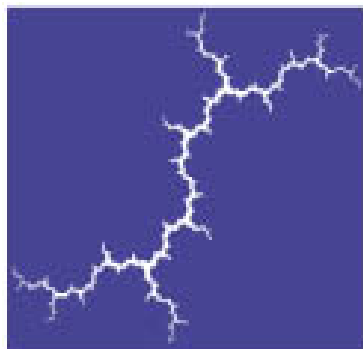


Electricity Portfolio Management

Bruce Biewald

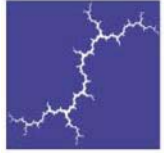
Illinois State University
Institute for Regulatory Policy Studies
Conference on “Beyond 2006”
Springfield, Illinois
May 20, 2004



Synapse
Energy Economics, Inc.

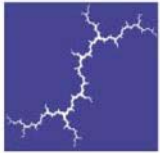
22 Pearl Street
Cambridge, MA 02139
617.661.3248
bbiewald@synapse-energy.com
www.synapse-energy.com



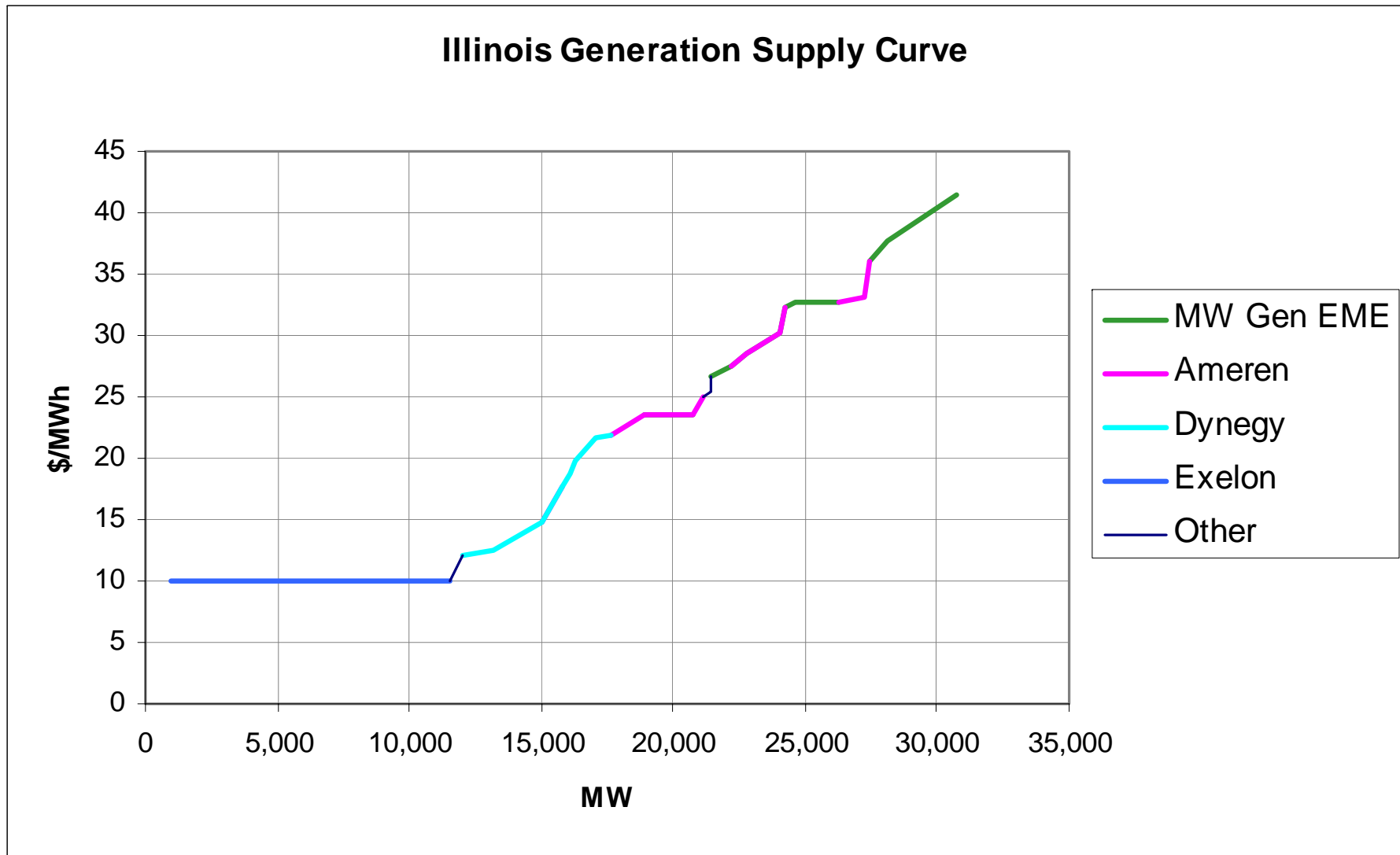


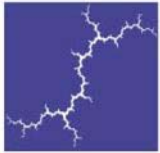
Portfolio Management - Why?

