

TEXAS PUBLIC POWER ASSOCIATION



Power Supply Planning in Texas

Ronald Moe

Daryl Pullin

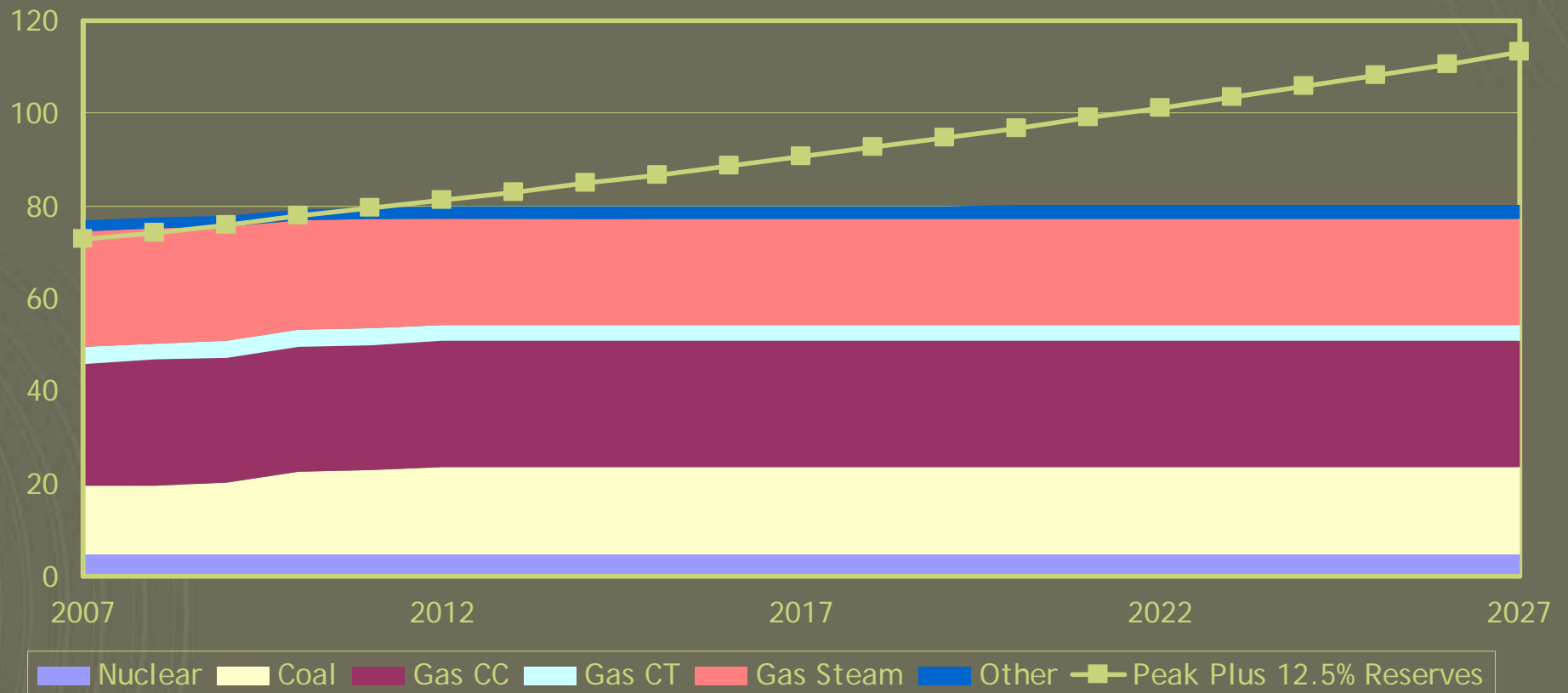
July 24, 2007

Outline

- Planning environment
- Planning methods

Planning Environment - Growing Capacity Needs

Expected ERCOT Peak Loads and Planned Capacity (GW)



