ICAP Demand Curve Review

New York ISO
ICAP Working Group

April 22, 2004

LEVITAN & ASSOCIATES, INC.

Overview

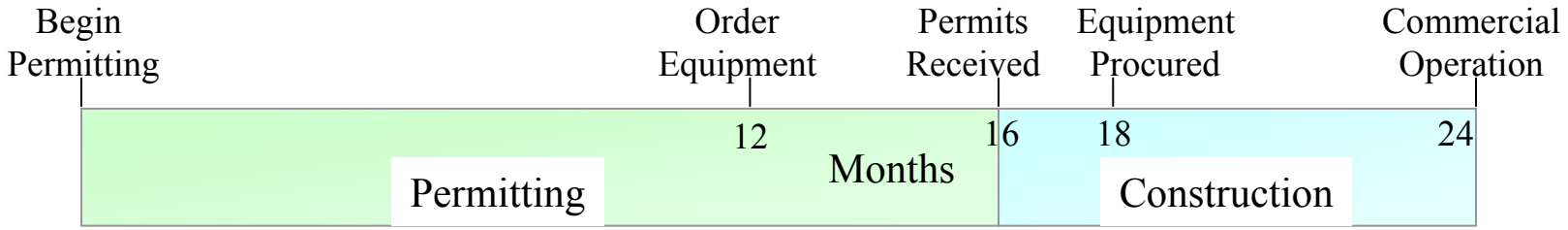
- Zones J, K, & ROS for ‘05, ‘06, & ‘07

LAI Approach:

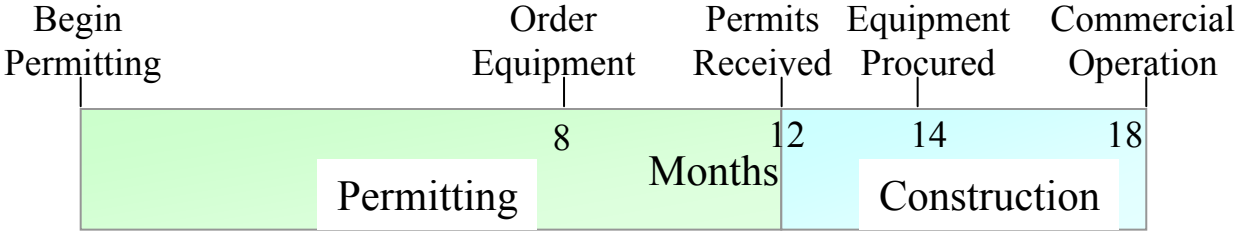
- Define Gas Turbine Peakers
  - Capital Costs, Performance
- Forecast Net Revenues
  - Energy & Ancillary Services Less Operating Costs
  - MarketSym – Topology, Fuel Costs, Bid Behavior, Supply / Demand
- Levelize Required ICAP Revenues
- Project Schedule / Q & A

