

**Sustainability Victoria Seminar May 2006**

# Saving Electricity in a Hurry

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# Outline

- **The need for demand response**
- **Experience from Perth, Feb 2004**
- **Demand Response Methods**
- **PDS programme**
- **Future outlook**

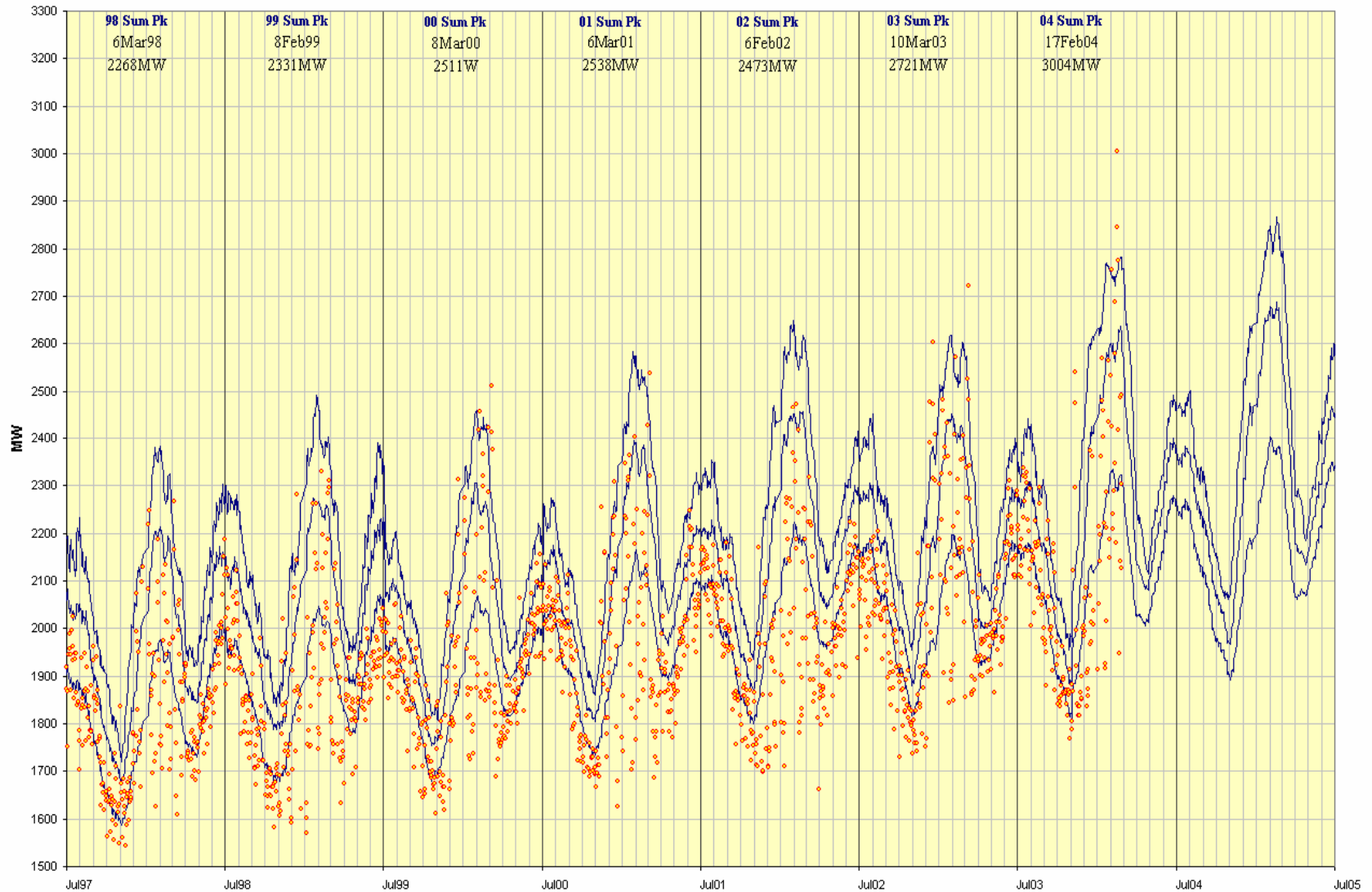
# The need .....

- On 18<sup>th</sup> Feb 2004, Western Power imposed compulsory restrictions on electricity use – essential use only
- Three factors converged on this day:
  - Extreme temperature (3<sup>rd</sup> day of high temperatures (temp range of 38.5 to 41.5 degrees Celsius) and high humidity.
  - Excessive load growth (e.g. air conditioning)
  - Gas pipeline capacity restrictions constrained use of peaking plant (i.e. open cycle plant)
- Public backlash against electricity restrictions (esp. air conditioner use)

### Western Power Load Area

#### Working Days Evening Peaks - Forecasts and Actuals

#### 1997/98 to 2004/05



# Newspaper Headlines

## Heat on Power Provider

**The West Australian, page 7, 17 February 2004**

The hot weather yesterday brought about record electricity demands.