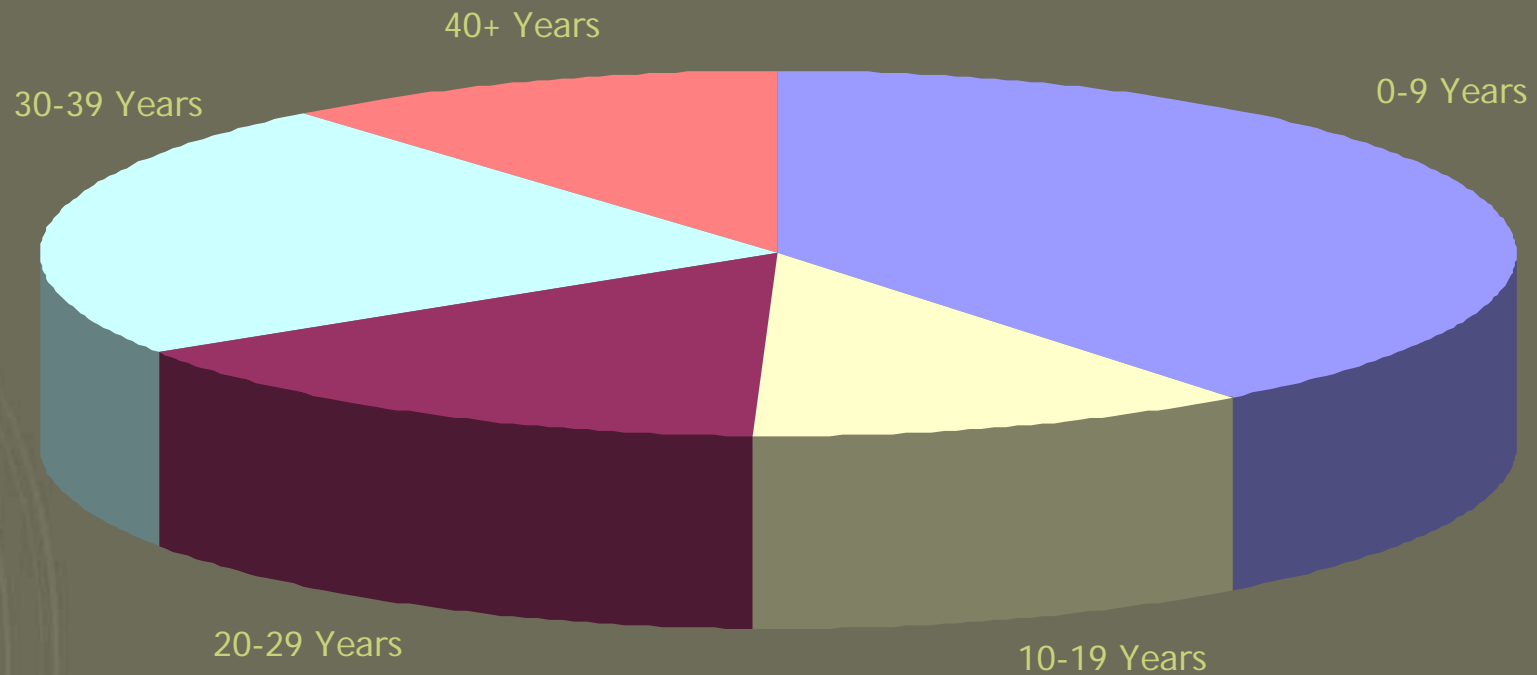
Planning Environment - High and Volatile Natural Gas Prices

Historical Henry Hub Cash Prices (\$ / MMBtu)