Peaker Definition

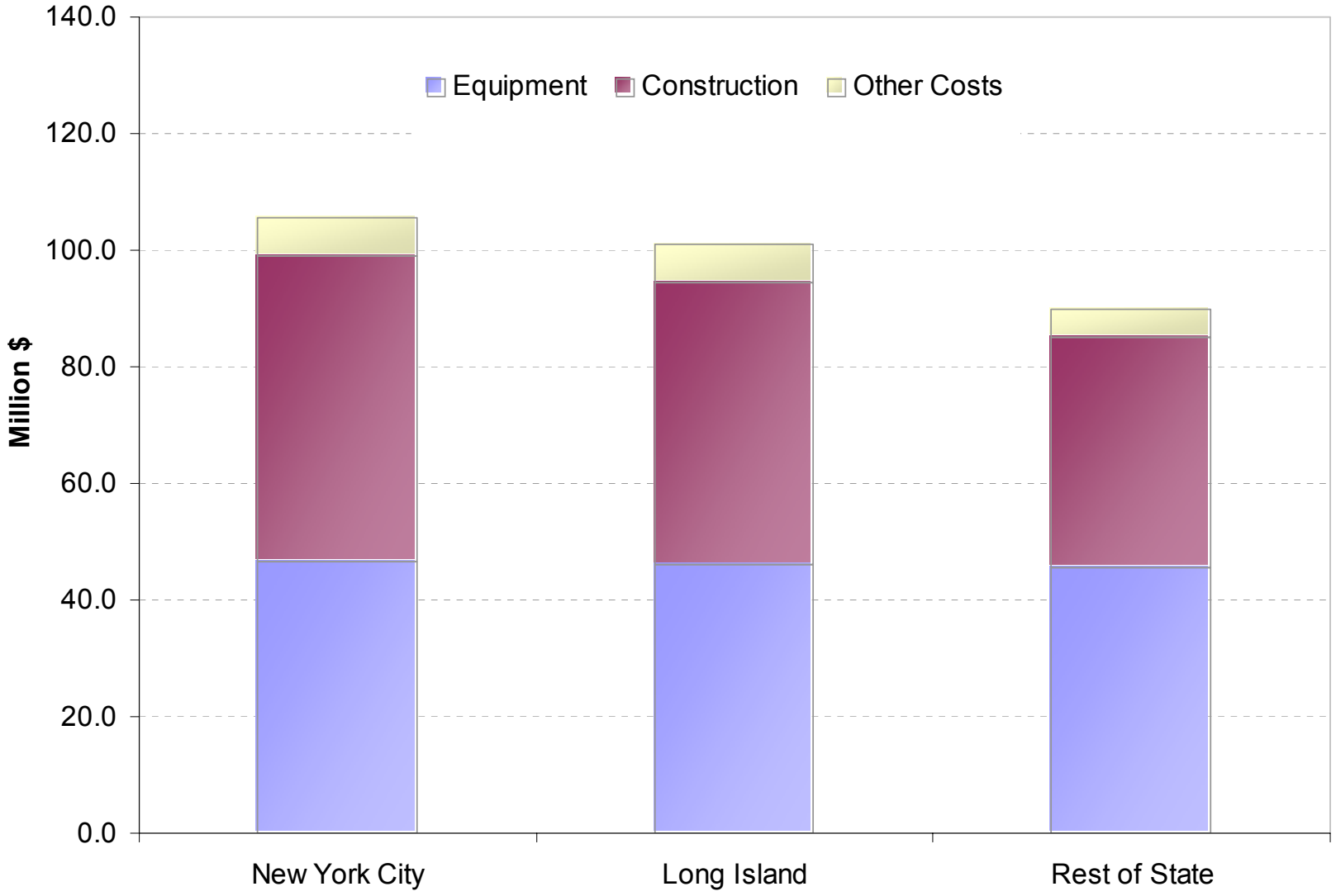
- Merchant Plant @ Brownfield Site
- 96 MW Aeroderivative Plant
  - Twin LM6000 w/ Sprint
  - Meet existing emission regulations
- 24 Month Schedule for NYC and LI



