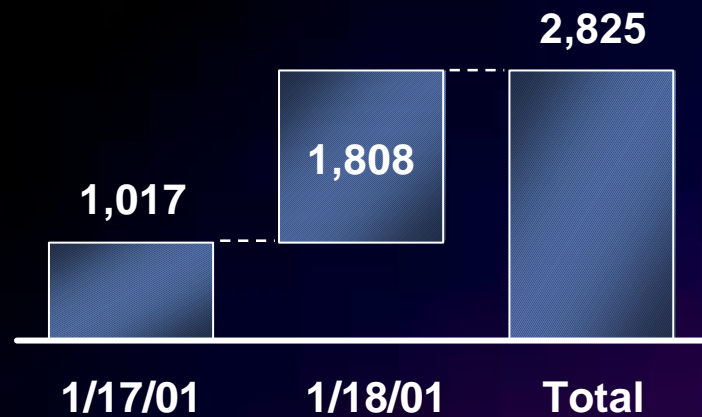
Percentage of respondents; 100% = 512



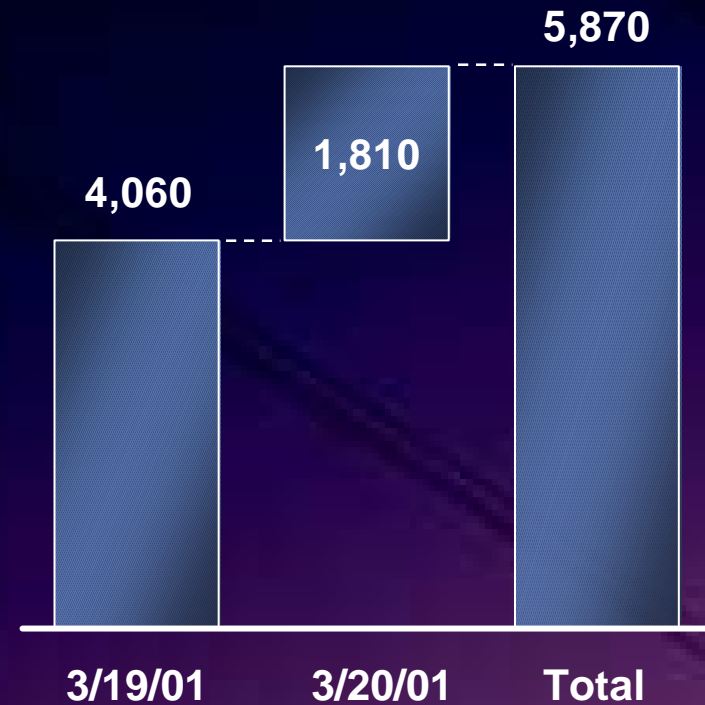
RECENT ROLLING BLACKOUTS

MWh offline

January 2001



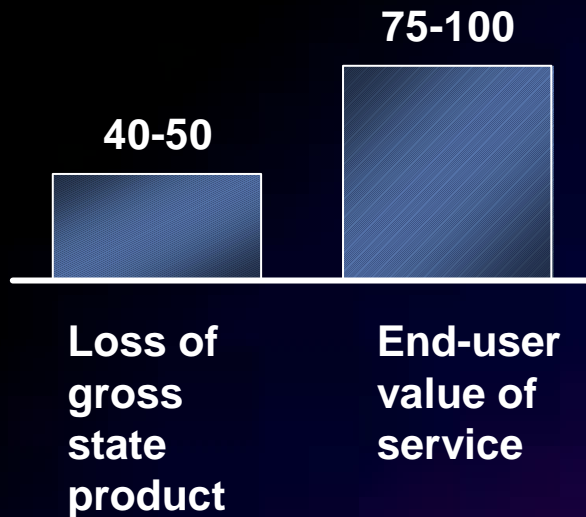
March 2001



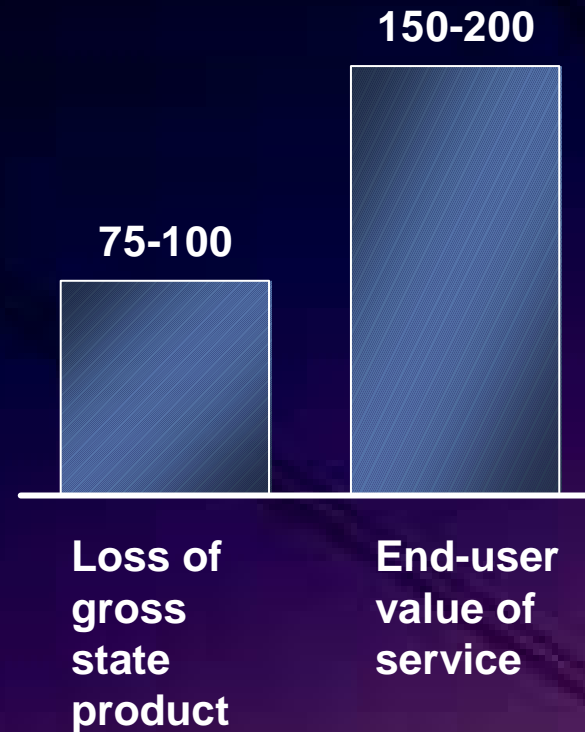
IMPACT OF BLACKOUTS ON STATE ECONOMY