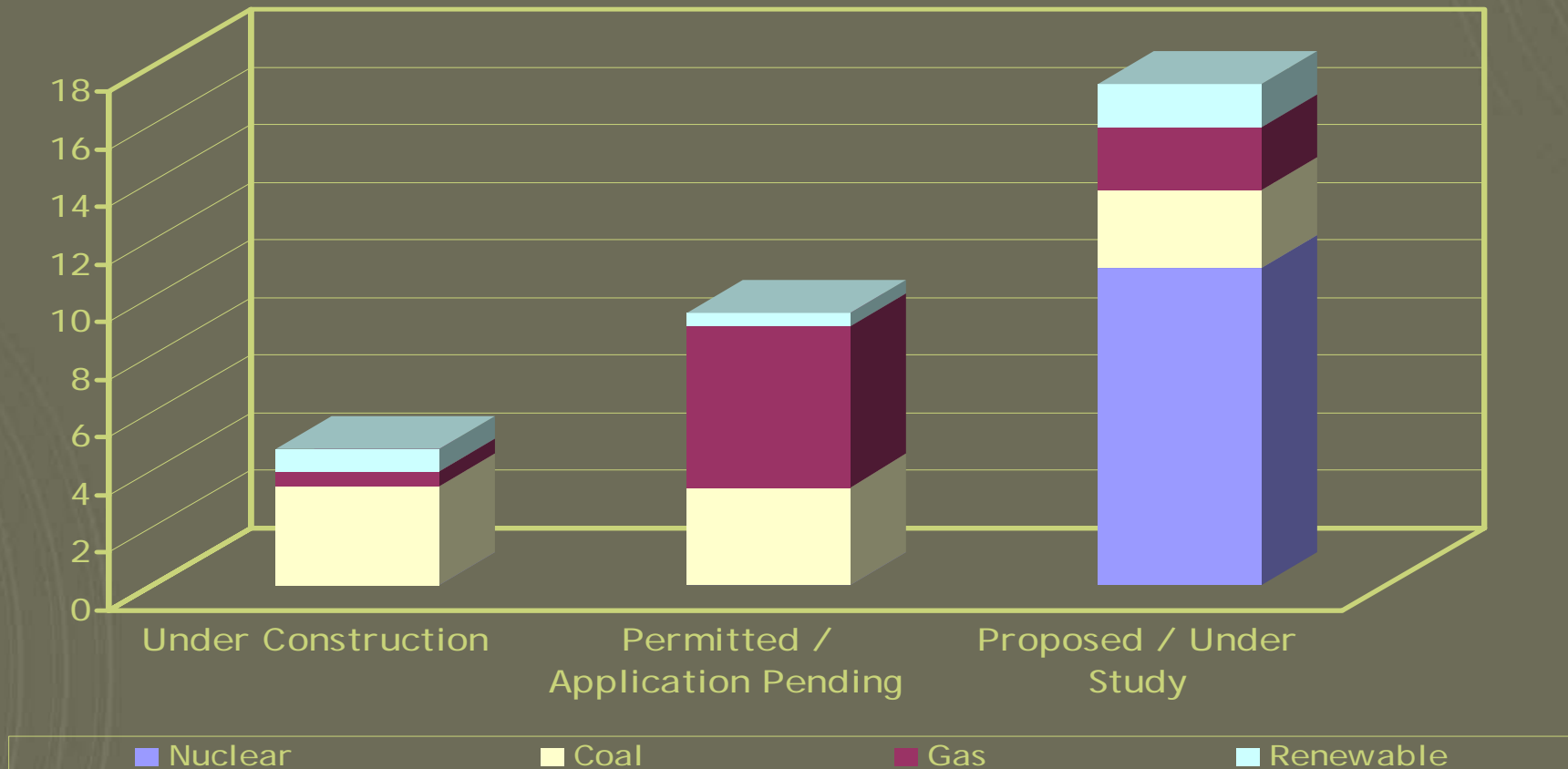
Planning Environment - Aging Generating Fleet

Age Distribution of Existing ERCOT Capacity



Planning Environment - Opportunities to Participate in Ongoing Development

ERCOT Generation in Development (GW)

