

Cost Benefit Study of the Proposed GridFlorida RTO

Presentation to the Florida Public Services Commission

Tallahassee, Florida
May 23, 2005



Outline

- Objective and Scope
- Process
- Grid Florida RTO Quantitative Benefits
- Grid Florida RTO Qualitative Benefits/Costs
- Grid Florida RTO Costs
- Summary of Net Quantitative Benefits/Costs

Objective and Scope

- To estimate the benefits and costs of forming the GridFlorida “greenfield” RTO under two modes of operation:
 - Day 1 operation
 - Day 2 operation
- All benefits and costs are compared to a Base Case reflective of today’s market.
- Sources of benefits and costs:
 - Investment efficiency (Qualitative)
 - Operational efficiency (Both Quantitative and Qualitative)
 - Participant costs/benefits of working with RTO (provided by Stakeholders)

Three Cases Examined

- Base Case: - (2004 – 2016)
 - Market as-is with company operation, multiple transmission providers and “pancaked” transmission rates.
 - Commitment hurdle rates used to capture company operation
 - Dispatch hurdles used to capture other market inefficiencies (these are assumed to be primarily associated with scheduling and dispatching operations of multiple transmission providers).
- Day 1 Case: - (2004 – 2016)
 - Company operation but with single transmission provider operating under a single transmission tariff.
 - Commitment hurdle rates used to capture company operation.
 - “Pancaked” transmission charges eliminated.
 - Dispatch hurdles eliminated.
- Delayed Day 2 Case: - Day 1 (2004 – 2006) and Day 2 (2007 – 2016)
 - Central (Peninsular Florida-wide) unit commitment and dispatch under a single transmission provider and a single transmission tariff in Day 2.
 - All commitment and dispatch hurdles, and “pancaked” transmission charges eliminated in Day 2.

Two Scenarios Examined – Treatment of Firm External Resources

- Scenario 1: Full Commitment and Dispatch Hurdles Between Southern and Peninsular Florida:
 - Utilities with firm external resources were not allowed to commit their capacity to meet their load in Peninsula Florida.
- Scenario 2: Partial Commitment and Dispatch Hurdle Rates Between Southern and Peninsular Florida:
 - Utilities with firm external resources were allowed to commit their capacity to meet their load in Peninsula Florida

Summary of Cases and Scenarios

Scenario Number	Scenario Description	Base Case Market	RTO Operation	
			Day 1 Case	Delayed Day 2 Case
Scenario 1	Full Commitment and Dispatch Hurdles Between Southern Peninsular Florida	√	√	√
Scenario 2	Partial Commitment and Dispatch Hurdle Rates Between Southern and Peninsular Florida	√	√	√

- For this presentation, the focus will be on Scenario 2 only.
- ICF presented results of both scenarios to Stakeholders on April 27, 2005
- Scenario 2 provided the most benefits in both Day 1 and Day 2.

The Process Involved Stakeholder Input and Comment

- Stakeholders provided ICF with market data.
- ICF held six Cost Benefit Workgroup Meetings (CBWGs).
 - **1st CBWG:** Teleconference held on June 4, 2004 and focused on general introductions, project scope, communication and data submission procedures.
 - **2nd CBWG:** Meeting held on June 22, 2004 and focused on modeling assumptions.
 - **3rd CBWG:** Meeting held of July 21, 2004 and focused on study approach.
 - **4th CBWG:** Meeting held on October 15, 2004 to present and discuss:
 - Model calibration results
 - RTO structure and operations architecture
 - RTO functions, roles and responsibilities between Control Areas and Control Zones
 - RTO personnel, systems and facility requirements for Day 1 and Day 2.
 - **5th CBWG:** Teleconference held on December 16, 2004 to present preliminary RTO cost estimates.
 - **6th CBWG:** Meeting held on April 27, 2005 to present Final RTO cost estimates and preliminary RTO benefits estimates.

The Process Involved Stakeholder Input and Comment

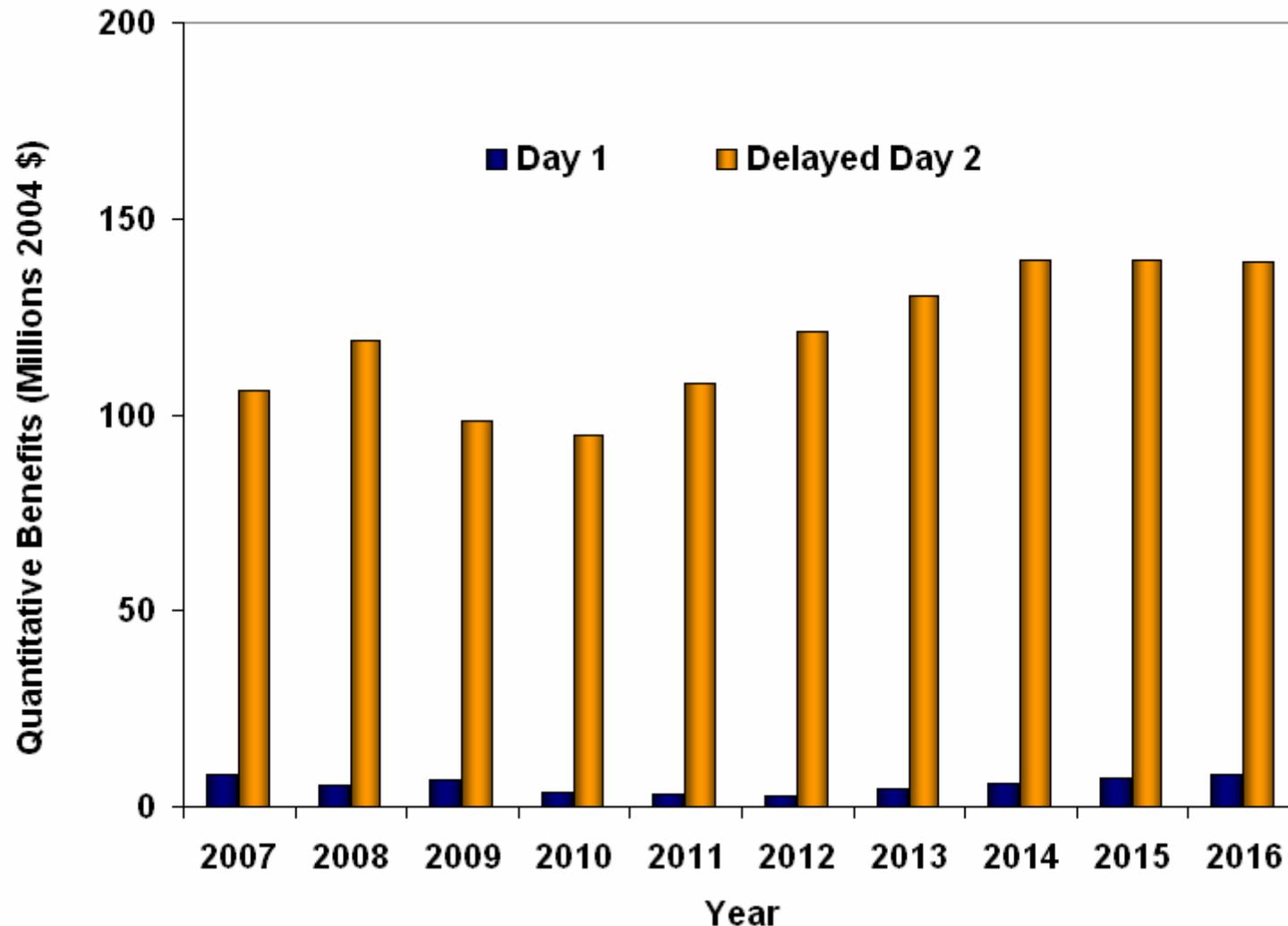
- There were three Stakeholder comment periods:
 - 1st comment period: July 2004 with specific focus on approach.
 - 2nd comment period: December 16, 2004 through January 7, 2005 with focus on preliminary RTO cost estimates.
 - 3rd comment period: April 27, 2005 through May 4, 2005 with focus on preliminary RTO benefit estimates.
- All documents produced in the process were made available to Stakeholders through the ICF Stakeholder Information website.
- ICF incorporated stakeholder comments in the analysis.

Unique Features About This Study

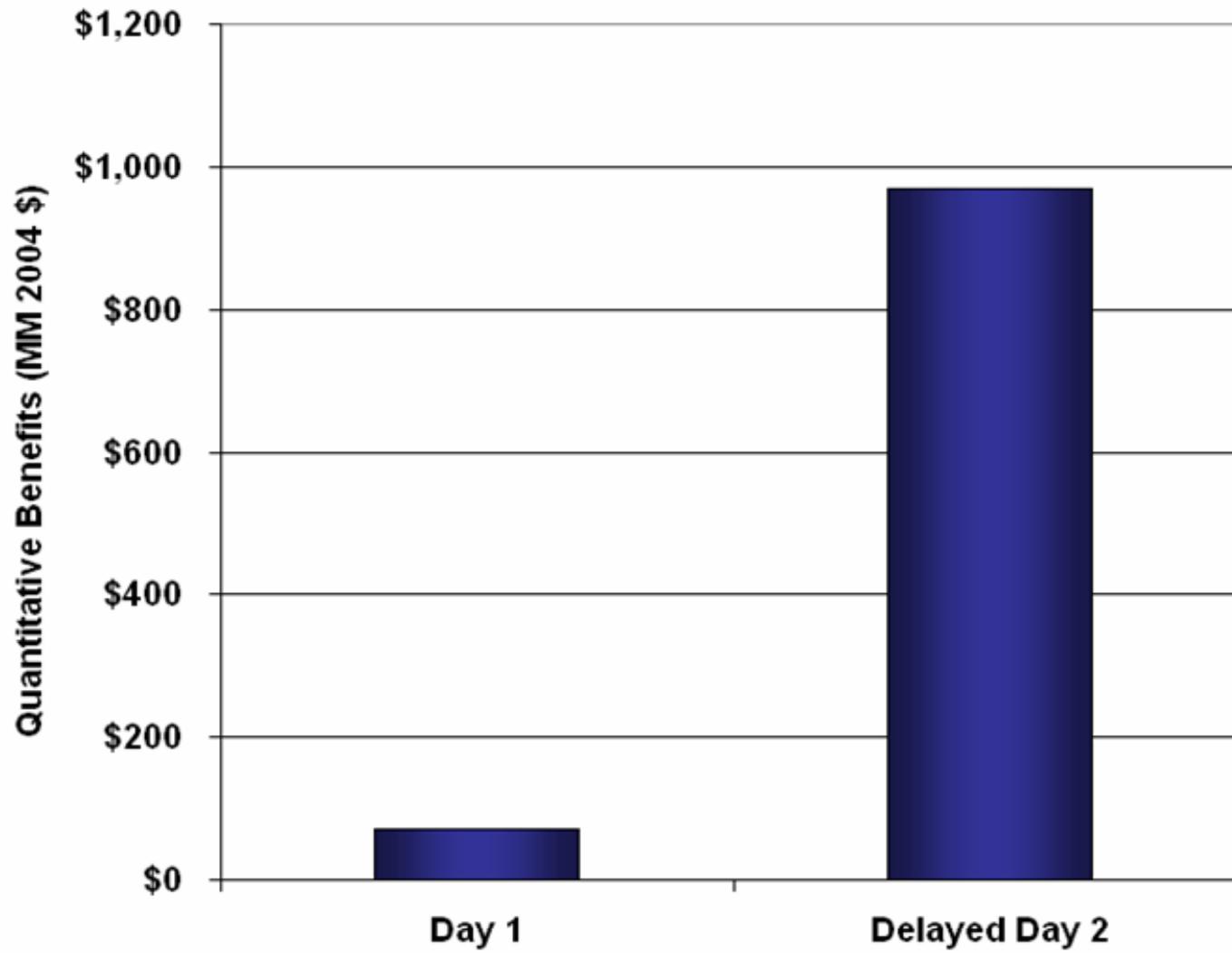
- Detail
 - 10 explicitly modeled years.
 - Modeling of marginal transmission losses.
 - Calibrated beyond coal resources.
- Scope
 - 2 scenarios considered under the Base Case.
- Open process with Applicant and Stakeholder review of intermediate deliverables.
- Final results incorporates Applicant and Stakeholder comments.

