

# Power Supply Study Phase III



Board Retreat

April 19, 2002



# Issues for Discussion

- Recap of power supply process
- Phase III considerations
  - Load forecast/need assessment
  - Siting Analysis
  - Market Review
  - Unit options analysis
- Conclusions/Recommendations

# Power Supply Process

## Phase I - (1994-1995)

- Springfield growing, need for additional capacity
- Reviewed the Iatan II and Missouri 2000 projects.
- Neither project went forward
- CU entered into market contract with KCPL for power from Montrose Plant

# Power Supply Process

## Phase II (1999-2000)

- Springfield growth continuing
- Deregulation discussed in Missouri
- Reviewed several side issues
  - Sell or retain assets -high value in the well maintained depreciated assets for CU customers. Would be recapitalized if sold-increased costs for Springfield residents.

# Power Supply Process

## Phase II (1999-2000)

- Review of Side issues (cont'd)
  - Impact of deregulation-customer loss scenarios to show risk of stranded cost
  - Business model of distributed generation

# Power Supply Process

## Phase II (1999-2000)

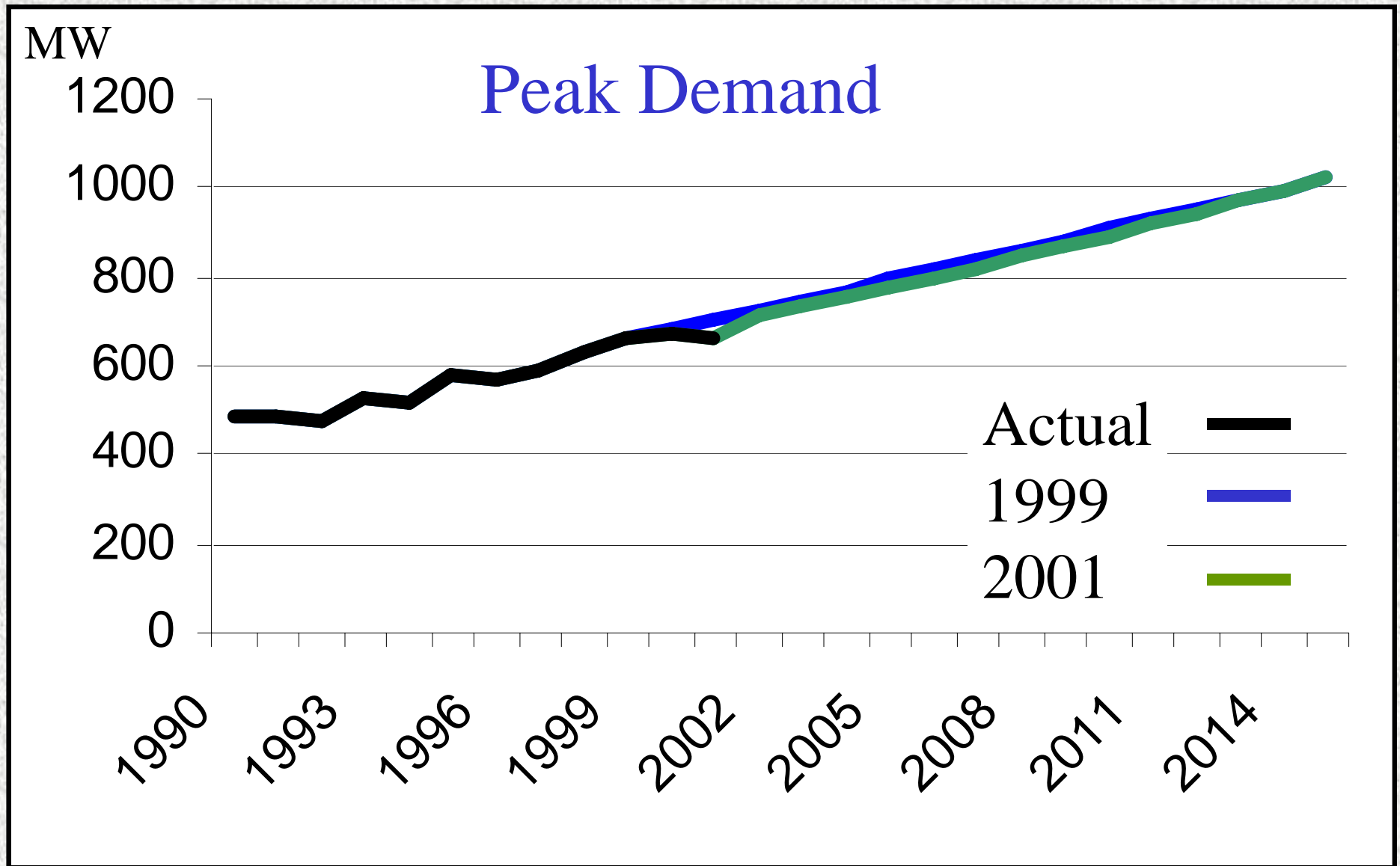
- Conclusions-
  - Keep existing units
  - Market is moving to gas fired units
  - Transmission delivery a growing problem
  - Energy more important in 2007 time frame
- Simple cycle combustion turbines proper next unit choice - Built the McCartney Plant

# Power Supply Process

## Phase III (2001-2002)

- Develop new load forecast
- Look at potential sites for new coal or gas unit
- Develop costs for coal and gas units
- Review area market
- Analyze options
- Develop expansion plan

# Load Forecast-



# Load Forecast- Load Factor

$$LF = \frac{\text{Energy Used in period}}{\text{Peak x hours in period}}$$

Annual load factor varies primarily due to:

- weather
- higher factor loads

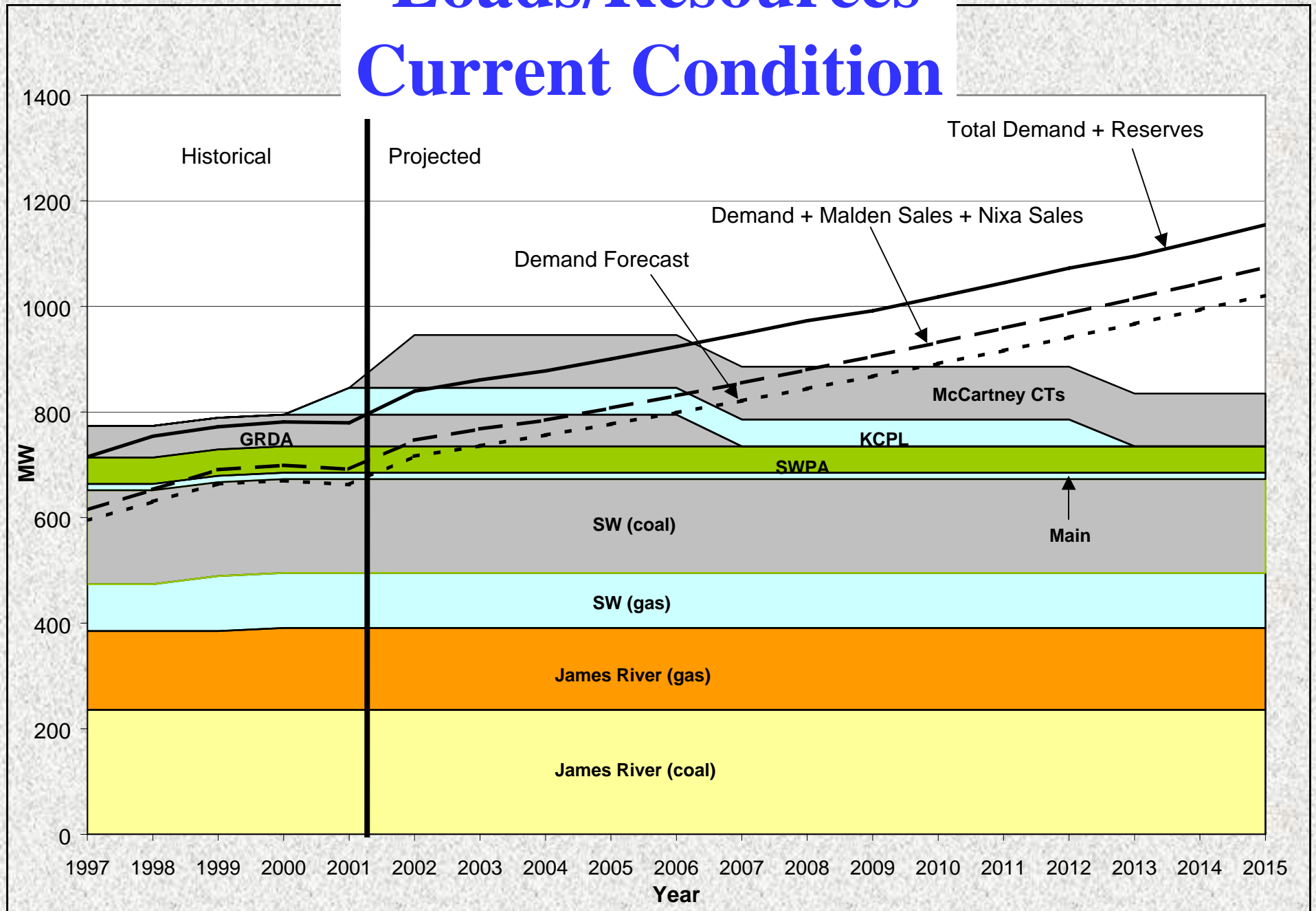
Higher load factors allow fixed costs to be spread over more kWh's reducing average costs

# Load Forecast- Load Factor (cont'd)

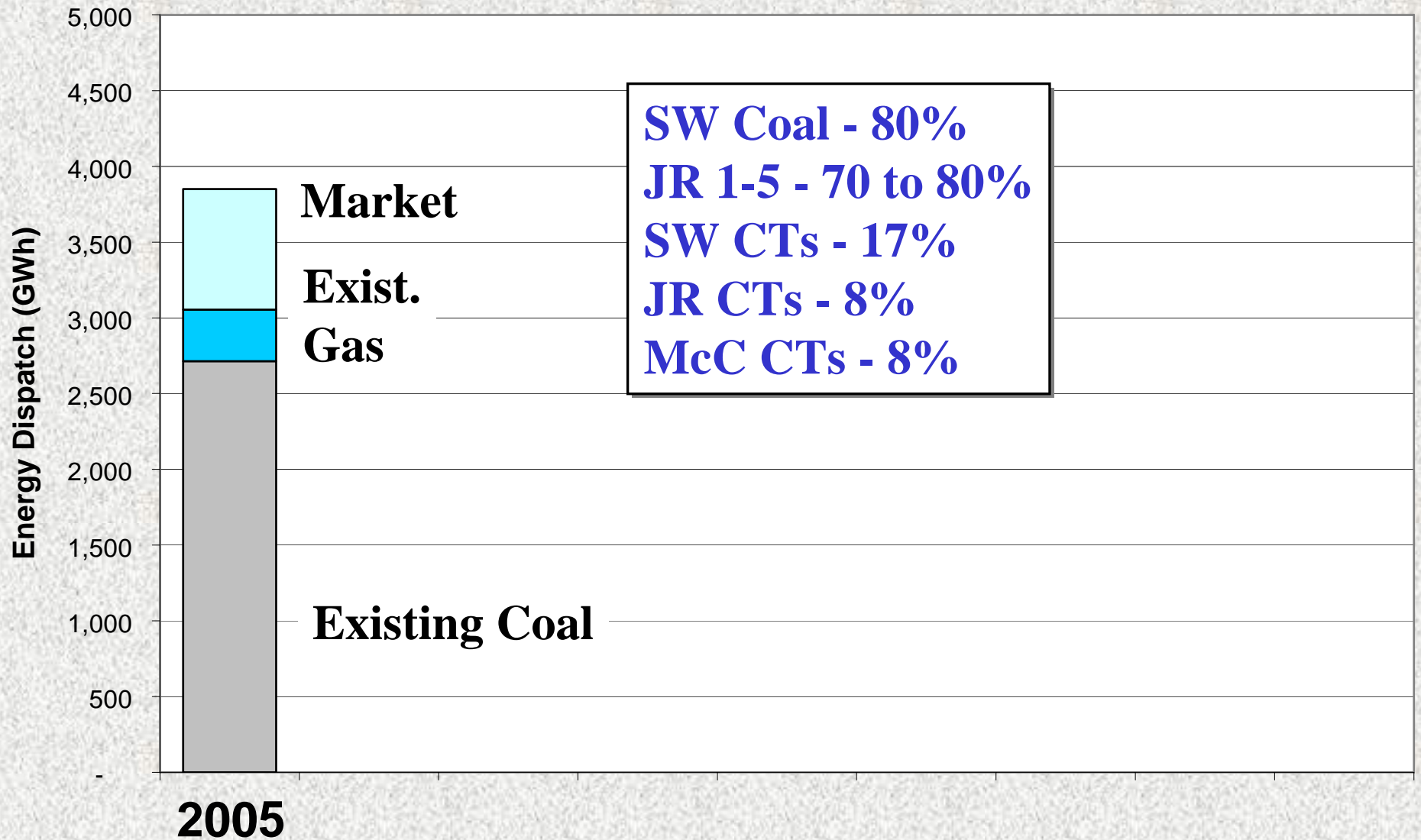
Year	Historic	Increased Sales	Weather
1995	49		
1996	50.8		
1997	49.5		
1998	50.3		
1999	47.6		
2000	49.3		
2001	49.8		
2002-on		52-53	48.5