- 18 Month Schedule for ROS



Peaker Definition – Capital Cost



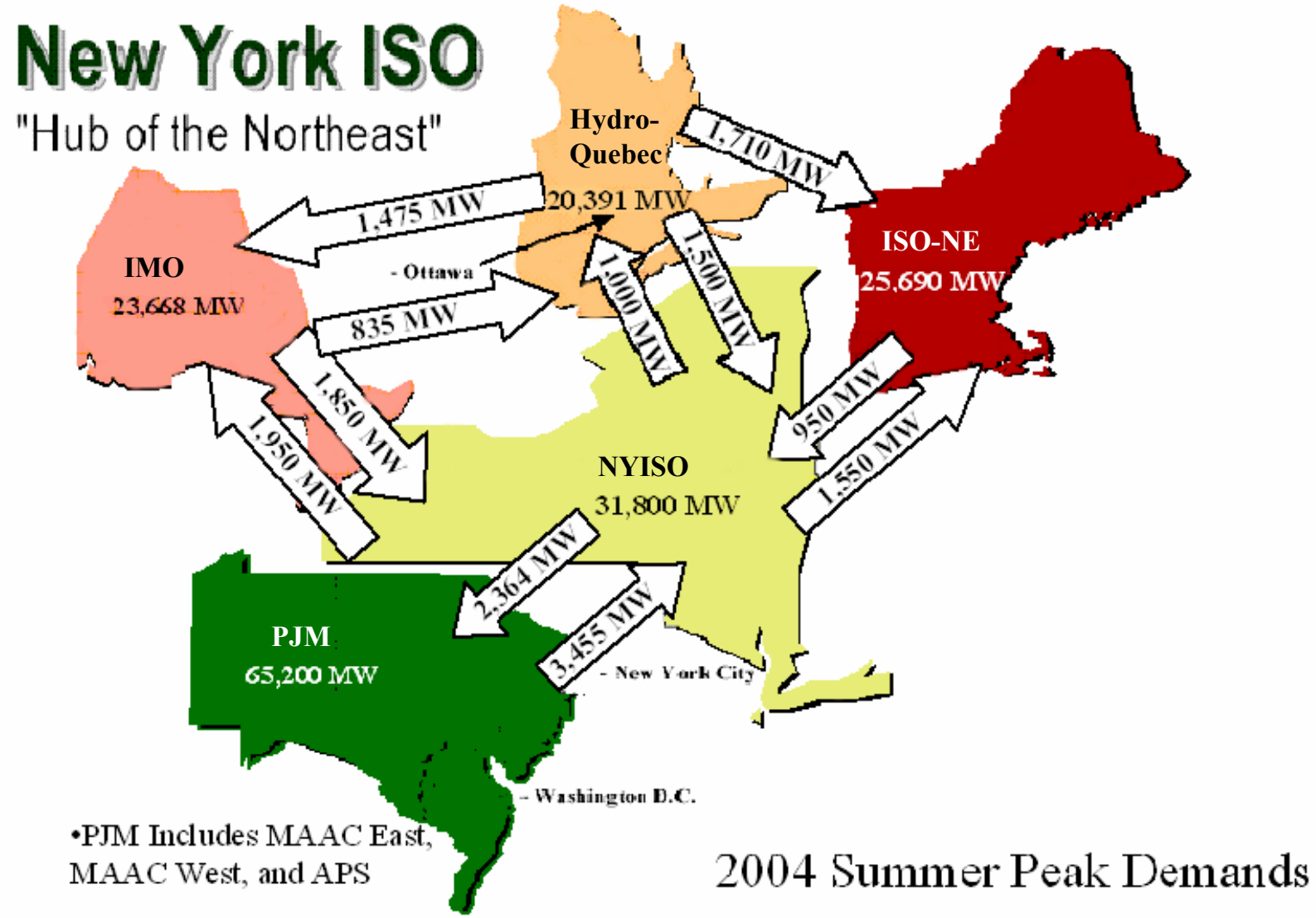
Peaker Definition – Capital Costs (2004)

	Zone J	Zone K	ROS
Owner's Costs	$ 6,711,000	$ 6,425,000	$ 4,795,000
Equipment	$ 41,500,000	$ 41,500,000	$ 41,500,000
Engineering & Design	$ 4,000,000	$ 3,500,000	$ 3,000,000
Construction	$ 52,430,000	$ 48,500,000	$ 39,510,000
Startup & Testing	$ 1,000,000	$ 1,000,000	$ 1,000,000
Total Cost	$ 105,641,000	$ 100,925,000	$ 89,805,000
Unit Cost (per kW)	$ 1,322	$ 1,263	$ 1,124