- Hedging – Prices go up and down!
- Reliability
- Market power
- Environmental impacts
- It makes sense (and is prudent)



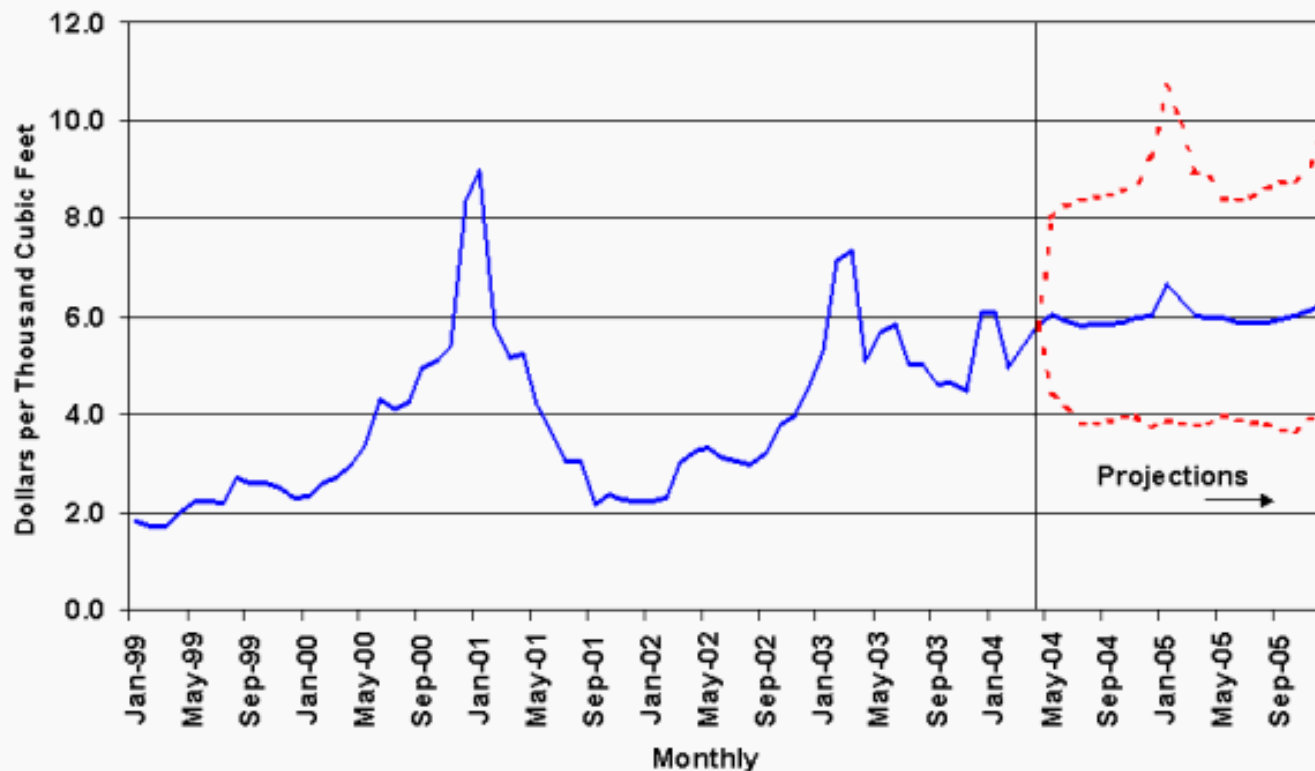
Market Power is a Big Problem





Natural Gas Prices

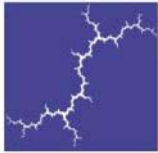
**Figure 9. U.S. Natural Gas Spot Prices
(Base Case and 95% Confidence Interval*)**