With same fixed costs, every 1% increase in LF reduces FC/kWh by approximately 2%

# Loads/Resources Current Condition



# Major Dispatch for Existing System



# Siting Study Process

- Mapped gas, transmission, coal lines
- Located water sources
- Located sensitive air permitting regions
- Located areas with access to fuel, water, transmission and space of
  - 100 acre tract for gas-33 sites selected
  - 1200+ acre tract for coal-32 sites selected
  - James River and Southwest

## **Siting Study Process** (cont'd)

- Performed field inspection of sites for local issues such as residential encroachment
- Transmission analysis indicated major improvements needed for units remote from Springfield area
- Screening analysis resulted in three sites besides the James River and Southwest sites to be considered for new resource

# Market Analysis

- Marginal unit from market is gas fired combined cycle
- Same option as available to CU
  - Municipal financing versus IPP return
  - O&M under CU control
  - Performance same as Market ie heat rate, cycling, etc.
- Transmission is still major delivery concern

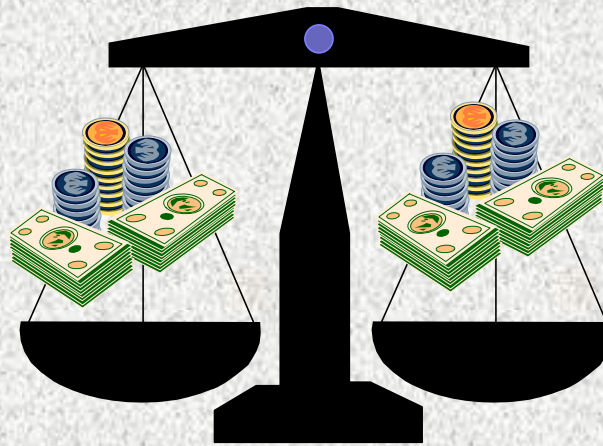
# Market Considerations (cont'd)

- Project sizes being
  - Scaled back
  - Delayed
  - Cancelled
- Area merchant coal plants on/off based on gas price- none near Springfield. 1400MW have been cancelled.

# Market Considerations (cont'd)

- Merchant returns have to increase for credit markets to feel secure on increasing debt
- Long term market (10+year) contracts are typically priced higher than shorter term contracts

