

Infrastructure Master Plan: Project Implementation Update

For Discussion Only

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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
 - *Control room technology has not been significantly updated in 40 years*
- ◆ The NYISO purchase of the Krey Blvd. building in 2005 was primarily driven by consolidation of three (3) leased facilities
 - *The NYISO moved the Alternate Control Center to Krey Blvd. to address security concerns at leased facility and proximity to Carman Road*
- ◆ Multiple infrastructure repairs and needed upgrades have been identified in recent years, but deferred due to budget constraints and other factors
- ◆ Adequacy of facilities and building system infrastructure is an important component of maintaining power system and market reliability

Project Requirements

- ◆ Facility deficiencies related to the data center and emergency generators at Carman Road have been deferred multiple times and work required to enhance them needs to start now.
 - *Failure to resolve these known facility issues could impact the NYISO's ability to reliably operate the grid and administer the markets.*
- ◆ The evolving nature of grid operations in New York is creating additional responsibilities and driving expanded control room space requirements that cannot be met with the present day configuration of the control rooms.
- ◆ Enhanced situational awareness capabilities resulting from Smart Grid investments cannot be fully leveraged for reliability without improvements to the visualization technology within the control rooms.
- ◆ Correcting existing infrastructure deficiencies and developing strategic improvements to NYISO's control room technology can be achieved much more economically if done at the same time.

Recent Project History

- ◆ In 2008, Market Participants approved a 2009 budget that included a \$25M project to address facility deficiencies at Carman Road.
 - *This plan did not address physical space requirements at NYISO's primary or alternate control rooms.*
 - *The project was not started due to the inability to secure financing*
- ◆ In 2009, Market Participants approved a 2010 budget that included a \$46M project to build a new control center at Krey Blvd., and address facility deficiencies at Carman Road.
- ◆ The NYISO reached terms with a consortium of banks to borrow up to \$50M for the necessary improvements.
- ◆ In December 2009, the NYISO filed a petition with the NYS PSC for approval to close on the financing agreement.
 - *The NYS PSC has not acted on the NYISO financing petition; the loan commitment expired on June 30, 2010.*

Project Urgency

- ◆ Actions have been taken to mitigate the facility risks within the Carman Road data center, but the construction lead time and migration timeframe necessitate starting in remediation in 2011
 - Adequacy assessment performed by KEMA supports NYISO decision to initiate construction now to avoid risk of failure and maximize benefits

- ◆ Business process changes for Broader Regional Markets necessitate control room staff expansion in 2011 and DOE project deliverables will provide better situational awareness tools by 2013
 - Current lead time for project is 24 months for Krey Blvd. primary option; 48 months for Carman Road option

- ◆ In addition to providing sufficient space and tools for the primary control center, the NYISO is required to maintain adequate backup control center capabilities
 - Adequacy assessment performed by KEMA indicates that the NYISO backup facilities are adequate for current reliability functions, but will not provide acceptable space or technology to support the NYISO's expanding responsibilities

Data Center Study

- ◆ The NYISO commissioned KEMA to perform a Carman Road Data Center Assessment Study
 - Review the current state of the Data Center at the Carman Road facility
 - Provide recommendations that can be used as an assessment of current adequacy and a roadmap for expansion
 - Identify risks associated with the current facility conditions based on industry best practices
 - Make recommendations regarding any necessary modifications or improvements
- ◆ The study considered a number of factors in assessing adequacy of the Data Center facility
 - Power consumption
 - Space requirements
 - Structural integrity
 - Temperature and environmental controls
 - Planned growth and platform expansion
- ◆ Opportunities for efficiency gains were identified, as applicable

Data Center Study Key Findings

- ◆ The NYISO's data center has delivered good value, but suffers from a number of operational issues
 - Structural weakness of raised floor
 - Computer air conditioning deficiencies
 - Inadequate power supply and distribution
 - Inadequate space for proper cable management
- ◆ None of the deficiencies, considered individually, necessitate replacement of the data center. However, taken in total, construction of a new data center is recommended
- ◆ Carman Road Data Center will remain useful over the next eighteen months, but deficiencies are expected sometime beyond that time
- ◆ KEMA also identified up to \$200K per year in power consumption efficiencies that can be obtained in implementation of a modern design
- ◆ KEMA recommends construction of a new data center. Greater benefit will be realized the sooner this activity is started in terms of realizing operating cost benefits, avoiding the stranded cost of partial solutions, and earlier mitigation of the risks in the existing data center

