Deloitte.

City of Denton

Assessment of Denton Municipal Electric's ("DME") FY 2015 and FY 2016 Energy Management Organization ("EMO") Cost Savings Model

September 11th -12th , 2017

City of Denton – DME EMO Cost Savings Model Assessment

We are pleased to provide the attached presentation with respect to the cost savings assessment services performed in accordance with our statement of work dated July 26, 2017 by Deloitte & Touche LLP, as requested by the City of Denton ("the Owner").

Our services and deliverables are solely for the Owner's benefit, and are not intended to be relied upon by any person or entity other than the Owner. The Owner should not disclose the services or deliverables, or refer to the services or deliverables, except as specifically set forth in the statement of work.

Our services were performed in accordance with the *Statement on Standards for Consulting Services* issued by the American Institute of Certified Public Accountants (AICPA) and did not constitute an engagement to provide audit, compilation, review, or attestation services as described in the pronouncements on professional standards issued by the AICPA, the Public Company Accounting Oversight Board, or other regulatory body and, therefore, we did not express an opinion or any other form of assurance with respect to our services.

We did not provide any legal advice regarding our services, nor did we provide any assurance regarding the outcome of any future audit or regulatory examination or other regulatory action. The responsibility for all legal issues with respect to these matters, such as reviewing all deliverable[s] and work product[s] for any legal implications to the Owner, will be the Owner's. It is further understood that management is responsible for, among other things, identifying and ensuring compliance with laws and regulations applicable to the Owner's activities.

We look forward to continuing to work with you on this engagement. Please do not hesitate to contact Steve Engler directly at 973-602-5206 or sengler@deloitte.com if you need additional information or clarification about any aspect of this presentation.

Agenda

Background

- In 2002, the Texas electric market went through a deregulation process. Beginning in the post-deregulation markets, Denton Municipal Electric ("DME") utilized services from several different energy companies to procure the power needed to meet end-user demand.
- In 2011, DME selected a single counterparty as an outsourced energy management provider to procure and deliver energy between FY 2011 until FY 2014.
- As the initial contract was set to expire, DME contemplated the creation of its own energy management organization to bring the function of power procurement and scheduling in-house.
- A component of the decision to implement the EMO was the expectation of cost savings relative to the alternative of outsourcing the function to a 3rd party.
- As part of this process and when the contract was up for renewal, DME requested a new quote from the same counterparty to extend the current contract through FY 2016.
- On October 1, 2014, DME implemented the Energy Management Organization ("EMO") to manage the utility's electric supply portfolio including all required scheduling, regulatory and settlement activities.
- The reported net savings was budgeted at $2.3 million for FY 2015, the final net savings estimate for the 12-month period was $13.5 million. Similarly, the reported FY 2016 net savings budgeted at $5.24 million was eclipsed by the final net savings and an initial estimate of $12.9 million.
- In order to assess and analyze the reported savings, the City of Denton has engaged D&T to perform a model validation and cost analysis of the EMO Cost Savings Model ("EMO Model") used for the FY 2015 and FY 2016 periods.

DME EMO Cost Savings Analysis

Engagement Objectives

Model validation and savings calculation re-performance

- Gather independently observed inputs
- Assess inputs & spreadsheet implementation
- Execute independent calculations
- Create EMO cost document inventory
- Perform independent EMO cost calculation

Benchmark Cost analysis

- Complete independent analysis of benchmark heat rate quoted as of May 2014
- Perform historical heat rate analysis
- Calculate estimated change in savings under different heat rate assumptions
- Perform ancillary service cost analysis

EMO Cost assessment

- Assess cost data provided by DME EMO
- Consider typical energy and risk management infrastructure requirements

Model validation and savings calculation re-performance

	Oct 2014 – Sept 2015	Oct 2015 – Sept 2016
Benchmark Cost (as calculated by D&T*)	$46,878,558	$40,032,681
Benchmark Cost (as calculated by DME)	$46,888,317	$39,703,505
Difference	**$(9,759)**	**$329,176**
EMO Cost (as calculated by D&T*)	$(33,400,290)	$(26,793,032)
EMO Cost (as calculated by DME)	$(33,419,533)	$(26,838,022)
Difference	**$19,243**	**$44,990**
Savings (as calculated by D&T*)	$13,478,268	$13,239,649
Savings (as calculated by DME)	$13,468,784	$12,865,483
Difference in cost savings	**$9,484**	**$374,166**
DME vs Independent Savings %	**~0%**	**~2.91%**

Contributing factors to the difference include (but are not limited to):

1. July and Sept 2016 loads as reported in the model were different than the source data observed.
2. The Oct 2015 ancillary services input cost was inconsistent with other months in the model.
3. Other differences included auction costs, DAM CRR statements, and DA/RTM ERCOT statements.