Quantitative RTO Benefits

RTO Benefits Are Largely Driven by GridFlorida-wide Markets - Annual Delayed Day 2 and Corresponding Day 1 Benefits (2007 – 2016)



Summary of Quantitative Benefits (NPV - 2004\$)



Mid Merit and Peaking Units are the Primary Sources of Quantitative Benefits - Illustrative Examples From 2007 Forecast

Plant Name	Company	Plant Type	Base Case Capacity Factor	Day 1 Capacity Factor	Delayed Day 2 Capacity Factor
John R Kelly	GAIN	CC	67%	67%	23%
Verobeach	FMPA	CC	52%	26%	23%
Gwivey	HST	CT	30%	12%	2%
Suwannee River 2	PEF	OG	34%	34%	10%
Larsen 8	LAK	CC	31%	32%	7%
Reedy Creek 1	REC	CC	25%	16%	3%
Indian River 3	OUC	OG	33%	38%	16%
Deer haven 1	GAIN	OG	17%	16%	1%
Suwannee River 1	PEF	OG	34%	34%	20%
Intercession 8	PEF	CT	14%	12%	0%
Lakeland CC	FMPA	CC	15%	11%	3%
Fort Pierce 9	FMPA	CC	15%	14%	3%
North side 3	JEA	OG	31%	35%	19%
Auburndale 2	TEC	CT	11%	10%	0%
Hopkins 1	TAL	OG	24%	25%	14%

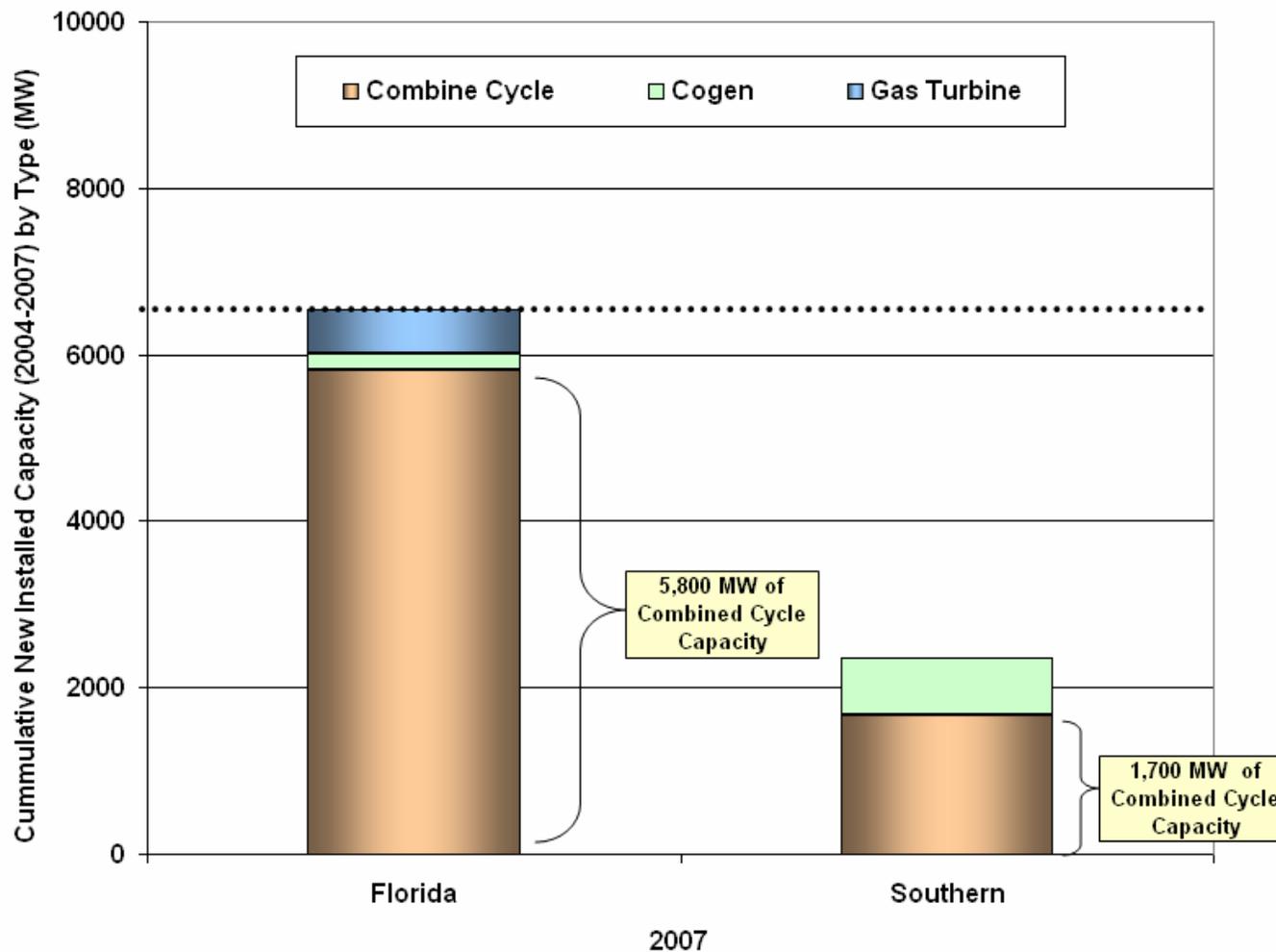
- The bulk of the savings are from GridFlorida-wide unit commitment and dispatch.

Mid Merit and Peaking Units are the Primary Sources of Quantitative Benefits - Illustrative Examples From 2007 Forecast

Plant Name	Company	Plant Type	Base Case Capacity Factor	Day 1 Capacity Factor	Delayed Day 2 Capacity Factor
McIntosh 1	LAK	OG	14%	13%	4%
North side 5	JEA	CT	9%	10%	1%
Putnam 2	FPL	CC	50%	50%	41%
Vandolah 2	PEF	CT	9%	7%	1%
Partners	TEC	CT	8%	3%	0%
Vandolah 1	PEF	CT	9%	7%	1%
Sebrin 2	TEC	CT	8%	7%	0%
Sebrin 1	TEC	CT	7%	7%	0%
Vandolah 3	PEF	CT	8%	7%	0%
Vandolah 4	PEF	CT	7%	6%	0%
Indian River 2	OUC	OG	14%	16%	7%
Cape Canaveral 2	FPL	OG	42%	40%	35%
McIntosh 2	LAK	OG	7%	6%	0%
Green Power	JEA	CT	8%	10%	2%
Bartow 3	PEF	CT	7%	7%	1%

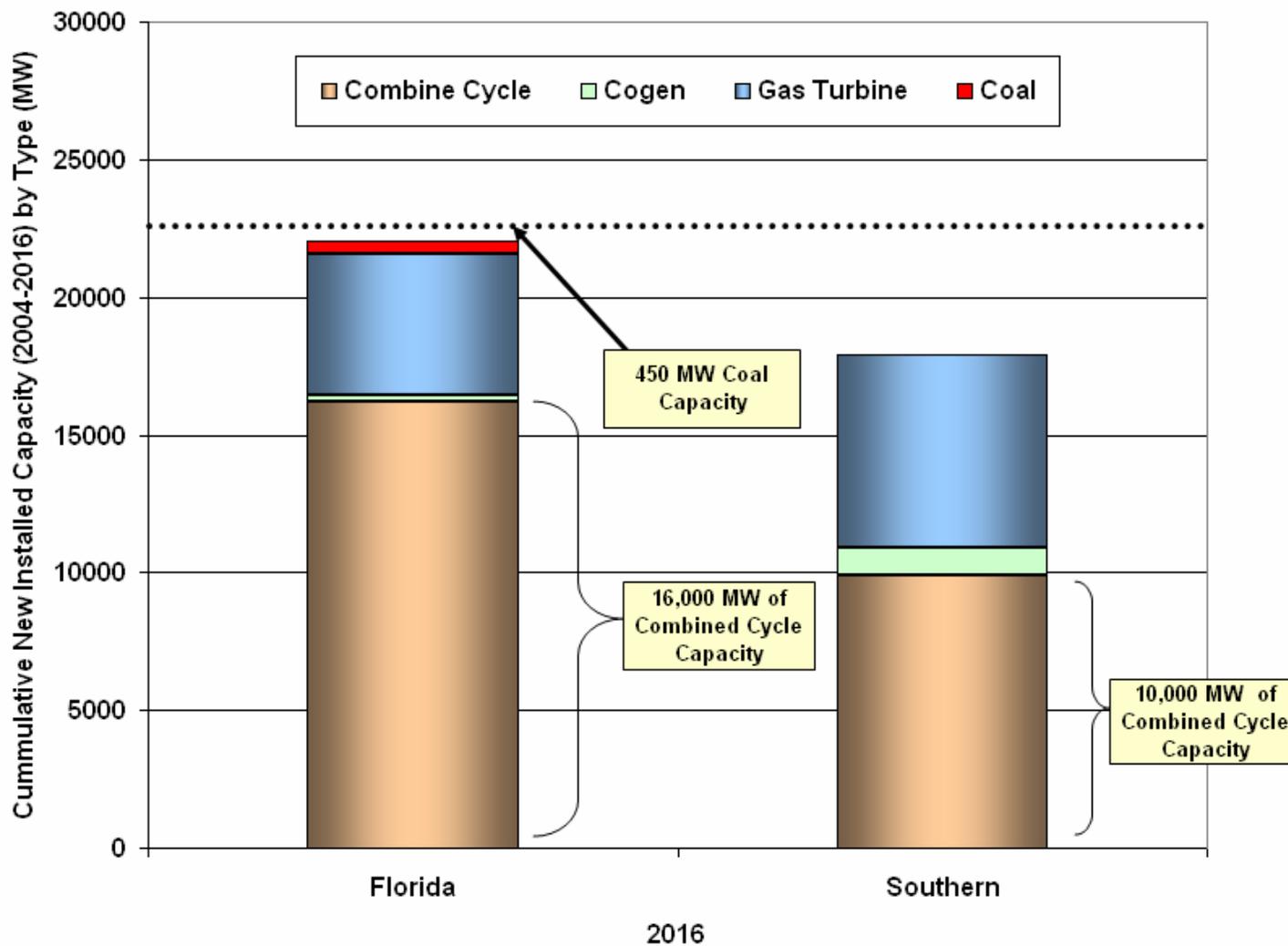
- The bulk of the savings are from GridFlorida-wide unit commitment and dispatch.

2004 to 2007 Cumulative New Installed Capacity – Southern Sub-Region of SERC¹ and Peninsular Florida²



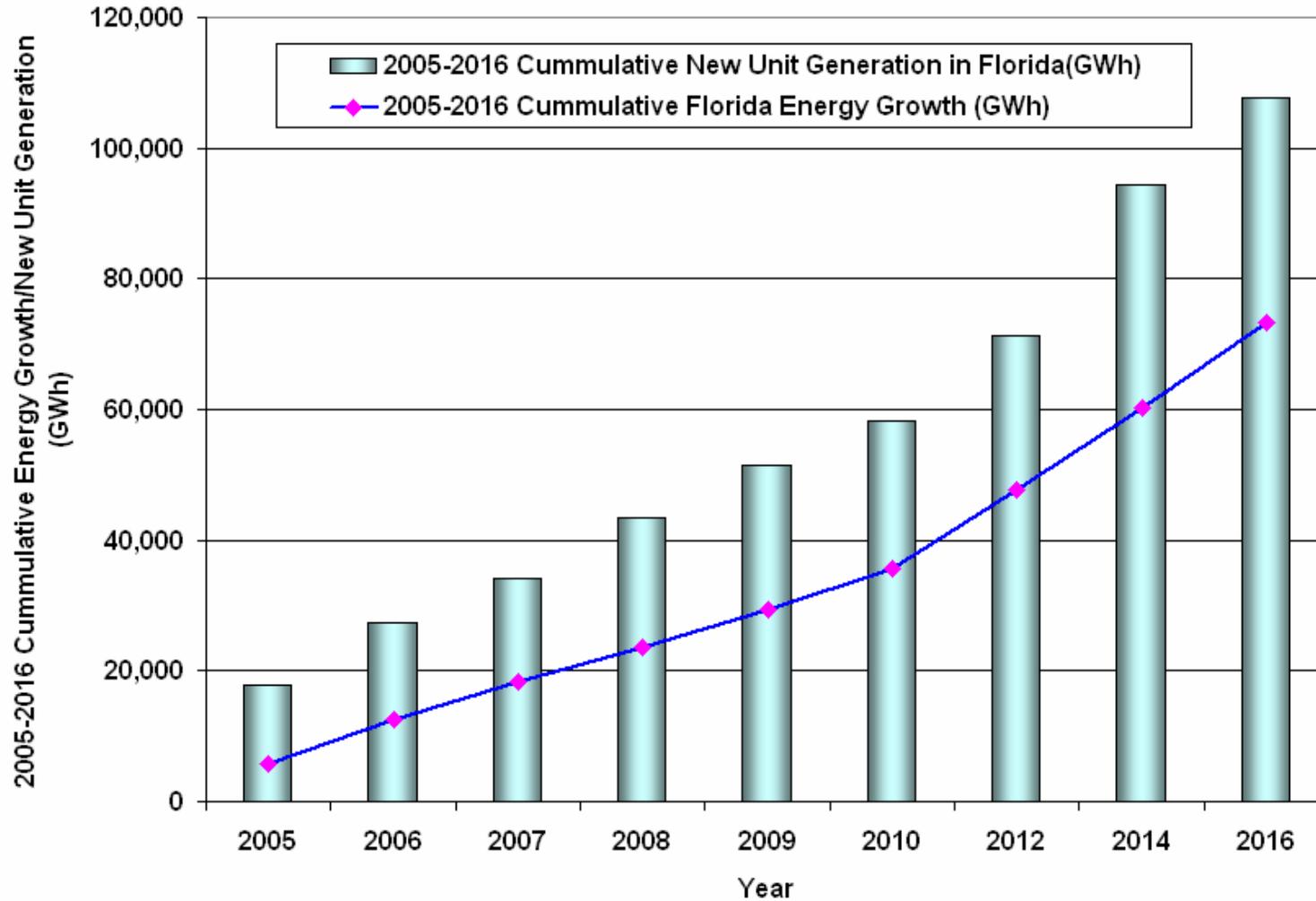
Source: ¹ ICF, ² Grid Florida Applicants & Stakeholders

2004 to 2016 Cumulative New Installed Capacity – Southern Sub-Region of SERC¹ and Peninsular Florida²

