Infrastructure Master Plan: Project and Financing Summary

DRAFT - For Discussion Only

Richard Dewey, Vice President, Information Technology & CIO,
Mary McGarvey, Vice President & CFO

Budget & Priorities Working Group

October 16, 2009

Background

- The Carman Road, Guilderland Power Control Center (PCC) was built in 1969 to support New York Power Pool operations (40 years old).
- The original and current design of the control room did not contemplate today's complex market and system operations needs, nor can the control room accommodate a number of new requirements …. described as "tipping points" in the following presentation.
  - *Control room technology has not been significantly updated in 40 years.*
- In 2005, the NYISO purchased the Krey Blvd. building to consolidate administrative functions from three (3) leased facilities; power control functions were not addressed at that time
  - *Consolidation of power control functions onto a single campus was identified as a subsequent phase when selecting the Krey Blvd. property*
- Multiple infrastructure repairs and needed upgrades have been identified in recent years, but deferred due to budget constraints and other factors.

Project Urgency

- Several infrastructure deficiencies have been identified for years, but have been deferred; addressing these concerns is overdue.
  - *$25M project was approved as part of the 2009 budget*
  - *Failure to resolve these known facility issues could impact the NYISO's ability to reliably operate the grid and administer the markets.*

- Significant investments are being made in Smart Grid technologies across the industry, but New York's ability to realize these benefits could be gated by necessary enhancements to NYISO existing power control technology.
  - *Evolving policies to improve Situational Awareness could be compromised*

- Evolving regulatory standards and market initiatives **(TIPPING POINTS)** will require expansion to NYISO's existing **control room** operations and technology within the next 1-4 years. This expansion will require additional control room space and new technology.

- Correcting existing infrastructure deficiencies and supporting strategic changes to NYISO's control room technology can be achieved much more economically if accomplished at the same time.

- NYISO currently has a long-term financing opportunity with a finite life and favorable conditions, which may be difficult to replicate within the next several years.

Project Urgency *(continued)*

- Necessary Improvements at Guilderland Facility:
  - Data Center Expansion
  - Asbestos Abatement
  - Emergency Generators
  - Fuel Tank Replacement
  - Temporary Office Removal
  - Control Room Perimeter / Staff Seating
  - Roof Replacement
  - Fire Alarm & Sprinkler Systems
  - Building Mechanical and Electrical Systems (Switchgear, Pumps, Controls)

- Necessary Improvements at East Greenbush Facility:
  - Alternate Power Feed and Switchgear
  - Emergency Generators
  - Generator Fuel Tanks

- See details on these required infrastructure enhancements in the Appendix to this presentation.

Project Urgency *(continued)*

- The NYISO must be prepared to manage the grid in a reliable manner with recognition that a combination of some or all the following requirements will be added in the next 1-4 years.

- Tipping Points – Impending need to accommodate additional control room staff and for new control center technology:
  - *Evolving and more stringent NERC CIP Standards*
  - *Expanded definition of the Bulk Power System (additional NERC Reliability Coordinator Responsibilities)*
  - *Broader Regional Markets (intra-hour transaction scheduling, loop flow and congestion management)*
  - *Situational Awareness Tools (e.g. Phasor Measurement Units, wide-area displays, readiness and availability of alternative supply resources (Demand Response, PHEV, Battery Storage, etc.)*
  - *Management of High Wind Resource Penetration Levels*

Project Urgency *(continued)*

- NYISO's existing Guilderland primary control center is not sufficient to address a combination of some or all these respective tipping points and will require expansion for staff and technology.

- As these tipping points materialize, the NYISO must take action to expand the existing control room and technology. Failure to do so may force NYISO to take emergency actions to preserve reliability.

- Therefore, NYISO explored a variety of options to correct the existing infrastructure deficiencies and simultaneously support strategic changes to NYISO's control room technology, resulting in a more cost-effective long-term solution.

Infrastructure Plan Options Reviewed

Scenario 1: Original 2008 limited expansion of Guilderland facility as approved in 2009 budget. Estimates did not include necessary control room modifications. Option does not meet reliability or expansion criteria.

Scenario 2: Expand the Guilderland facility to house an optimal Primary Control Center and data center. Update the East Greenbush building infrastructure to support greater data center redundancy for power and cooling.

Scenario 3: New building at the East Greenbush site to house a new optimal Primary Control Center. Expand the Guilderland facility to house a new data center, provide additional business continuity office space, and update building infrastructure to support greater data center redundancy for power and cooling.