## Power chaos claims two top bureaucrats

**The Australian, page 1, 20 February 2004**

JUST a day after more than a million West Australians lost their electricity supply those responsible lost their jobs.

## Business angry and confused by bans

**The West Australian, page 5, Thursday, 19 February 2004**

WESTERN Power's electricity crisis has left WA business angry and confused and could cost tens of millions of dollars, the Chamber of Commerce and Industry says.

## Heavy hitter sought for inquiry

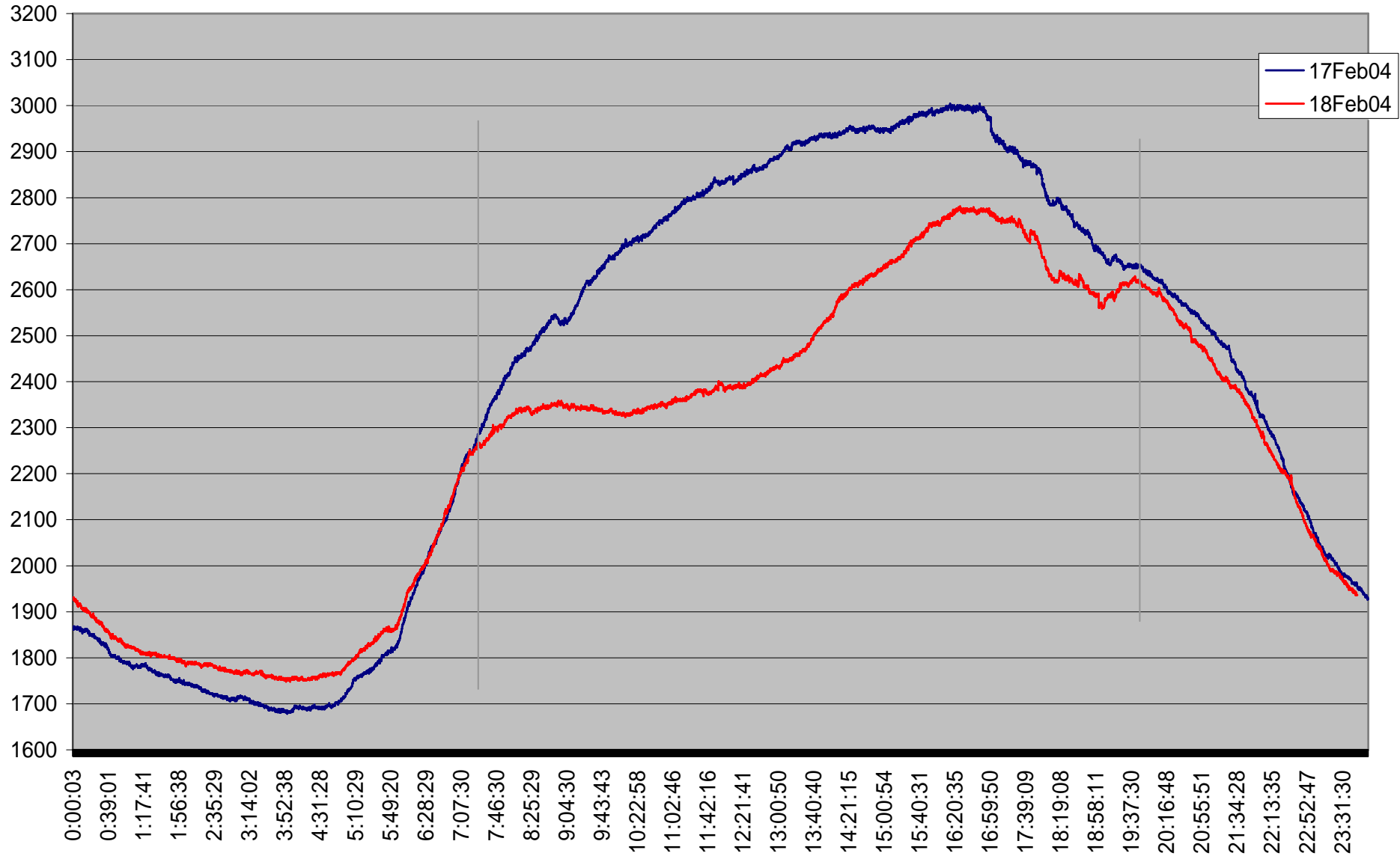
**The Weekend Australian, page 10, 21 February 2004**