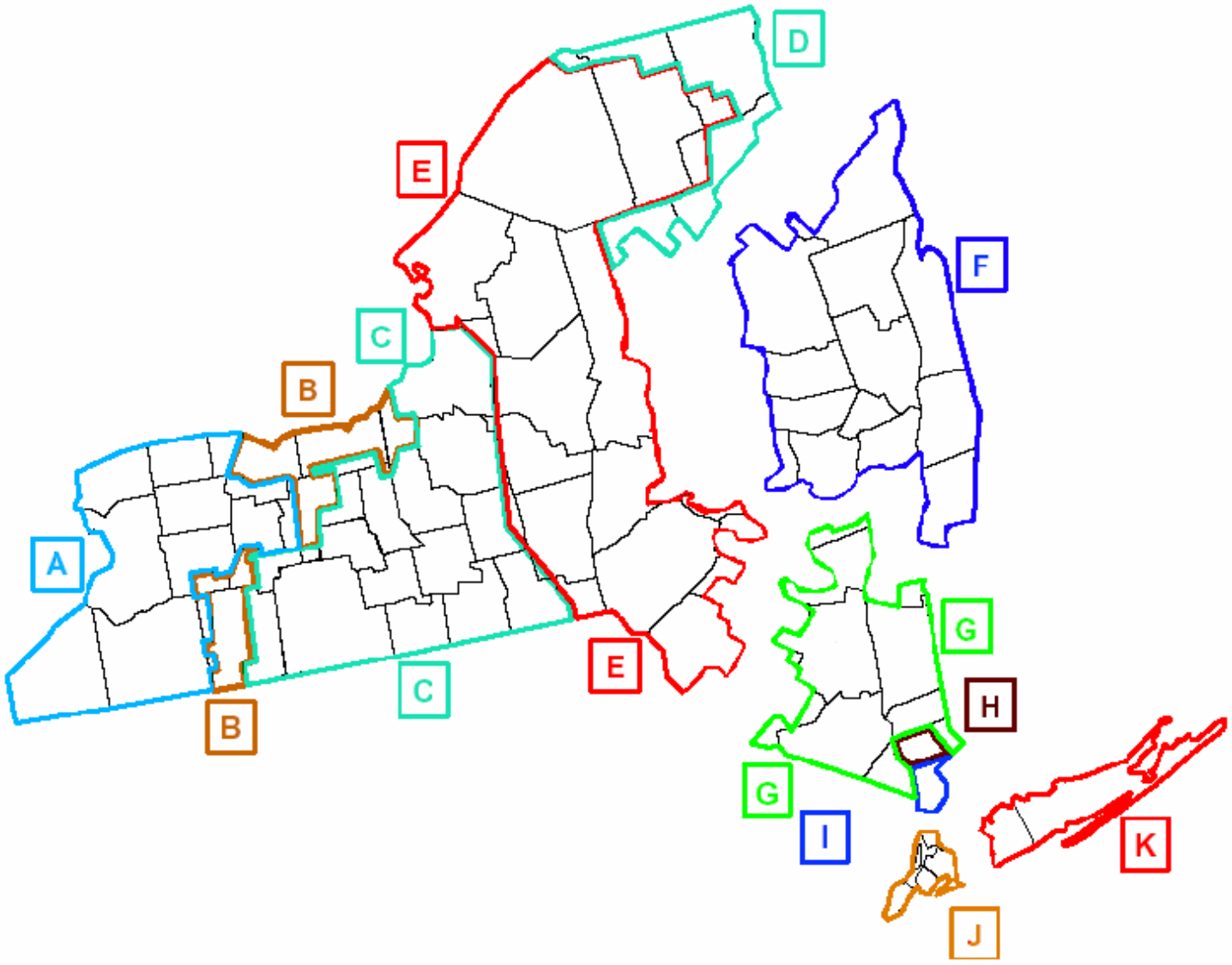
Peaker Definition – Performance

- Output (summer conditions)
  - 96 MW gross 92 MW net
- Heat Rate (summer conditions)
  - 8,962 Btu/kWh net (LHV)
- Emission Reduction Systems
  - Water / ammonia injection
  - SCR / CO catalyst @ 90% reduction
  - 2.0 ppm NO_x / 15 ppm CO
  - 10 ppm ammonia slip