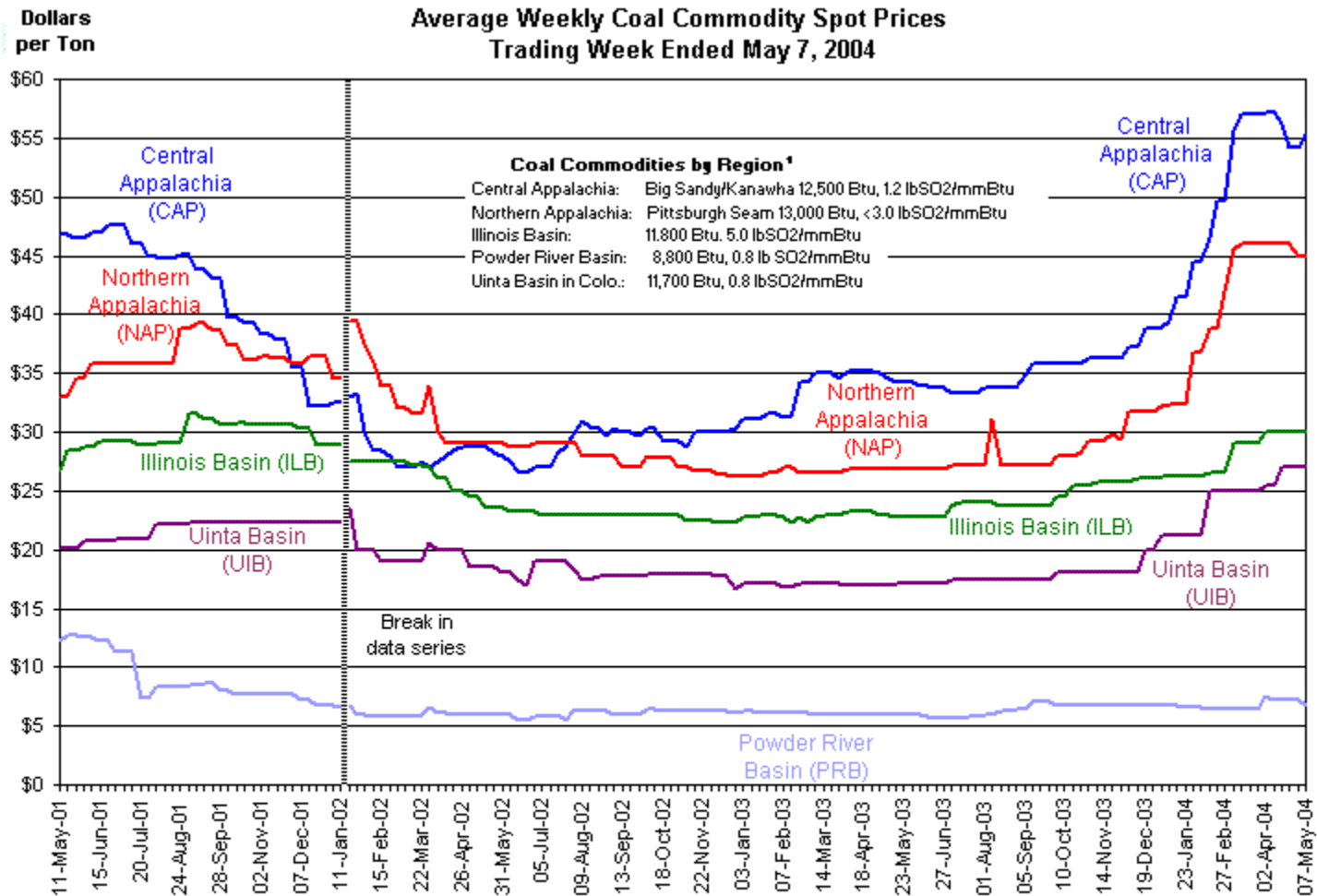
*The confidence intervals show ± 2 standard errors based on the properties of the model. The ranges do not include the effects of major supply disruptions.

Sources: History: Natural Gas Week; Projections: Short-Term Energy Outlook, May 2004.