Control Room Study

- ◆ The NYISO commissioned KEMA to perform a Control Center Needs Assessment Study
 - Review the adequacy of NYISO control centers for accommodating the existing and projected new responsibilities to ensure reliable grid operations and market administration.
 - Make recommendations regarding any necessary modifications or improvements in keeping with industry best practices
- ◆ The study considered additional responsibilities that would need to be accommodated in the near-term within the Control Center infrastructure (“Expanded NYISO Responsibilities”)
 - Implementation of the Broader Regional Markets
 - Incorporation of Smart Grid technologies
 - Incorporation of intermittent, renewable generation resources
 - Compliance with evolving reliability requirements
- ◆ Requirements for adequate back-up facilities were assessed for current requirements and future needs were also addressed

Control Room Study Key Findings

- ◆ The NYISO's control centers accommodate the NYISO's existing responsibilities
- ◆ NYISO must address shortcomings in order to implement the Expanded NYISO Responsibilities
 - Failure to address shortcomings could compromise the NYISO's ability to reliably perform core functions
 - Adequacy of the Krey Blvd Control Center to support operations will lessen over time as the control room staffing increase and functions are added
- ◆ KEMA recommends that the NYISO construct a new Primary Control Center at Krey Blvd. and convert the Carman Road facility into a viable and sustainable Alternate Control Center
- ◆ KEMA recommends that NYISO initiate planning and construction as soon as practicable

Cost Benefit Assessment

- ◆ The NYISO commissioned Energy Initiatives Group (EIG) to perform a cost analysis for the project
 - Compare implementation scenarios and determine lowest cost feasible option, including Net Present Value (NPV)
 - Provide cost benefit analysis and identify project cost payback timeframe for lowest cost implementation scenario
- ◆ EIG identified the Krey Blvd. control center options as the lowest cost approach to satisfy the reliability and business requirements
 - Cost in net present value \$7.7M lower than Carman Road control center scenario
- ◆ Cost benefit analysis demonstrates significant positive return for New York

Project Cost Adjustments

- ◆ The cost estimates for the various implementation options have changed over time for a variety of reasons:
 - Initial cost estimates were based on conceptual designs and preliminary estimates
 - Design activities have continued to progress, and updated numbers have been based on a more complete / accurate design
 - Material costs fluctuate over time; design estimates from builders reflect most up to date costs
 - Assumptions made with respect to project implementation efficiencies have changed due to segmenting project between sites

- ◆ The NYISO is committed to providing Market Participants with the most current project cost expectation, based on the best available information at that time

- ◆ Final project estimates will not be known until construction drawings and related processes are completed (targeted for mid-2011)

Project Cost Comparison

- ◆ The cost estimates for the recommended project have increased since Q4 2009 for the following reasons:
 - Project lifecycle: The current project plan spans 3 years whereas prior project plans occurred over 2 years (requests to slow the project and spread the cost annual impact have lengthened the project timeline)
 - Lost economic synergies: Economic synergies planned for original project design have been lost / reduced due to segmenting project between sites
 - Higher construction / material costs: As anticipated, material costs have increased since 2009
 - Inflation: Inflationary assumptions are included for a longer project timeline
 - Additional Architectural Analyses: Additional scenario analyses for project options and justifications was not included in original project estimates

Krey Blvd. Primary Option

	2011	2012	2013	2014	2015	2016	Total
Carman Road Data Center / Generators	10.9	2.5					13.4
Krey Blvd. Control Room Design	1.2						1.2
Krey Blvd. Construction		17.0	17.3				34.3
Annual Sub-Totals:	12.1	19.5	17.3				\$48.9M

- ◆ Key Points:
 - *Shortest timeframe to mitigate data center risks and to meet control center requirements*
 - *End-state configuration presents greatest efficiencies*

Carman Road Primary Option

	2011	2012	2013	2014	2015	2016	Total
Carman Road Data Center / Generators	10.9	2.5					13.4
Backup Control Room Design	1.2						1.2
Krey Blvd. Backup Control Room		4.0	11.0				15.0
Carman Road Temp. Control Room			3.0				3.0
Primary Control Room Design			1.2				1.2
Carman Road Control Room				12.0	8.5		20.5
End State Office Retrofit						1.0	1.0
Krey. Blvd Business Continuity					0.9		0.9
Annual Sub-Totals:	12.1	6.5	15.2	12.0	9.4	1.0	\$56.2M

◆ Key Points:

- *Interim back-up control center required (lost investment)*
- *Time for data center migration prohibits early control room construction*
- *Control room requirements not met until 2015*

Next Steps

- ◆ Renewed discussions with stakeholders regarding support for NYISO recommendations in Infrastructure Master Plan
- ◆ Continued review with stakeholders of studies to support data center assessment, backup control center adequacy, and cost benefit analysis
- ◆ Incorporation of project costs into budget discussions for 2011 and beyond
- ◆ Stakeholder review and approval of 2011 budget
- ◆ Pursuit of additional project funding opportunities and potential regulatory approval in 2011