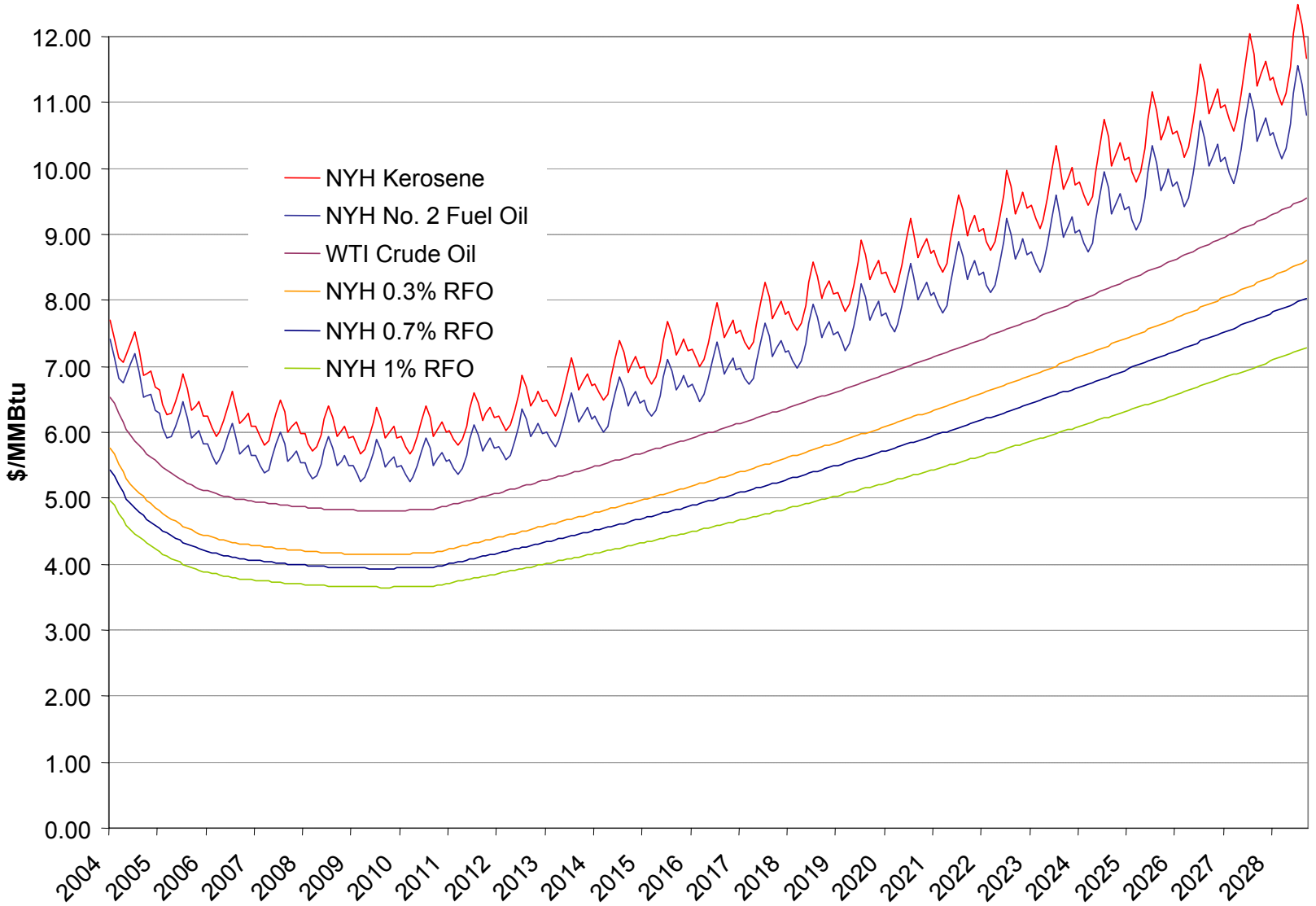
Forecast – Model Topology



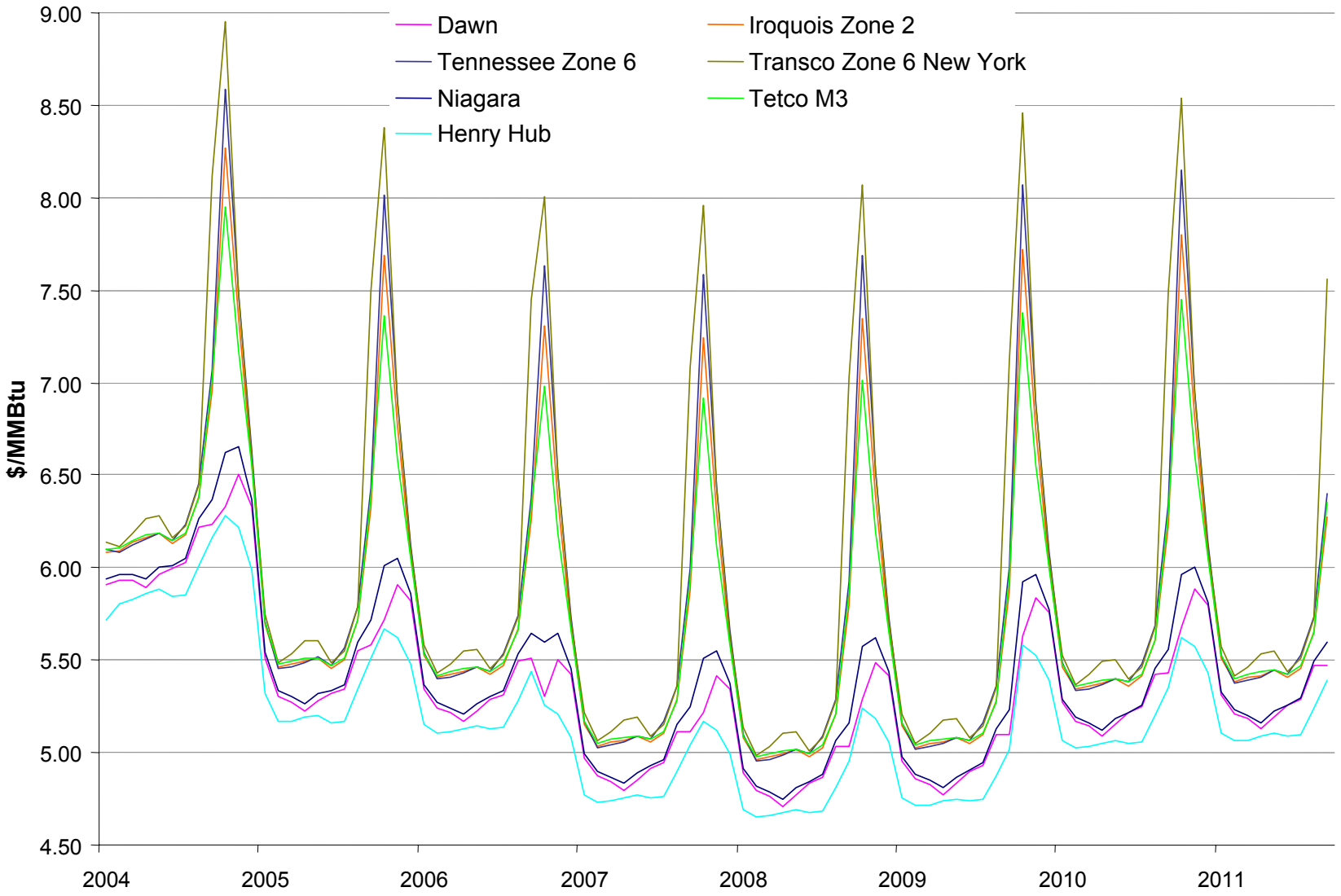
Forecast - NYISO Topology



Forecast – Fuel Oil Costs



Forecast – Gas Costs

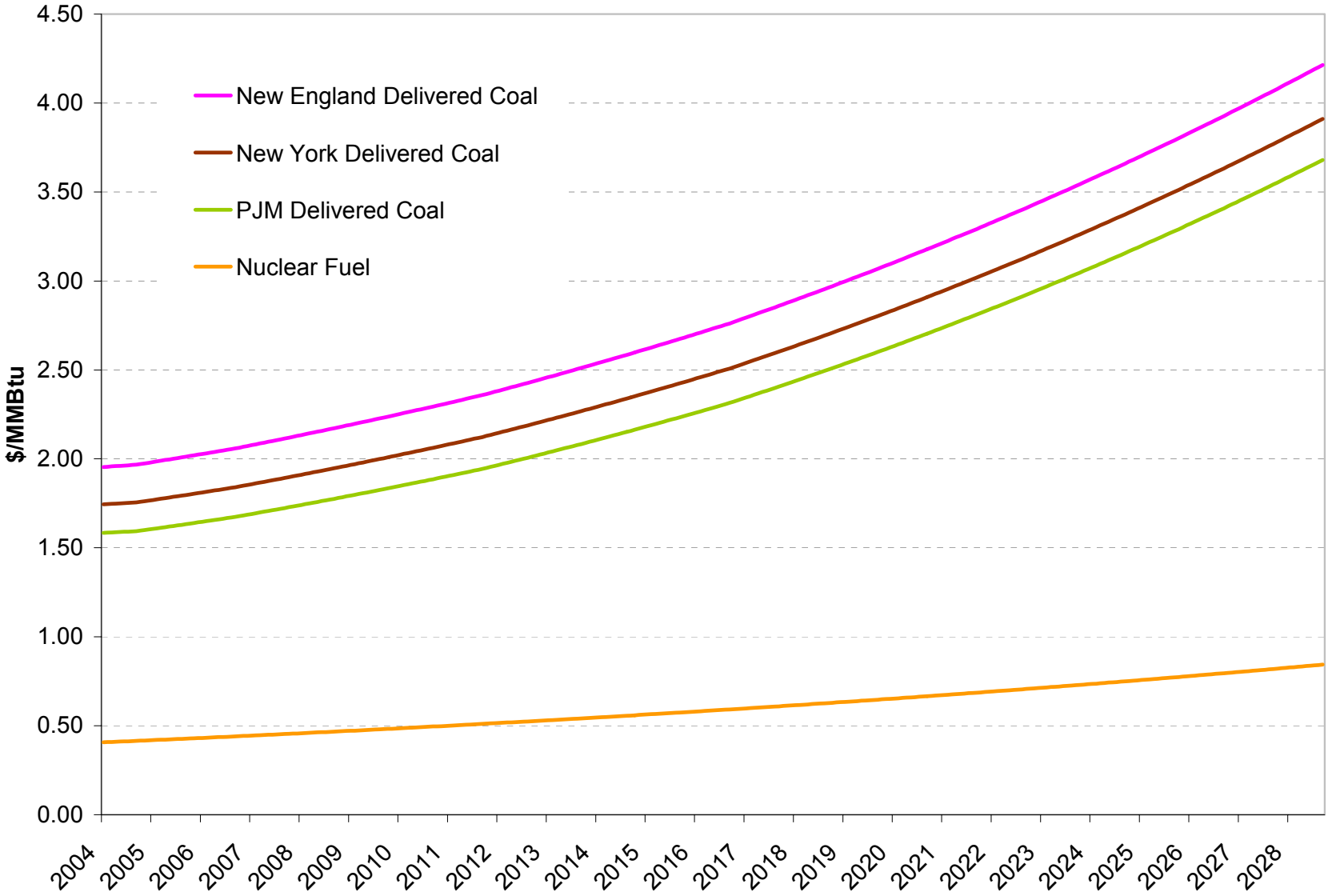


Forecast – Regional Trading Hubs

- Gas Supply to Generation by Trading Hub

Areas of Supply	Transco Z6-NY	TETCO M3	IGT-Z2	Tennessee Zone 6	Dawn	Niagara
NY-Zones A-E						X
NY-Zone F			X			
NY-Zones G-I	X		X			
NY-Zone J	X					
NY-Zone K	X		X			
PJM-E	X	X				
PJM-W		X				
New England			X	X		
Ontario					X	
Quebec					X	

Forecast – Coal & Uranium Costs



Forecast – Generator Bid Behavior

- Volatility Events During Limited Hours Raise Energy Prices Above Cost-Based Forecast Levels
  - Generators appear to bid rationally based on variable operating costs for *most* capacity