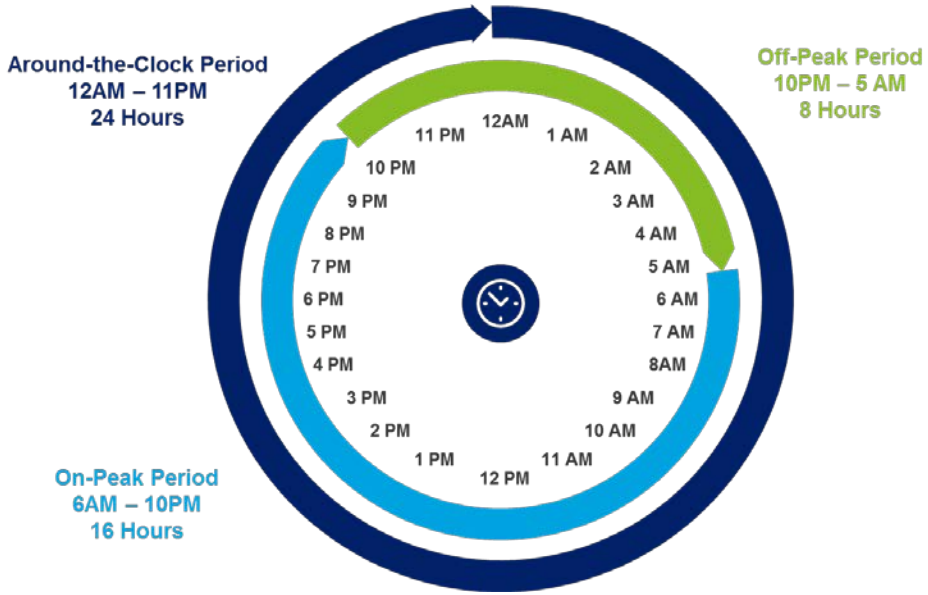
* Note that, for this portion of the engagement, D&T re-performed the Benchmark Cost and EMO cost calculations with the same inputs and assumptions as previously included by DME.

What is a heat rate?

- The factor by which fuel (i.e. natural gas) is converted into electricity.
- It is also a measure of the efficiency of the power plant. This means that the more efficient power plants generate electricity at lower fuel prices. Less efficient, or higher heat rate, power plants produce power at higher fuel prices.
- Heat rates are typically expressed as a ratio of the price of power to the price of natural gas.
- Therefore, a power plant that is generating power at a price of $100 based on a natural gas cost of $10 has a heat rate of 10. Or it takes 10 units of natural gas (MMBtu) to create 1 unit of power (MW).
- When the heat rate is calculated based on a particular area or zone, it is referred to as the implied heat rate.