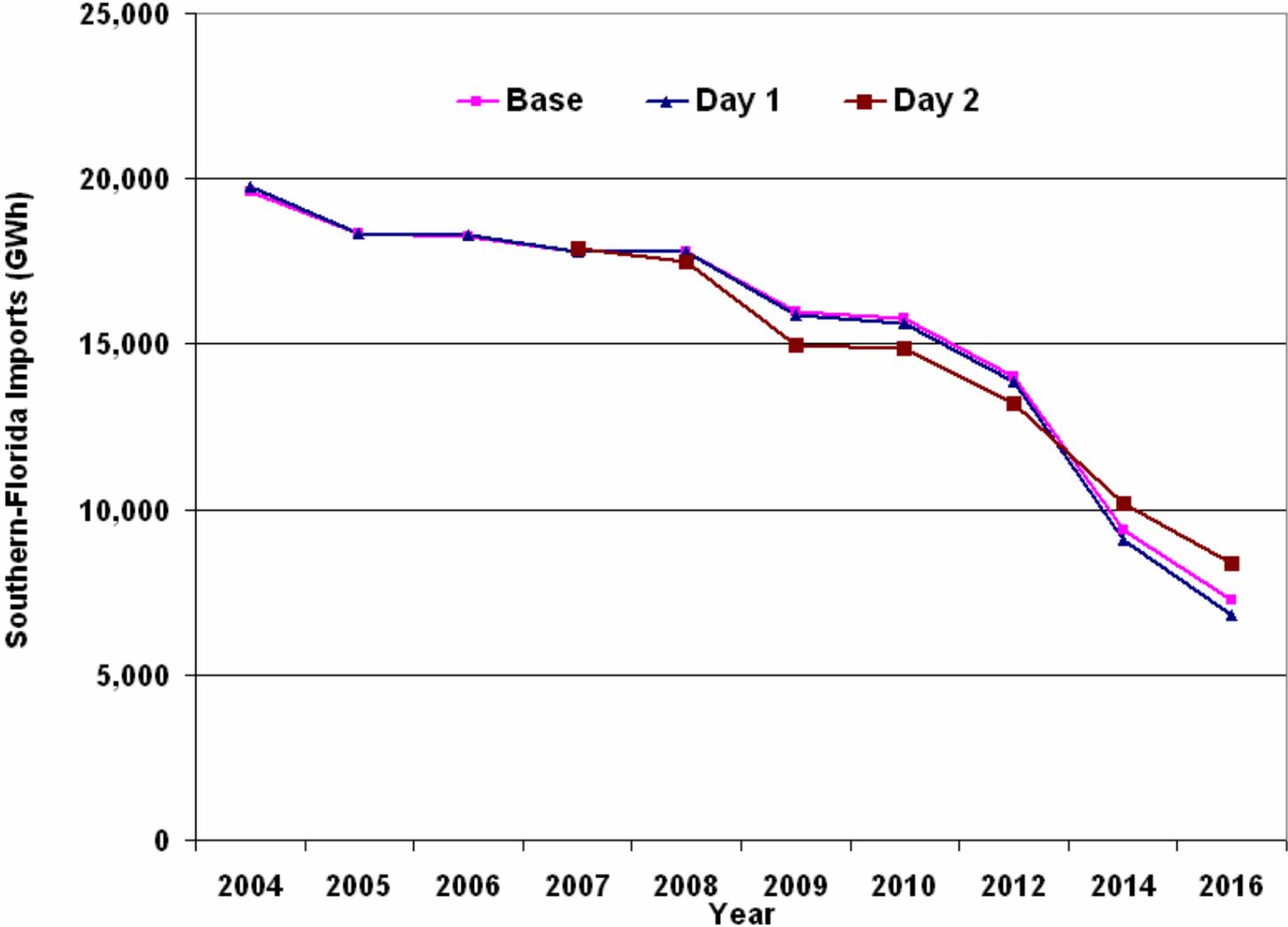


Source: ¹ ICF, ² Grid Florida Applicants & Stakeholders

2005-2016 Cumulative Energy Growth/New Unit Generation in Peninsular Florida



Imports Into Peninsular Florida Decline With Demand Growth and Incremental New Gas Capacity in Both Regions.



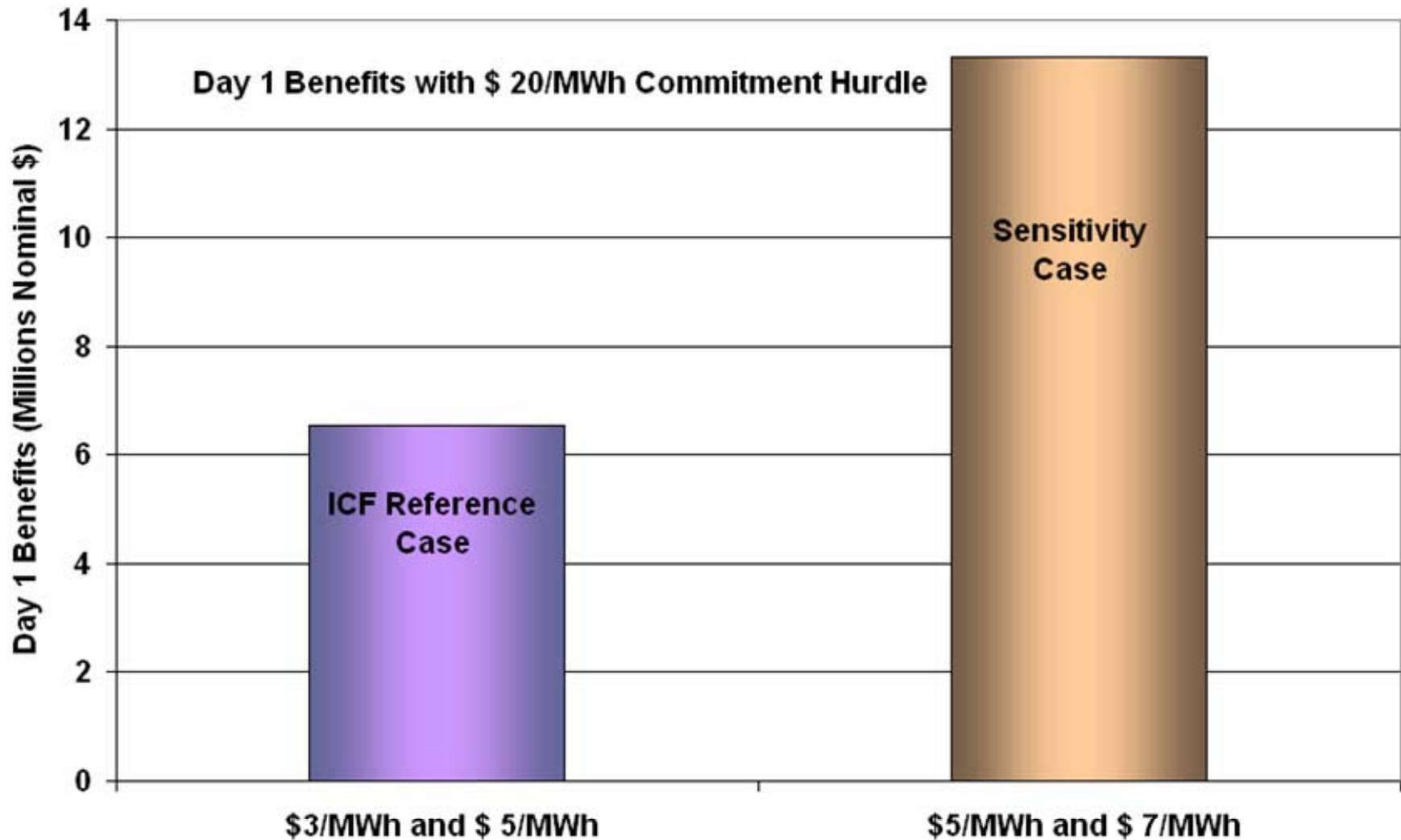
Are ICF's Day 1 Quantitative Benefits Reasonable?

- The majority of benefits in Florida come from GridFlorida wide unit commitment and dispatch (Day 2). The Day 1 results reflect traditional company operation with de-pancaking of transmission charges within the GridFlorida footprint.
- Because there is already a high level of connectivity between Control Areas in Florida, most transactions occur between adjacent systems and therefore, the need for transactions wheeled through multiple systems are typically infrequent and small in transaction size.
- Most transmission service provided in Florida is Network Service, as opposed to Point-to-Point Service. Utilities pay for transmission based on their respective load ratio share of the embedded cost of the transmission system, giving them Network Customer priority so that their transactions are not subject to additional wheeling charges.

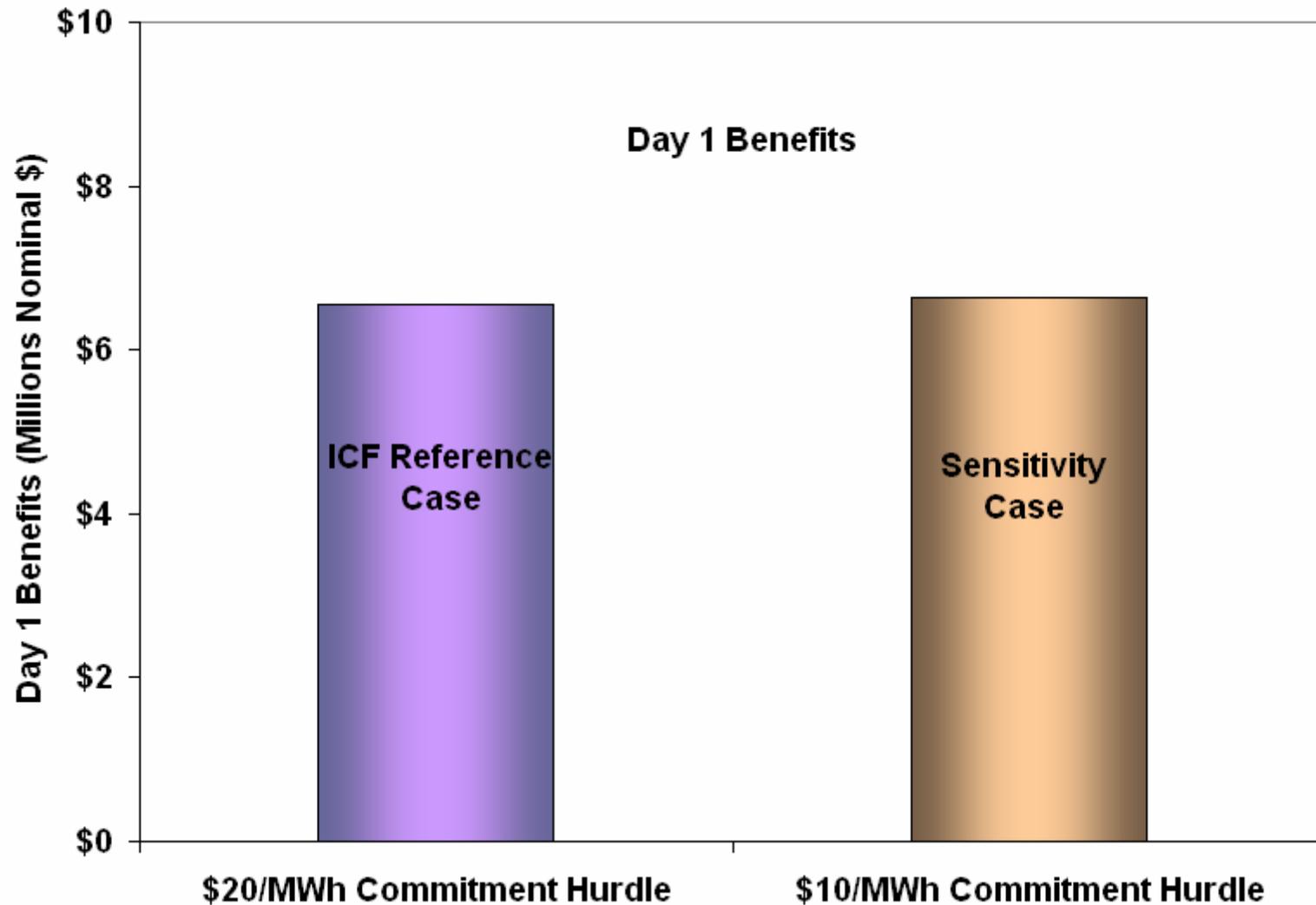
Recap Use of Hurdle Rates

- Commitment hurdle rates used to capture company operation
- Dispatch hurdles used to capture other market inefficiencies (these are assumed to be primarily associated with scheduling and dispatching operations of multiple transmission providers).

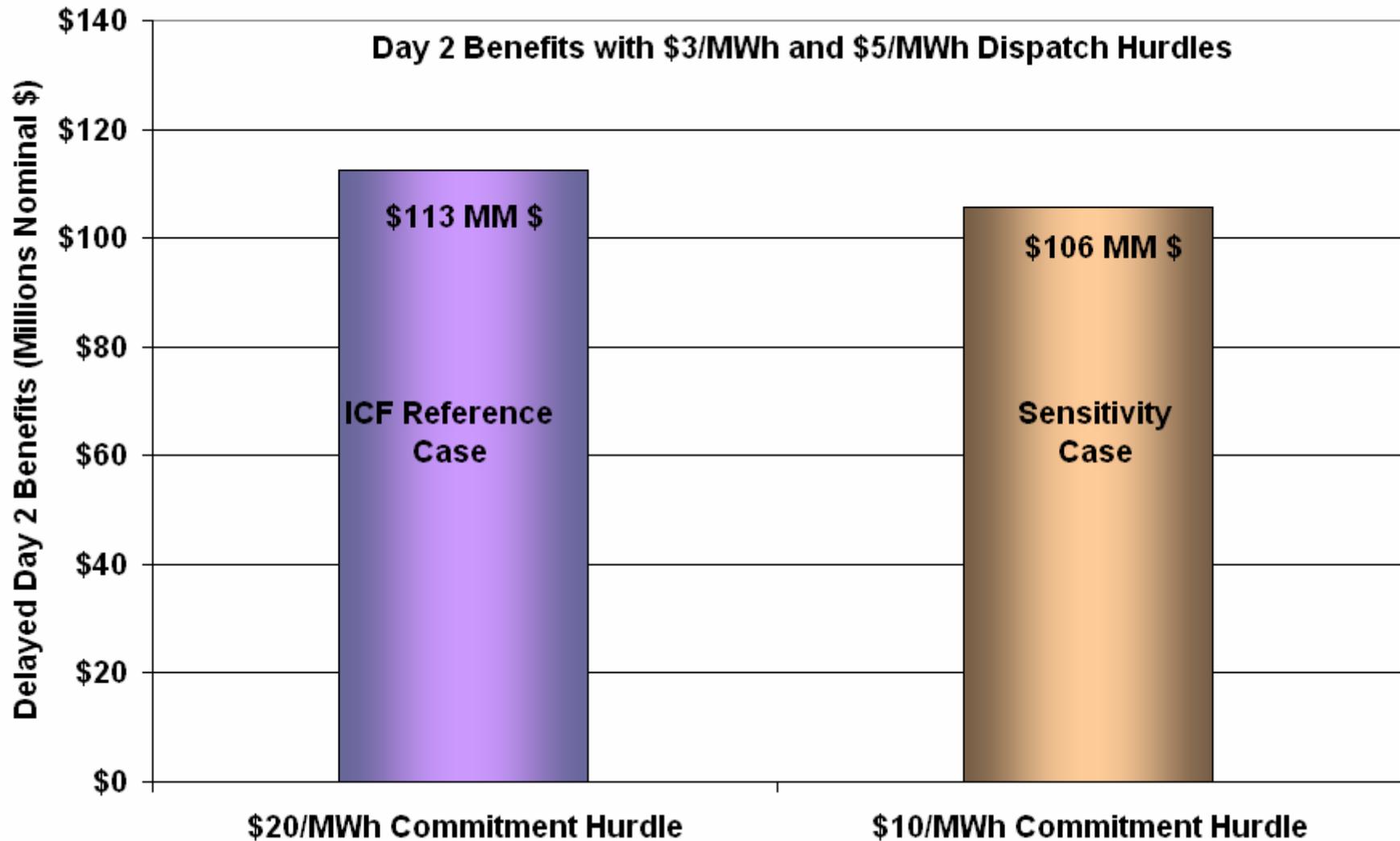
Day 1 Benefits Are Sensitive To Base Case Dispatch Hurdles - 2007



Day 1 Benefits are Largely Unaffected by the Base Case Commitment Hurdle - 2007



Day 2 Benefits are Sensitive to the Base Case Commitment Hurdle - 2007



Qualitative RTO Factors

Qualitative Benefits and Costs

Qualitative Factor	Potential Day 1 Impact		Potential Day 2 Impact	
	Costs	Benefits	Costs	Benefits
Investment Efficiency		√		√
Bilateral Long-Term Contracting		√		√
Elimination of Contract Path Scheduling		√		√
Transition Risks	√		√	
Market Transparency		√		√
Scope, Organizational and Regulatory Issues	√		√	
Other factors				
ROE	-	-	-	-
Inter-Regional Tariffs		√		√
Efficiency and Standards		√		√
Merchant Power Plants		√		√

*Qualitative benefits/costs associated with Utility administrative/operation with RTO to be addressed by Applicants .