# Resource Analysis

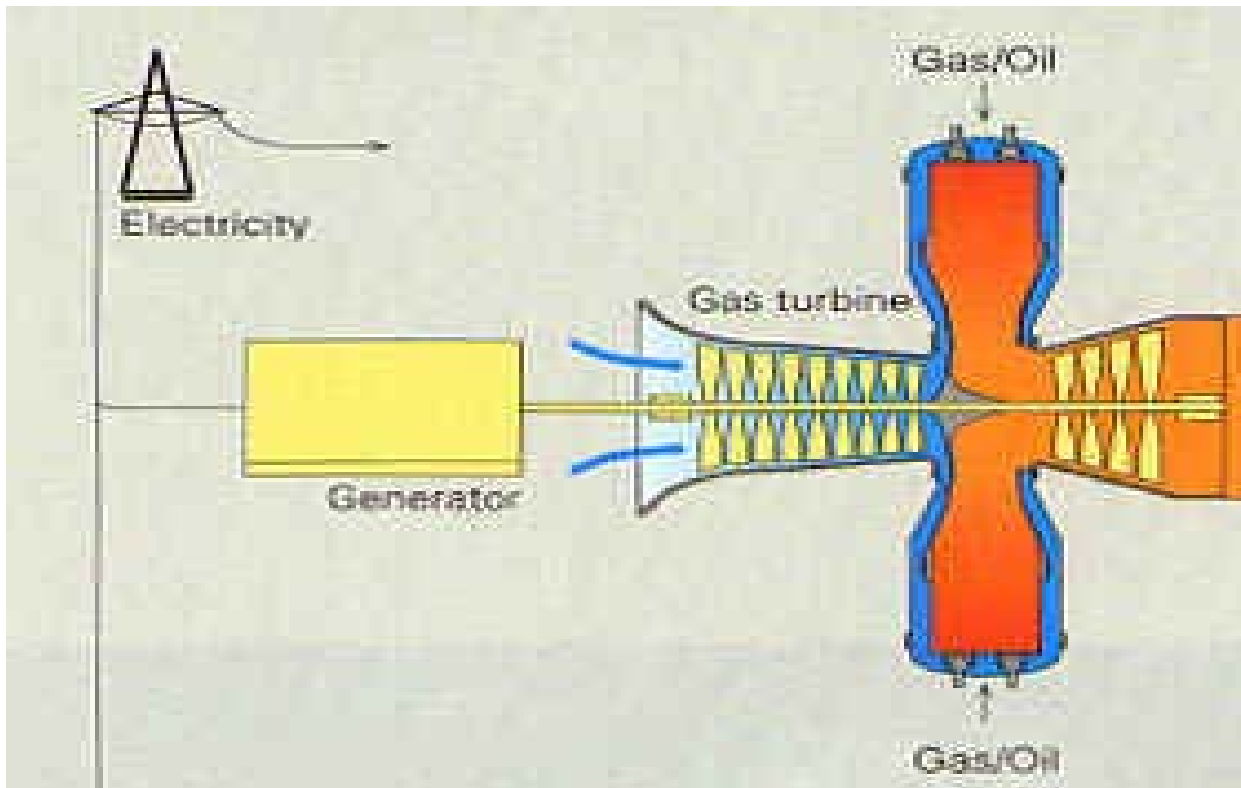


# Unit Options Analysis

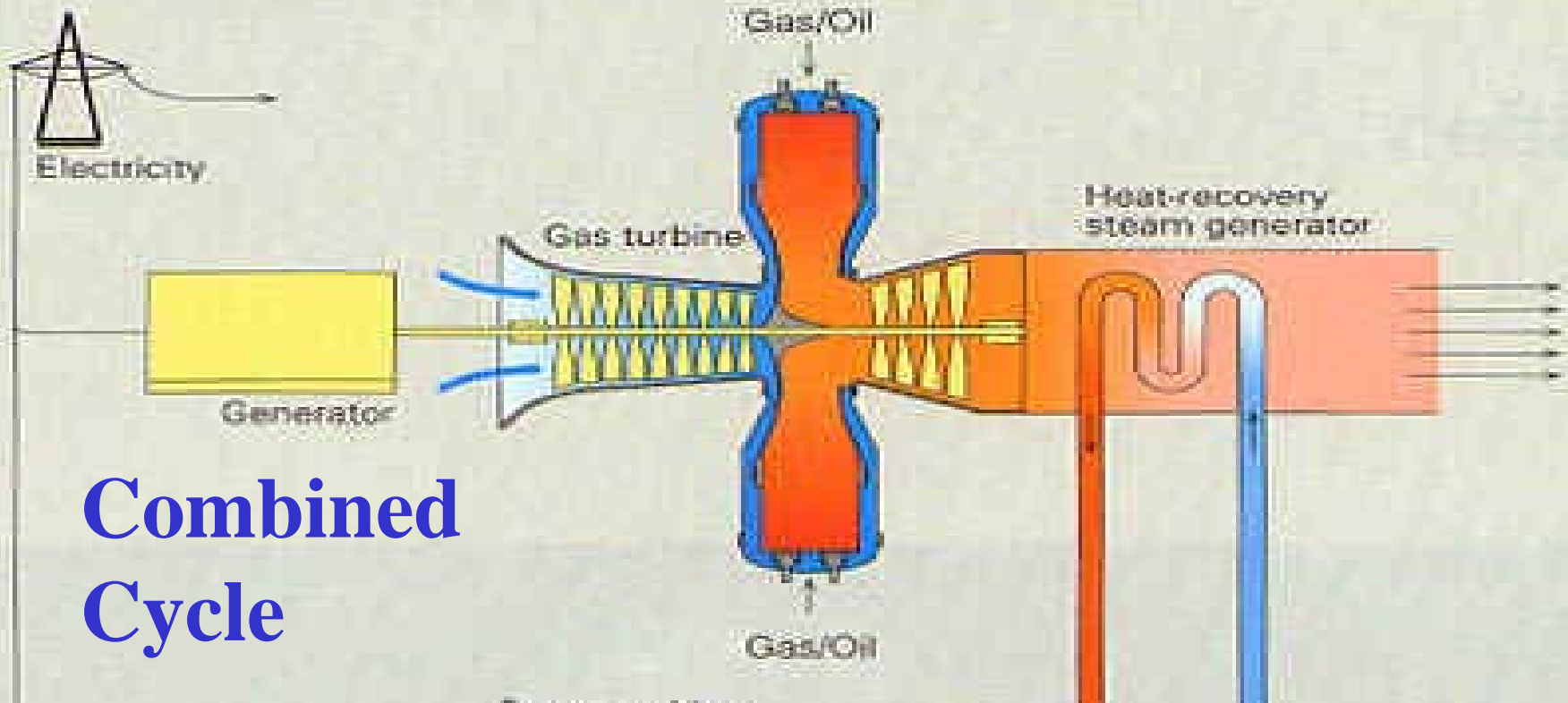
- Unit types considered
  - 50MW
    - Simple cycle combustion turbines-used McCartney CT as candidate
  - 250MW
    - Combined cycle
    - Coal unit

# Unit Options Analysis

- 250 MW considered because:
  - Minimum size to get economies of scale in coal plant or combined cycle plant
  - Minimum size for efficient combined cycle unit
- If below 250MW, then McCartney type CT is good unit choice
- Capital investment of \$200 to \$500 million