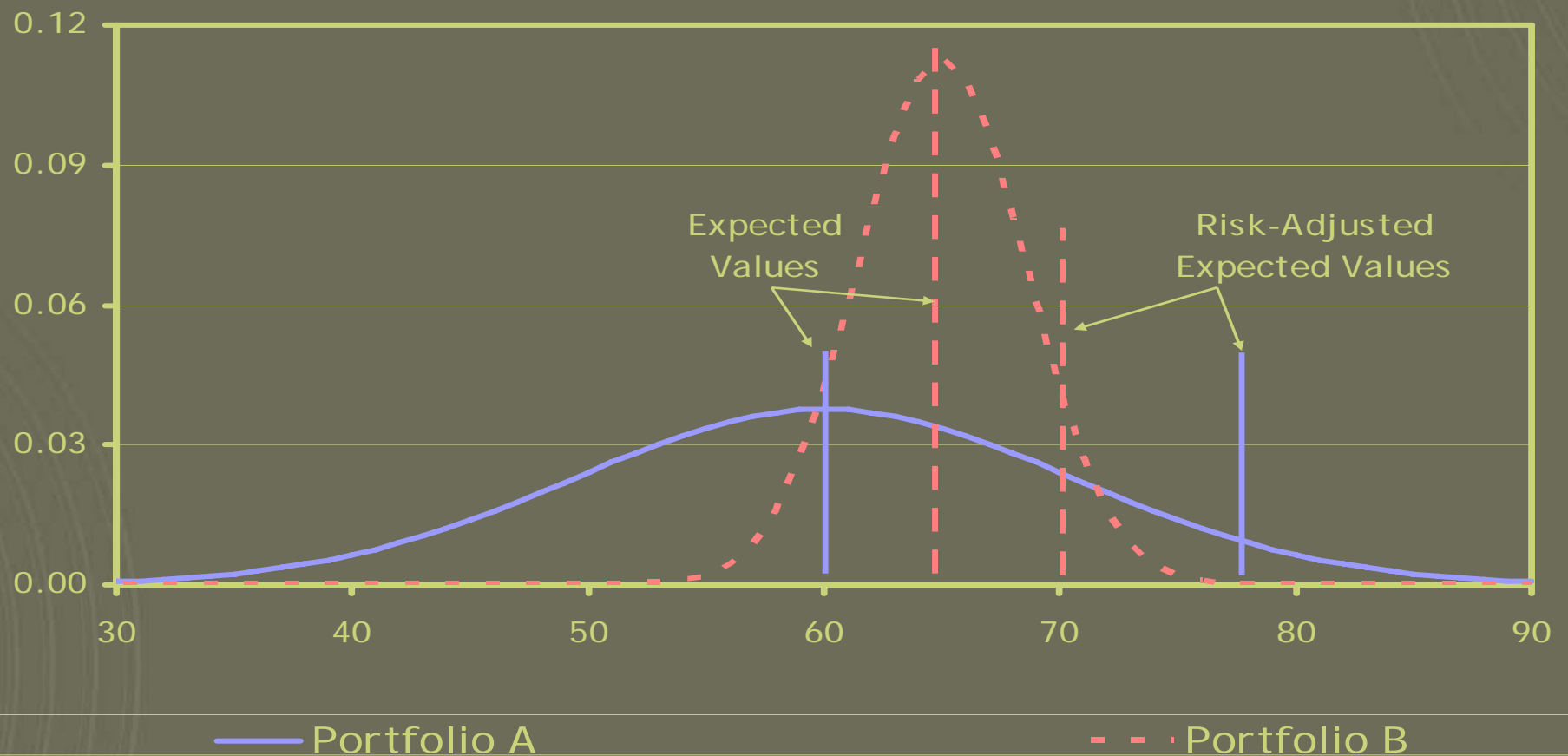


Planning Environment - Critical Issues

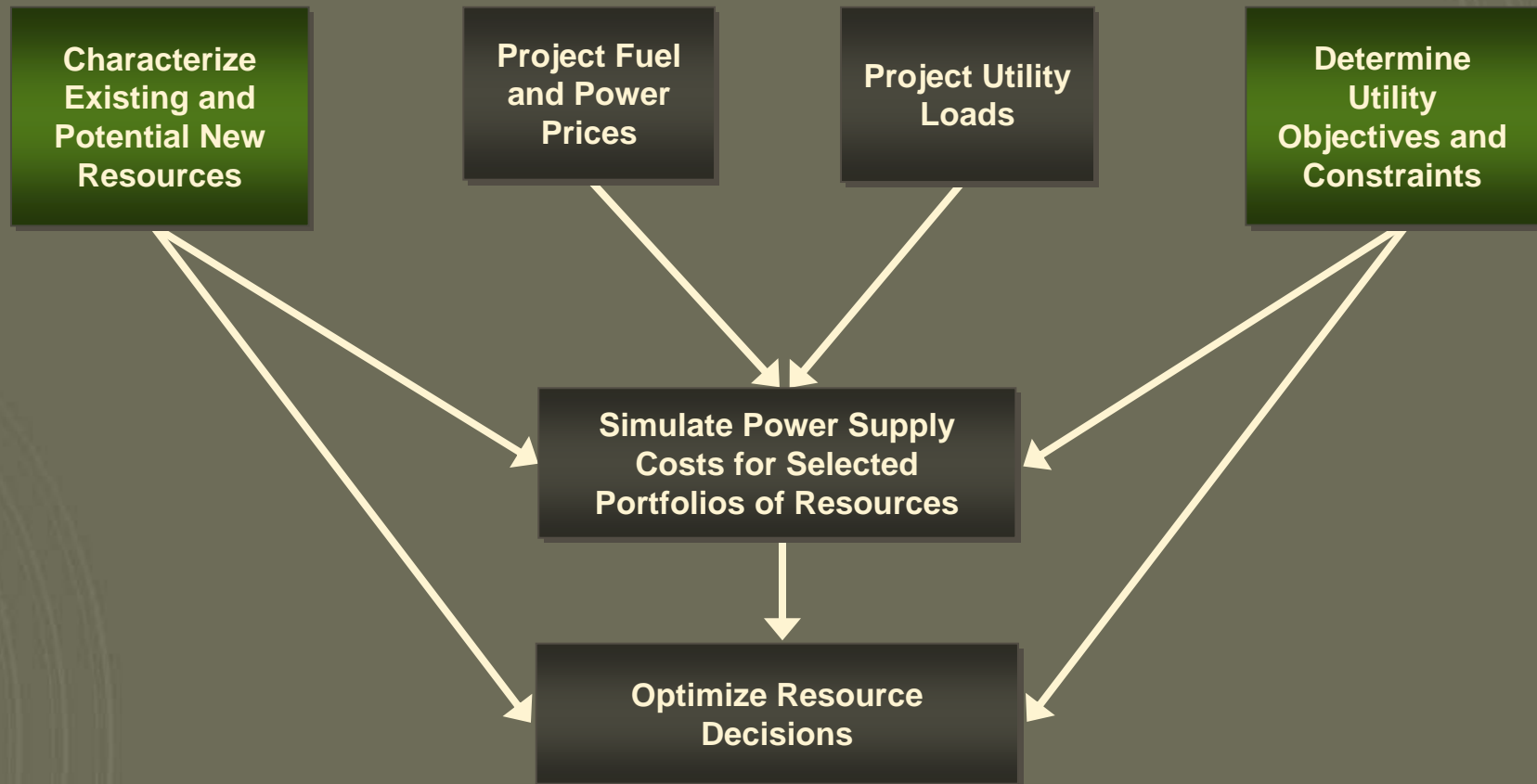
- Participation in ERCOT power market a viable power supply strategy
 - Purchases and sales
 - Spot and forward
- Considerable uncertainty about future:
 - New unit capital costs
 - Fuel and power prices
 - Ability to permit / construct new nuclear and coal units
 - Environmental regulations and compliance option viability
 - ERCOT market structure

Planning Environment - Risk Aversion

Probability Distributions of Levelized Costs (2007 \$ / MWh)