RTO Costing

Previous RTO Costs Were Based on Broad Top-Down Estimates

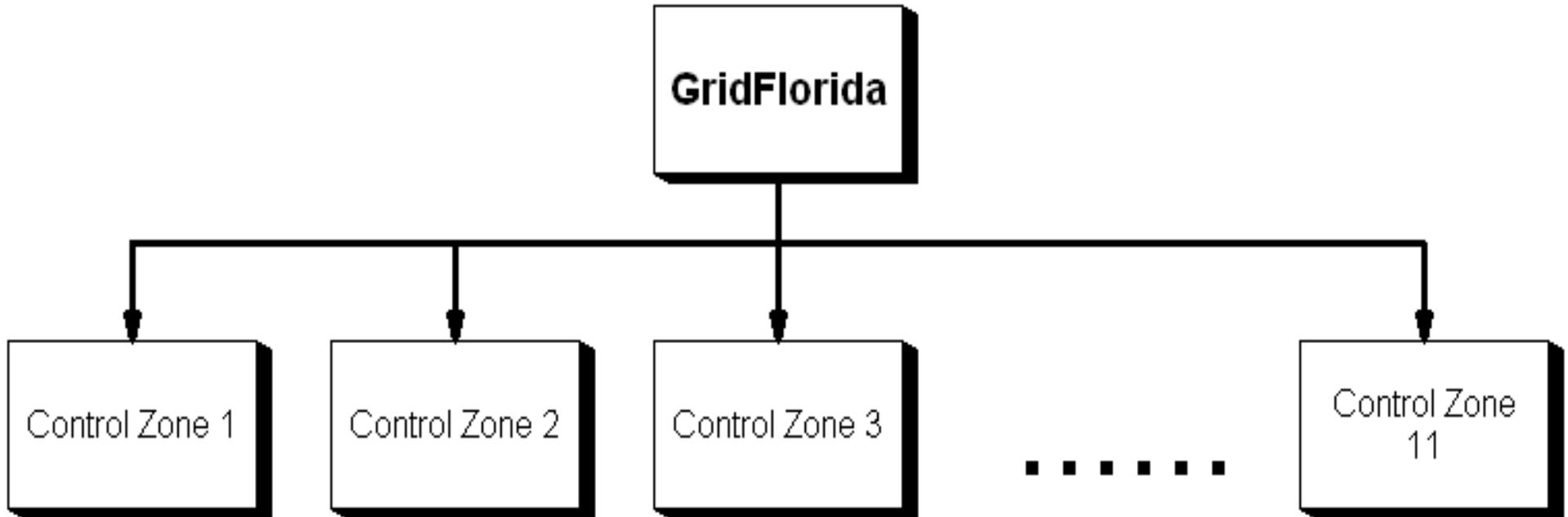
- RTO costs estimated in previous cost-benefit studies were based on:
 - Existing Northeast RTO startup costs
 - \$/MWh estimates
 - Transmission owner estimates
 - Weighted average of existing RTO costs
 - Market participant surveys
 - Company surveys and RTO budget forecasts

The RTO Cost Modeling Involved Stakeholder Input and Comment

- Grid Florida RTO Structure modeled – presented and discussed at the 3rd CBWG meeting on July 21, 2004. 
- Functions, roles and responsibilities between GridFlorida Control Area and Control Zones for both Day 1 and Day 2 Operation; Architecture of Grid Florida Operation– presented and discussed at the 3rd CBWG meeting on July 21, 2004.  
- Systems, personnel and physical facility requirements – presented and discussed at the 4th CBWG meeting on October 15, 2004. 
- Preliminary cost estimates provided on December 15, 2004 and discussed at the 5th CBWG meeting on December 16, 2004.
- Stakeholders comments were received on January 7, 2005.
- Final cost estimates incorporating Stakeholder comments provided on April 21, 2005 and discussed at the 6th CBWG meeting on April 27, 2005.



Proposed GridFlorida RTO Structure Modeled



- Existing control areas become Control Zones operating under the new GridFlorida RTO



Day 1 and Day 2 RTO Operational Functions By GridFlorida Control Area and Control Zones

X: Full and exclusive responsibility A: Primary responsibility B: Support role	Day 1		Day 2	
	GridFlorida RTO	Control Zones	GridFlorida RTO	Control Zones
Grid Operations				
Energy Management System	A	B	X	
ICCP Data Communication System	A	B	X	
Resource Adequacy	A	B	A	B
Planning and Engineering				
Long-Term Reliability	A	B	A	B
Engineering and Facility Studies	A	B	A	B
Interconnection Requests	A	B	A	B



Day 1 and Day 2 RTO Operational Functions By GridFlorida Control Area and Control Zones

X: Full and exclusive responsibility A: Primary responsibility B: Support role	Day 1		Day 2	
	GridFlorida RTO	Control Zones	GridFlorida RTO	Control Zones
Long Term Activities				
Planning and Expansion ¹	A	B	A	B
Tariff Administration and OATT	X		X	
OASIS	X		X	
Market Monitoring	X		X	
Inter RTO Coordination	A	B	X	
Short Term Reliability	A	B	X	
ATC and TTC Calculation	X		X	
Seasonal Activities				
Congestion Right Allocation and Auctions			X	
RMR Designations	A	B	A	B
Weekly Activities				
Load Forecasting	A	B	A	B
Outage Scheduling	A	B	A	B

¹ Includes monitoring of installed capacity requirements



Day 1 and Day 2 RTO Operational Functions By GridFlorida Control Area and Control Zones

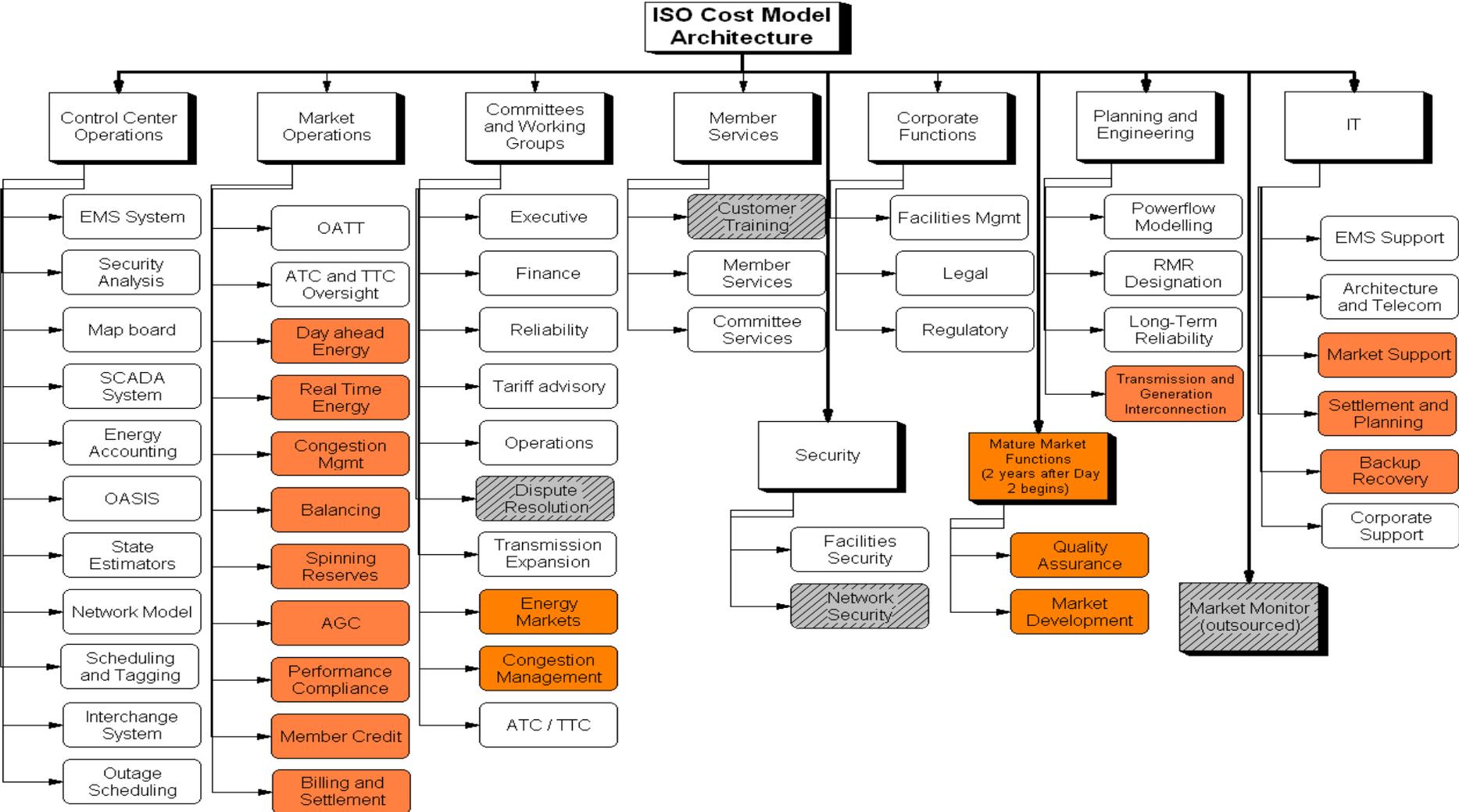
	Day 1		Day 2	
	GridFlorida RTO	Control Zones	GridFlorida RTO	Control Zones
X: Full and exclusive responsibility A: Primary responsibility B: Support role				
Day Ahead Activities				
Day Ahead Market Operations			X	
Day Ahead Reliability Review	A	B	A	B
Day Ahead Ancillary Services Markets			X	
SCUC	B	A	X	
Real-time Activities				
Scheduling and Dispatching Operations (SCED)	B	A	X	
Ancillary Services - Operating Reserves and AGC	B	A	A	B
Security Coordination	A	B	X	
Balancing Function	A	B		
Billing and Settlement				
Billing	A	B	X	
Settlement	A	B	X	
Archiving				
Data Storage and Archiving	A	B	X	

Day 1 and Day 2 RTO Operational Functions By GridFlorida Control Area and Control Zones

X: Full and exclusive responsibility A: Primary responsibility B: Support role	Day 1		Day 2	
	GridFlorida RTO	Control Zones	GridFlorida RTO	Control Zones
Administration				
Customer Interface and Administrative Services	X		X	
Publications and Documentation	X		X	
Operations Support and Training	X		X	
Enforcement	X		X	
Corporate Services and Human Resources	X		X	
Performance Monitoring and Compliance	X		X	
Regulatory Affairs	X		X	
Board of Directors, Committees and Working Groups	X		X	



Architecture of GridFlorida RTO Operations



Shaded boxes indicate cost items associated primarily with Day 2 Cost operation
 Hatched boxes indicate areas which will incur significant incremental investment at Day 2

RTO System Requirements for Day 1 Operation

- EMS System and Applications
 - State estimator
 - Network/Power flow model
 - Security analysis model
 - SCADA application
 - Simulation and Training Systems
 - Hardware support
 - Annual maintenance
- Map Board
 - EMS link
 - Annual maintenance
- Communication (ICCP Pathways and Frame Relay) and backup systems
- Scheduling and Tagging System
- OASIS (hosted by 3rd party)
 - Compliance with current requirements and OASIS 2A
- Various transmission models (Load Flow, Production Cost, etc...)
- Commercial Operations/Billing and Settlement Software



Incremental RTO System Requirements for Day 2 Operation

- Real-Time Market Engine (includes Operating Reserves and AGC markets)
 - Bidding and publishing system
 - Market clearing engine (MCE)
 - EMS Interface
 - Settlement interface
 - Market database
 - Annual maintenance
- Day Ahead Market Engine
 - Bidding and publishing system
 - Market clearing engine (MCE)
 - EMS Interface
 - Settlement interface
 - Market database
 - Annual maintenance
 - Real-time market interface
 - Reliability assessment
- FTR Market Engine (multi-period)
 - Market database
 - Contingency analysis
 - Bid/post interface
 - Interface to outage schedule and network model
- Enhanced Commercial Operations / Billing and Settlement Systems
- Simulation and Training Systems
 - Market system
- BCC¹ Backup Systems
- Market Monitor (outsourced)

¹BCC - Backup Control Center



RTO Physical Facility Requirements

Day 1

- Main Control Center
 - 97,000 sq. ft.
 - Hardened
 - Redundant backup generators
 - Full telecom redundancy
 - UPS¹ system
- Back up control center (w/EMS)
 - 25,000 sq. ft.
 - Hardened
 - Redundant Backup generators
 - Full telecom redundancy
 - UPS system