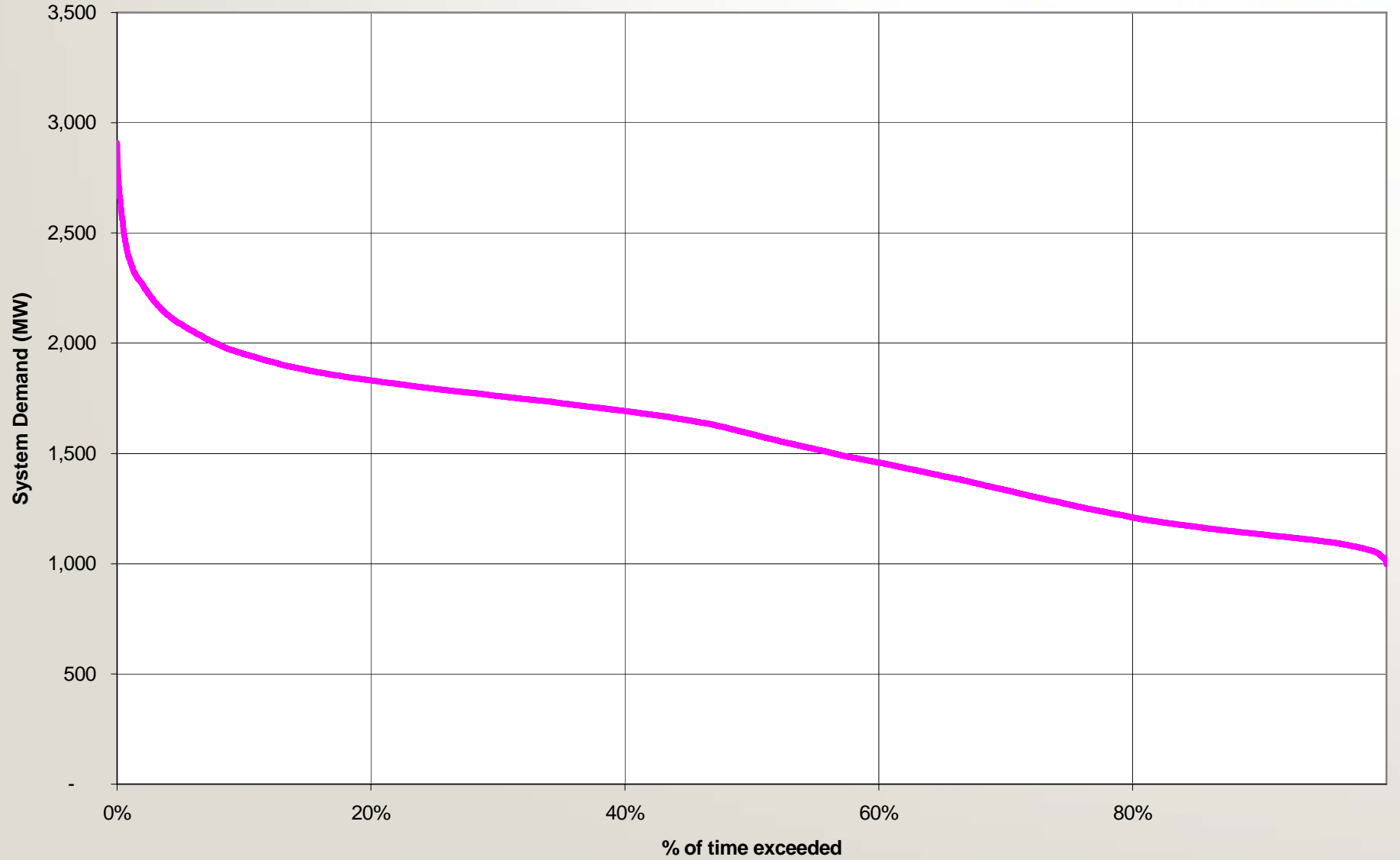
REJECTING calls for his resignation, West Australian Deputy Premier Eric Ripper yesterday signalled he would seek a heavyweight investigator with a military or crisis-management background to lead the inquiry into Wednesday's power fiasco. Jim Gill, Water Corp, suggested.