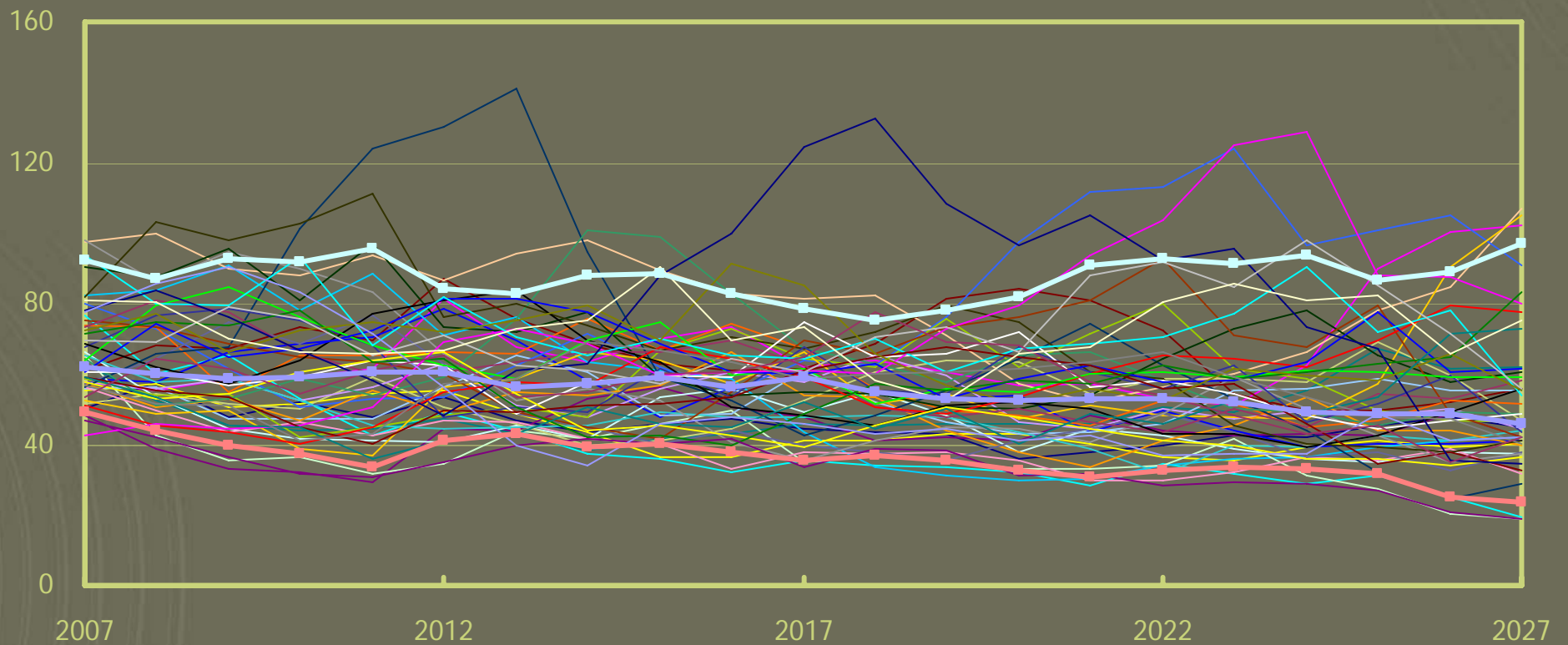


Planning Methods - Overview



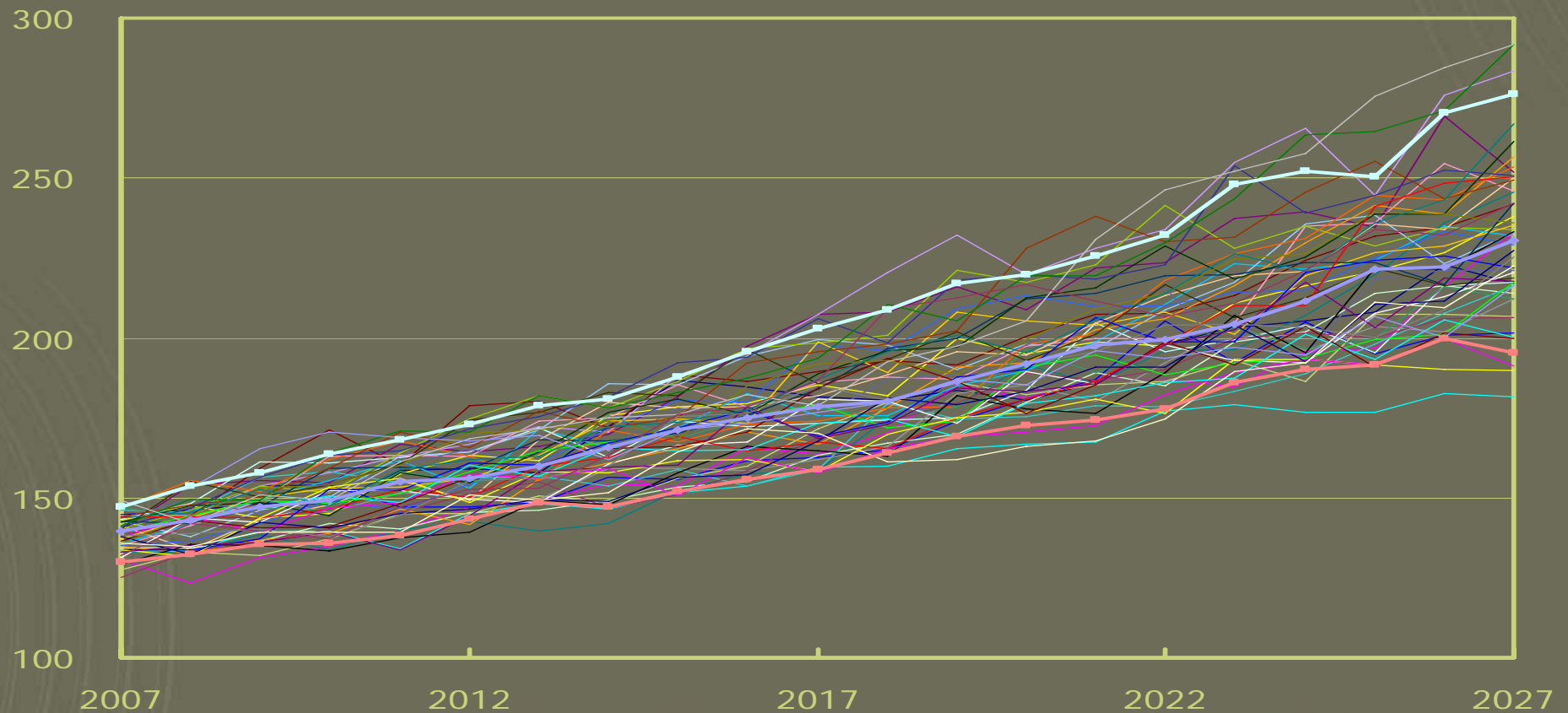
Planning Methods - Stochastic Price Projections