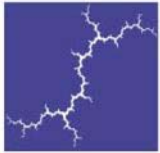


Coal Prices Rising

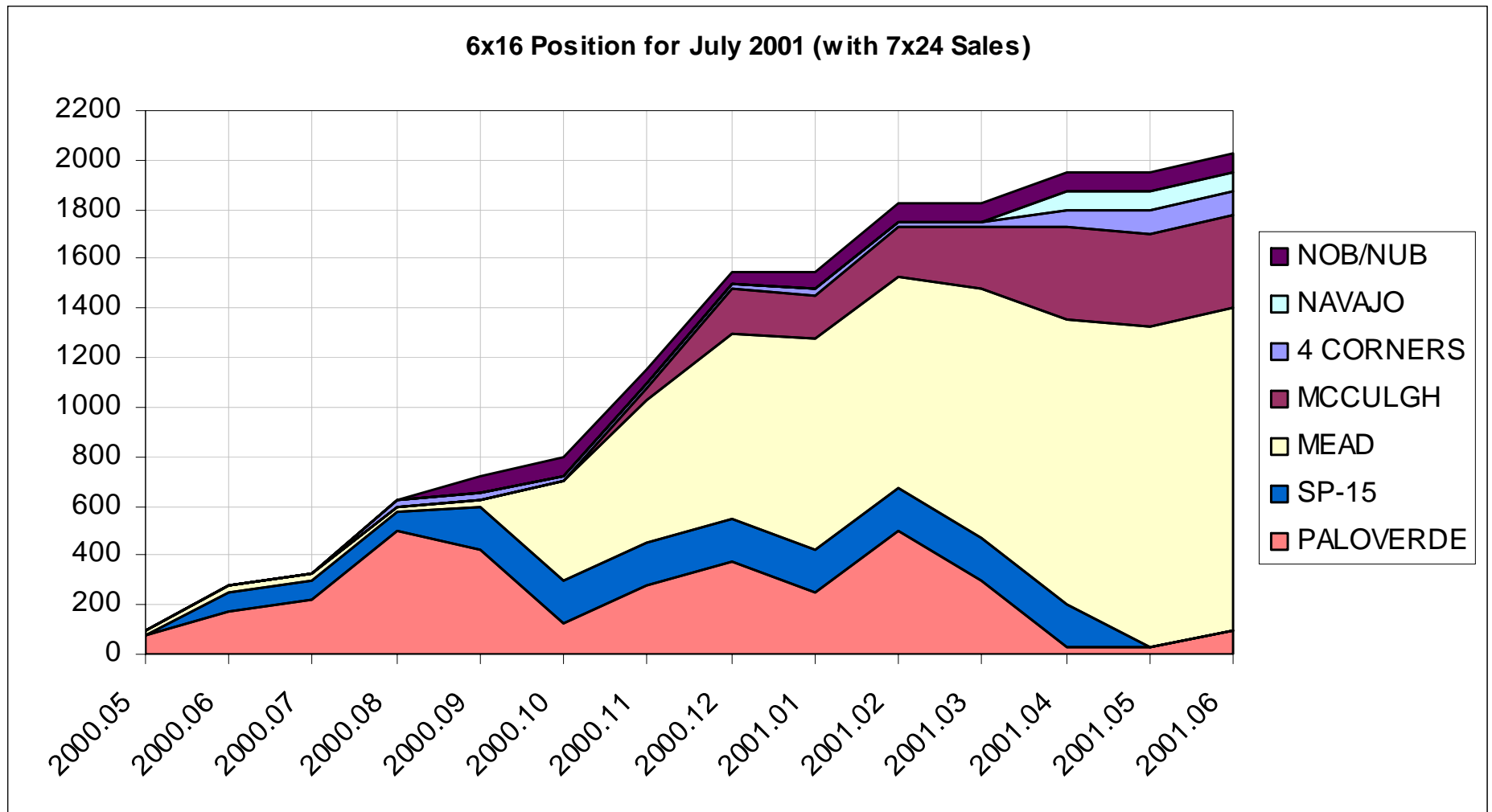


*Prior to January 11, 2002, EIA averaged 12-month "forward" spot prices for several coal specifications; after that date, coal prices shown are for a relatively high-Btu coal selected in each region, for delivery in the "prompt" quarter. The "prompt quarter" is the next calendar quarter, with quarters shifting forward after the 15th of the month preceding each quarter's end.

Source: with permission, selected from listed prices in Platts Coal Outlook, "Weekly Price Survey."