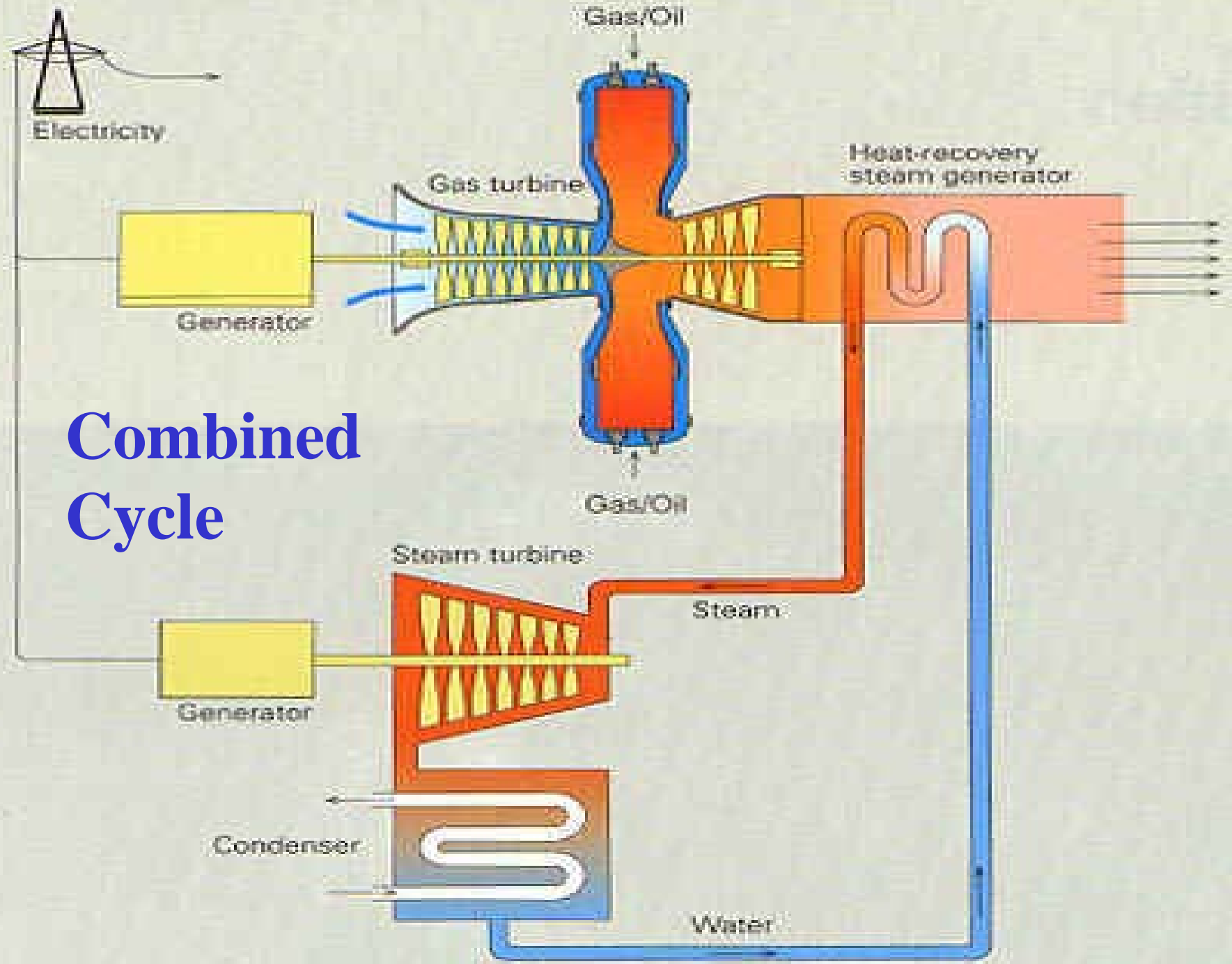


# Combustion Turbine (McCartney )

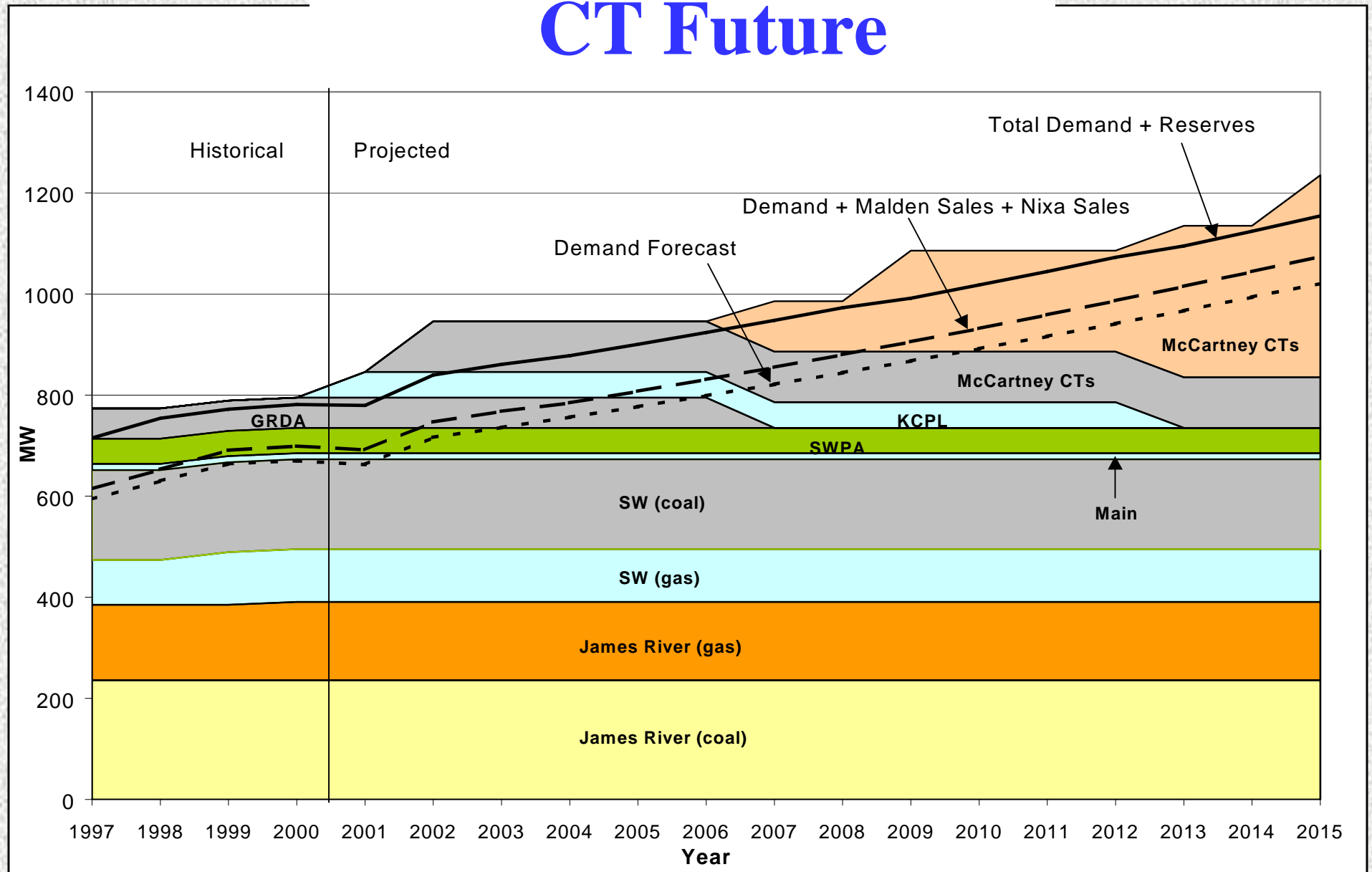


# Combined Cycle

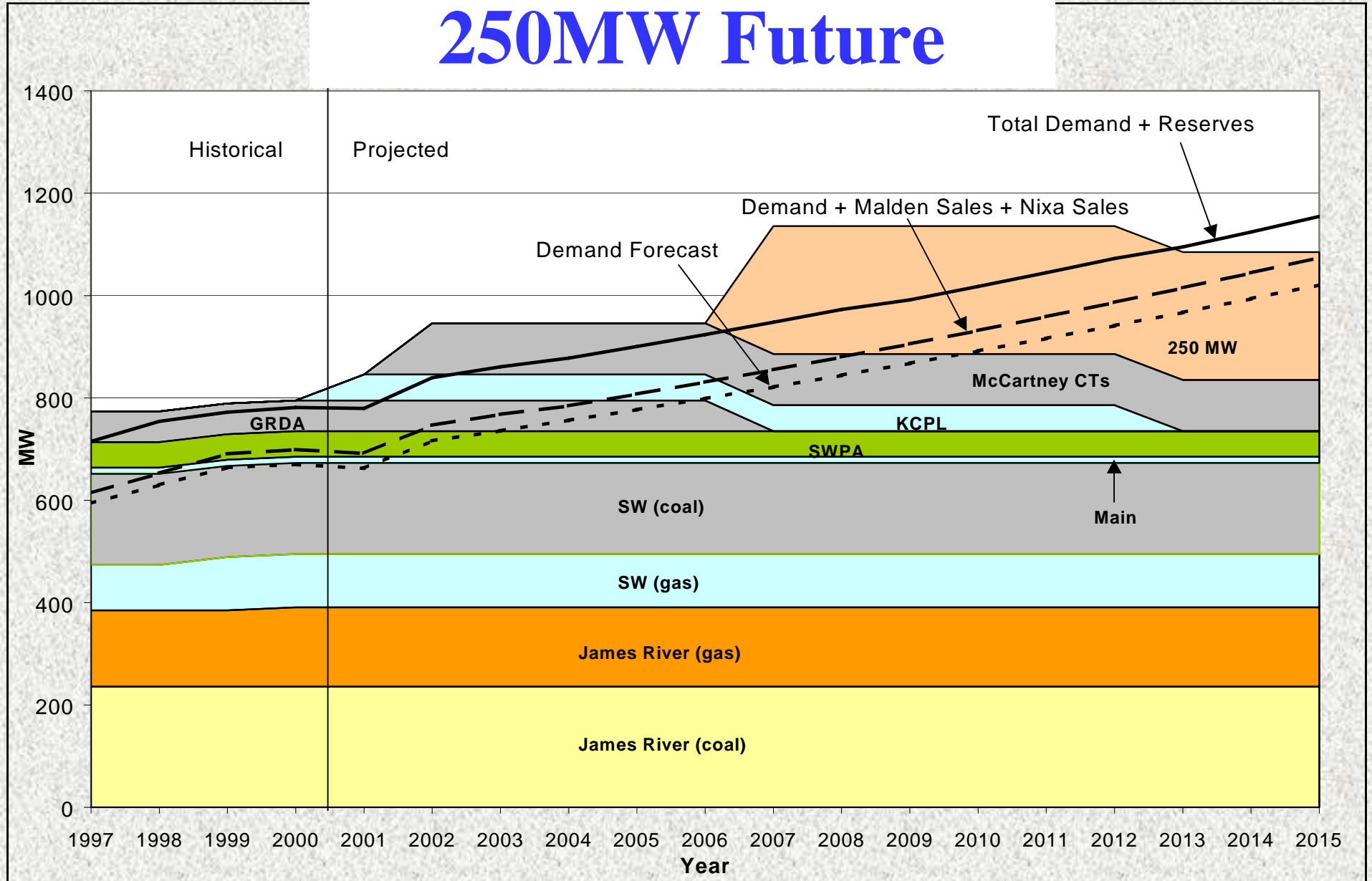
# Combined Cycle



# Loads and Resources- CT Future



# Loads and Resources- 250MW Future



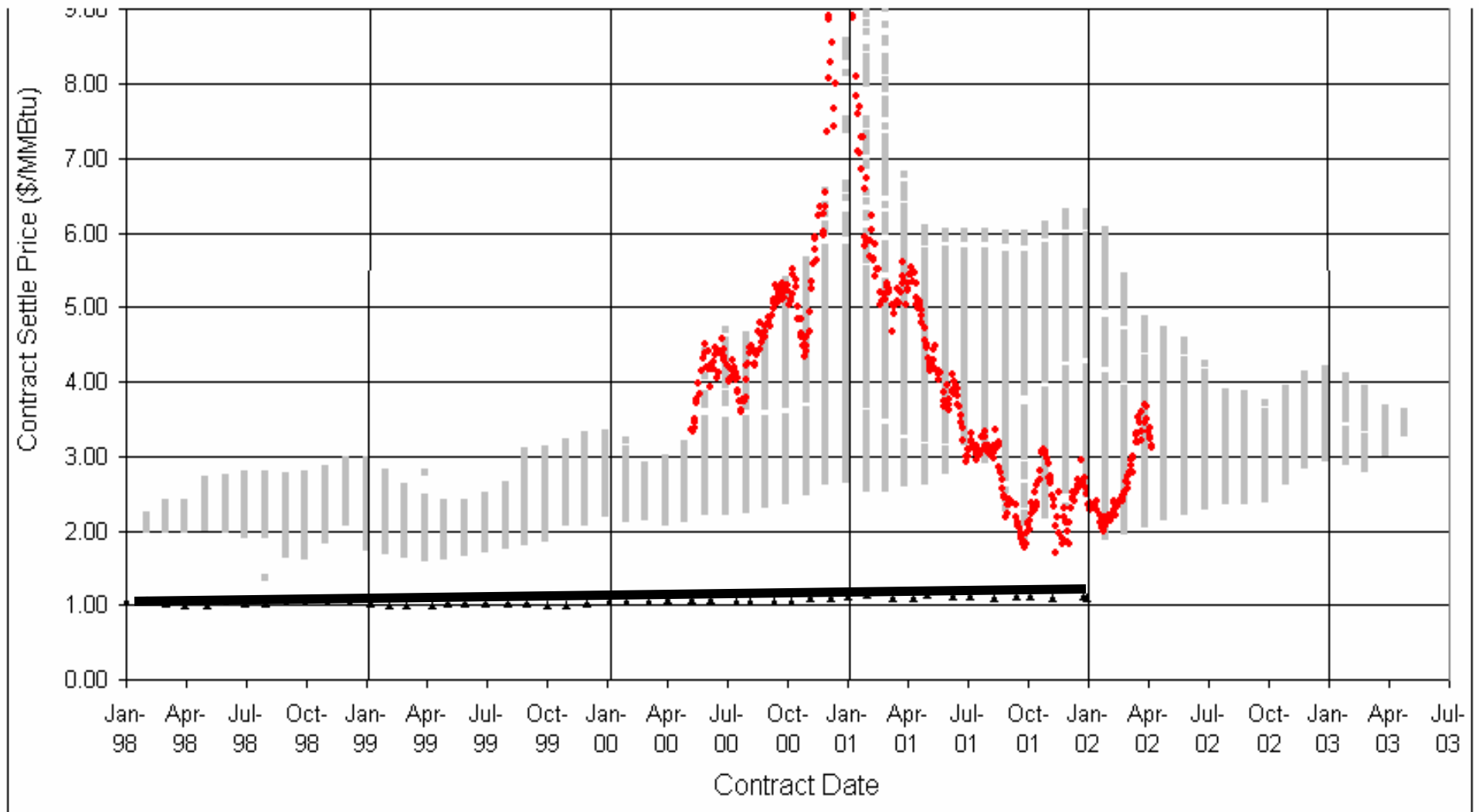
# Fuel Considerations

- Gas
  - Used EIA base gas forecast-Approximately 4.5% escalation with 2007 gas of 4.06/MMBtu
  - Added component to increase gas capacity by 20,000 Dtherms per day on a firm basis
  - Added 50 cent internal CU charge
  - Reviewed break even cost between gas and coal