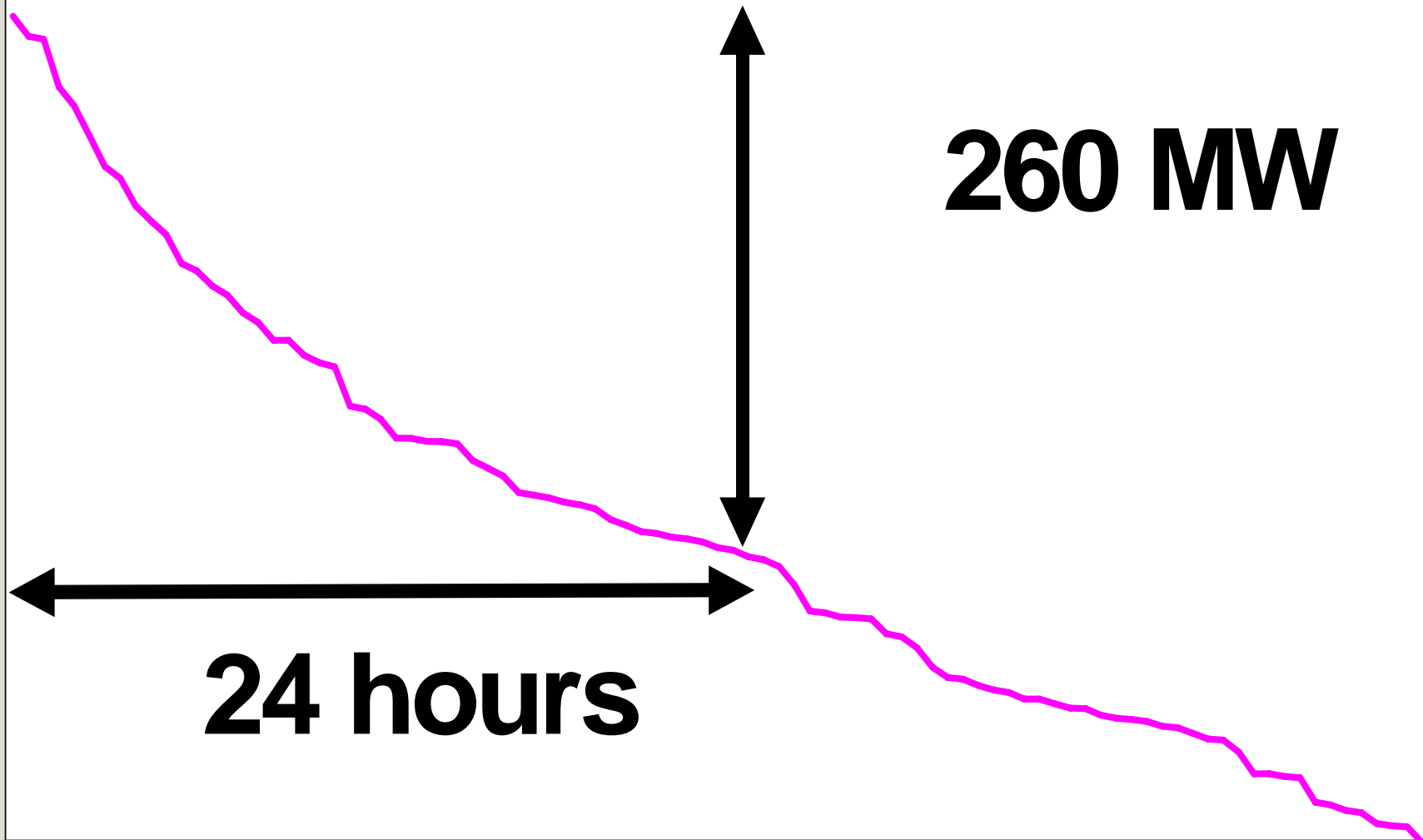
# Power Restriction Order

- **Domestic Customers**
  - **Air-conditioning not to be used**
  - **Limited cooking one hot plate only**
  - **Only two lights per household**
  - **Water reticulation and swimming pool not to be used**
- **Industrial and Commercial**
  - **Air conditioning off and only fan ventilation permitted**
  - **Only one lift permitted in high rise buildings**
  - **No electricity for industrial production**

**Western Power Load Profile**  
**17Feb04 and 18Feb04**  
**3.23GWH lost to due Restrictions**







# Power System Planning

- **Add more Generation?**
  - **250 MW open cycle GT \$M25/year plus operating costs**
    - **Immediate dispatch**
    - **Available all year**
    - **Not energy or time limited**
    - **Part of Gen portfolio**
- **Reduce Demand**
  - **Often time and energy limited**
    - **Usually costs less**
  - **Some delay in implementation**