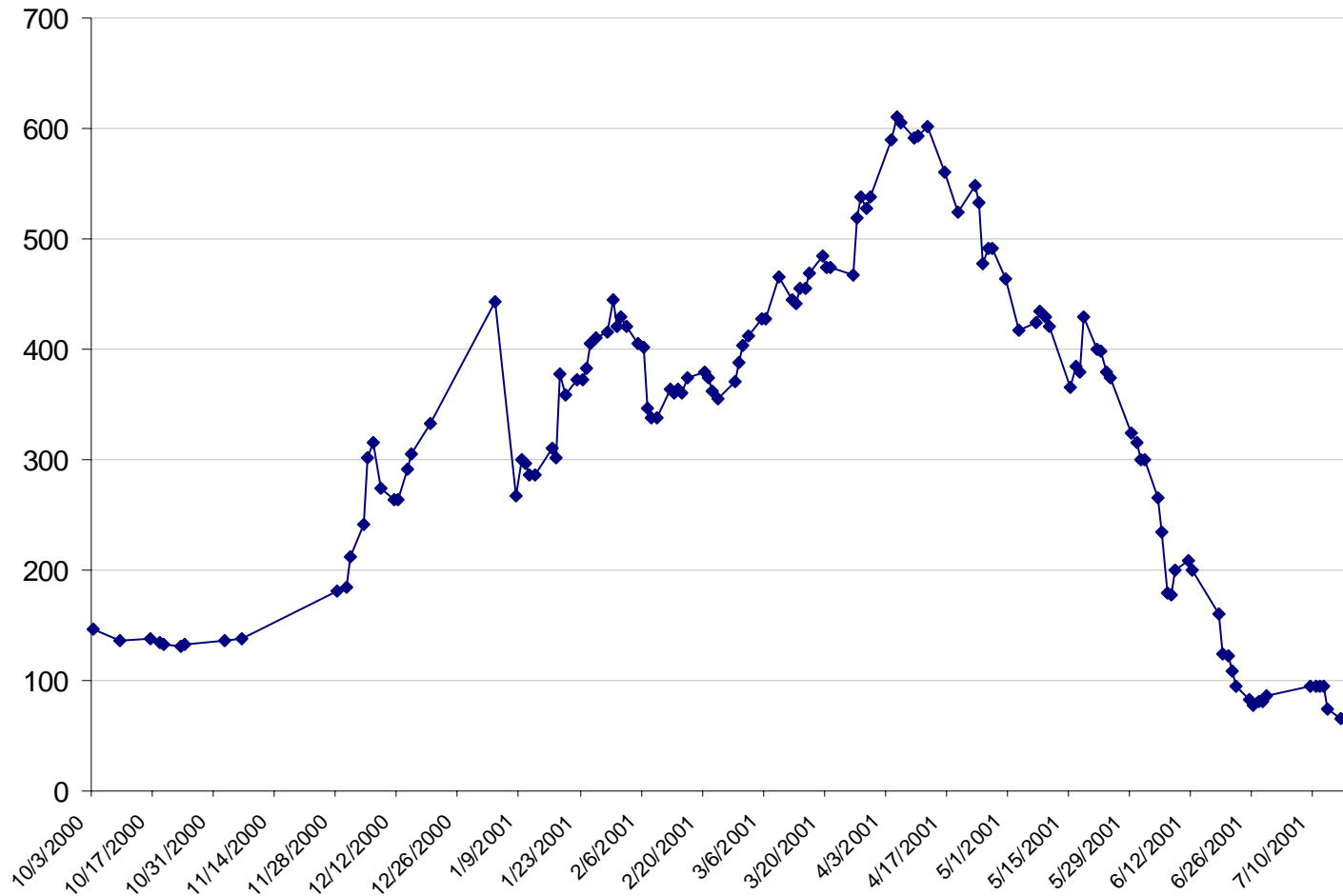


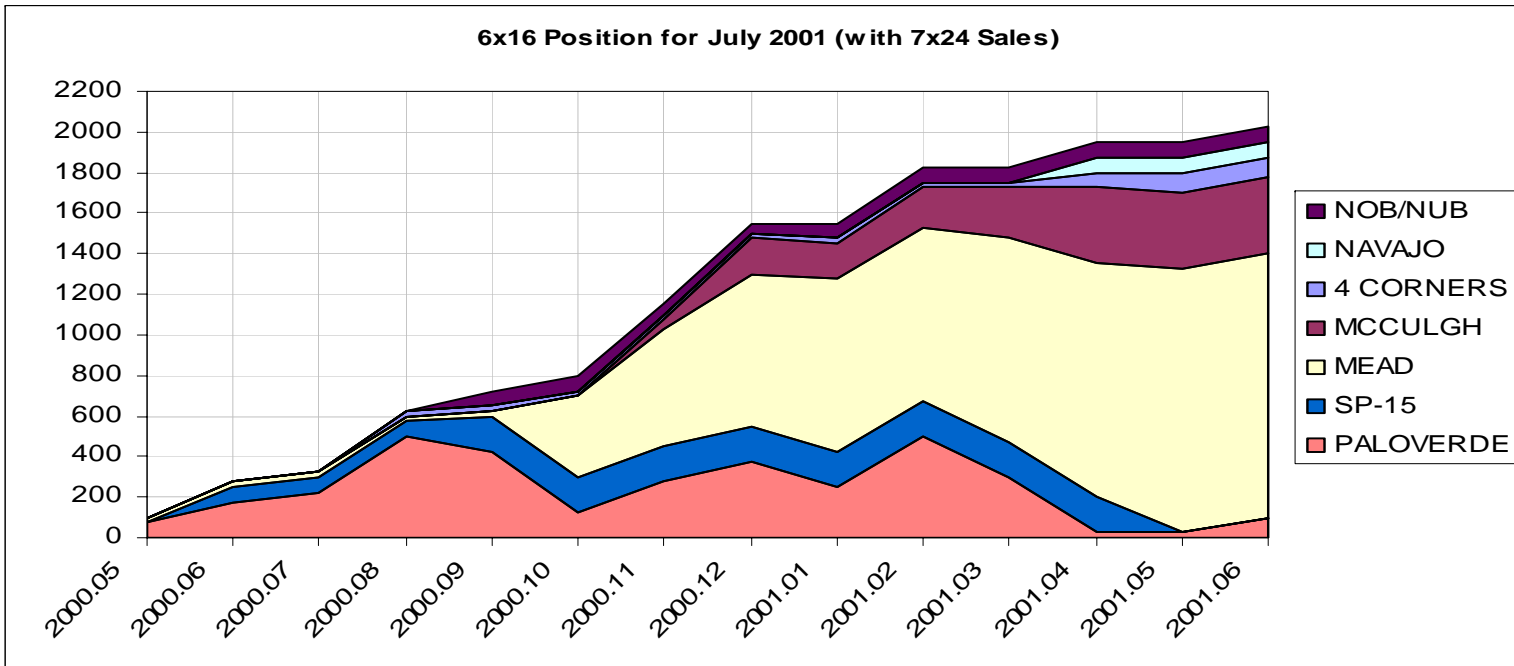
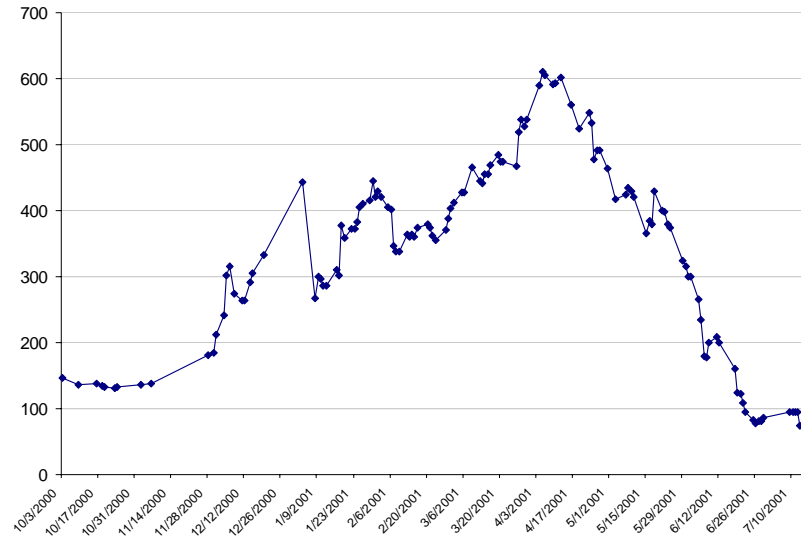
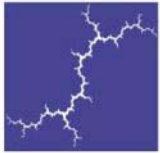
Nevada Purchasing





