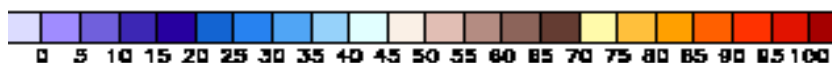
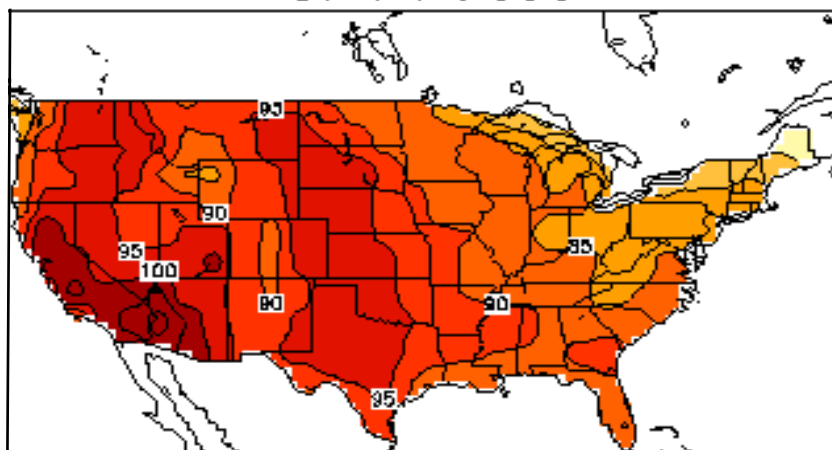