\$ Millions

January 2001

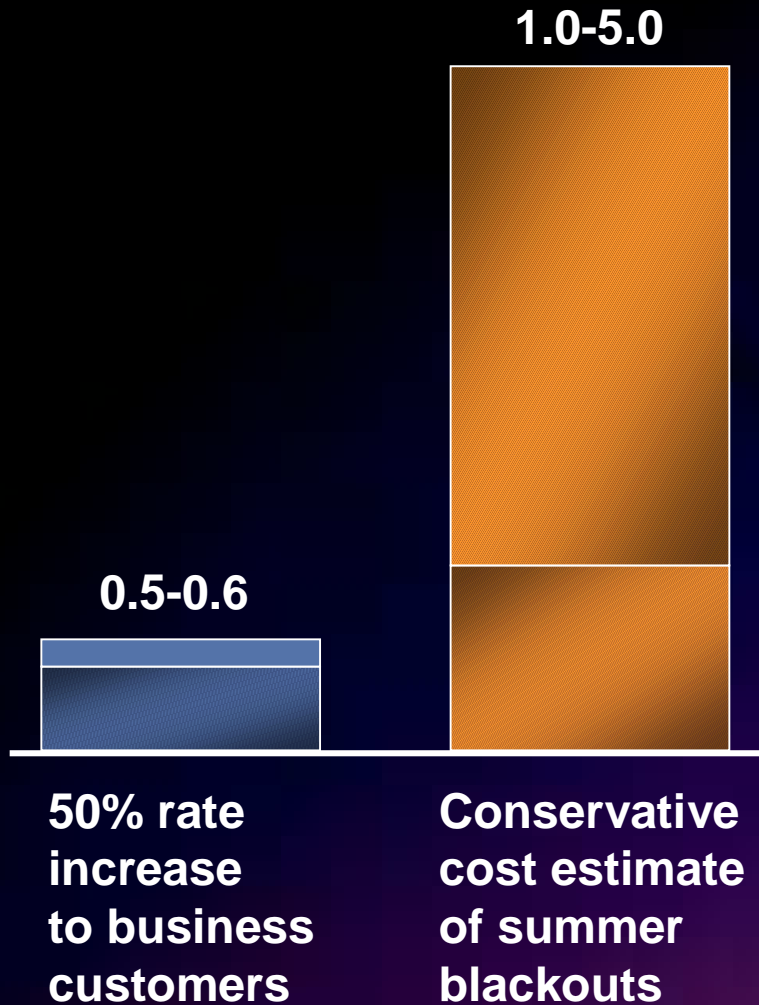


March 2001



IMPACT ON THE BAY AREA ECONOMIC ENGINE

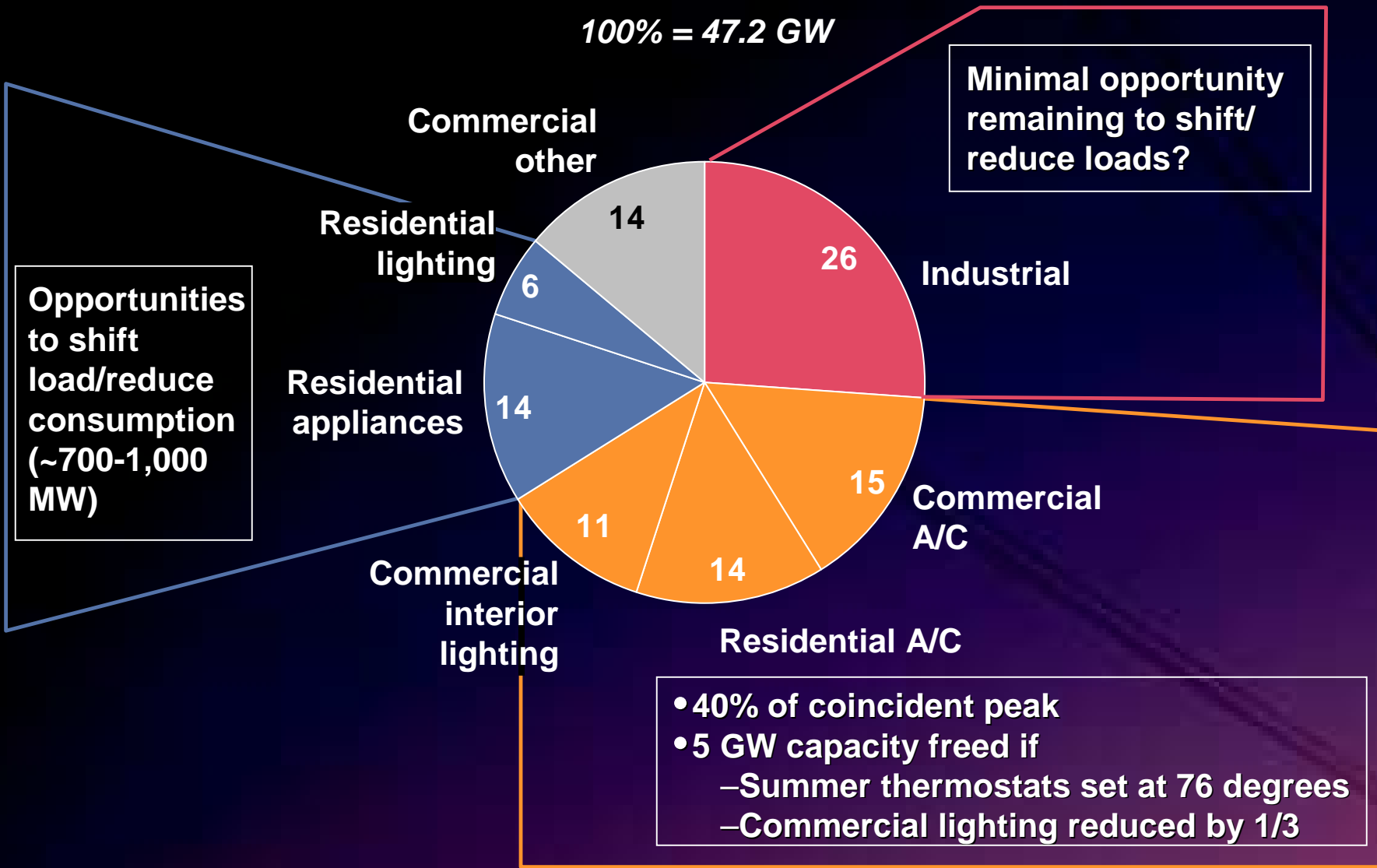
Lost output
\$ Billions



- Despite focus on rates/prices, lack of reliability is greatest threat to economy