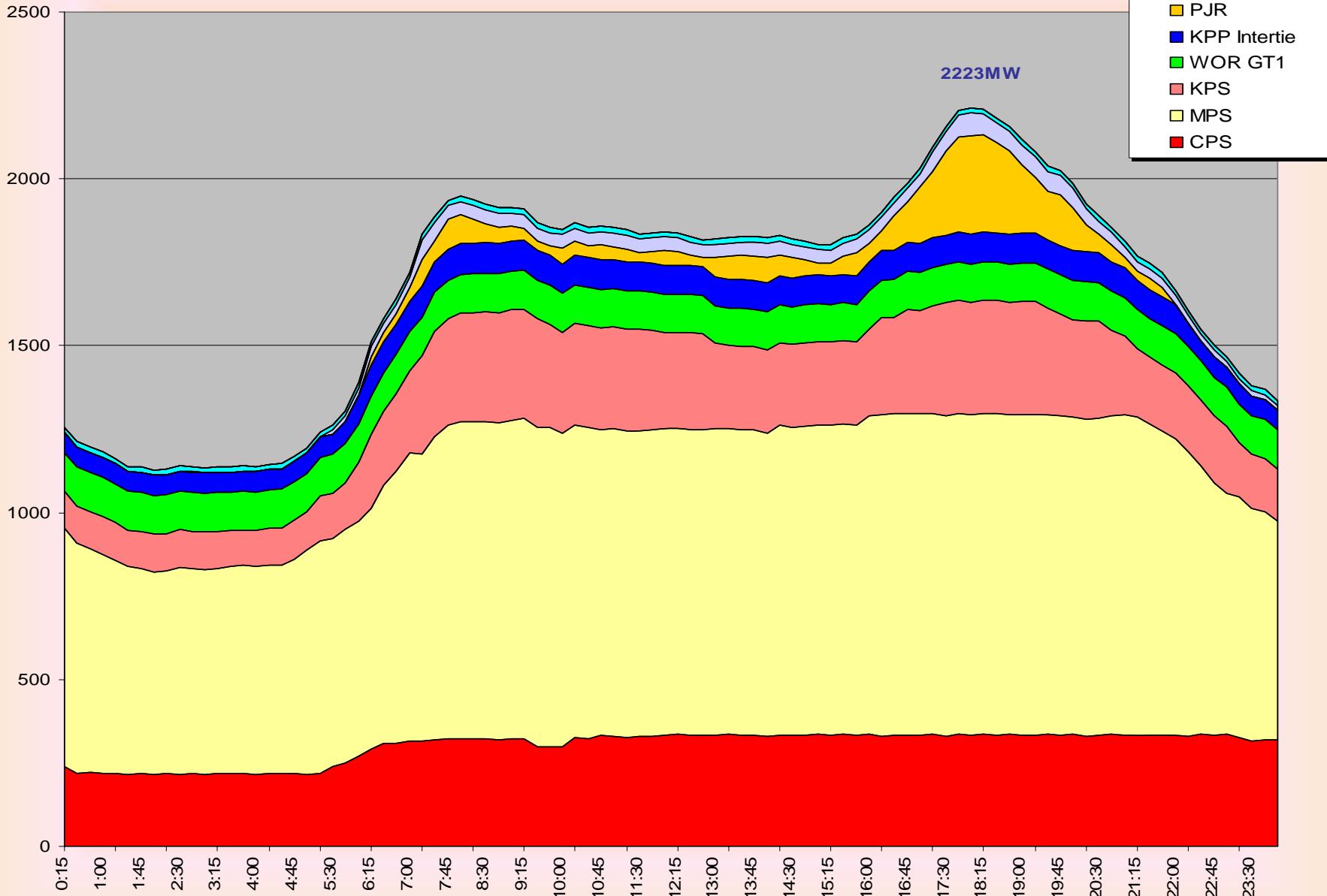
# Power Restrictions versus Rolling Blackouts?

- Share the pain
- Indiscriminate
- Controllability

# Demand Response Methods

- **Technical methods**
  - V & f control**
  - ripple control of hot water systems,**
  - control of air conditioners**
- **High Prices**
  - time of use tariffs,**
  - Voll \$10000/MWhr**
- **Contract Arrangements**
  - usually time and energy**
  - constrained**