# NASEO Annual Meeting

## The Great Heat Storm of '06

Max Temperature (F)  
07 24 2006



**Scott W. Matthews**  
**Chief Deputy Director**  
**California Energy Commission**  
September 13, 2006



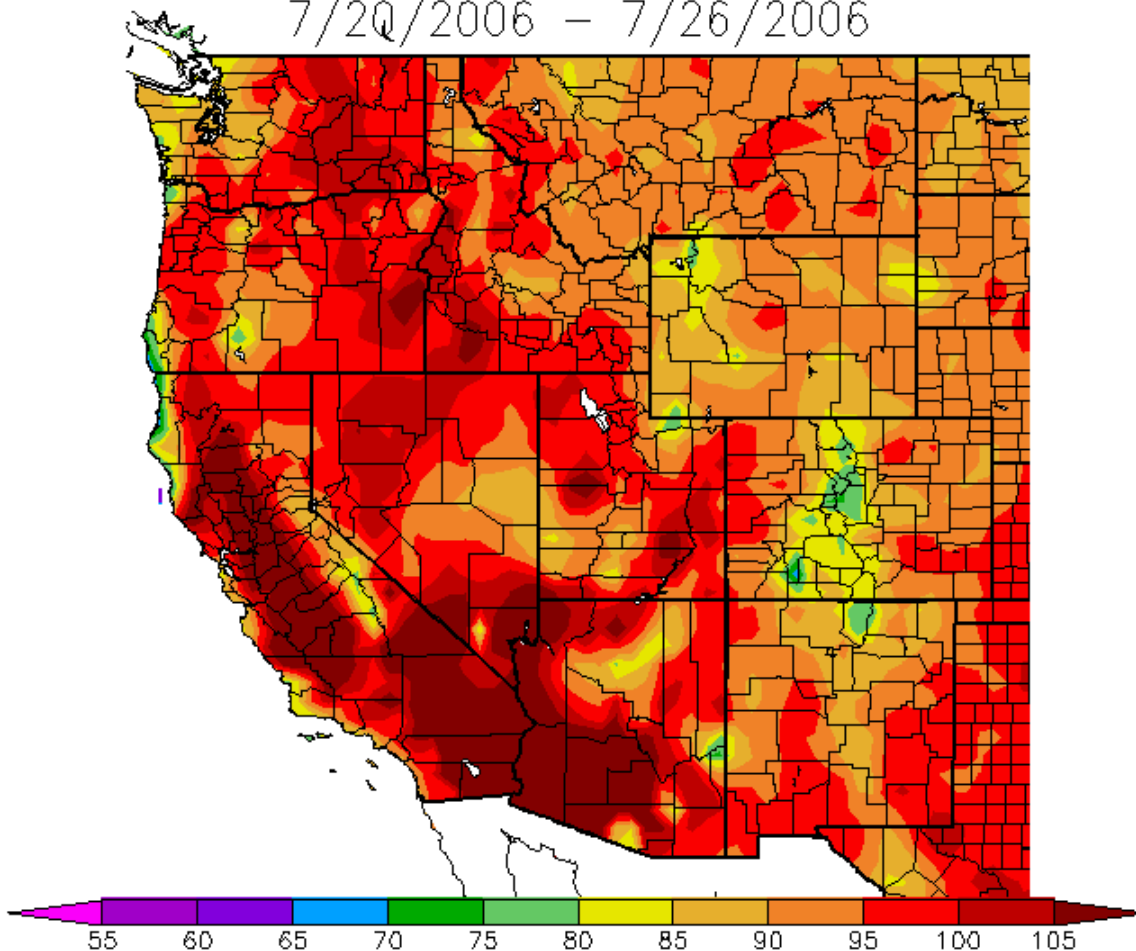
# Topics to be Covered

- **How hot was it?**
- **What were the impacts?**
- **What do we do now?**
- **What's the future hold for us?**



# How Hot Was It?

Av. Max. Temperature (deg. F)  
7/20/2006 - 7/26/2006



Generated 8/25/2006 at WRCC using provisional data.  
NOAA Regional Climate Centers