Scenario 4: New building at alternate site to house an optimal Primary Control Center and data center. Update the East Greenbush building infrastructure to support greater data center redundancy for power and cooling.

Total Project Cost Estimates

	Guilderland Scenario 2	East Greenbush Scenario 3
Construction, Electrical, Mechanical	$29.0M	$27.9M
Control Room, Video Display, Security	$ 4.0M	$ 5.2M
Design Team, CM, Contingencies	$ 8.2M	$ 8.3M
Interim Deliverables (2009)	$ (3.0M)	$(3.0M)
Subtotal Design & Construction	**$38.2M**	**$38.4M**
Facilities Equipment, Infrastructure	$ 0.2M	$ 1.0M
IT Network, Move, Telemetry, AV	$ 4.1M	$ 5.5M
Video Graphics Design	$ 0.7M	$ 0.7M
Security Improvements	$ 0.1M	$ 0.2M
Subtotal IT Infrastructure	**$ 5.1M ***	**$ 7.4M ***
Grand Project Total	**$43.3M**	**$45.8M**
Approx. Guilderland allocation	***$38M***	***$10M***
Approx. East Greenbush allocation	***$5M***	***$36M***

*** - Items traditionally included as part of IT Infrastructure budget.**

Financing Considerations

- Options for long-term financing have been aggressively pursued since 2008, but options remain limited considering current and projected lending climate.

- Current 20-year financing proposal is the result of extensive negotiations with lenders and has a limited window for acceptance (by October 31).
  - *Declining existing financing proposal would likely severely damage NYISO's ability to secure similar funding opportunities in future years*

- Current financing proposal has advantageous terms & conditions, that also are unlikely to be replicated in future financing opportunities:
  - *Term / amortization period (20 years)*
  - *Loan commitment period (almost one year)*
  - *Security / collateral*
  - *Covenants*
  - *Depository requirements*
  - *Fees/interest costs*

- Unrelated to the Infrastructure Master Plan, NYISO must pursue financing and PSC approval for two separate objectives during 2010 (Revolver and Projects Financings).

Project Timeline

- October 2009:
  - *BOD discussion on Infrastructure project & financing proposal (10/19);*
  - *MP vote(s) on 2010 budget and Infrastructure project proposal (10/28);*
  - *BOD conf. call to approve Infrastructure project & financing proposal (10/28 – 10/30);*
  - *NYISO to execute commitment lender (by 10/31)*

- Nov/Dec 2009:
  - *NYISO to draft/submit PSC Section 69 petition for approval;*
  - *NYISO and lenders to begin negotiations on loan document*

- Feb/March 2010:
  - *PSC approval of project financing (projected)*

- June 2010:
  - *Loan closing (projected)*

- *Note: Between October 2009 and June 2010, NYISO's Facilities department will be pursuing municipality approvals, conducting a bidding process for construction managers, and other processes required for loan closing.*

Governance Considerations

- Market Participants have asked NYISO to further quantify the impact of various Infrastructure Master Plan options.
- Market Participants have also asked NYISO to consider reducing the scope and/or phasing in the proposed project.
- See details and RS1 implications for the options considered on the following slides.

Scenario 3 Option

- Summary:
  - *PCC located in East Greenbush*
  - *ACC located in Guilderland*
  - *24-month construction period*

- Cost:
  - *$45.8M estimate (rounded to $50M during budget discussions to date)*
  - *Financed over 20 years (2 years interest only, 18 years principal & interest repayments)*

RS1 Impact	2010	2011	2012	2013	2014	2015-2030	Total Cost	NPV
In $ (millions)	$0.1	$1.6	$3.8	$4.6	$4.6	$71.3	**$86.0**	**$39.9**
In $/MWh	$0.001	$0.010	$0.022	$0.026	$0.026	~$0.026		

Scenario 2 Option

- Summary:
  - *PCC located in Guilderland*
  - *ACC located in East Greenbush*
  - *36-month construction period*

- Cost:
  - *$43.3M estimate*
  - *Financed over 20 years (3 years interest only, 17 years principal & interest repayments)*

RS1 Impact	2010	2011	2012	2013	2014	2015-2030	Total Cost		NPV
In $ (millions)	$0.1	$1.0	$2.1	$3.7	$4.4	$69.4	**$80.7**		**$36.4**
In $/MWh	$0.001	$0.006	$0.012	$0.021	$0.026	~$0.026			