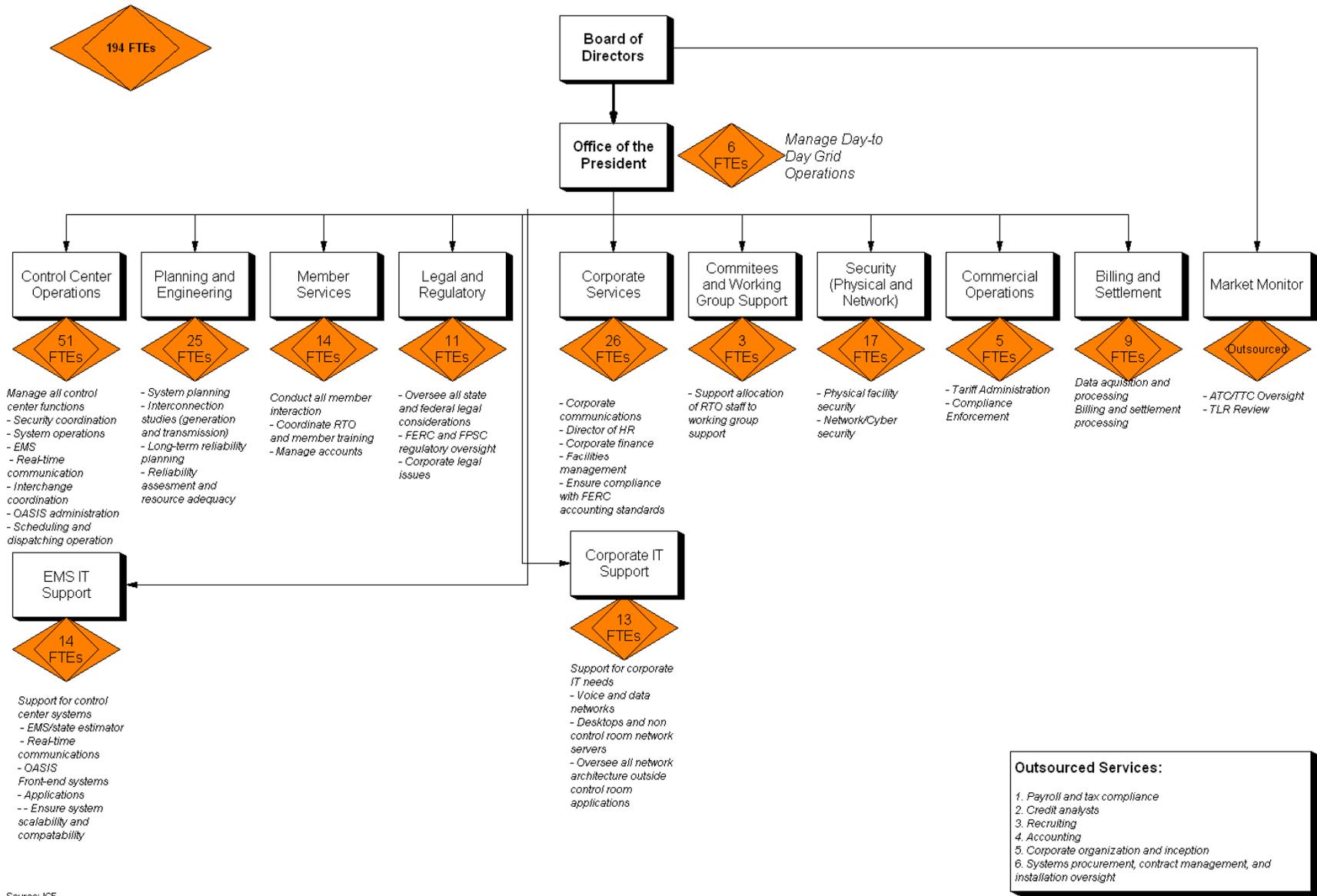
Day 2

- Main Control Center
 - Incremental 42,000 sq. ft.
- Off-site data storage facility or contracted service for market and settlement data

¹ UPS – Uninterruptible Power Supply

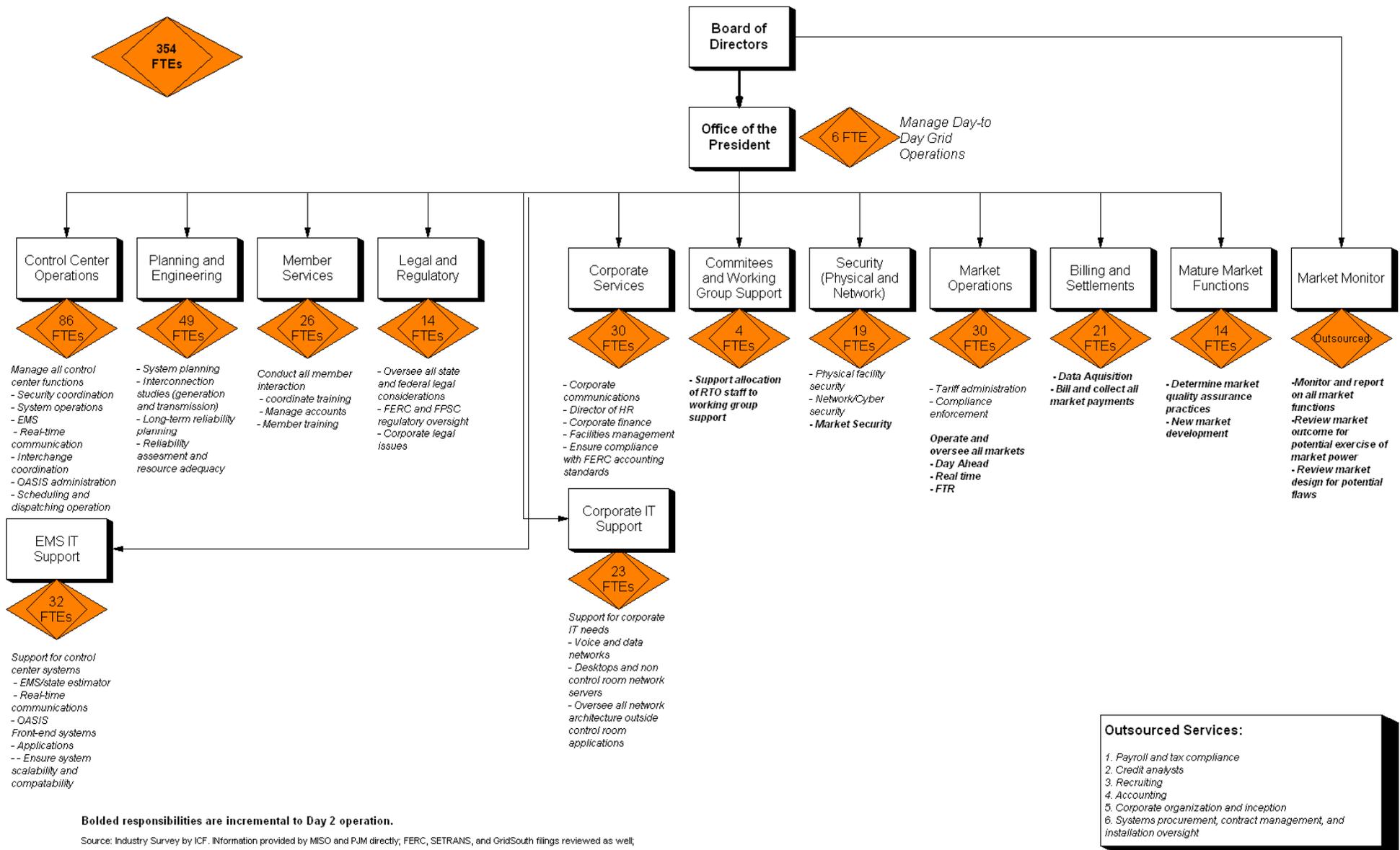


Proposed RTO Organizational Chart and FTE Headcount – Day 1



Source: ICF

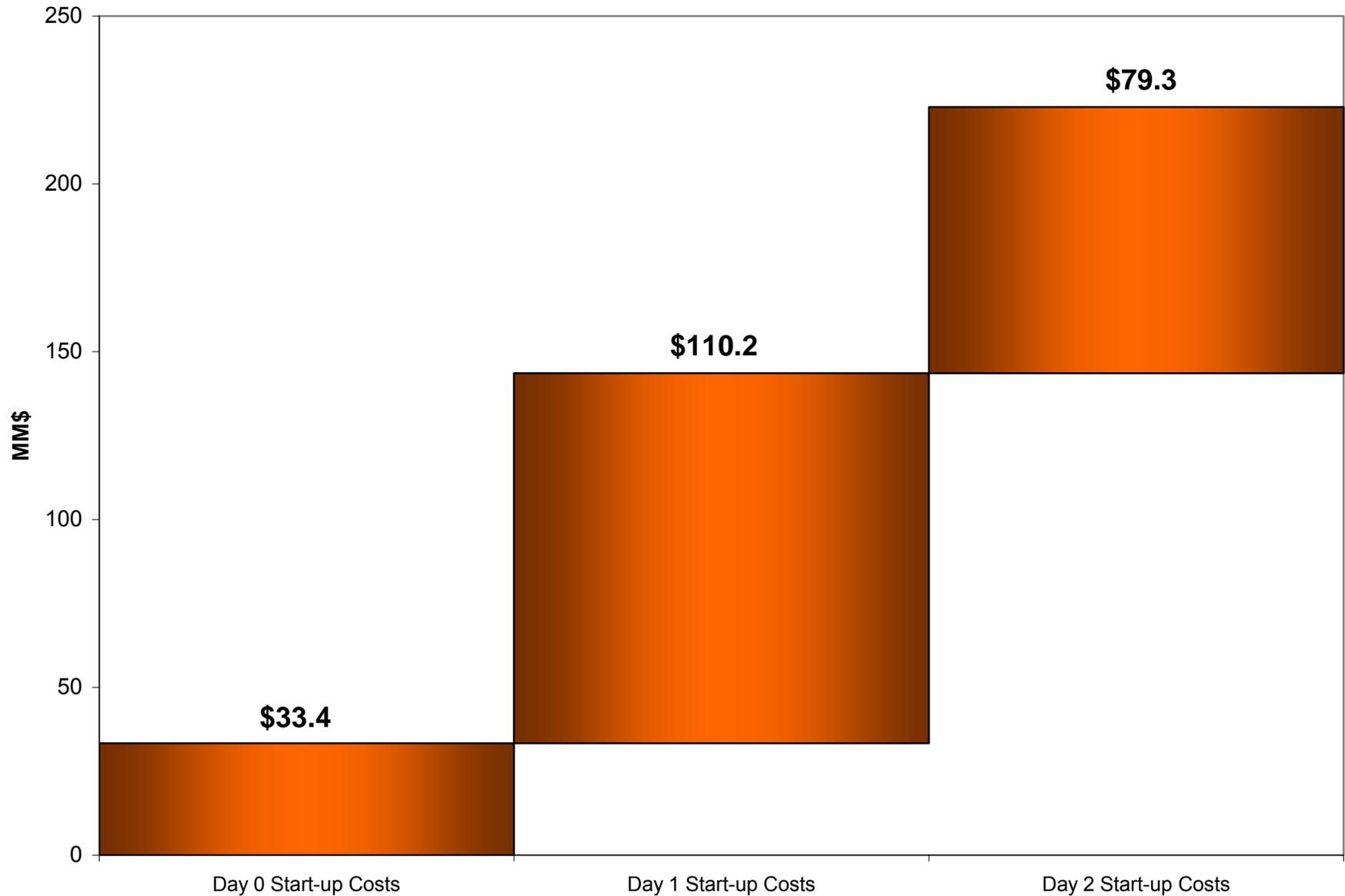
Proposed RTO Organizational Chart and Employee Headcount – Day 2



ICF's RTO Cost Estimates are Detailed in 5 Broad Categories

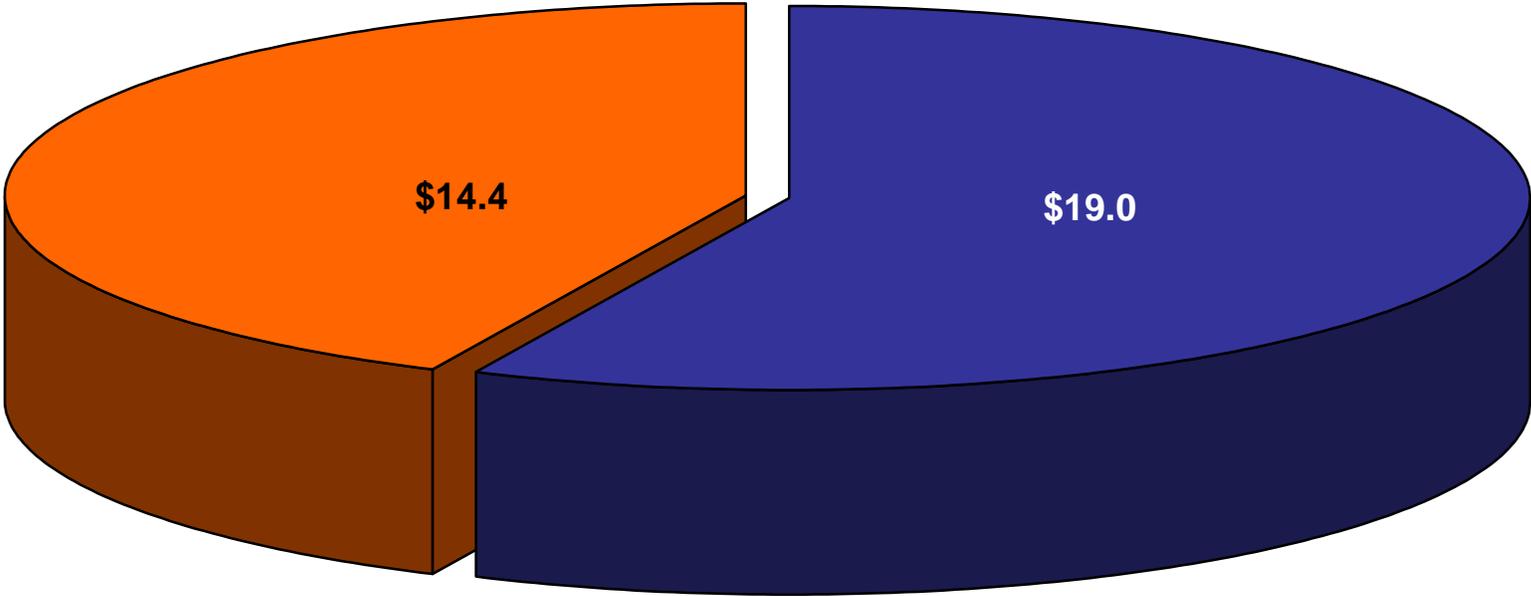
- ICF has developed a detailed “bottom-up” cost estimate of the proposed GridFlorida RTO. Cost estimates were developed with input from vendors and contacts at existing RTOs.
- Costs are divided into 5 broad categories for summary purposes:
 - **Day 0 Startup Costs** – All costs incurred before FPSC decision to proceed with the RTO.
 - **Day 1 Start-up Costs** – Incremental cost estimate to transform the current Peninsular Florida marketplace into full Day 1 Operation.
 - **Day 2 Start-up Costs** –Incremental cost estimate to transform the current Peninsular Florida marketplace from Day 1 operation to a fully market based Day 2 RTO.
 - **Day 1 Operating Costs** – Annual expenses associated with operating a Day 1 RTO.
 - **Day 2 Operating Costs** – Incremental annual expenses associated with a Day 2 RTO.