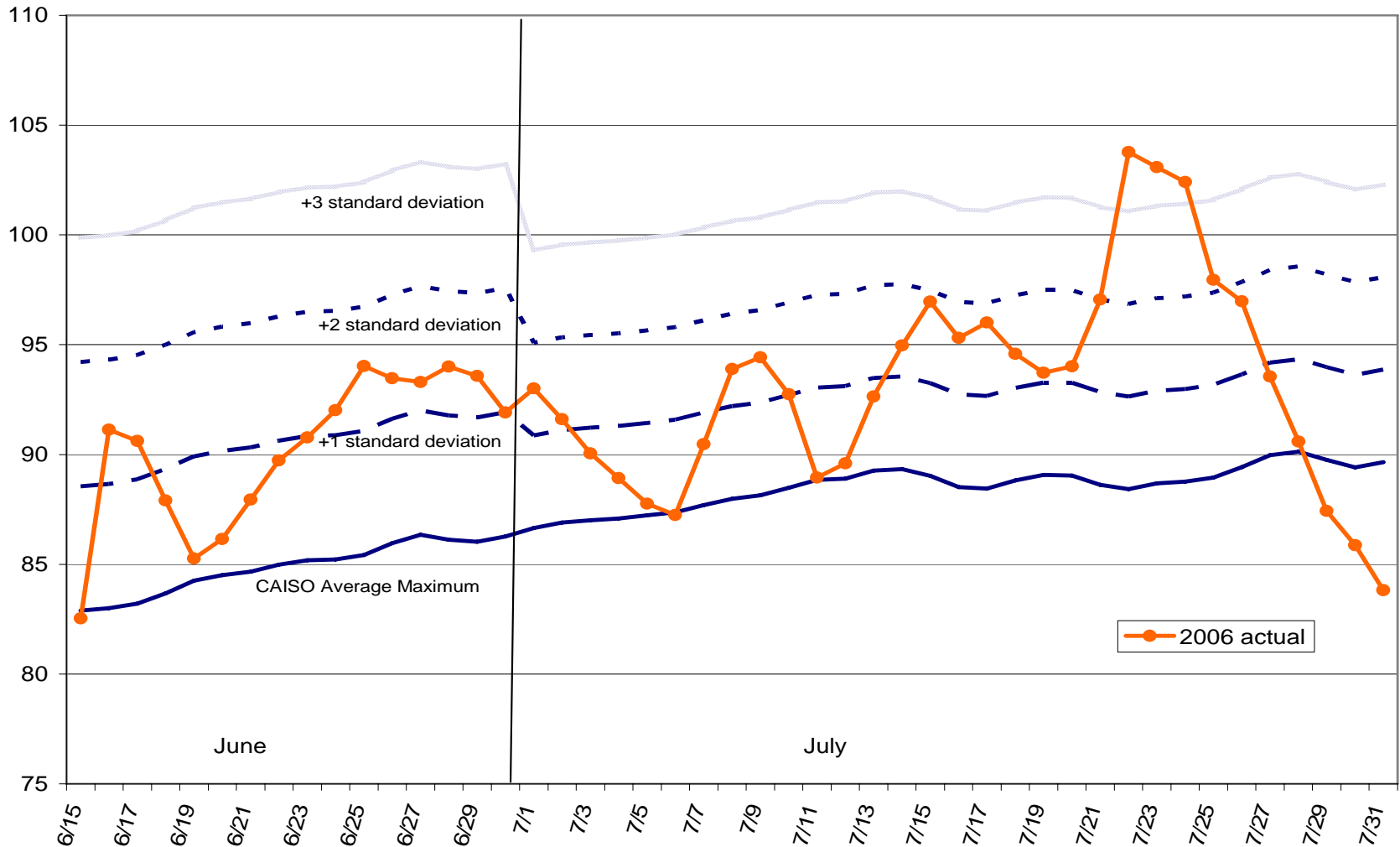


# Unprecedented Heat Event

- Longest, strongest CA heat storm since 1955
- Hottest 24 hr-temps in 57 years (my house 115°F)
- Hotter in NorCal than SoCal
- Didn't cool down at night (Stockton low-82°F, My house 91°F)