"Phased Approach" Option*

- Summary:
  - *Bifurcates the current Infrastructure Master Plan into two phases.*
  - *Interim $25M phase addresses immediate deficiencies in Guilderland, as follows:*
    - 2010: Fire Alarm & Sprinkler Systems, Asbestos Abatement, Roof Replacement, Emergency Generators, Fuel Tank Replacements = $5M total
    - 2011: Temporary Office Removal, Data Center Expansion, Control Room Perimeter/Staff Seating = $10-$15M total
    - 2012: Building Mechanical and Electrical Systems (Switchgear, Pumps, Controls), KCC Improvements = $5M total
  - *Subsequent second phase requires a renovated and expanded control room (with specific location and source of long-term financing TBD).*

***Some MPs asked the NYISO to evaluate this option.**

"Phased Approach" Option *(continued)*

- Cost:
  - *Total cost for both project phases would now approximate $65M+ rather than $50M (lost economic synergies, inflation, higher future construction costs, etc.).*
  - *Costs for interim phase focusing on Guilderland enhancements could be financed over 20 years using current financing proposal or funded via RS1 within annual budgets for 2010-2012.*
- Risks:
  - *Obtaining financing for second phase is not assured and this would put the NYISO in a significant risk of not being able to fulfill future core reliability obligations (see "Tipping Points" discussion).*

"Phased Approach" Option *(continued)*

- Timeline – Interim Phase:
  - *As outlined on slide 9*

- Timeline – Phase II:
  - *Market Participant discussions: 2009 - 2011*
  - *Obtain long-term financing: 2011*
  - *PSC Section 69 petition: Filed by year-end 2011*
  - *Loan closing: Mid-2012*
  - *Construction period: 2012 through 2014/2015 (depends on project scope / location of PCC)*
  - *Construction complete / begin principal repayments: 2014/2015 (depends on project scope / location of PCC)*

"Phased Approach" Option *(continued)*

Total Borrowing	2010	2011	2012	2013	2014	2015-2033	Total Cost	NPV
With No Financing for Interim Phase:								
$25M Interim Phase: not financed	$5.0	$15.0	$5.0	-	-	-	**$25.0**	
$40M Phase II: 20 Year Fin'g (TBD)	-	-	$0.1	$1.4	$3.3	$70.5	**$75.3**	
$65M Total	**$5.0**	**$15.0**	**$5.1**	**$1.4**	**$3.3**	**$70.5**	**$100.3**	**$51.8**
In $/MWh	**$0.030**	**$0.088**	**$0.030**	**$0.001**	**$0.019**	**~$0.022**		
With 20-Year Financing for Interim Phase:								
$25M Interim Phase: 20 Year Fin'g	$0.1	$0.9	$2.1	$2.5	$2.5	$38.9	**$47.0**	
$40M Phase II: 20 Year Fin'g (TBD)	-	-	$0.1	$1.4	$3.3	$70.5	**$75.3**	
$65M Total	**$0.1**	**$0.9**	**$2.2**	**$3.9**	**$5.8**	**$109.4**	**$122.3**	**$51.9**
In $/MWh	**$0.001**	**$0.005**	**$0.013**	**$0.023**	**$0.033**	**~$0.034**		

Note: For comparative purposes, the Phased Approach assumes that the primary control center is ultimately located in East Greenbush, and that future financing for Phase II would have comparable interest rates to those in the existing financing offer for Phase I.

If future financing for Phase II results in higher interest rates of 100 bps, the total cost would increase from $122.3M to $127.7M and the NPV would increase from $51.9M to $54.2M.

RS1 Impacts – in $ (millions)

Option	Total Project Cost	2010	2011	2012	2013	2014	2015-2033	Total RS1	NPV
"Scenario 3": PCC@Krey, ACC@Carman	$45.8M	$0.1	$1.6	$3.8	$4.6	$4.6	$71.3	**$86.0**	**$39.9**
"Scenario 2": PCC@Carman, ACC@Krey	$43.3M	$0.1	$1.0	$2.1	$3.7	$4.4	$69.4	**$80.7**	**$36.4**
Phased: No Fin'g for Interim Phase	$65M Total	$5.0	$15.0	$5.1	$1.4	$3.3	$70.5	**$100.3**	**$51.8**
Phased: With 20 Yr Fin'g for Interim Phase	$65M Total	$0.1	$0.9	$2.2	$3.9	$5.8	$109.4	**$122.3**	**$51.9**

Total Costs Comparison:
Phased approach *with* long-term financing for both phases adds ~$35-40M to the project cost.