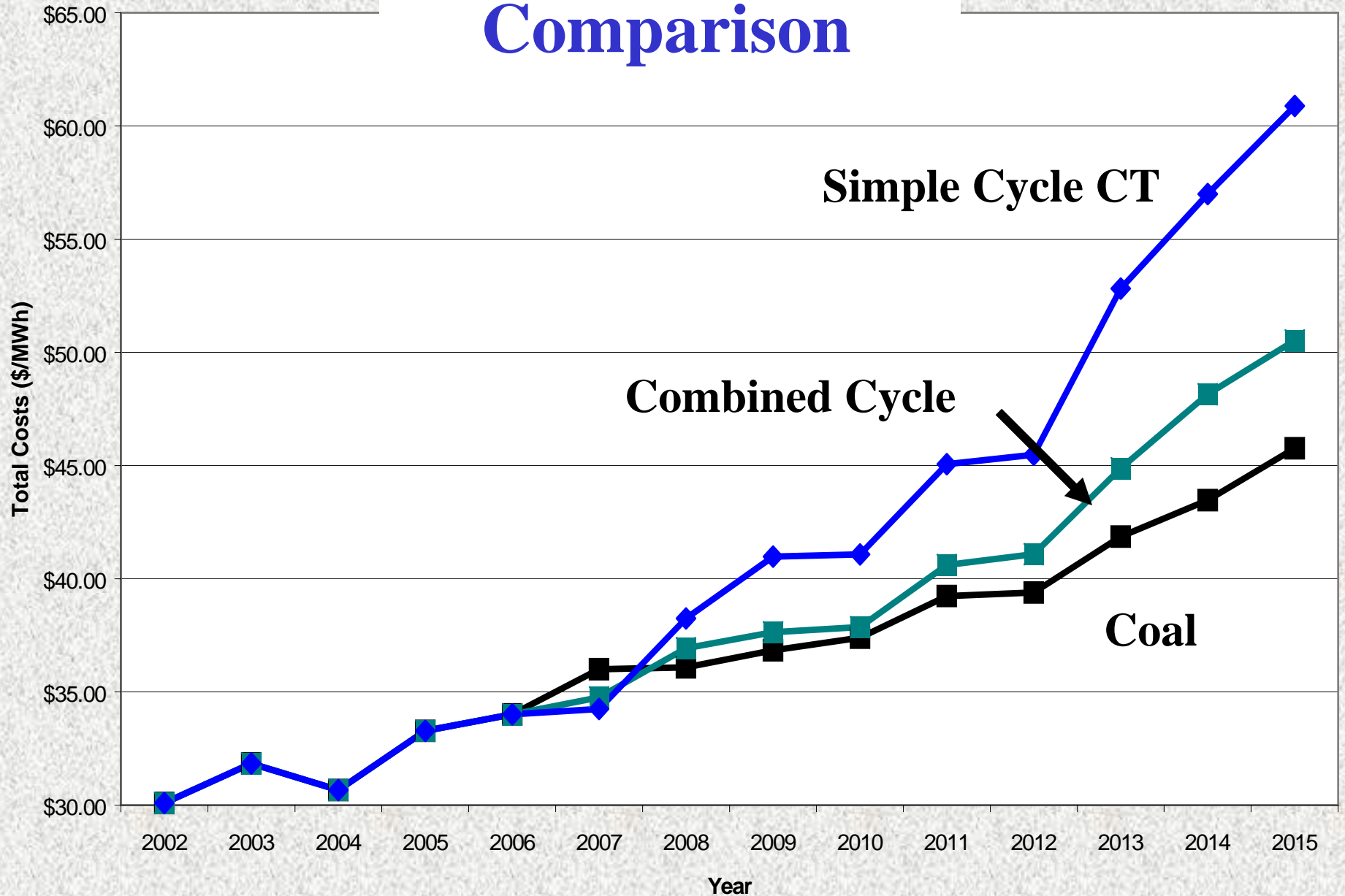
# Fuel Considerations (cont'd)

- Coal
  - Adjusted existing CU costs to reflect increases expected in next five year contracts for existing units - Escalate at approximately 4.2% with 2007 coal at \$1.30 /MMBtu for new unit
  - Used 8200 Btu coal as basis for new unit
  - Ran a sensitivity on using 8200 Btu coal for all units with attendant derates

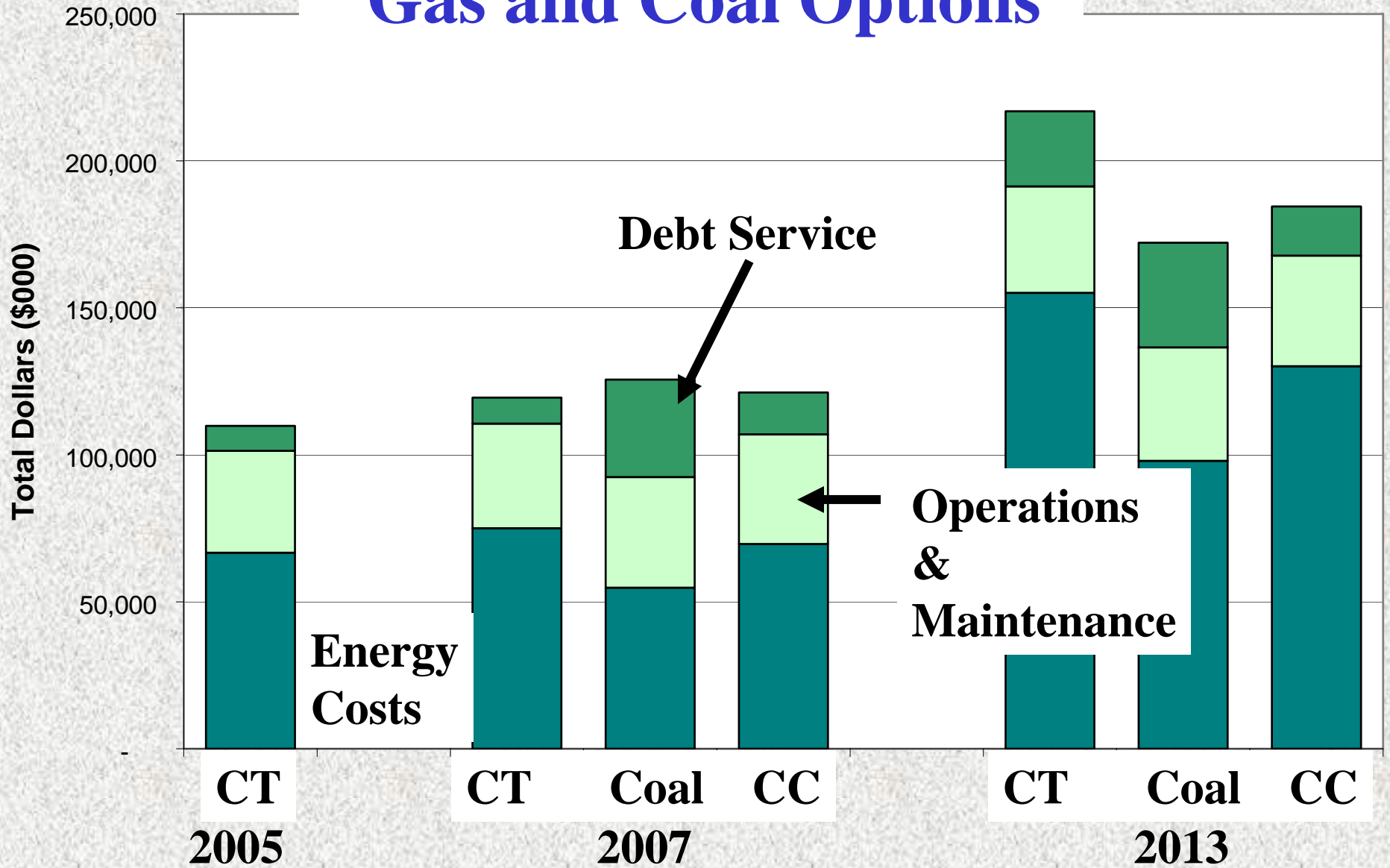
# Comparison of Gas Spot and Futures to Southwest Coal Pricing