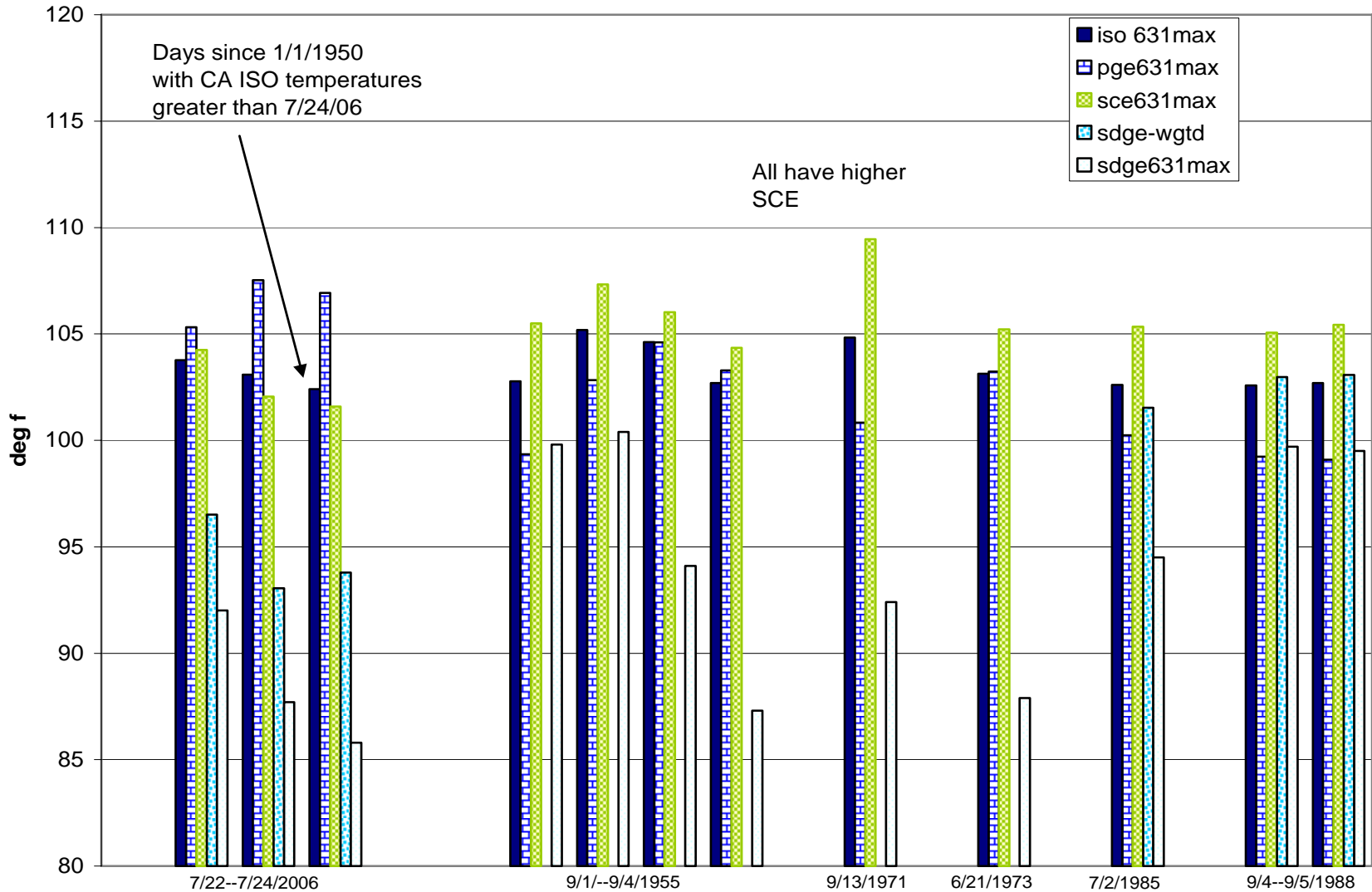


# CA ISO Temperature Above Normal 6/15—7/27





# Unprecedented Heat Distribution





# So How Hot Was It?





# What Were the Impacts?

- **All time highs in electricity demand**
- **Overall excellent system response**
- **Distribution system took a beating**
- **138 heat related deaths**



# Record Peaks in Electricity Use

- **ISO load 50,270 MW-11% higher than last year**
- **PG&E load 13% higher**
- **SCE load 3.6% higher**
- **SDG&E load 11% higher**
- **WECC load 152,007 MW-9.5% higher**
- **BPA Control Area 15.6°F above normal**



# Excellent System Response

- ISO operated the grid effectively
- BPA provided needed MW
- Generators kept power plants on line
- Firefighters protected the grid
- Consumers reduced demand