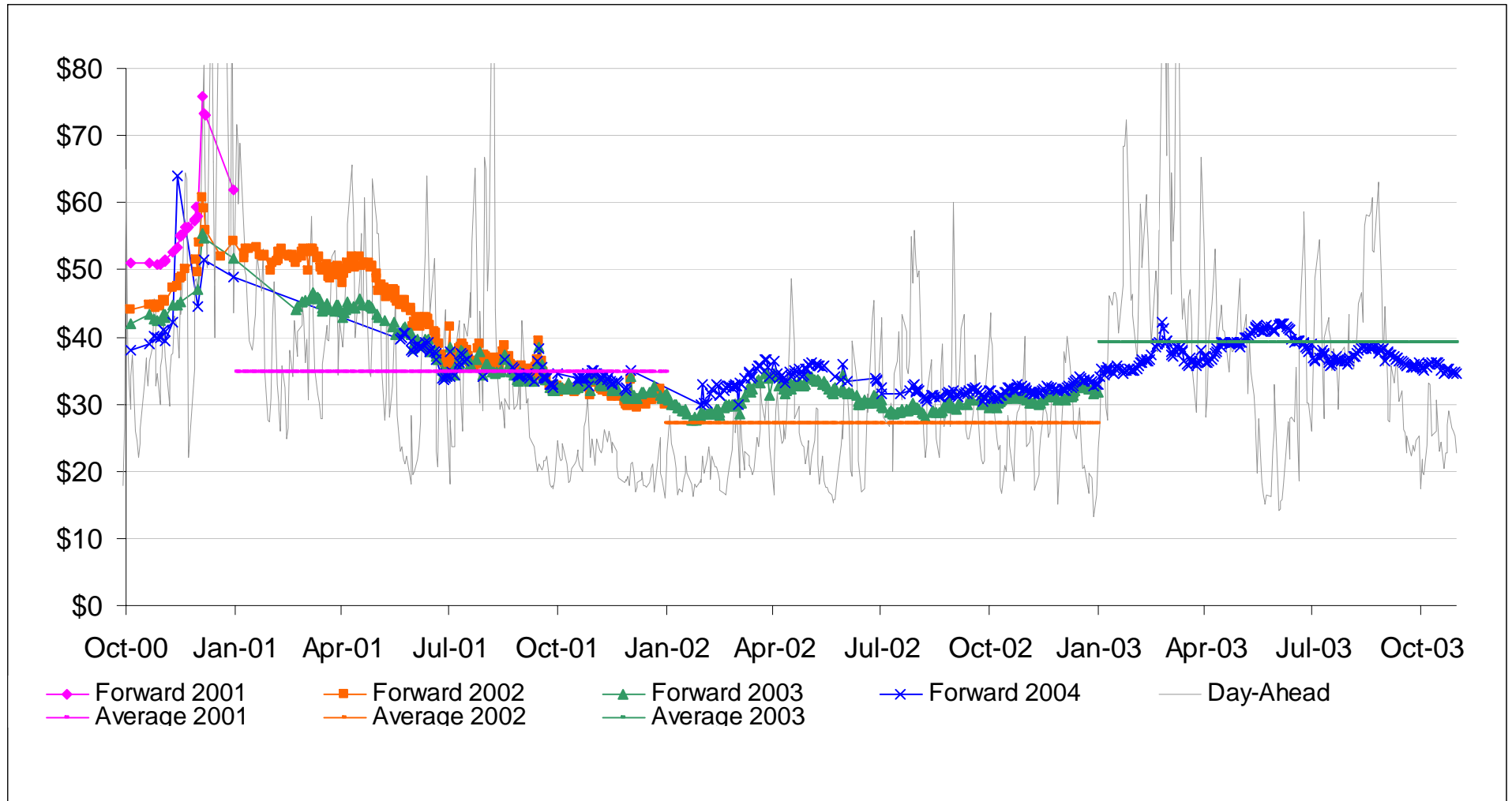
Price for Delivery in July 2001 at Palo Verde (\$/MWh)