Estimated GridFlorida RTO Start-up Costs by Category (2004\$)



Day 0 Start-up Costs By Category (2004\$)

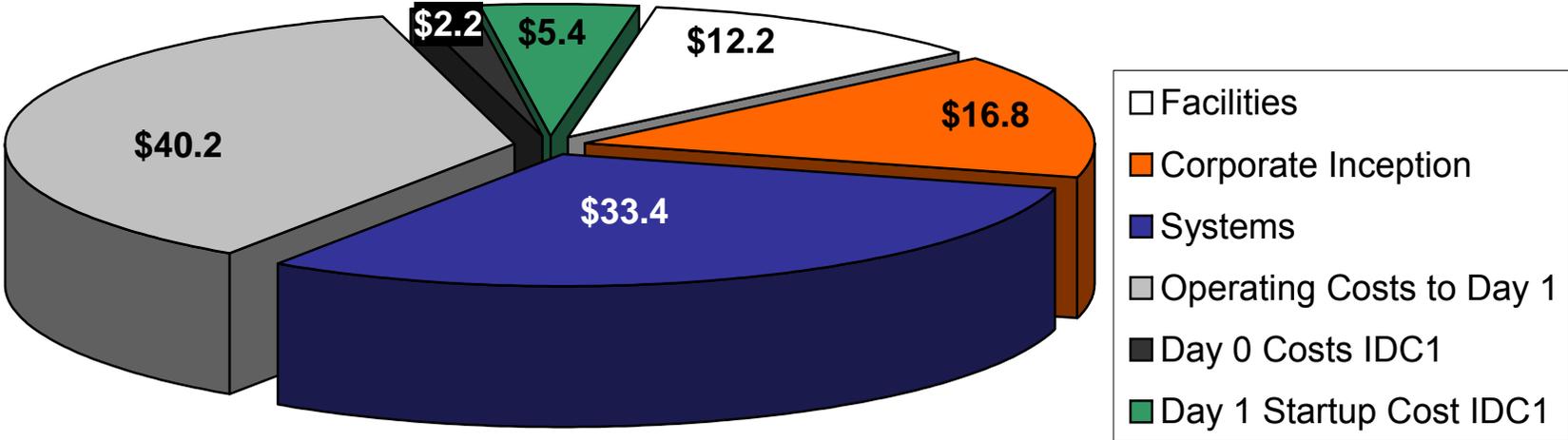
Total = \$33.4 Million



- Costs Incurred Through 12/31/2003
- Estimated Incremental costs to Day 0 (provided by GridFlorida Applicants)

Incremental Day 1 Start-up Costs By Category (2004\$)

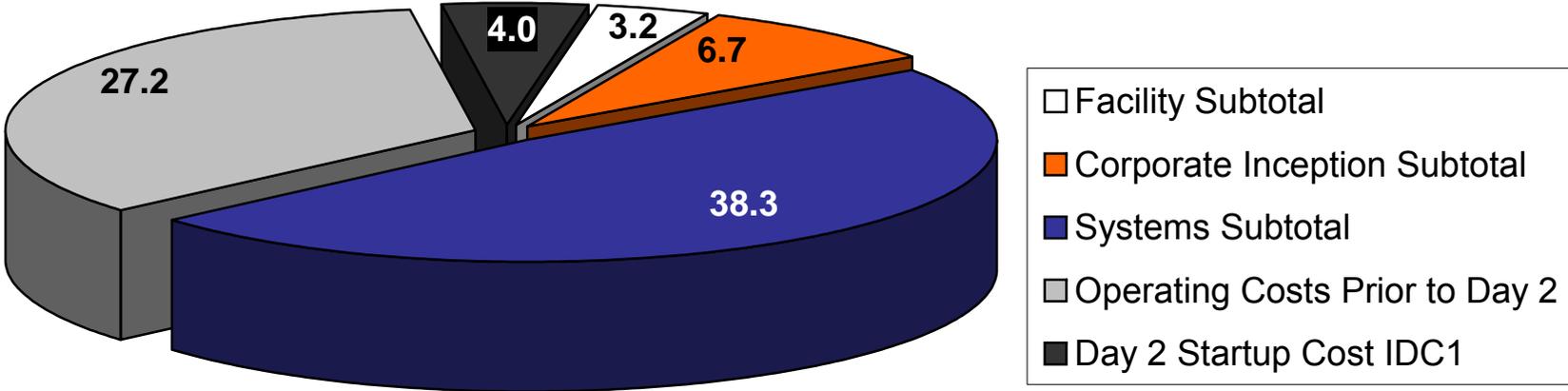
Total = \$110.2 Million



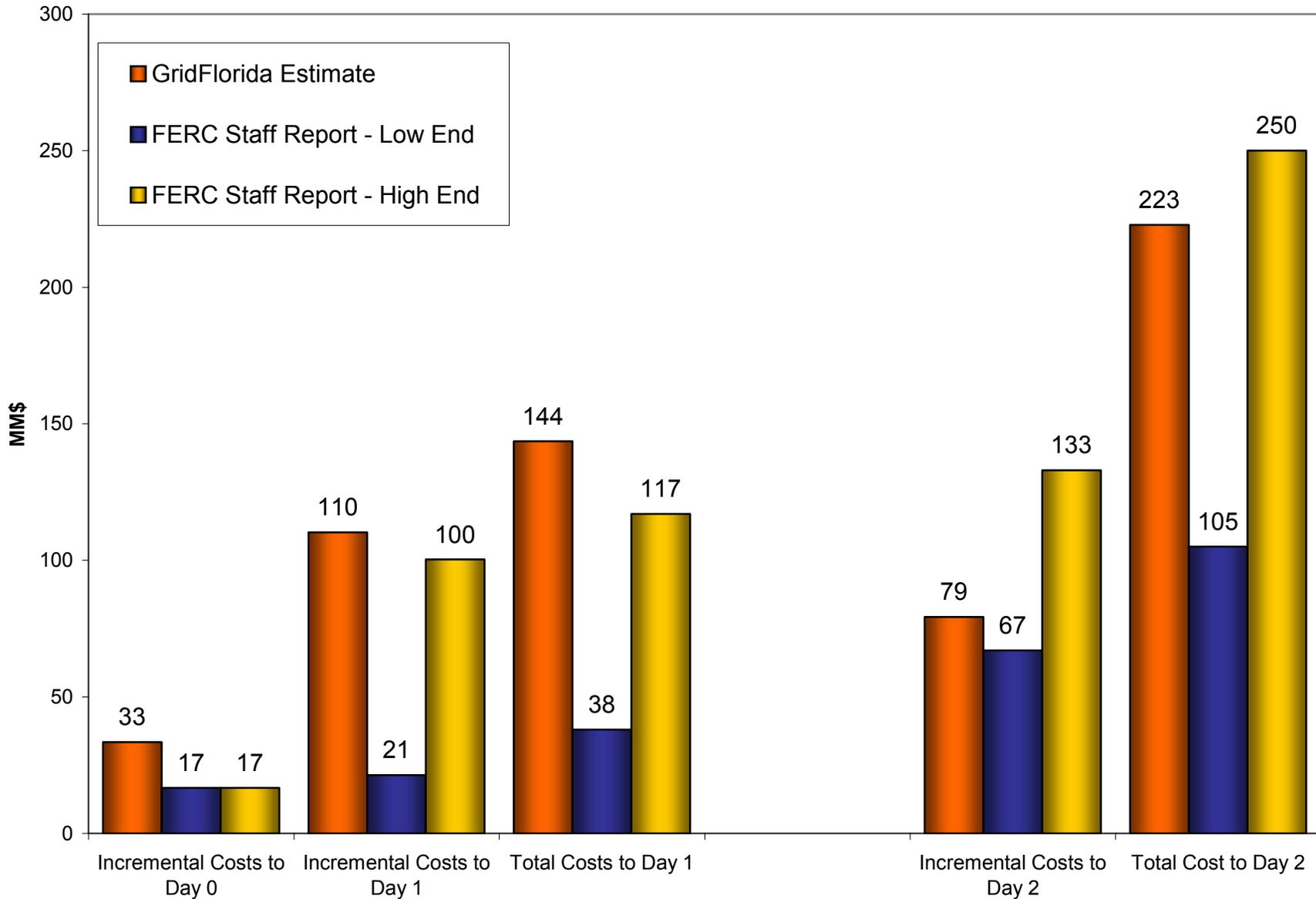
IDC- Interest during Construction

Incremental Day 2 Start-up Costs By Category (2004\$)

Total = \$79.2 Million

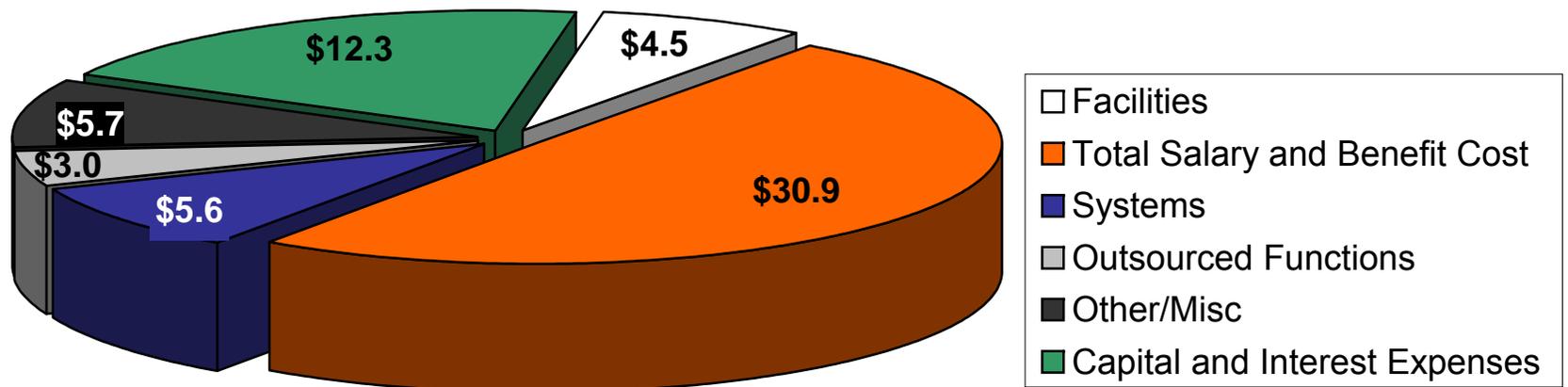


ICF Start-up Costs Estimates vs. the FERC Staff Report



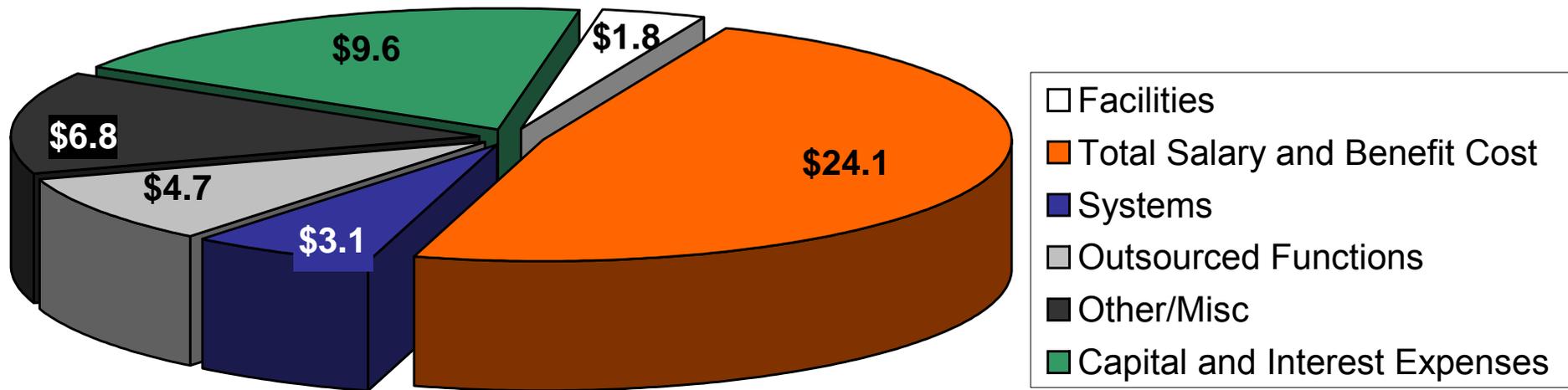
Incremental Day 1 Operating Costs By Category – 2004 (2004\$)