# Western Power Generation Profile (including Purchases) 2002 Winter Peak Day Wednesday, 12 June 2002

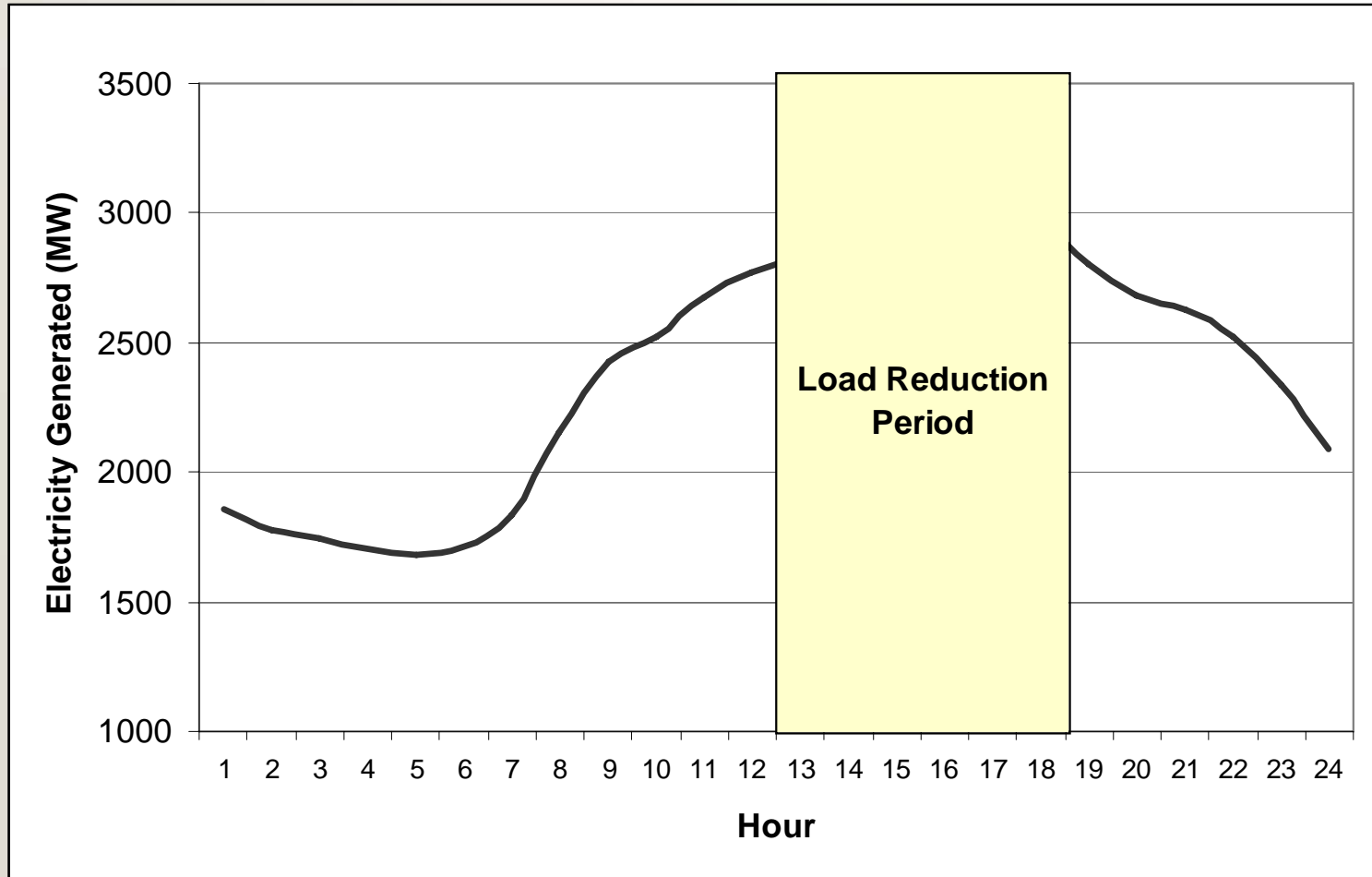


# PDS Program

## Key Design Features

- Must not be complicated
- Must provide flexibility to customers
- Load reduction must be dispatched using existing communications channels