Cinergy Day-Ahead and Calendar Forward Prices (\$/MWh on-peak)

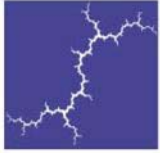




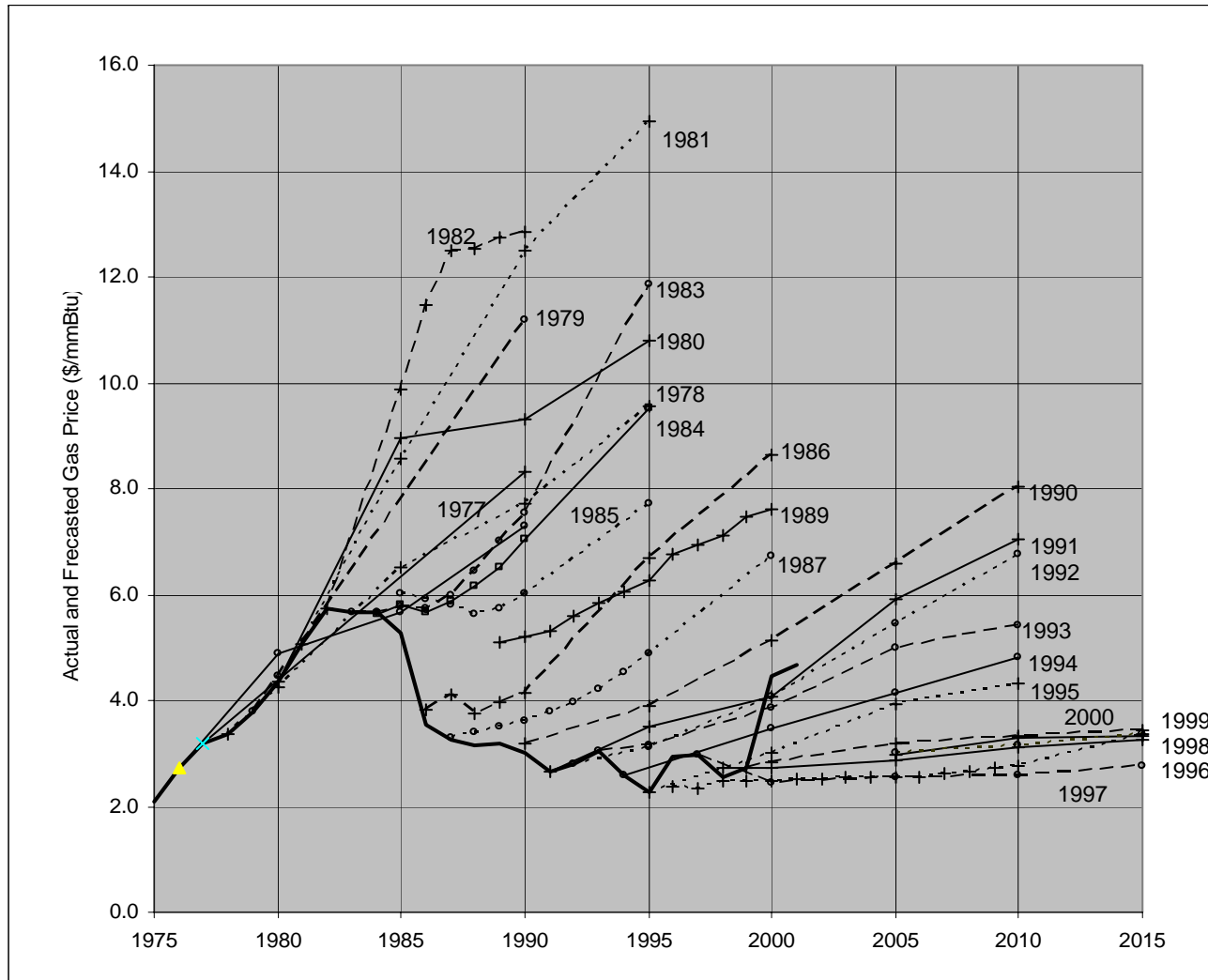
A 3 Year Laddering Approach

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
33%	Original Contracts	Rollover Contracts	Rollover Contracts	Rollover Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts
33%	Original Contracts	Original Contracts	Rollover Contracts	Rollover Contracts	Rollover Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts
33%	Original Contracts	Original Contracts	Original Contracts	Rollover Contracts	Rollover Contracts	Rollover Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts	Subsequent Contracts

Original Contracts	Original Contracts
Rollover Contracts	Rollover Contracts
Subsequent Contracts	Subsequent Contracts



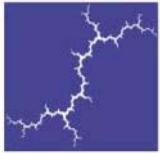
Gas Price Projections Since 1975





Contracts for Renewables



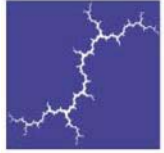


Illustrative Portfolio Approach

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
20%	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term	Discretionary/Short Term
20%	Original Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Subsequent Ladder Contracts	Subsequent Ladder Contracts	Subsequent Ladder Contracts	Subsequent Ladder Contracts
20%	Original Ladder Contracts	Original Ladder Contracts	Original Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Subsequent Ladder Contracts	Subsequent Ladder Contracts
20%	Original Ladder Contracts	Original Ladder Contracts	Original Ladder Contracts	Original Ladder Contracts	Original Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts	Rollover Ladder Contracts
20%	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)	Long-Term (Renewables)

Original Ladder Contracts
Rollover Ladder Contracts
Subsequent Ladder Contracts

Discretionary/Short Term
Long-Term (Renewables)



Portfolio Management – How?