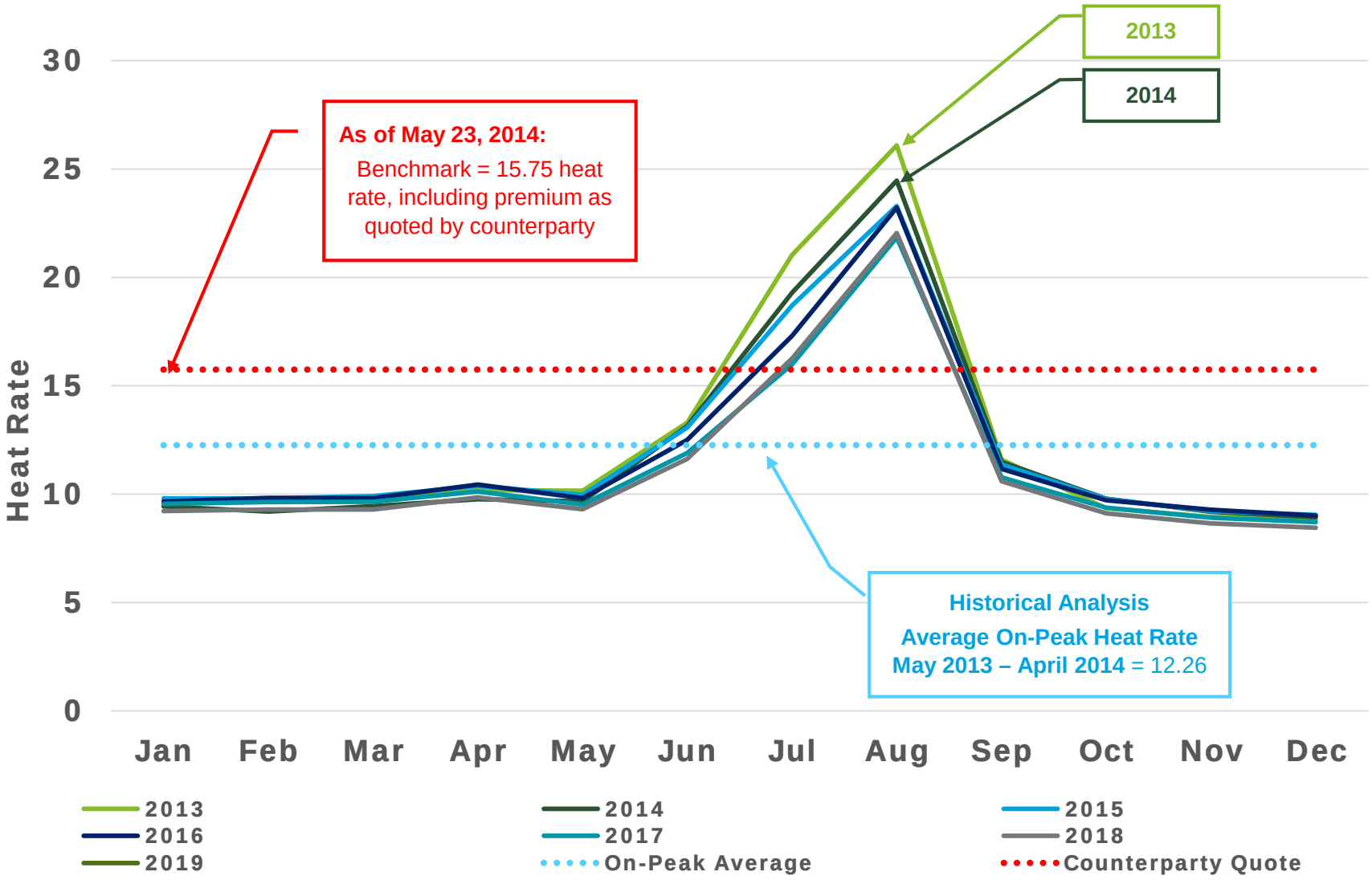
On-peak, off-peak, and around-the-clock power

- The heat rate provided by the counterparty in May 2014 was for an on-peak heat rate for the particular date on which it was provided.
- However, it may not be a reasonable representation for the power to be procured by DME from the counterparty since DME would be procuring around-the-clock ("ATC") power for every hour of the day.
- The original contract was to provide energy based on DME's need for incremental power above what the utility could self-supply on an ATC basis.
- If DME only needed to procure power for hours 6AM to 10PM then an on-peak heat rate would be more appropriate.