## Electricity Demand (MW) - 17/2/04

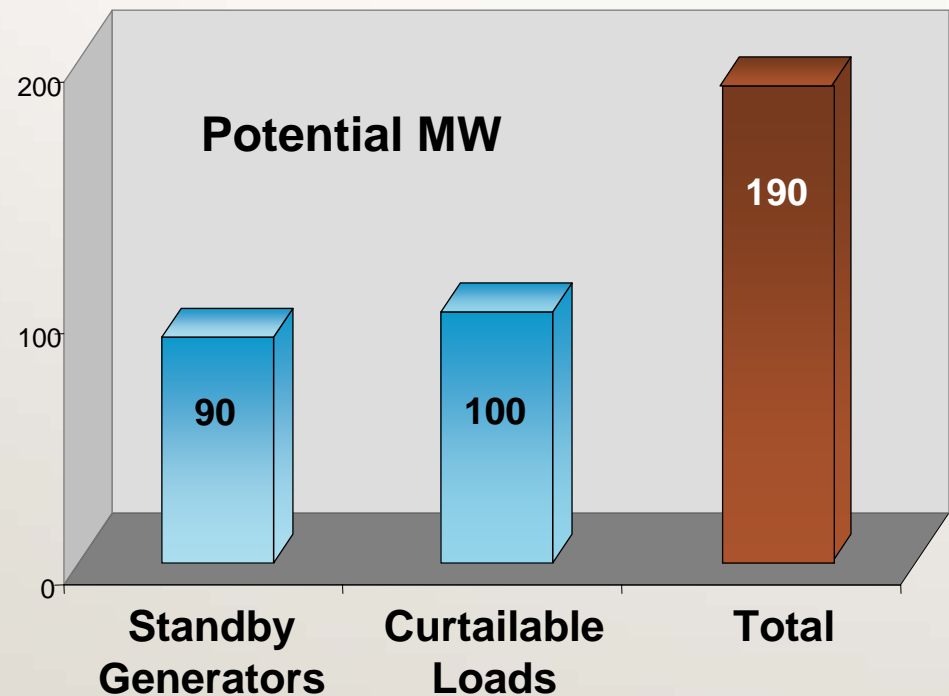


# How much load reduction potential was technically available?

- **Many ways to contribute:**
  - **Using standby generators**
  - **Rescheduling batch processes**
  - **Changing HVAC set-points**
  - **Operating pumps off-peak**
  - **Rescheduling maintenance and shutdowns**
  - **Changing production schedules**

***TARGET CUSTOMERS:***  
***Those who could provide load reduction with minimal disruption to their business activities***

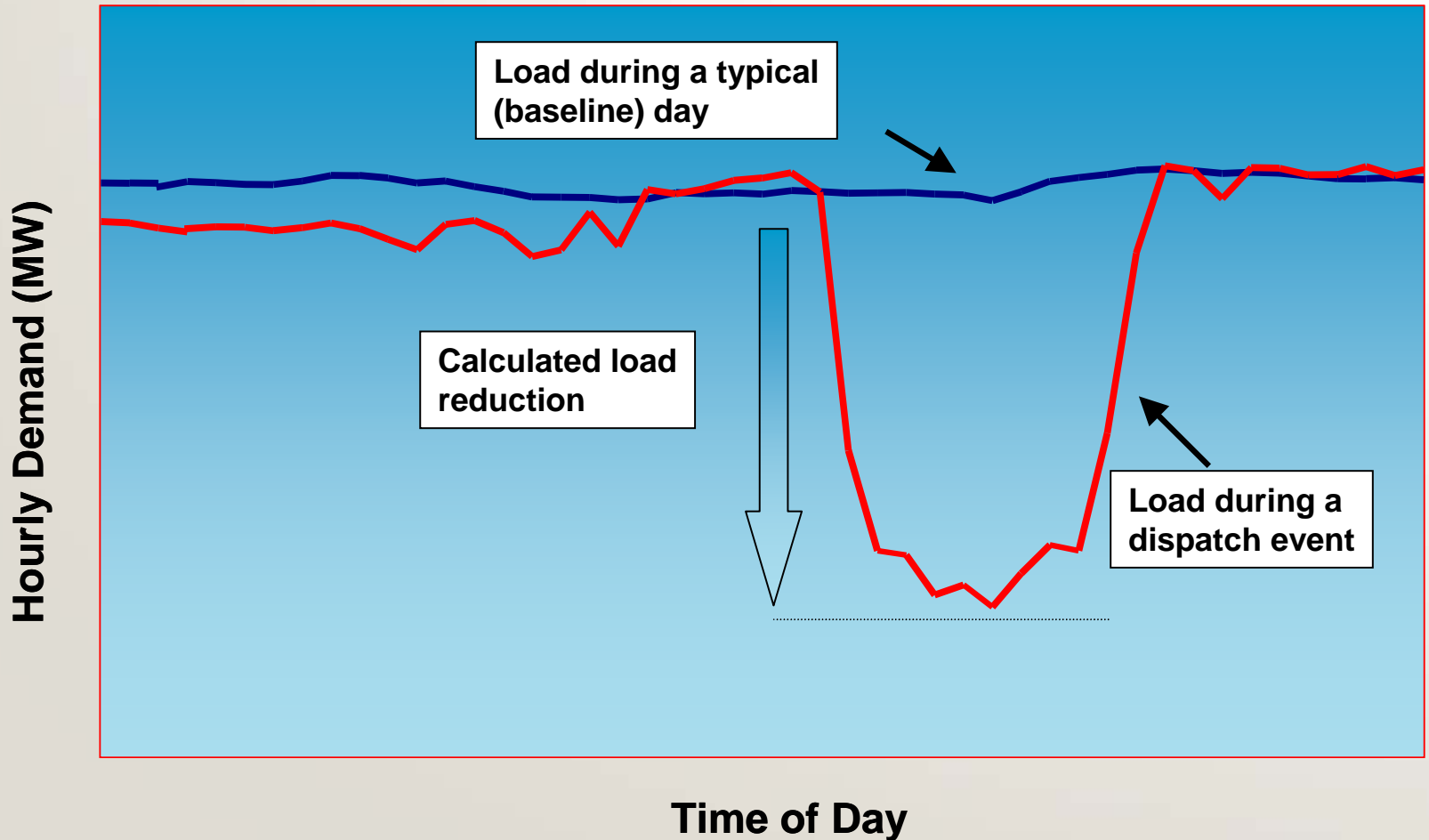
**Technical Potential from Major Customers**