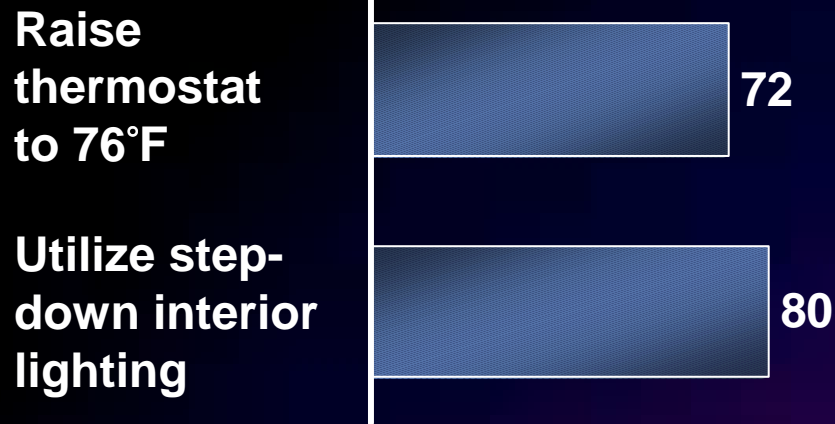
COINCIDENT PEAK LOADS

100% = 47.2 GW

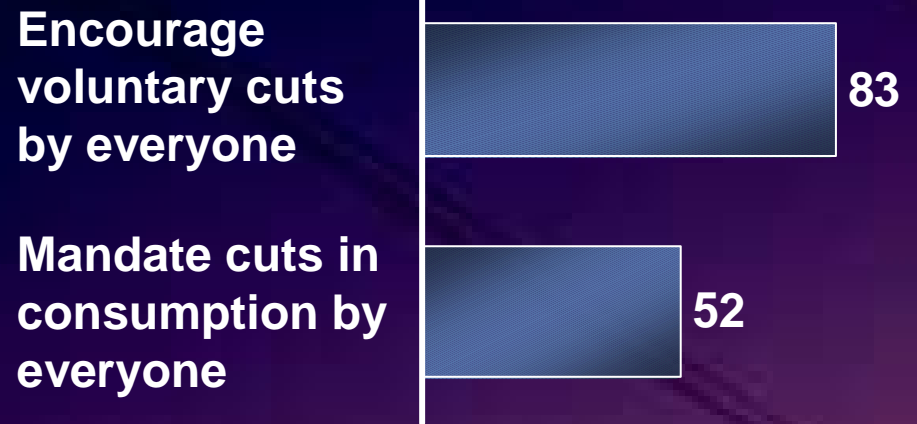


SUPPORT FOR GOVERNMENT-SPONSORED CONSERVATION MEASURES

Bay Area businesses prepared to ...
Percentage of survey respondents
100% = 512



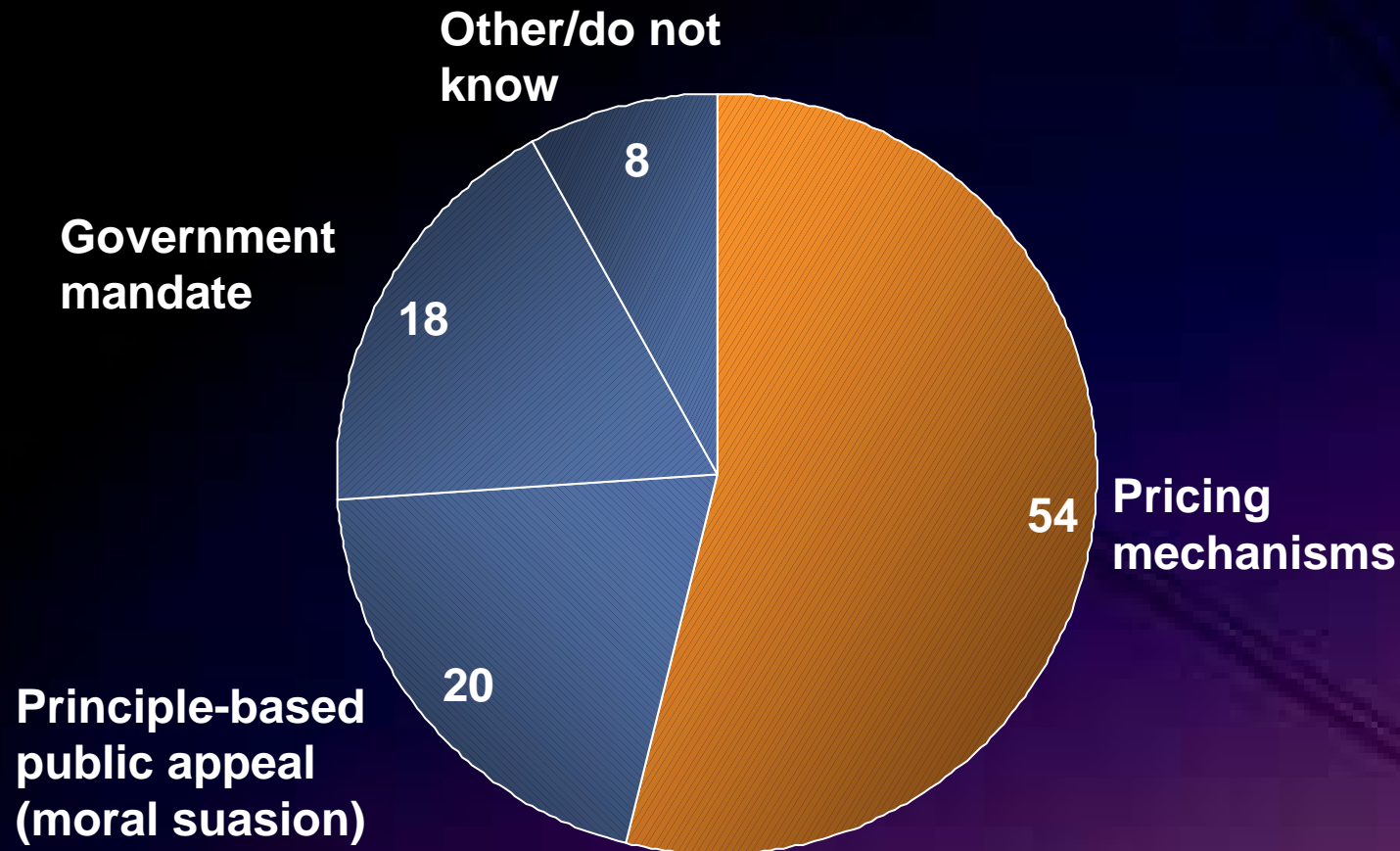
California residents support for measures to ...
Percentage of survey respondents
100% = 800



MOST EFFECTIVE MEANS OF ENSURING CONSERVATION

Percentage of respondents

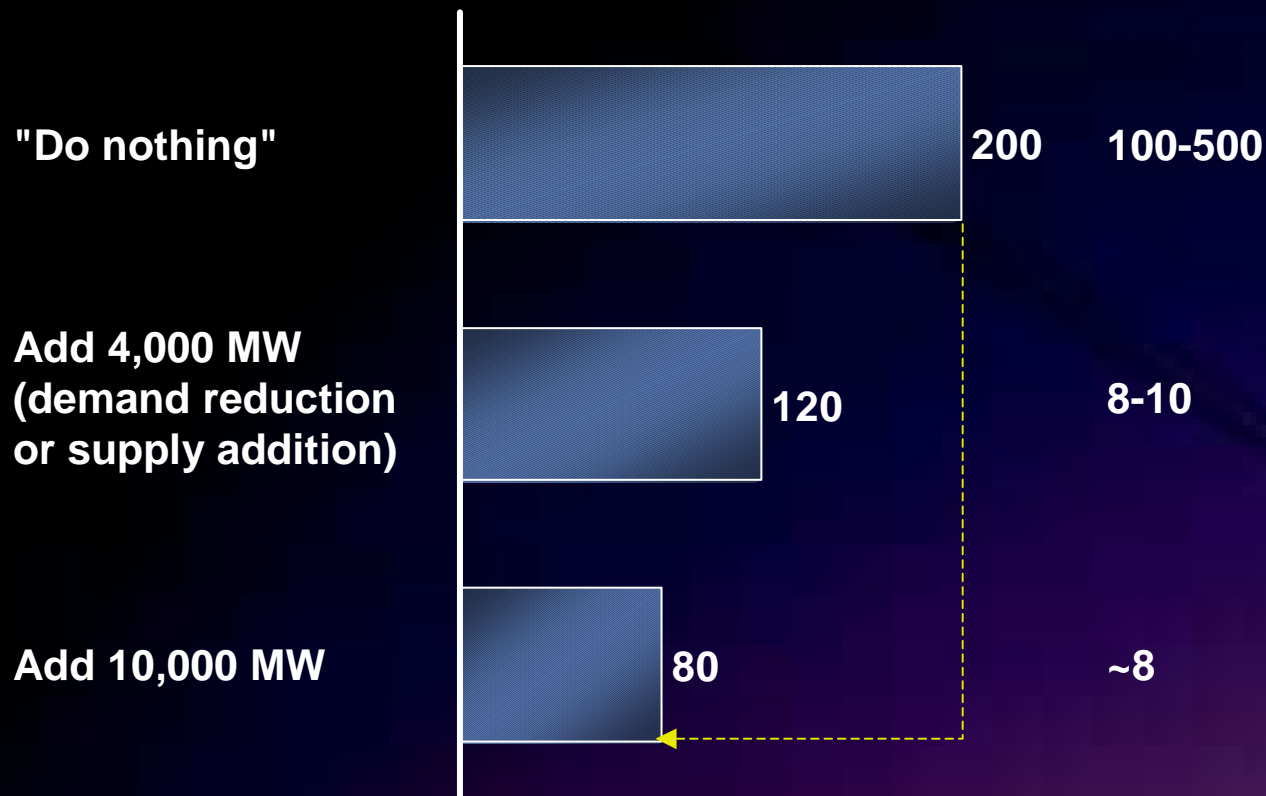
100% = 512



ESTIMATED IMPACT OF INCREASED SUPPLY ON WHOLESALE COSTS

Modeled 2001 wholesale power price
\$/MWh

Unserved
load
Gwh



An additional 10,000 MW of electric supply would net \$10-15 billion in savings to California this year alone