Phased approach *without* long-term financing for the interim phase adds $15-$20M to the proposed project cost, and has significant impacts on RS1 during 2010-2012.

RS1 Impacts – in $/MWh

Option	Total Project Cost	2010	2011	2012	2013	2014	2015-2033
"Scenario 3": PCC@Krey, ACC@Carman	$45.8M	$0.001	$0.010	$0.022	$0.026	$0.026	~$0.026
"Scenario 2": PCC@Carman, ACC@Krey	$43.3M	$0.001	$0.006	$0.012	$0.021	$0.026	~$0.026
Phased: No Fin'g for Interim Phase	$65M Total	$0.030	$0.088	$0.030	$0.001	$0.019	~$0.022
Phased: With 20 Yr Fin'g for Interim Phase	$65M Total	$0.001	$0.005	$0.013	$0.023	$0.033	~$0.034

RS1 Comparison:
Phased approach *with* long-term financing for both phases has the highest impact on RS1 (most years).

Phased approach *without* long-term financing for the interim phase has lowest impact on RS1 for most years, but has significant impacts on RS1 during 2010-2012.

Evaluation of Options

Option	Pros	Cons
Scenario 3	• Addresses immediate deficiencies in Guilderland facility; • Financial synergies from larger project (saves ~$35M from Phased Approach); • Shortest construction period (24 months); • Establishes control room technology to support pending "tipping point" regulatory / market initiatives; • Takes advantage of existing long-term financing offer; • Efficiencies from staff centralized in one location; • Provides business continuity site for potential loss of operations	• Near-term financial commitment
Scenario 2	• Addresses immediate deficiencies in Guilderland facility; • Financial synergies from larger project (saves ~$40M from Phased Approach); • Establishes control room technology to support pending "tipping point" regulatory / market initiatives; •Takes advantage of existing long-term financing offer;	• Longer construction period (36 months); • Operational risk due to multiple control room moves (NYS grid operated from ACC for at least 6 months); • Significant investment in 40-year-old facility; • Does not achieve centralized staff & related efficiencies; • Near-term financial commitment
Phased Approach	• Addresses immediate deficiencies in Guilderland facility; • Reduced near-term financial commitment	• Most costly overall option ($35-$40M higher than other options); • Long-term financing may not exist or may be challenging to secure in future; • Postpones necessary control room technology by an additional ~2 years to 2014-5; • Significant investment in 40-year-old facility •Takes away the NYISO's ability to respond to "tipping point" requirements and market initiatives for the next 4-5 years

Recommendation

- NYISO recommends that Market Participants support Scenario 3, as outlined in this presentation:
  - *Corrects immediate control center reliability needs*
  - *Positions NYISO to manage "tipping point" needs in a reliable manner*
  - *Significantly lower overall cost than if project is bifurcated into multiple phases*
  - *Significantly shorter construction period and risk than Scenario 2, with minimal cost differential,*
  - *Avoids deferring necessary Control Room investment,*
  - *Avoids making significant investment in 40-year-old building,*
  - *Permits efficiencies of centralized staff for Operations and other departments,*
  - *Takes advantage of existing long-term financing offer.*

APPENDIX

Necessary Infrastructure Improvements

Necessary PCC Improvements

- **Data Center Expansion**
  - *Issue: Existing PCC data center does not have adequate size, cooling, overhead room, or under floor air return space to support level of computing redundancy necessary for grid management and market systems.*
  - *Risk: As computing requirements expand (storage, processing power, footprint, etc.), frequency of hardware failures may increase and / or system design options will be limited.*
  - *Alternatives: Reduce level of system redundancy to shrink footprint, risking overall system and data availability.*
  - *Incremental / Relative Cost: $4-5M*

- **Asbestos Abatement**
  - *Issue: Asbestos is present in floor tiles, some plumbing elbows, and spray-on fireproofing above drop ceiling (return air plenum).*
  - *Risk: Environmental / health concern if the material becomes airborne. Maintenance of required systems (fire suppression, electrical, air ducts, etc.) is complicated / limited without abatement.*
  - *Alternatives: Continue to monitor environmental data, enforce rigid maintenance restrictions, and limit building construction options that could increase risk.*
  - *Incremental / Relative Cost: ~$2M*

Necessary PCC Improvements (Cont.)