Average Annual Power Prices (2007 \$ / MWh)



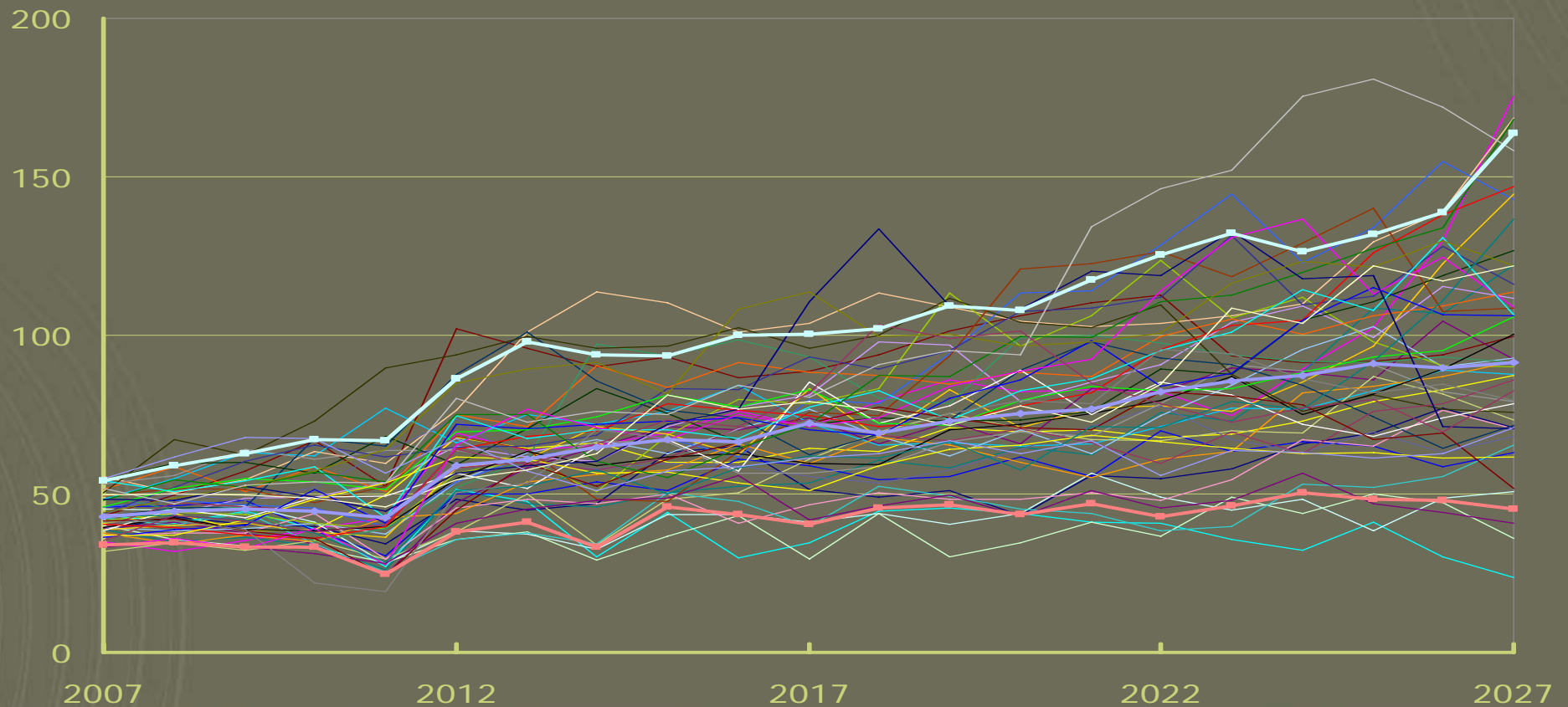
Planning Methods - Stochastic Load Projections