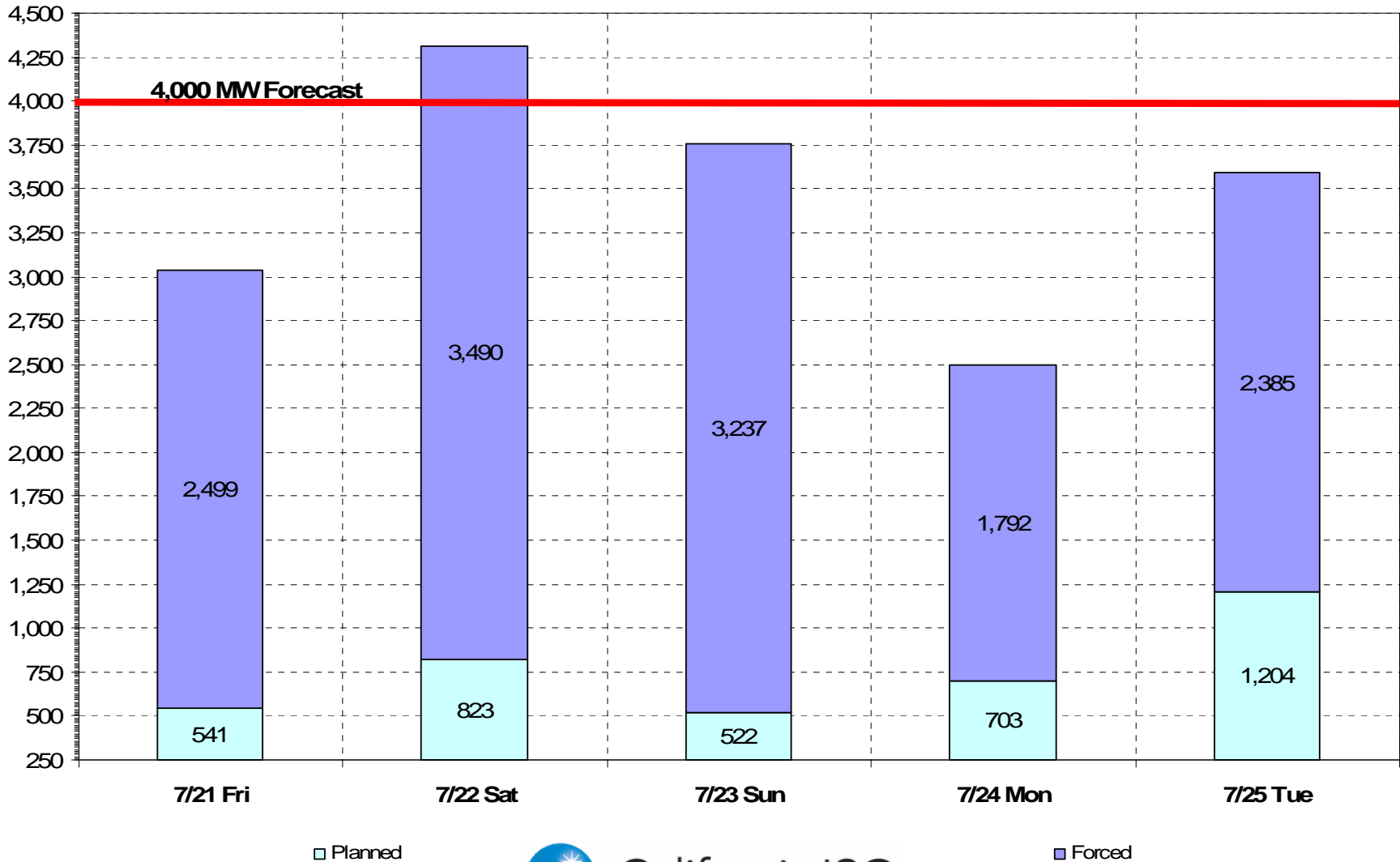


Flex  
your  
POWER

A stylized illustration of a hand holding a smartphone. The hand is orange and blue, and the phone is red. The background is green and blue, suggesting a landscape or sky.



# Generation Outages at Peak



California ISO  
Your Link to Power



# Distribution System Failures

- **Transformers failed because of heat**
  - **PG&E 1,200**
  - **SCE 1,375**
  - **SDG&E 170**
- **Customers lost distribution service**
  - **PG&E 1.3 million**
  - **SCE 1.1 million**
  - **SDG&E 45,000**



# HEAT Related Deaths

- **Emergency Response unprepared**
- **Citizens uninformed**
- **No warnings until too late**
- **No worker deaths**
- **No electricity outage related deaths**



# What Did We Learn?

- **The system is more resilient than thought**
- **The level of our risk tolerance**
- **Distribution system is a weak link**
- **Not prepared for heat related deaths**



# The System is Resilient

- **Both demand and supply helped**
- **DR and Interruptibles contributed**
- **Customers reduced AC**
- **Operators and generators came through**



# Tolerance for Risk

- **Planned for 1 in 10 events**
- **Proposed actions**
  - **Revise the forecast**
  - **Build more peakers**
  - **Plan for 1 in 20, 1 in 40**
  - **More demand side efforts**
  - **Increase the reserve margin**
  - **Build redundant Transmission and Distribution**