The California ~~Power~~ Energy Crisis

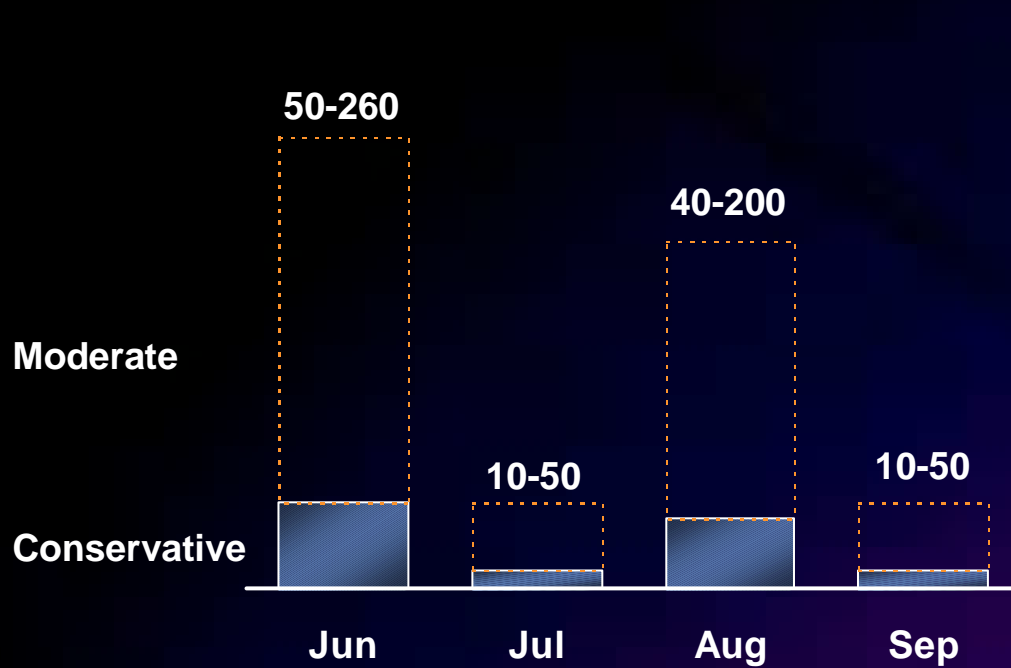
Bay Area Economic Forum

A partnership of the Bay Area Council and the
Association of Bay Area Governments