  - Last capacity blocks *sometimes* bid at increasing prices ("hockey stick")
  - Peakers tend to bid entire capacity as one block up to $1,000
  - Energy-limited and low load factor resources have incentive for high bid prices
- Price Volatility Enhances Peaker Energy Revenues

Forecast – Demand Forecast

- Preliminary 2004 Gold Book Values to 2013
- LAI Extrapolation to 2027

	Peak Demand (MW)	Annual Energy (MWh)
2005	32,319	168,005
2010	34,411	177,831
2015	36,078	184,097
2020	37,986	191,466
2025	39,995	199,241

Forecast – Supply Mix

- Near-Term - plants under construction and planned retirements
  - NYISO
  - PJM
  - ISO-NE
- Long-Term Entry - added to maintain reliability
  - LAI Entry Model for each market
  - GTs balanced with CCs
- Long-Term Attrition
  - LAI Attrition Model within each market
  - Retirement if 3 years of negative cash flow

Forecast – Net Revenues

- Peaker Revenues
  - Energy
  - Ancillary services
- Less Variable Costs (Bid Basis)
  - Fuel
  - Variable O&M
  - Emission allowances
- Less Fixed Costs
  - Fixed O&M
  - Site lease, property taxes
  - G&A, insurance
- Unrecovered Capital Costs (Levelized)

Levelization – Assumptions

- Life of Unit
  - 15 v. 20 yrs
- Financing
  - PPAs should not be necessary
  - Non-recourse project financing not viable
  - Parent company on-balance sheet
  - 60% debt @ 6.5%
  - 40% equity @ 25% (pre-tax)
- Levelization
  - Real dollars

Project Schedule / Questions & Answers

- Initial results by mid-May
- Review by NYISO
- Final Report by June 4
- Presentation by end of June

- Questions & Answers