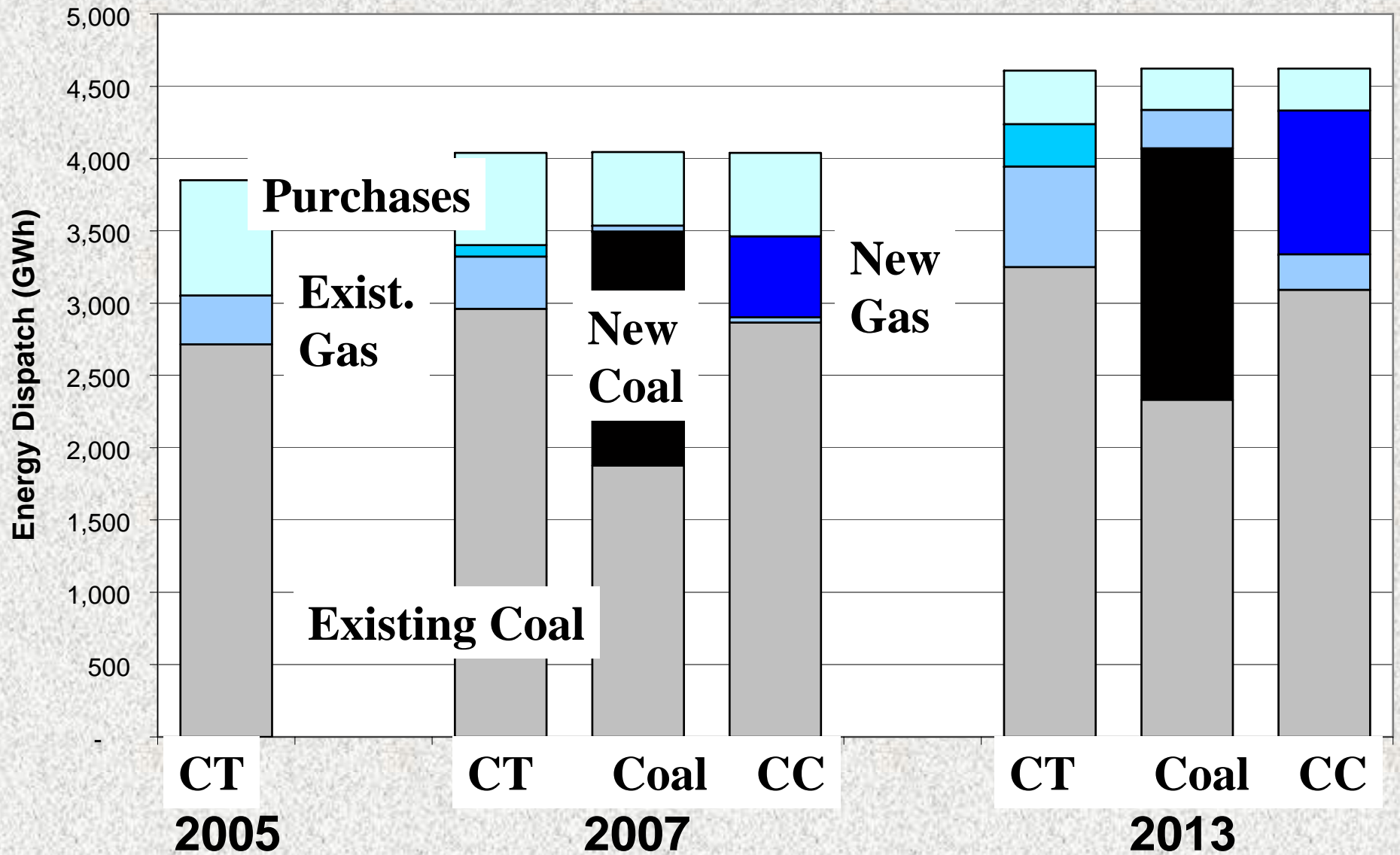
# Total Annual Cost Comparison



# Major Cost Components Gas and Coal Options



# Major Dispatch for Coal and Gas Options





# Conclusions

- Reliance on market exposes CU to gas fired energy and transmission delivery issues
- Newest CU base load unit will be 30 years old in 2007
- Springfield has two sites which provide:
  - delivery security
  - lower development/construction cost
- Proposed unit provides security against loss of largest existing unit

## Conclusions (cont'd)

- Coal unit at Southwest provides the lower cost evaluation of the options considered and provides
  - fuel diversity from market
  - reduced loading on existing units
- Commercial operation in 2007 will require an aggressive approach to CU approval, financing, permitting, etc.

# Recommendations

- CU proceed with plans to add a 250MW unit at one of the preferred sites
- Based on analysis to date, a coal unit provides the lower evaluated cost
- Develop preliminary schedule for in service date-interim contract capacity needs
- Hold preliminary discussions with rating agencies for concerns over coal option

## **Recommendations** (cont'd)

- Discuss the contract issue with MEUC, Empire or others on a serious basis
- Consider approach to rail competition
- Discuss gas extension costs with Williams and alternate coal delivery with UP
- Determine permitting approach for new unit and impact to existing facilities