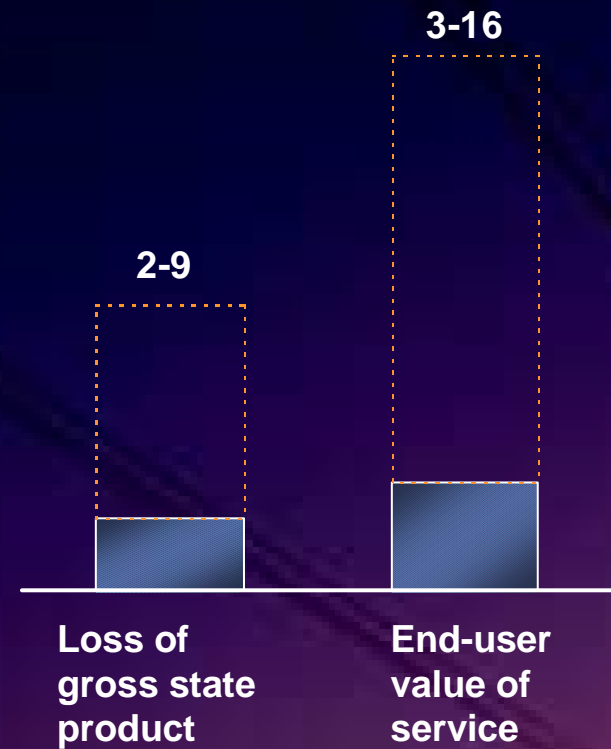
April 2001

POTENTIAL IMPACT OF SUMMER SHORTAGE

Estimated power outages
GWh

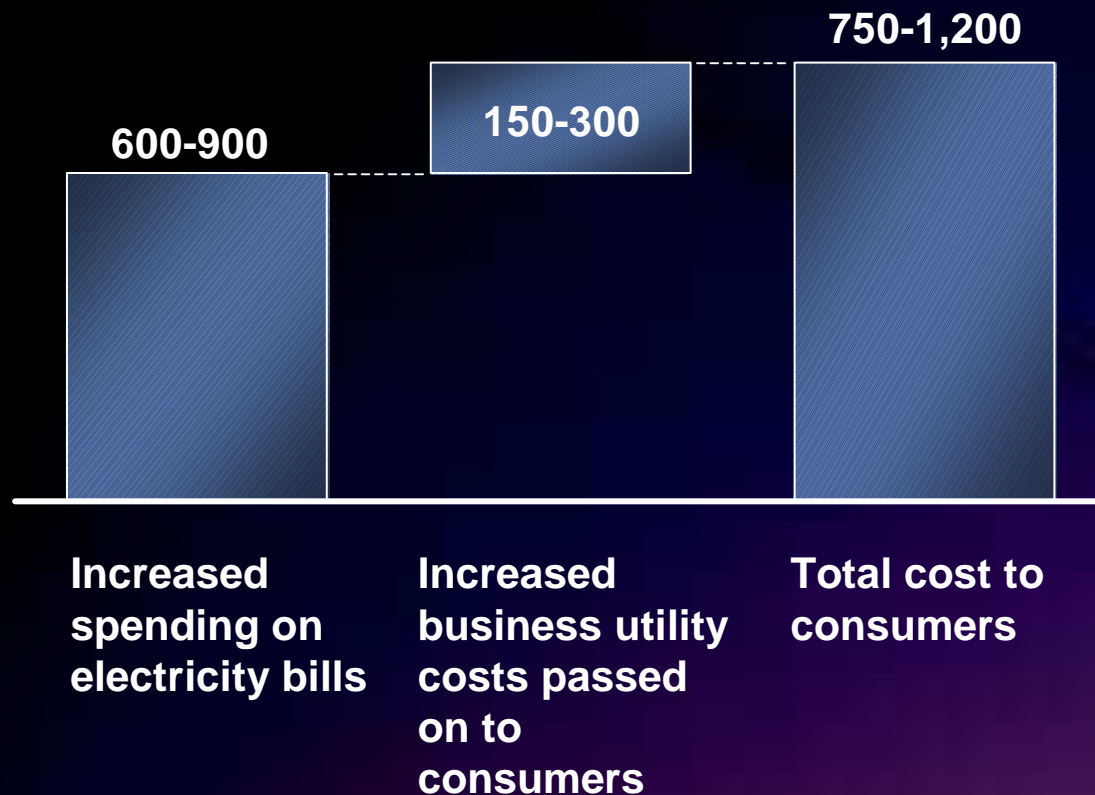


Statewide economic impact of
summer blackouts
\$ Billions



IMPACT OF RATE INCREASES ON BAY AREA CONSUMERS

Direct and indirect costs to consumers
\$ Millions



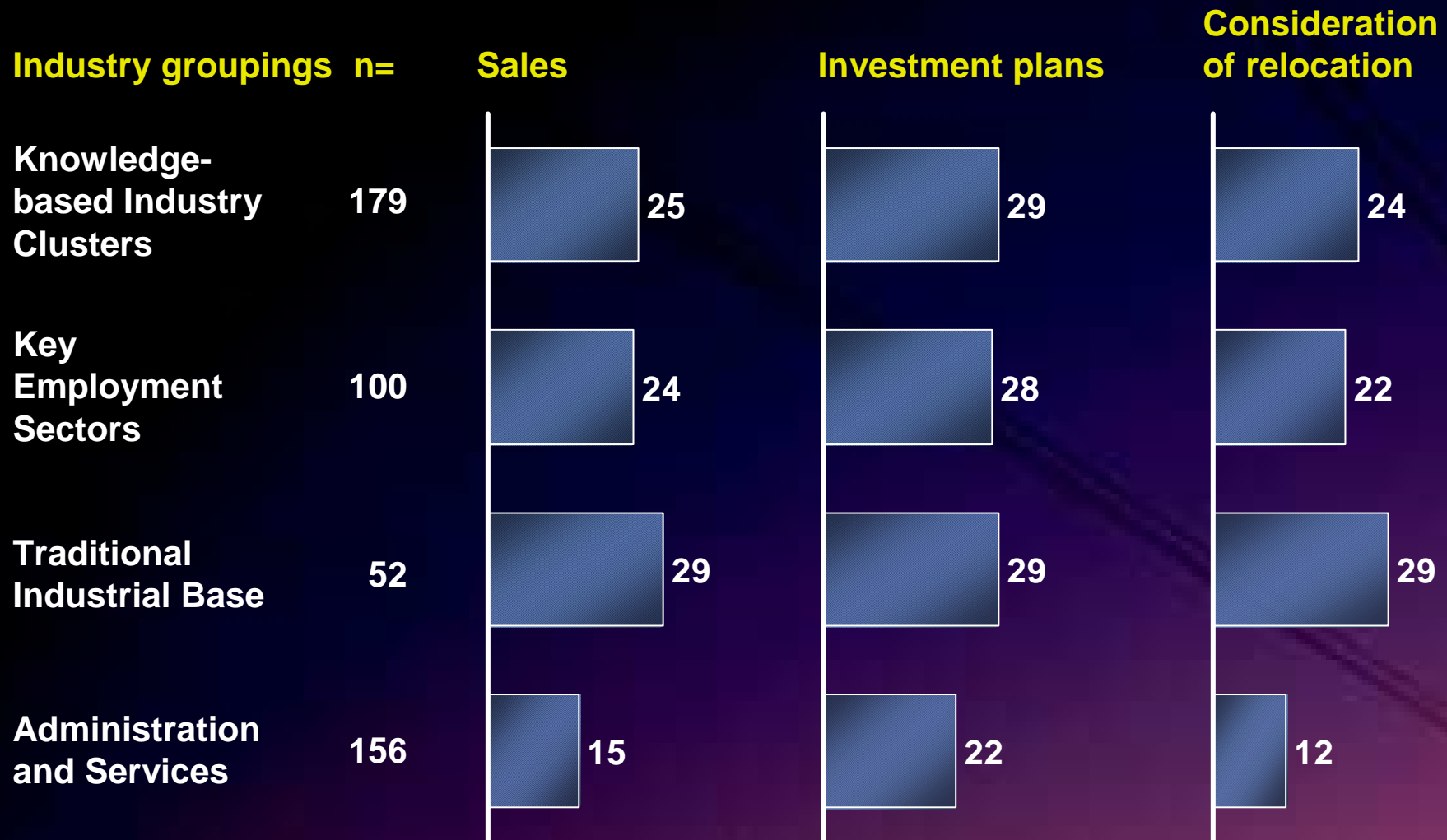
Bay Area disposable income, currently exceeding \$250 billion, would be reduced by 0.28-0.45%

IMPACT OF ENERGY CRISIS BY SECTOR

Agree or strongly agree

Percentage of respondents; 100% = 512

Crisis has strongly impacted ...



PERCEPTION OF THREATS TO BAY AREA ECONOMY

Percentage of respondents; 100% = 512
1 = strongly disagree, 5 = strong agree

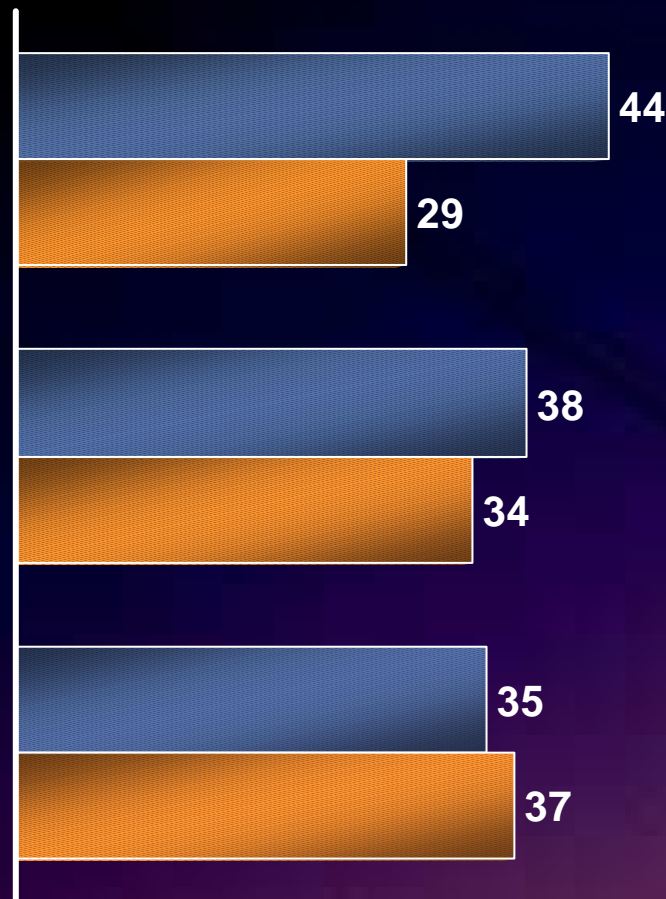
Agree or strongly agree
Disagree or strongly disagree

Energy crisis is of greater concern than:

Transportation congestion

Housing shortage

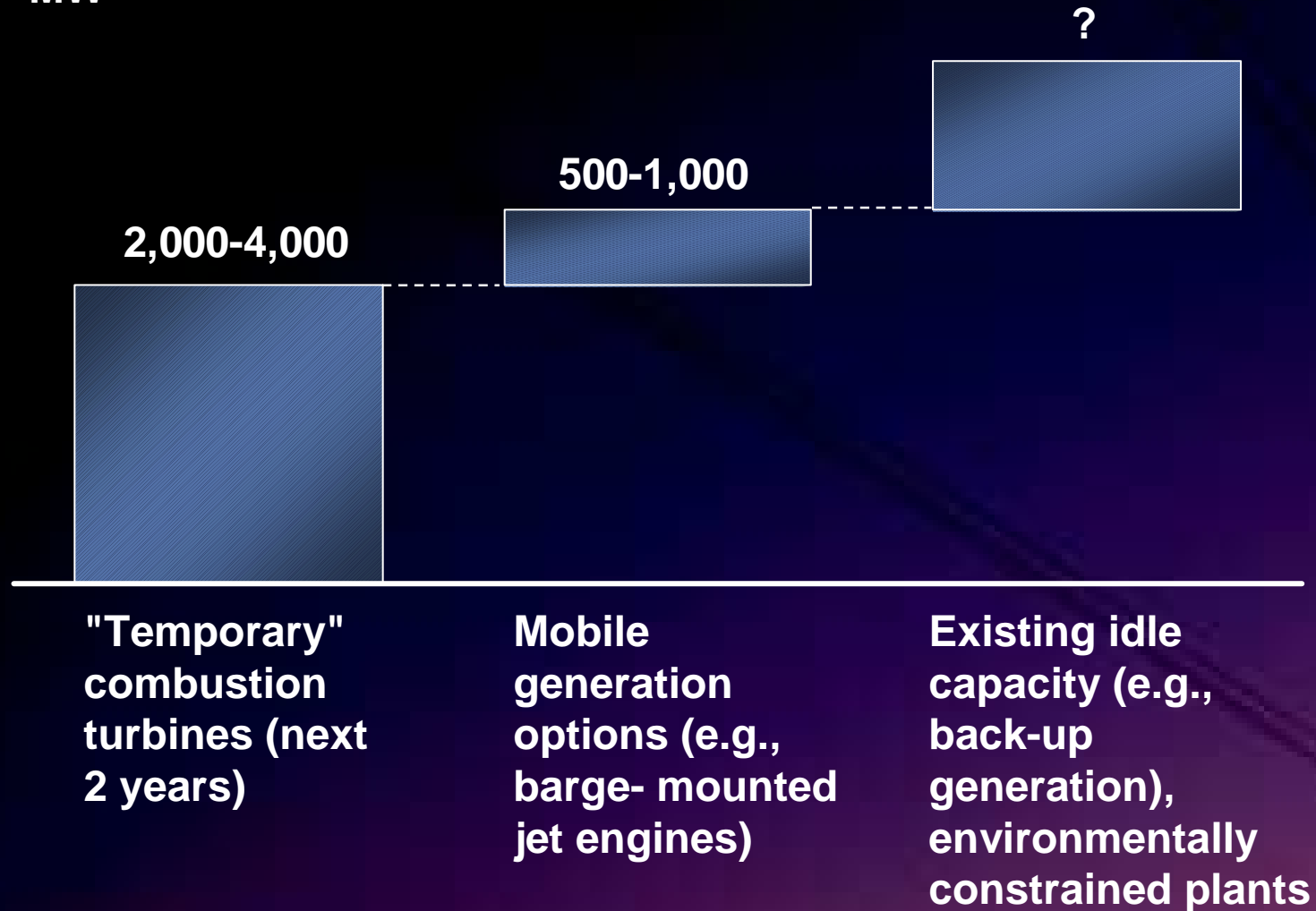
Poor quality of education



Crisis is perceived to be at least as serious as other known threats to the economy

ACTIONS TO ADDRESS SUPPLY

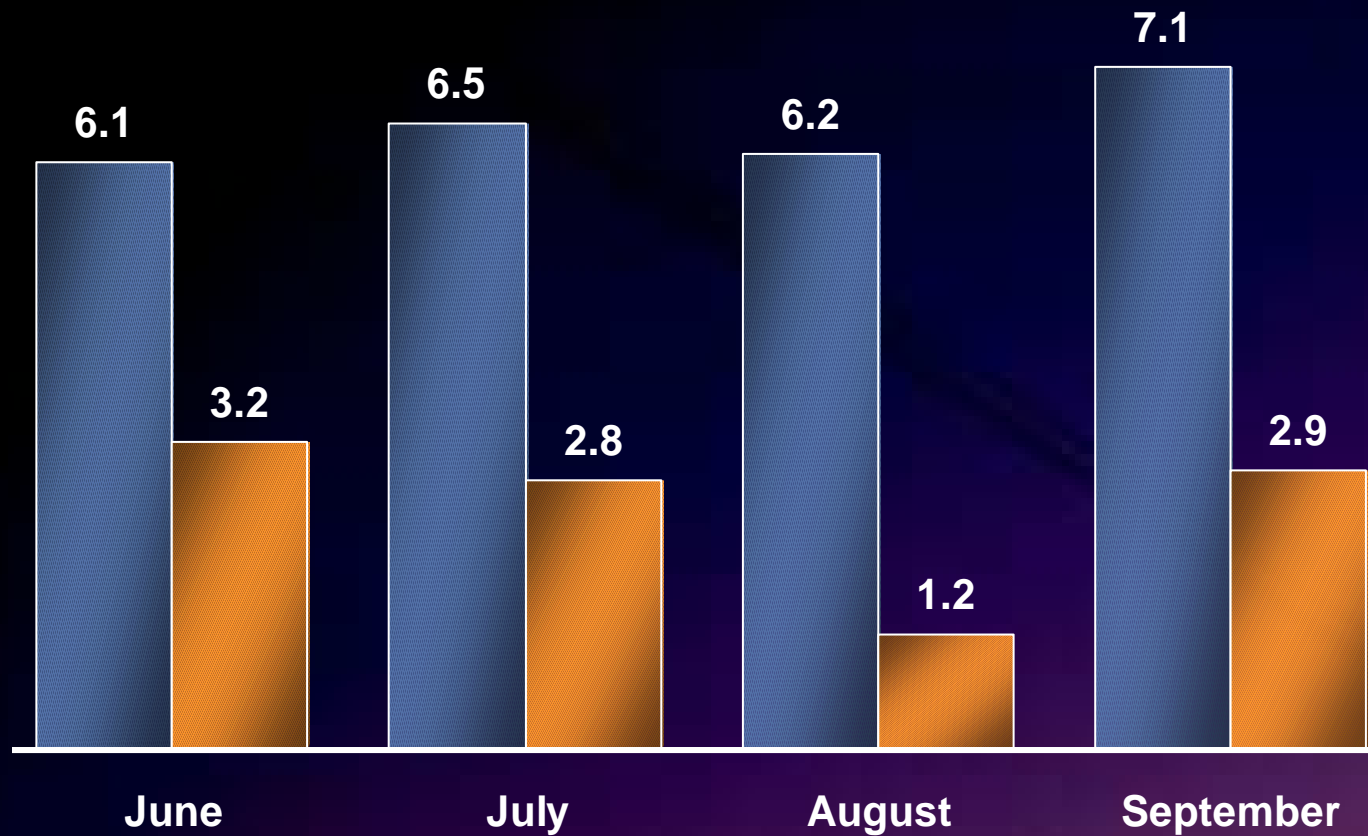
Possible incremental supply options
MW



IMPORTS INTO CALIFORNIA

1999
2000

Net imports during peak hours – June-September
Average GW

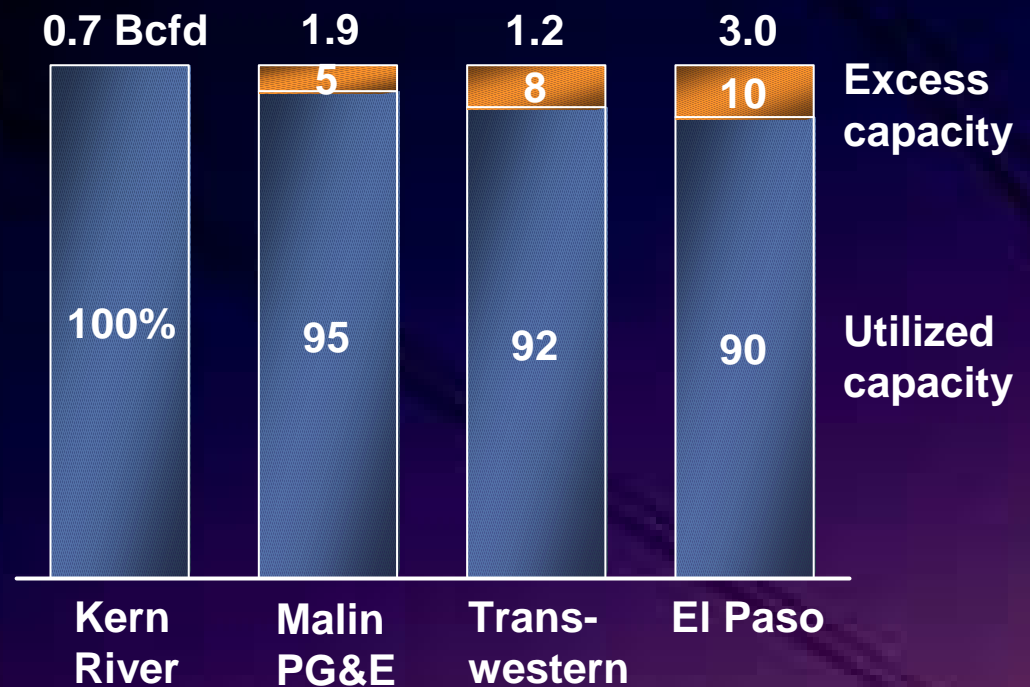


CONSTRAINTS IN GAS INFRASTRUCTURE

Major natural gas pipelines into California



Pipeline capacity Average daily use, January 2001



MICROECONOMIC ROOTS OF THE CRISIS

Structure of supply (35-45%)