Total = \$61.9 Million

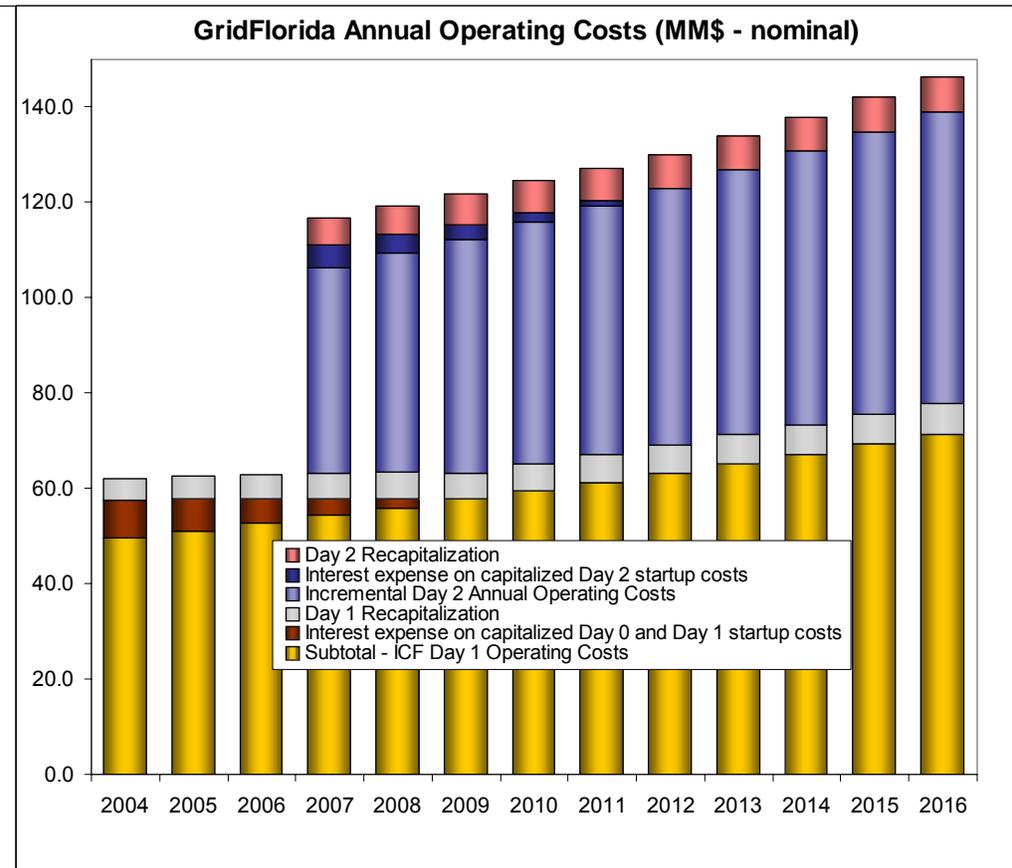
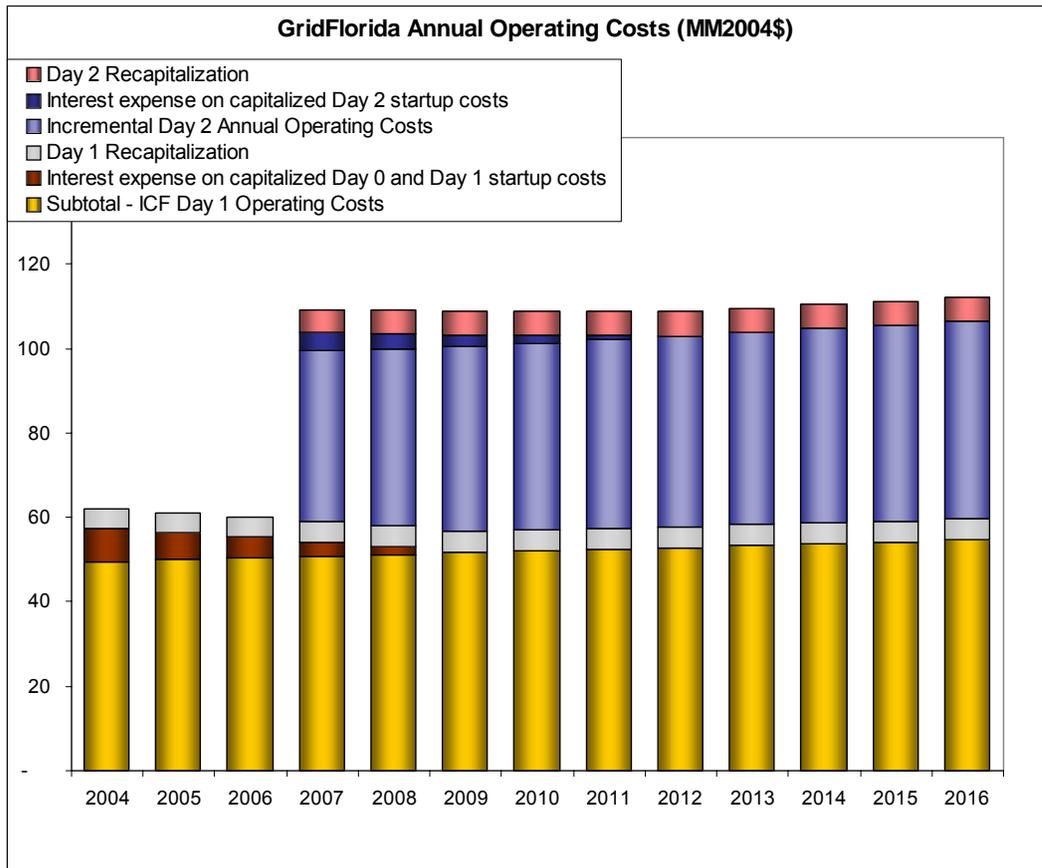


Incremental Day 2 Operating Costs By Category – 2007 (2004\$)

Total = \$49.6 Million

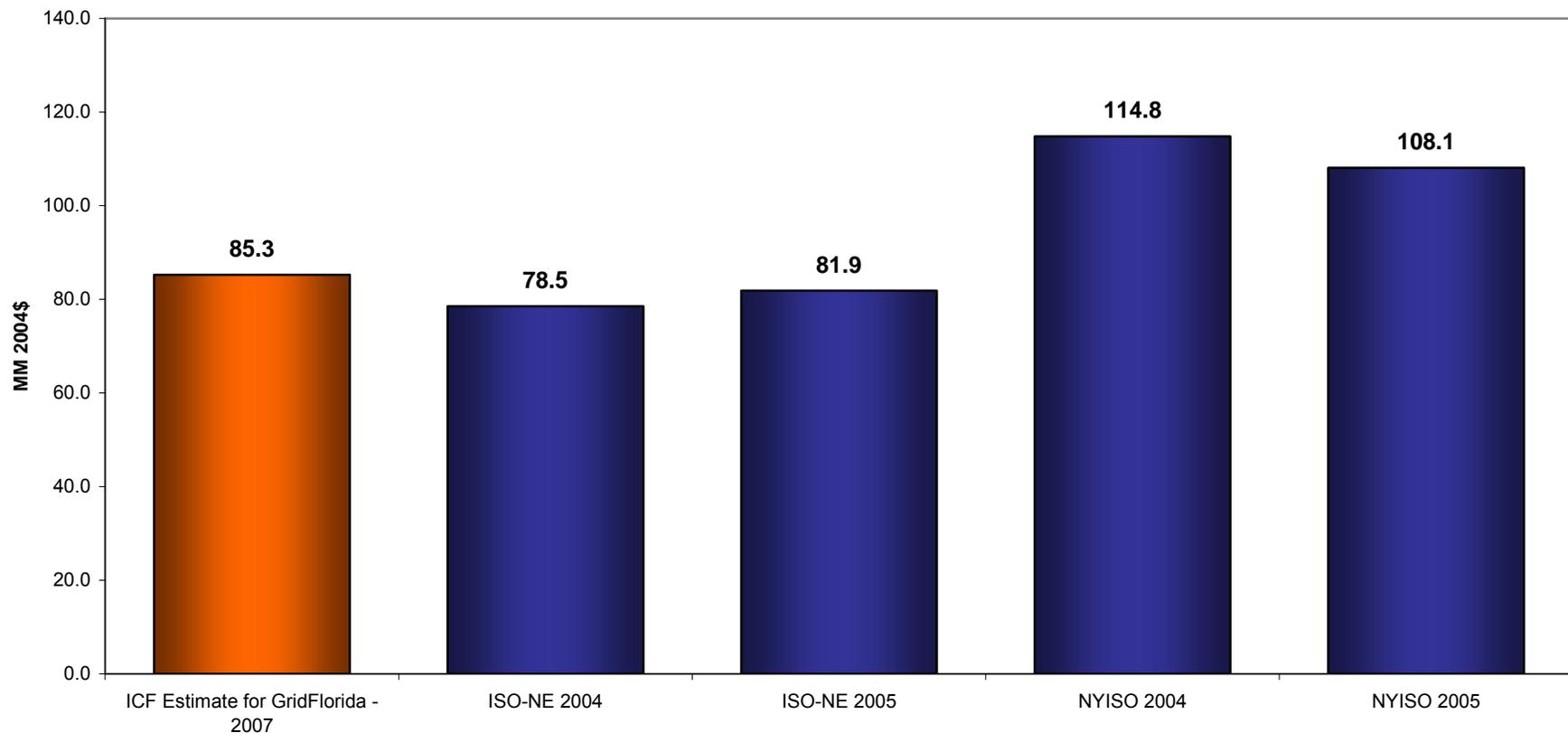


GridFlorida Annual Operating Costs 2004-2016¹



¹Excludes principal repayment of startup costs

Comparison of GridFlorida Day 2 Operating Costs with Existing ISOs



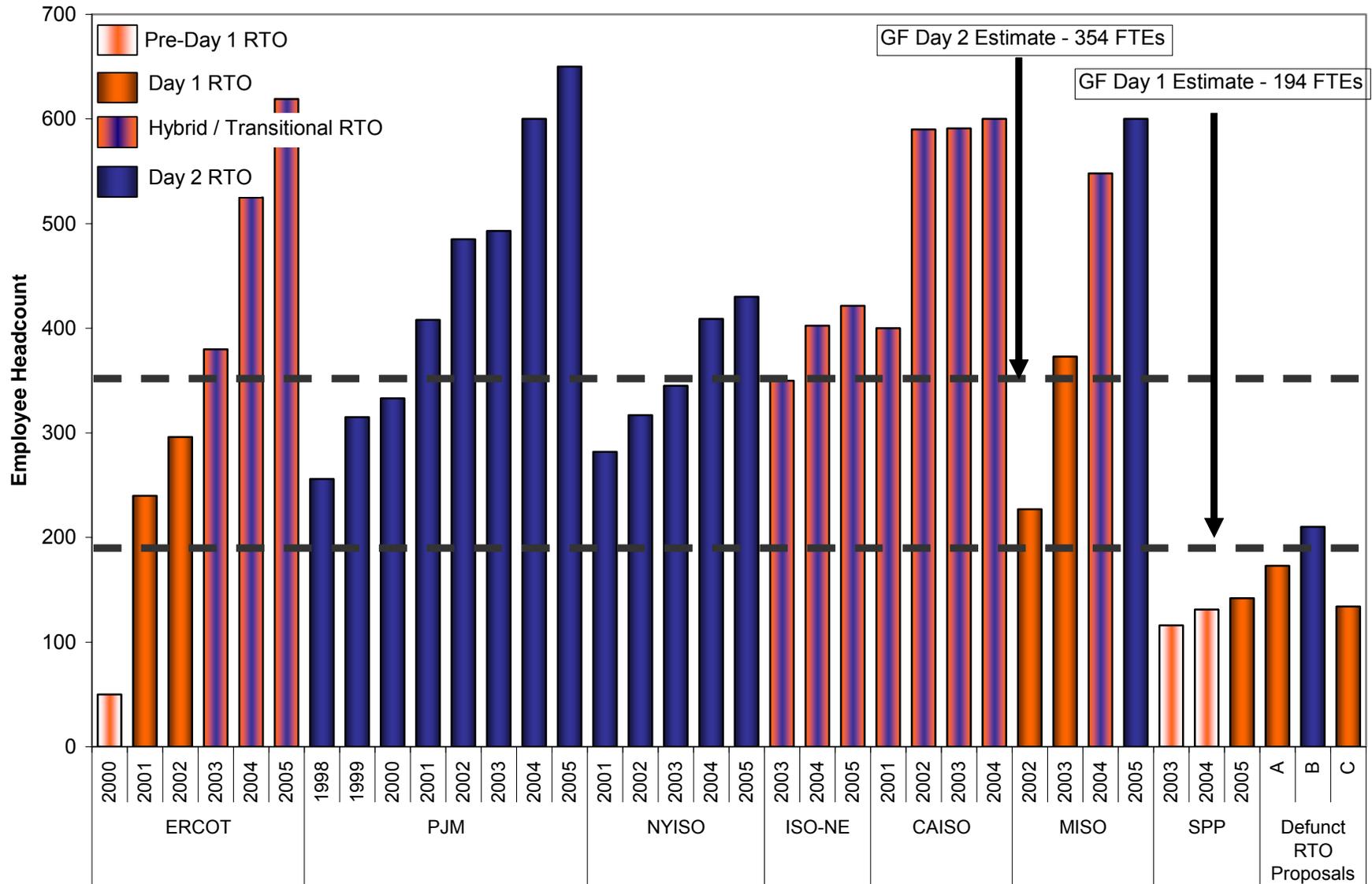
Notes:

All estimates exclude debt service, capital expenses, blackout related expenses (NYISO 2004, and FERC fees)
GridFlorida 2004 total demand – 226 TWh; NYISO 2004 total demand – 160 TWh; ISO-NE 2004 total demand – 131 TWh
GridFlorida 2004 peak demand – 43.0; NYISO 2004 peak demand – 28.4 GW; ISO-NE 2004 peak demand – 23.7 GW

Sources:

GridFlorida – ICF Consulting 4.20.2005
ISO-NE 2004 - http://www.iso-ne.com/committees/budget_and_finance/2004/2004-09-02/2005%20Budget%20Materials%20for%20BF%209-2-04.pdf
ISO-NE 2005 - http://www.iso-ne.com/committees/budget_and_finance/2004/2004-05-13/March%20Forecast%20for%20year%20end%202004.pdf
NYISO 2004 - http://www.nyiso.com/services/documents/groups/mc_budgets_stdnds_perf_sub/09_26_03/ver2_092603_bsp_presentation.pdf
NYISO 2005 - mdex.nyiso.com/publish/Document/49bd70_ffbd1dd2ea_-7f650a03015f?rev=1&action=download&_property=Attachment

Comparison of Grid Florida RTO and Existing ISO and RTO Employee Count



Source: RTO contacts, annual reports, budget proceedings and other publicly available sources.