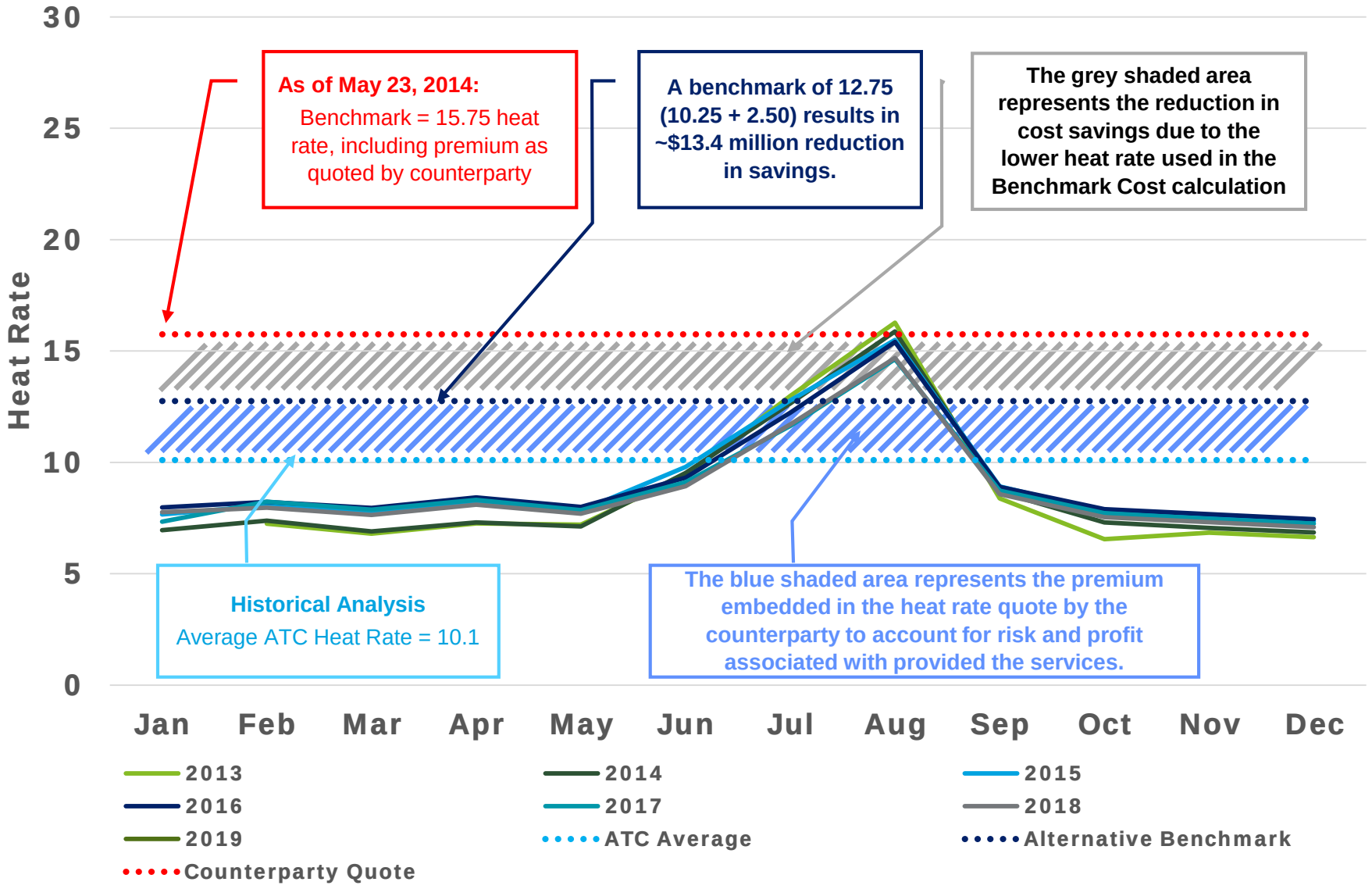
Benchmark Cost analysis

On-peak heat rate analysis



Benchmark Cost analysis

Around-the-clock ("ATC") heat rate analysis



Benchmark Cost analysis

Heat rate analysis

FY 2015					
Heat Rate	**Premium**	**Benchmark**	**Reduction in cost savings**	**Adjusted Cost Savings**	**Budgeted Cost Savings**
13.25	2.5	15.75	N/A	N/A	$2,300,000
12.25	2.5	14.75	($2,449,176)	$11,019,608	
11.75	2.5	14.25	($3,673,763)	$9,795,021	
11.25	2.5	13.75	($4,898,351)	$8,570,433	
10.75	2.5	13.25	($6,122,938)	$7,345,846	
10.25	2.5	12.75	($7,347,526)	$6,121,258	
9.75	2.5	12.25	($8,572,113)	$4,896,671	
9.25	2.5	11.75	($9,796,701)	$3,672,083	

- The Adjusted Cost Savings for FY 2015 is calculated by applying the adjusted heat rate to the Benchmark Cost calculation, then comparing to the Cost Savings calculated by DME ($13,468,784) as presented on slide 5.

FY 2016					
Heat Rate	**Premium**	**Benchmark**	**Reduction in cost savings**	**Adjusted Cost Savings**	**Budgeted Cost Savings**
13.25	2.5	15.75	N/A	N/A	$5,240,000
12.25	2.5	14.75	($2,008,451)	$10,857,032	
11.75	2.5	14.25	($3,012,677)	$9,852,806	
11.25	2.5	13.75	($4,016,902)	$8,848,581	
10.75	2.5	13.25	($5,021,128)	$7,844,355	
10.25	2.5	12.75	($6,025,354)	$6,840,129	
9.75	2.5	12.25	($7,029,579)	$5,835,904	
9.25	2.5	11.75	($8,033,805)	$4,831,678	

- The Adjusted Cost Savings for FY 2016 is calculated by applying the adjusted heat rate to the Benchmark Cost calculation, then comparing to the Cost Savings calculated by DME ($12,865,483) as presented in slide 5.