- Steep supply curve
- Highly dependent on gas (with no alternative)
- High gas prices and costs for environmental externalities
- Large amounts of "unreliable" capacity (e.g., hydro, imports)

Market dynamics (55-65%)

- Capacity additions not timely
- Demand unresponsive to price
- Bidding rules/procurement requirements magnified generator market power
- Price caps distorted market signals and made matters worse

BAY AREA ECONOMIC CLUSTERS

KEY INDUSTRY GROUPINGS

Knowledge-based Industry Clusters

- Banking and Finance
- Biosciences
- Computers and Electronics
- Environmental Technology
- Multimedia
- Telecommunications
- Tourism

Key Employment Sectors

- Business Services
- Retail Trade
- Wholesale Trade



OTHER INDUSTRY GROUPINGS

Traditional Industrial Base

- Construction, Transportation, Transportation Equipment
- Manufacturing – fabrication
- Manufacturing – refining, conversion, processing
- Resource Extraction

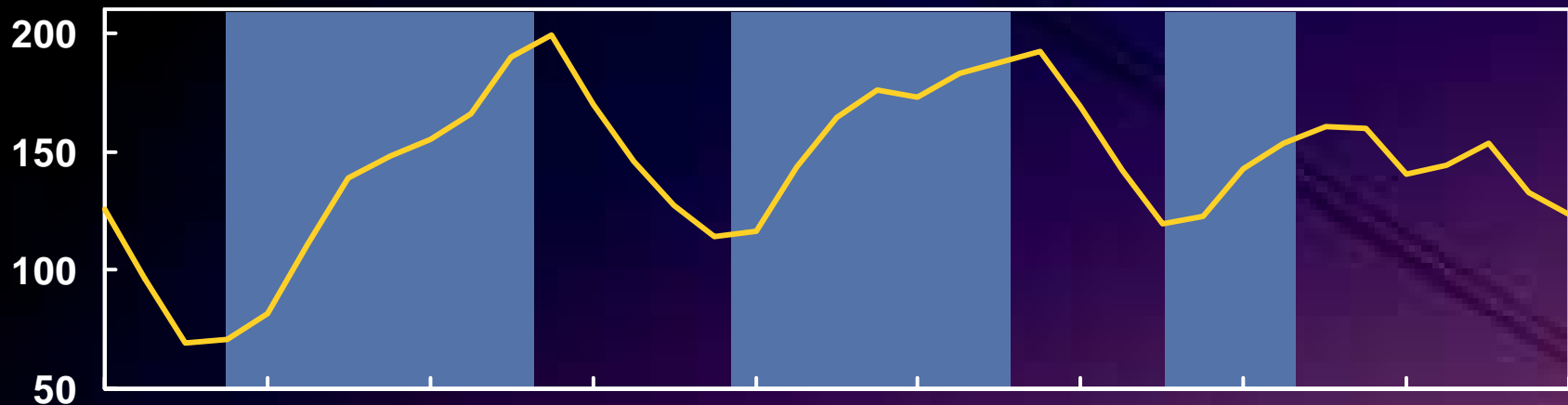
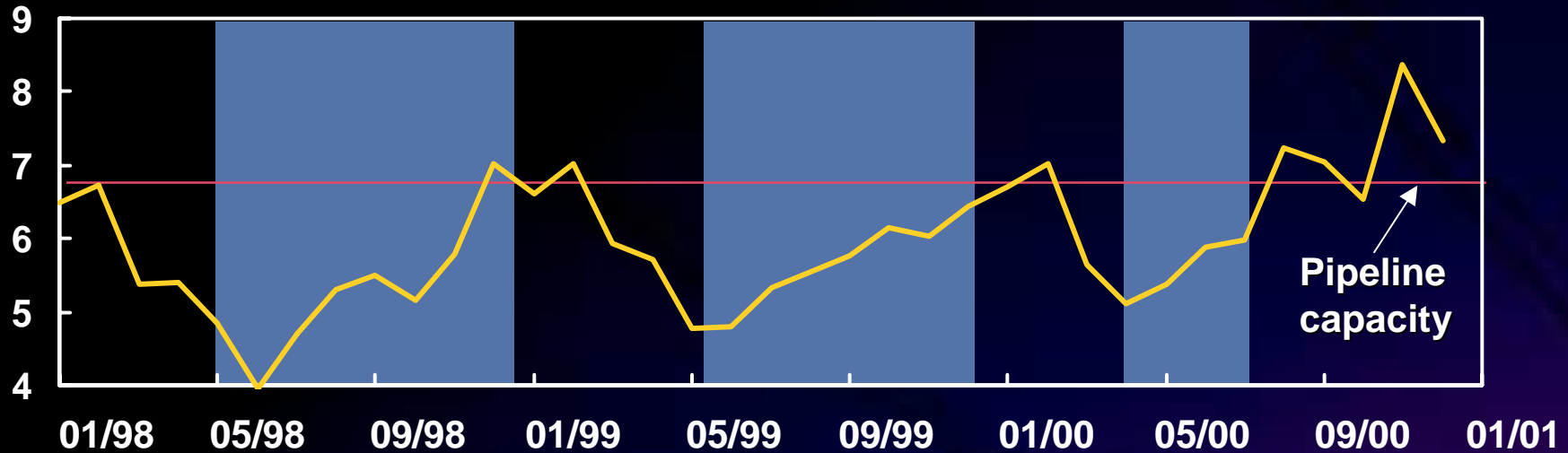
Administration and Services

- Public Administration
- Services

A CRISIS IN GAS IS LOOMING

California total monthly demand
Bcfd

Storage fill period



California gas storage volumes
Bcf

IMPACT OF ENERGY CRISIS

Percentage of survey respondents who agree or strongly agree; 100% = 512

Business issue

Sales

21

Investment plans

26

Consideration of relocation

20

Ability to attract talent

18

Profit margin

43

Competitiveness relative to other companies in our industry

42

WHAT DO WE DO ABOUT IT?

Timeframe

Issues

Immediate
Solvency crisis

Creating liquidity

- Utility solvency
- Possible delivery curtailments
- Federal vs. state jurisdiction
- Contract risks/intergenerational equity