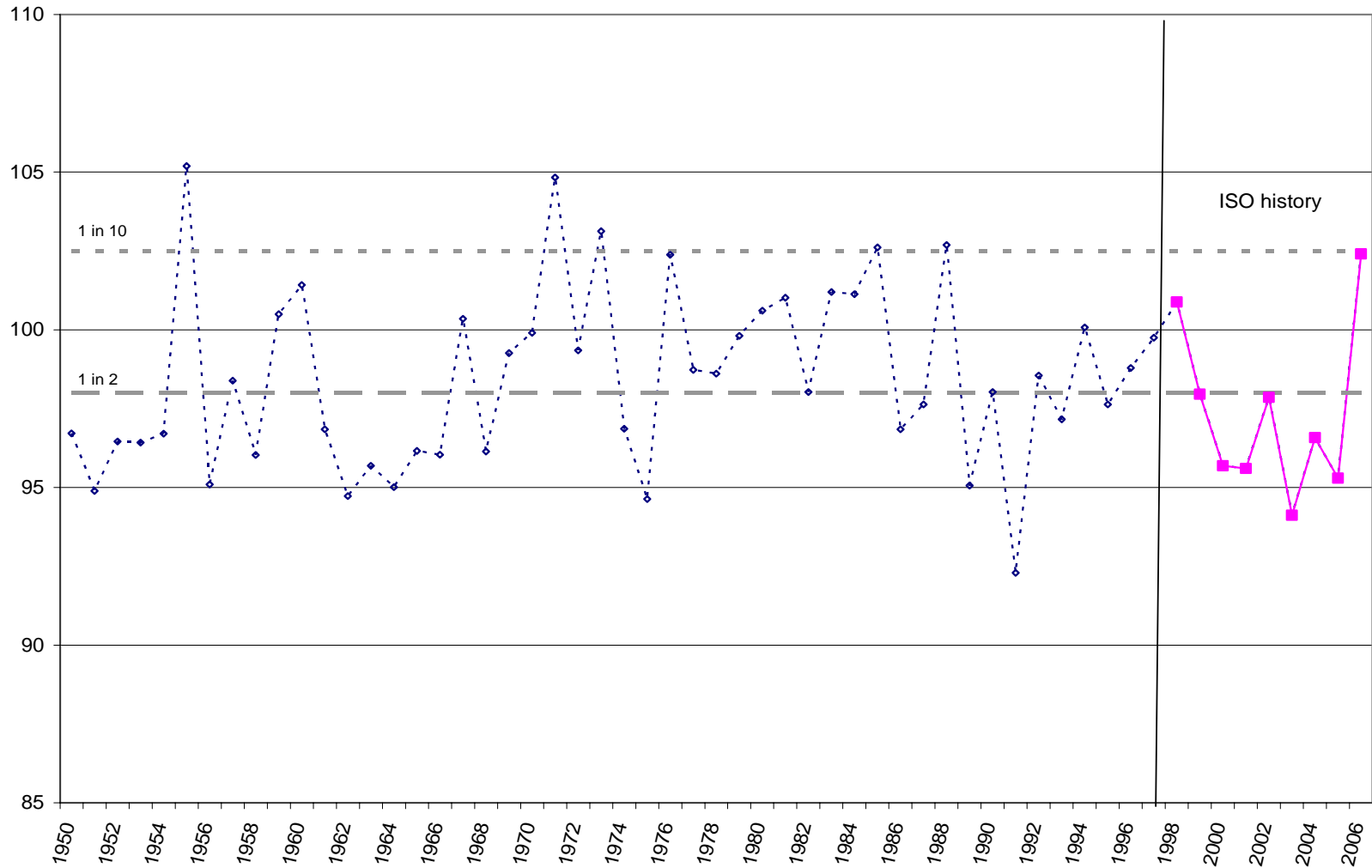


# What's the Future Hold

- **Climate Change's impact on weather?**
- **Renewables affect on reliability?**
- **What will happen to aging power plants?**
- **Will Demand Response meet its promise?**
- **Energy Crisis fatigue?**



# 1950-2006 CA ISO Area Annual Maximum Temperatures





# It's Not Too Late