Own and contract

Long term and short term

Mix of resource types

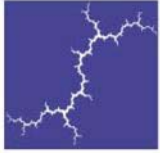
Balance of supply and demand resources

Mix of instruments

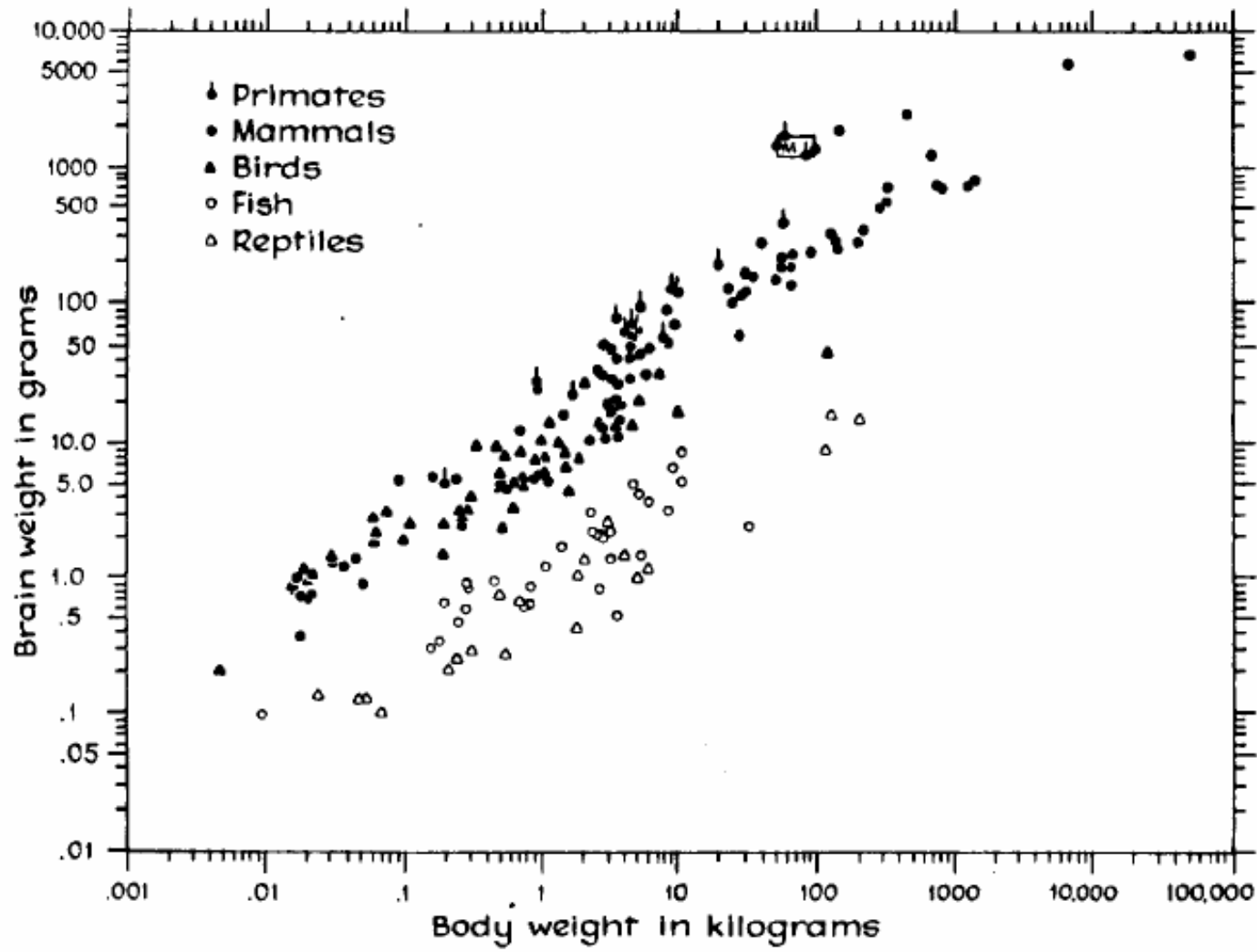
Central and distributed

Laddering

Procure over time



Brain v Body Size: 198 Species



Portfolio Management

How to Procure Electricity Resources
to Provide Reliable, Low-Cost,
and Efficient Electricity
Services to All Retail Customers

October 10, 2003

prepared by:

Synapse Energy Economics, Inc.