Average Annual Loads (MWh / hr)



Planning Methods - Stochastic Production Cost Simulations

Portfolio A Annual Production Costs (Million 2007 \$)



Planning Methods - Stochastic Optimization

2011 - 2013 Additions

Deterministic Optimization

Year	Addition(s)
2011	50 MW CC
2013	100 MW Coal

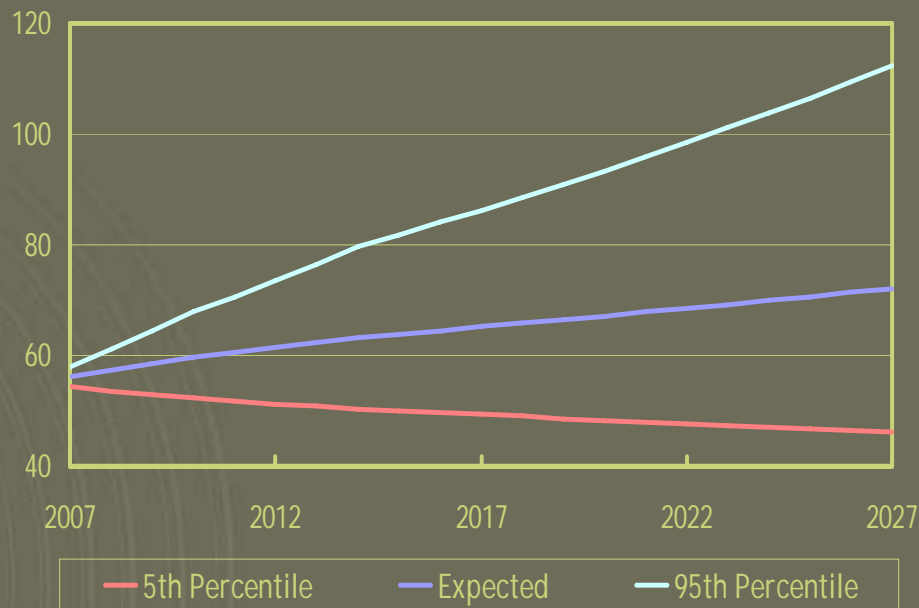
Stochastic Optimization

Year	Values of Uncertain Variables Five Years Earlier	Addition(s)
2011	Actual 2006	50 MW CC
2013	Expected	50 MW Coal
	Low Load, and Expected or High Coal Prices	Nothing
	Expected or High Load, High Coal Prices, Expected or Low Gas Prices	50 MW CC
	High Load, Low Coal Prices	100 MW Coal

Planning Methods - Stochastic Optimization

Distributions of Power Supply Costs (2007 \$ / MWh)

Deterministic Optimization



Stochastic Optimization



Summary

- Planning environment
 - Growing loads, aging and inefficient generating fleet, high and volatile gas prices
 - Participation in ERCOT power market a viable option
 - Considerable uncertainty about future
- Planning methods
 - Must address key components of planning environment
 - Stochastic planning methods identify capacity decisions that produce lower expected costs and lower risk

Contact Information

Ronald Moe

National Director
Generation Planning & Analysis
1001 Fourth Avenue, Suite 2500
Seattle, WA 98154
Phone: 206.695.4472
Email: rmoe@rwbeck.com

Daryl Pullin

National Director
Management Advisory Services
5806 Mesa Drive, Suite 310
Austin, TX 78731
Phone: 512.651.64155
Email: dpullin@rwbeck.com