# Timing Essential

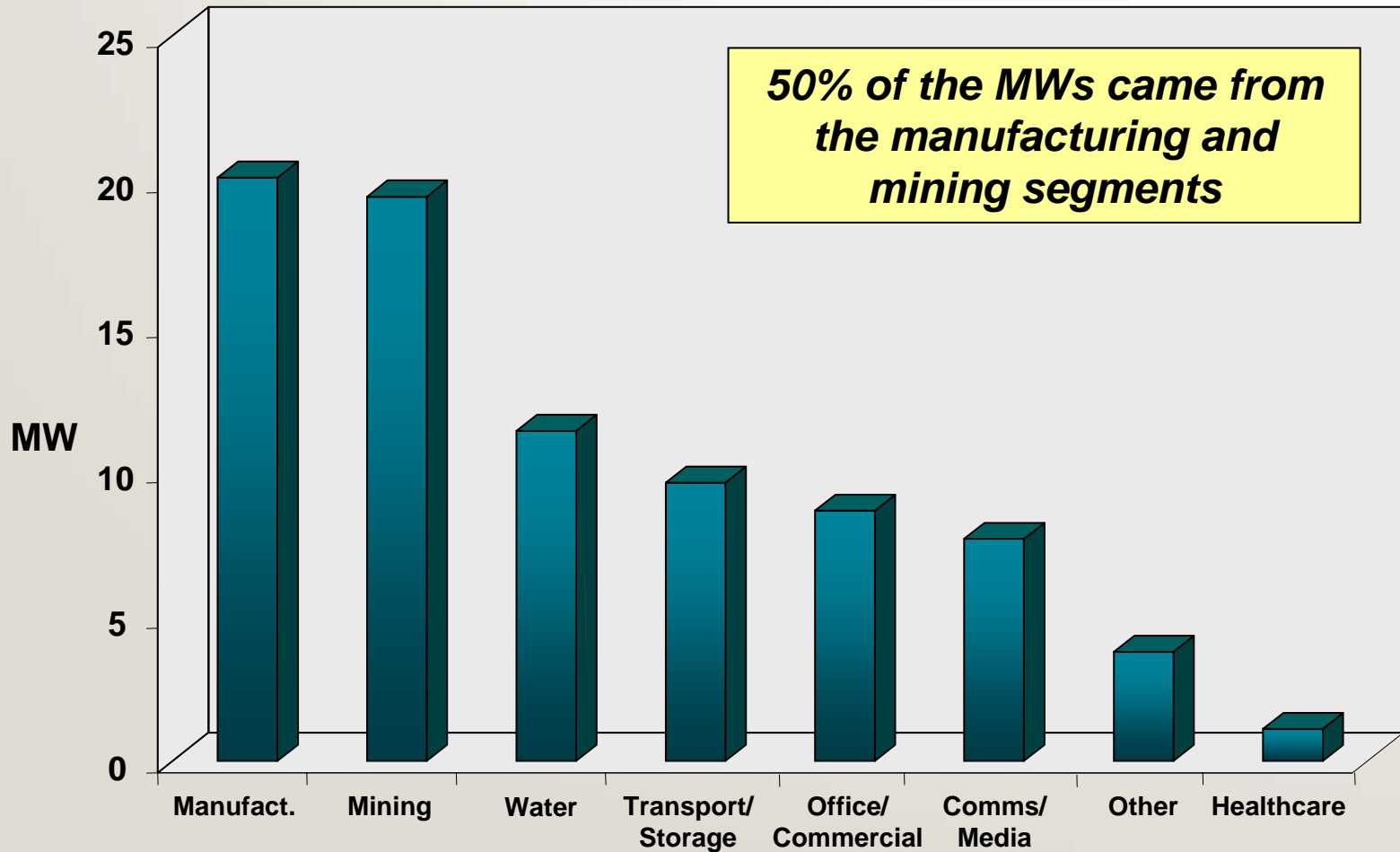
- 24 hours notice
- 4 hours notice
- 1 hour notice

# Verifying Load Reductions



Payments were made to customers at the end of each month

# Participation by Industry Segment



# Dispatch Events

- Two dispatch events:
  - 15 Feb 2005 – 17.2 MW (1 hour)
  - 23 March 2005 – 38.5 MW (4 hours)

Achieved over 80% participation rate

# Where to from Here?

- More Energy conscious
  - Air conditioner efficiency
- Real Pricing of Electricity?
- Accuracy of weather forecasts
- Interdependency of Electricity with Gas