- **Emergency Generators**
  - *Issue: Emergency generators for the computer room and control center are 30 years old and nearing end of life. Load growth within building now makes these units undersized to support operations in a non-redundant mode (without mitigating actions). Alternate generator for office environment not adequate to sustain all load.*
  - *Risk: Maintenance of legacy units challenging (spare parts / component failure). Long term business continuity difficult to achieve without mitigating measures (reduce building / office load); sufficient redundancy not available in event of generator failure.*
  - *Alternatives: Continue preventative maintenance plan on existing generators, maintain emergency procedures of reducing building load during emergency situations, and limit future load growth within computer room.*
  - *Incremental / Relative Cost: $1-2M*

- **Fuel Tank Replacement**
  - *Issue: Underground single-walled, fiberglass diesel fuel tanks are end of life and require replacement; insurance carrier recommend replacement to reduce risk of leakage and subsequent environmental issue.*
  - *Risk: Tanks may leak resulting in expensive clean-up and potential fines.*
  - *Alternatives: Continue to monitor environmental data and enforce rigid maintenance procedures.*
  - *Incremental / Relative Cost: ~$1M*

Necessary PCC Improvements (Cont.)

- **Temporary Office Removal**
  - *Issue: Temporary structure added on rear of building to accommodate staff expansion during NYISO startup is end of life (occupancy permit expired) and needs to be removed.*
  - *Risk: Potential for non-compliance with town ordinances and subsequent fines.*
  - *Alternatives: Apply for additional extension of occupancy permit. Defer demolition to later date, although cost of project is considerably more cost effective when bundled with other renovations.*
  - *Incremental / Relative Cost: <$1M*

- **Control Room Perimeter / Staff Seating**
  - *Issue: Security best practices recommend that control room access be limited to essential staff. Space and configuration limitations of current PCC require that desks / offices of certain non-essential staff are located within control room.*
  - *Risk: Elevated number of non-essential staff in the control room increases the cost of compliance with NERC CIP standards and increases opportunities for errors which could result in compliance violations and penalties.*
  - *Alternatives: Relocate some Operations staff to alternate site. This will result in additional furniture and office construction costs at the KCC and lead to significant inefficiencies for Operations functions.*
  - *Incremental / Relative Cost: <$1M (highly dependant on overall construction direction)*

Necessary PCC Improvements (Cont.)

- **Roof Replacement**
  - *Issue: Existing roof is end of life and leaking in multiple locations (including over control room). Replacement is required; patching has been occurring for five (5) years.*
  - *Risk: Continued leakage could result in occupancy limitations and / or more costly repairs at a later date.*
  - *Alternatives: Continue inspection and maintenance program and monitor closely.*
  - *Incremental / Relative Cost: <$1M*

- **Fire Alarm & Sprinkler Systems**
  - *Issue: Many components of fire alarm and sprinkler systems are original to building and end of life. Maintenance has been restricted in some areas due to proximity to asbestos.*
  - *Risk: System failure may result due to component failure or inability to properly maintain.*
  - *Alternatives: Continue inspection and maintenance program and monitor closely.*
  - *Incremental / Relative Cost: <$1M*

- **Building Mechanical and Electrical Systems (Switchgear, Pumps, Controls)**
  - *Issue: Many components of electrical and plumbing systems are original to building and end of life.*
  - *Risk: System failure may result due to component failure due to equipment lifecycle.*
  - *Alternatives: Continue inspection and maintenance program and monitor closely.*
  - *Incremental / Relative Cost: $2-3M*

Additional KCC Improvements

- **Alternate Power Feed and Switchgear**
  - *Issue: Current utility configuration limited to single feed from power grid.*
  - *Risk: Commercial power feed subject failure due to single contingency; availability and redundancy design objectives require alternate path.*
  - *Alternatives: Rely more heavily on emergency generators for business continuity.*
  - *Incremental / Relative Cost: $2-4M*

- **Emergency Generators**
  - *Issue: Generators not sized to sustain full building load in a non-redundant mode.*
  - *Risk: Long term business continuity difficult to achieve without mitigating measures (reduce building / office load); sufficient redundancy not available in event of commercial power and generator failure.*
  - *Alternatives: Maintain emergency procedures of reducing building load during emergency situations, and limit future load growth within office structure and computer room.*
  - *Incremental / Relative Cost: $1-2M*

- **Generator Fuel Tanks**
  - *Issue: Generator fuel tanks not sized to sustain long term business continuity event.*
  - *Risk: Loss of commercial power in multi-day scenario would require replenishment of diesel fuel; may not be available depending on nature of emergency.*
  - *Alternatives: Review opportunity to obtain emergency fuel contracts.*
  - *Incremental / Relative Cost: <$1M*