Benchmark Cost analysis

Ancillary Services and Qualified Scheduling Entity ("QSE") costs

	FY 2015			FY 2016		
	Benchmark	Actual Costs	Cost Savings	Benchmark	Actual Costs	Cost Savings
EMO Costs	$7,977,720	$4,740,205	$3,237,514	$8,199,242	$ 4,701,112	$3,498,130

- Ancillary services are additional costs required to support the generation and delivery of electricity to end-users. Ancillary services are a function of the need to actively manage the generation, distribution and transmission system to ensure safe and reliable delivery of electricity to end-users.
- QSE costs are costs related to interacting with ERCOT and managing the city's electricity needs
- The Benchmark ancillary service cost was $5.25/MWh (FY 2015) with an assumed 5% growth rate to derive the $5.51/MWh (FY 2016).
- The ancillary services and QSE costs calculated based on the counterparty quote is higher than the actual costs incurred by DME by approximately $3 – $3.5 million.
- While there is not a liquid forward market for ancillary services that would allow a similar analysis that was performed for the heat rate quote, this comparison does help identify where a substantial portion of the cost savings comes from.

Benchmark Cost analysis

Summary

	FY 2015	FY2016
Budgeted cost savings	$2,300,000	$5,240,000
DME calculated cost savings	$13,468,784	$12,865,483
Heat rate benchmark adjustment	($7,347,526)	($6,025,354)
Adjusted cost savings	$6,121,258	$6,840,129
Portion of cost savings attributable to heat rate	54.5%	46.8%
Adjusted cost savings	$6,121,258	$6,840,129
Estimated ancillary services (“A/S”) cost savings	$3,237,514	$3,498,130
Portion of ***adjusted*** cost savings attributable to A/S	52.8%	51.1%

- As can be seen above approximately half of the cost savings can be explained by a heat rate benchmark that is not supported by historical analysis.
- As demonstrated on slide 10, the difference in cost savings is significant (reduced by approximately 54% and 47% for FY 2015 and FY 2016 respectively) when changing the heat rate assumption to an around-the-clock heat rate.
- Additionally, when you consider that the ancillary service cost quoted by the counterparty is significantly higher than the actual ancillary service costs reported by DME, approximately 53% and 51% of the remaining cost savings can be explained by the lower actual ancillary service cost.

EMO Cost assessment

For the EMO Cost, D&T reviewed the costs associated with running the EMO and focused on assessing the existence and/or absence of particular elements that are typically present in prevalent utility risk management programs.

Governance & Strategy

- Legislation and regulatory affairs (ERCOT, CFTC, FERC, NERC)
- Risk oversight, senior management oversight, risk culture
- Risk oversight, risk management committee, risk culture
- Quantitative hedge strategy and hedge program design
- Compliance oversight

People

- Middle/Back office support and risk control oversight
- IT and software development support

Process

- Internal audit and/or regular control reviews
- Cost of capital
- Data, software licenses, membership fees

Technology

- Independent MtM, position, and risk reporting
- Value-at-Risk (“VaR”) calculations
- Key Performance Indicators (“KPI”) / Key Risk Indicators (“KRI”)

Engagement Summary

- The model validation and calculation re-performance identified only small differences in the cost savings as reported by DME and re-performed independently by Deloitte & Touche LLP (“D&T”).

- The two main drivers in the cost savings are (1) the heat rate and (2) the ancillary services cost. Both were quoted by the counterparty.

  1. There are two elements of the heat rate that when further analyzed result in a reduction in savings of between $6 and $7 million per year:
     - Using an around-the-clock heat rate vs. an on-peak heat rate
     - Using a thorough historical analysis rather than relying on a single data point
  2. The ancillary services and QSE costs account for more than $3 million per year in cost savings when compared to the actual ancillary services and QSE cost incurred by the EMO.

- D&T reviewed the EMO costs and identified some potential costs that may not have been considered during the creation, implementation and operation of the EMO, including:
  - Governance costs
  - Costs due to potential personnel gaps
  - Data, license, software and systems costs

Recommended Next Steps

Based on D&T's analysis and assessment of the EMO Model, including the Benchmark Cost and the EMO Costs, we recommend the following next steps in order to develop a more complete understanding of the cost savings, the risk that may or may not have been introduced by the EMO, and the EMO's ability to effectively manage the risk.

- ***FY 2017 benchmark analysis***: Consider performing an analysis of alternative benchmark calculations to be used in the cost savings calculation. This should be undertaken prior to the calculation of the estimated FY 2017 cost savings.

- ***Risk profile and hedge strategy assessment:*** Consider quantifying the risk introduced by the decision move from an outsourced energy management model to an in-house management.

- ***EMO risk assessment:*** Consider having an independent assessment of the EMO's current and future capabilities required to support the EMO's mission, energy management and risk management activities.