Next 6-18 months
Supply/demand imbalance

Restoring supply/demand balance

- Summer blackout risks
- Winter gas curtailments
- Excess payments to suppliers

Long-term
Market reform

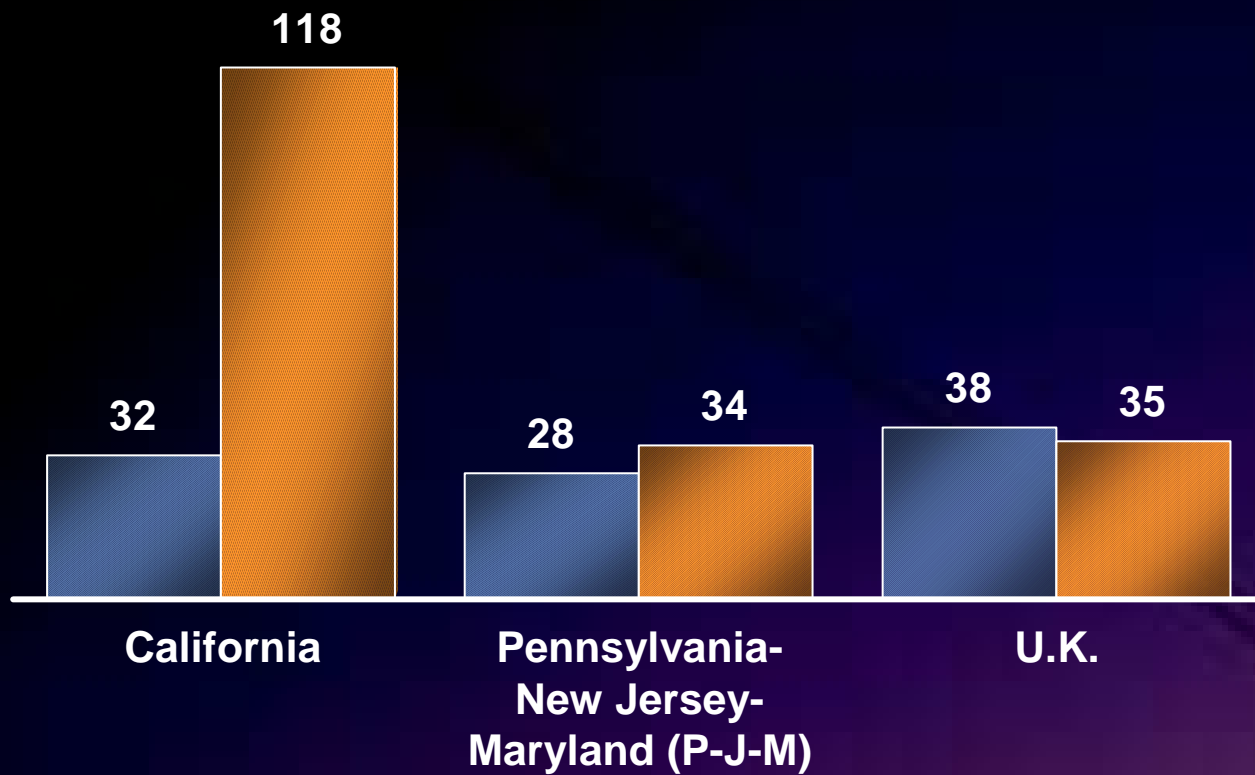
Reforming power/energy policy

- Capacity addition process
- Demand responsiveness
- Fuel mix
- Market structure/rules
- Public vs. private sector roles

AVERAGE ELECTRIC WHOLESALe PRICES

Dollars/MWh

1999
2000



BUSINESS COMMUNITY POSITION

Fundamental principles

- Electric power deregulation should be reformed, not abandoned
- Near-term actions should not compromise longer-term competitiveness of our economy (e.g., stranded assets)

Key actions/ requirements

- Provide immediate supply-demand imbalance relief
 - Conservation mandates (a/c and commercial lighting)
 - Progressive and/or market-based rates
 - Maximize available supply (existing and new additions)
- Reform long-term supply-demand balancing process
 - Simplify regulatory oversight and streamline permitting
 - Rationalize competing priorities
 - Expand TOU and RT pricing options
- Strengthen incentives for development and maintenance of cost effective and reliable distribution infrastructure
- Resolve public and private sector roles
 - Price-setting
 - Securing long-term capacity (resource planning)
 - Funding infrastructure
 - Daily operations and maintenance

ATTRACTING NEW INVESTMENT



Nothing here necessarily need be inconsistent with

- Environmental priorities
- Development/land-use objectives
- Etc.

Provided the trade-offs are acknowledged and consistently applied

CALIFORNIA ENERGY REGULATION

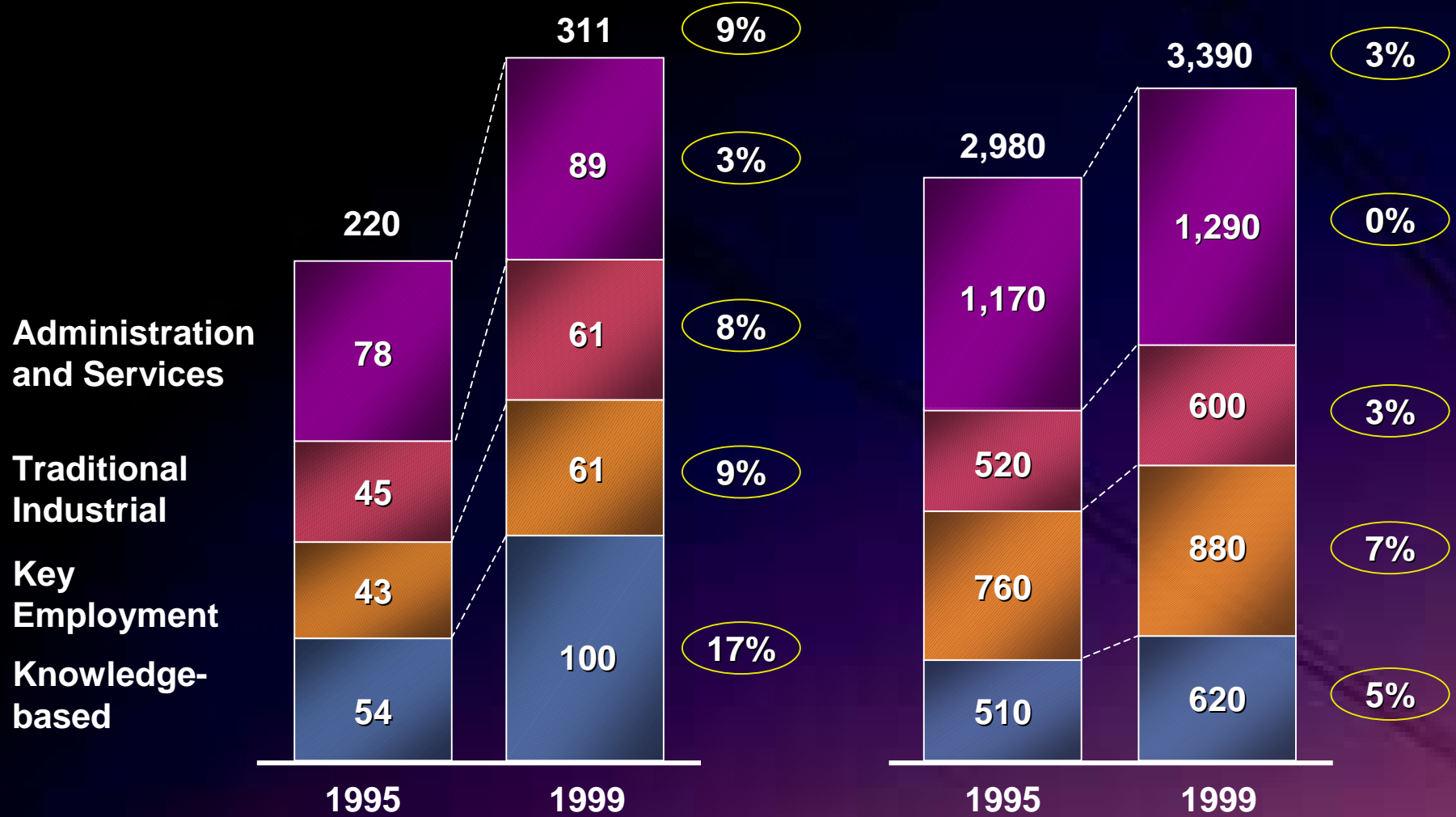


BAY AREA ECONOMIC PROFILE

○ Average annual growth rate

Output
\$ Billions

Employment
Thousands



BAY AREA ENERGY INTENSITY