NYISO FTE Benchmark Adjusted for GridFlorida RTO Functions

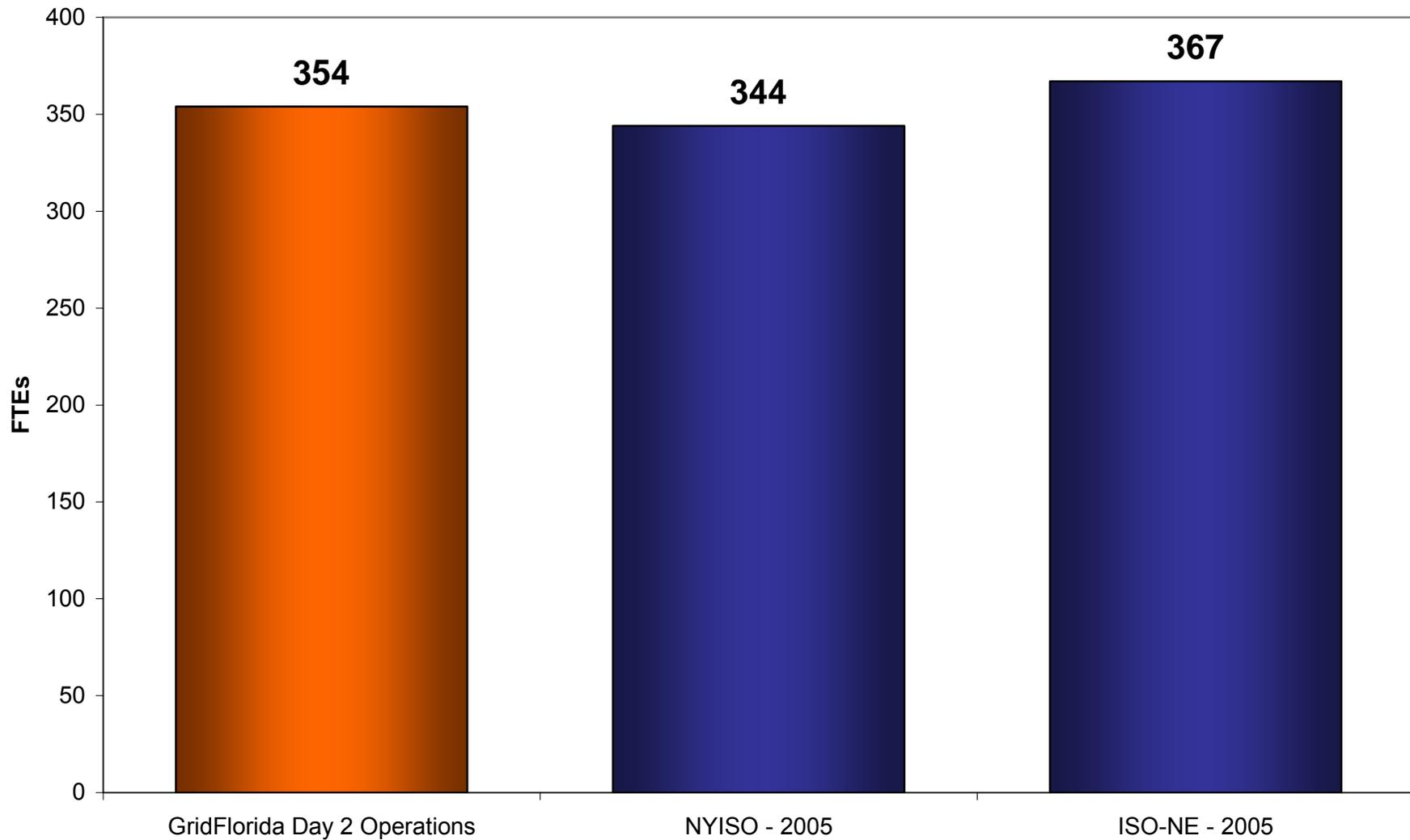
FTE Count	Note	Source
430.0	2005 NYISO FTEs ¹ (includes employees and contractors).	NYISO
(14.0)	Adjustment to account for employees directly tied to ICAP and LICAP market operations.	NYISO
(34.0)	Adjustment to reflect outsourced Market Monitoring function at GridFlorida.	NYISO
(8.0)	Adjustment to reflect minimum savings expected as NYISO combines from four operating locations into 2 (HQ and BCC) in 2007.	NYISO
(6.0)	Adjustment for outsourced payroll/benefits administration and accounting.	NYISO
(9.0)	Adjustment to reflect outsourced training functions.	NYISO
(2.0)	Adjustment for outsourced reproduction services.	ICF
(2.0)	Adjustment to reflect outsourced public relations and marketing functions.	ICF
(3.0)	Adjustment to reflect outsourced auditing functions.	ICF
(5.0)	Adjustment to reflect outsourced credit analysis functions.	ICF
(3.0)	Adjustment for simplified "Seams Monitoring" and participation in the Virtual NE Market development.	ICF
344.0	NYISO Benchmark for GridFlorida Equivalent FTEs	

¹ FTE – Full Time Equivalents

ISO-NE FTE Benchmark Adjusted for GridFlorida RTO Functions

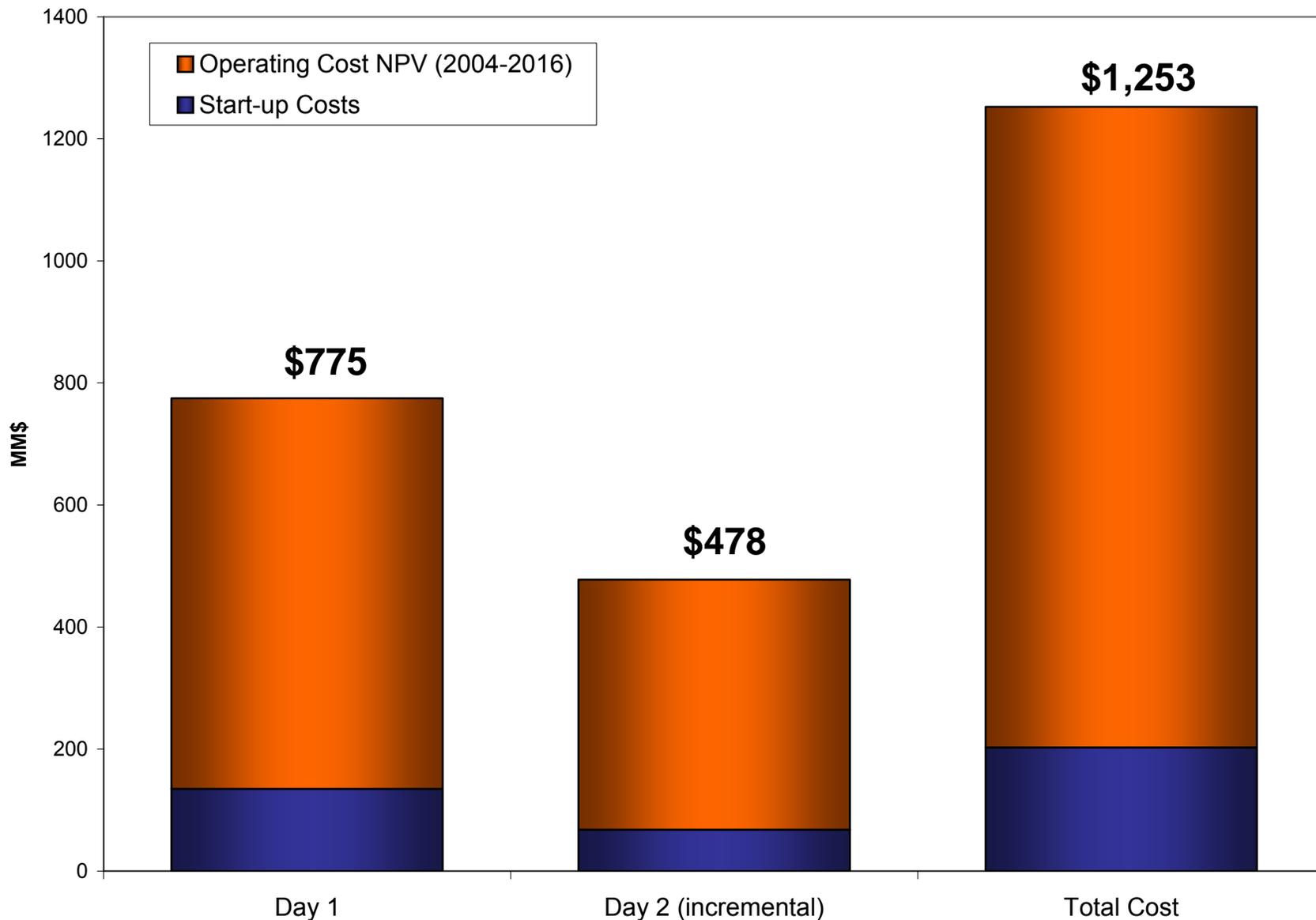
FTE Count	Note	Source
431	ISO-NE 2005 Employee Count.	ISO-NE
(2.5)	Adjustment to convert employees to FTEs.	ISO-NE
(5.5)	Adjustment to account for employees tied directly to ICAP market operations.	ISO-NE
(10.8)	Adjustment to account for employees tied directly to LICAP market operations.	ISO-NE
(13.0)	Adjustment to reflect outsourced Market Monitor function at GridFlorida.	ISO-NE
(6.0)	Adjustment for outsourced payroll/benefits administration and accounting.	ICF Estimate
(9.0)	Adjustment to reflect outsourced training functions.	ISO-NE
(2.0)	Adjustment for outsourced reproduction services.	ICF Estimate
(2.0)	Adjustment to reflect outsourced public relations and marketing functions.	ICF estimate
(3.0)	Adjustment to reflect outsourced auditing functions.	ISO-NE
(5.0)	Adjustment to reflect outsourced credit analysis functions.	ICF estimate
(2.0)	Adjustment for simplified legal requirements related to single state jurisdiction.	ICF / ISO-NE
(3.0)	Adjustment for "simplified" seams monitoring and participation in the "Virtual NE Market" development.	ICF Estimate
367	ISO-NE Benchmark for GridFlorida Equivalent FTEs	

GridFlorida FTE Benchmarks



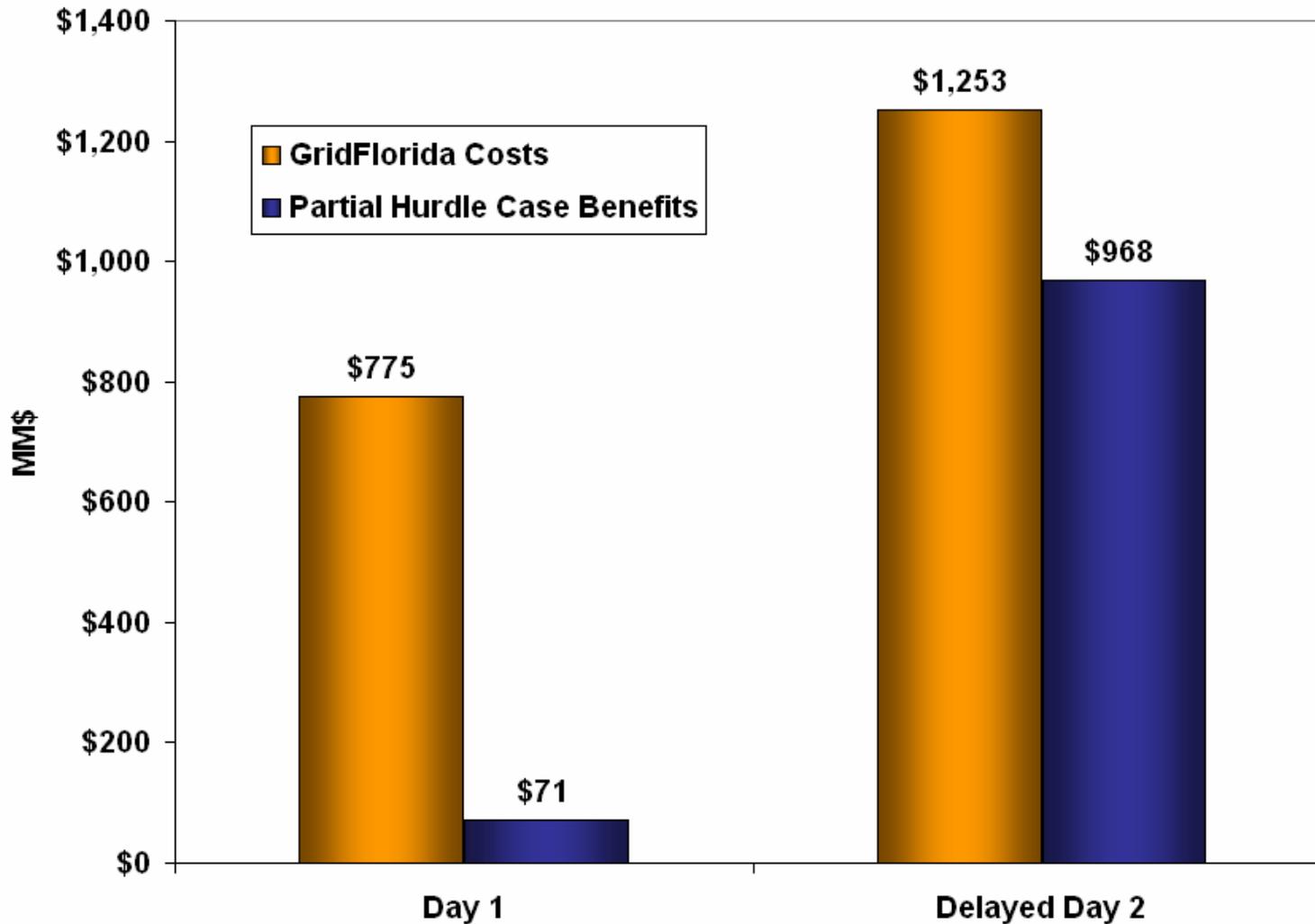
NYISO and ISO-NE FTE counts adjusted for GridFlorida RTO functions

GridFlorida Total Cost Estimates (NPV 2004-2016) (2004\$)



Summary of Quantitative Benefits/Costs

Summary of Benefits and Costs (NPV - 2004\$)



* Includes Day 0 Costs