

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

PJM Interconnection, L.L.C.)	
)	Docket No. ER08-1569-001
)	

**PROTEST OF THE
INDEPENDENT MARKET MONITOR FOR PJM**

Pursuant to Rule 211 of the Commission Rules and Regulations, 18 CFR § 385.211 (2008), Monitoring Analytics, LLC, acting in its capacity as the Independent Market Monitor for PJM¹ (“Market Monitor”), submits this protest of the compliance filing submitted by PJM Interconnection, L.L.C. (“PJM”) in the above-referenced proceeding. The compliance filing goes beyond the simple steps needed for compliance with the Commission’s directive in the order issued November 26, 2008 (“November 26th Order”)² and includes additional revisions that materially deviate from the consensus reached by the stakeholders on the relevant issues in late 2007 in a manner that yields an illogical and unduly discriminatory result. Approval of these proposed additional revisions will undermine PJM’s market power mitigation as it applies to operating

¹ PJM Interconnection, L.L.C., a FERC approved Regional Transmission Organization. *PJM Interconnection, L.L.C.*, 96 FERC ¶61,061 (2001). Capitalized terms used herein and not otherwise defined shall have the meaning specified in the PJM Tariff.

² *PJM Interconnection L.L.C.*, 125 FERC ¶61,244.

parameter limits included in offers submitted by generators which receive operating reserves payments, and the Commission should therefore reject them.

The Market Monitor does not undertake this action lightly. It brought the problem to the attention of PJM staff and requested that they take corrective action, but nothing has come of this effort. The Market Monitor, therefore, requests that the Commission reject those portions of PJM's compliance filing that both exceed the scope of the Commission's direction and fail to adhere to the substance of the Commission's finding on the issue relevant to those provisions. The Commission can determine this on the face of the filing without having to explore the issues raised on the merits. If PJM still wishes to pursue this course, it can develop a new section 205 filing in accordance with its established process.

In the alternative, if the Commission does not reject the controversial aspects of this filing on procedural grounds, then it should reject those provisions based on PJM's failure to justify them. The Commission could do so on the basis of this pleading, but if it prefers, the Market Monitor would welcome an opportunity to explore this issue in greater detail. Should the Commission pursue this course, the Market Monitor recommends that the Commission set this matter for hearing, hold such hearing in abeyance, and appoint a settlement judge to assist in finding a reasonable resolution of this matter.

I. ARGUMENT

A. **The Commission Should Reject Those Portions of the Compliance Filing That Both Violate and Exceed the Scope of the Commission's Directive**

1. *The Commission Should Reject Provisions Not Appropriately Included in This Compliance Filing*

The November 26th Order approved the revisions to the PJM Operating Agreement ("OA"), etc., in this proceeding on the condition (at P 40) that PJM file within 30 days revisions to the OA incorporating paragraphs 65–69 from the rules, which PJM correctly identifies as those rules approved by the PJM Members Committee on November 15, 2007 ("Approved Rules"):

While AEP objects to the subjectivity of some of the requirements, the existing just and reasonable tariff provisions, as AEP itself recognizes, provide PJM with the ability to assess the data provided by companies, and we find that PJM, as an independent market administrator, needs to be able to exercise reasonable discretion in reviewing the appropriateness of information provided to it. Issues as to PJM's specific determinations are outside the scope of the tariff provisions at issue in this filing; in the event that AEP is unable to resolve these issues with PJM, it can bring such issues before the Commission for resolution. AEP specifically requests that PJM post the criteria for determining whether a unit is being utilized for reliability or transmission. PJM, citing Operating Reserve Construct business rules 65 through 69, states that it already has done so. AEP requests that PJM conduct a review of the impact of BORCA on the market and system operations within three months of implementation. PJM, citing Operating Reserve Construct business rule 71, states that it already has committed to do so. While PJM's business rules already respond to the concerns raised by AEP, we believe these criteria bear upon the administration of the PJM OATT because they provide a basis for how these resources will be used in the day-ahead and real-time markets. Therefore, as a condition to our acceptance of this filing, PJM must

file within 30 days to revise its tariff to include these business rules in its tariff.

Rules 65–69 relate to the “basis for how these resources will be used in the day-ahead and real-time markets,” and are entirely incorporated, with modification, in the proposed revised Section 3.2.3(b) of the OA. The Market Monitor does not protest any aspect of the proposed revisions to Section 3.2.3(b), which entirely meet the condition imposed by the Commission in its November 26th Order. Rule 71 states that the Reserves Market Working Group will reconvene three months after implementation to conduct a review of the impact on market and system operations. Similarly, the Market Monitor does not protest inclusion of this rule, agreed upon by the Members Committee, along with the other rules, on November 15, 2007.

However, PJM also unilaterally included as part of this compliance filing revisions to the rules governing Parameter Limited Schedules. These rules were put in place to limit the exercise of market power by withholding through the use of restrictive operating parameters in order to increase operating reserve payments to generating units. The rules also provide for specific methods to support exceptions to the defined parameter limited schedules. The revisions to these rules filed by PJM would significantly weaken the standards for supporting such exceptions.

The rules governing exceptions to the parameter limited schedules (paragraph 23) provide that all generation suppliers may seek exceptions to the defined parameters based on “physical operational limitations.” .

The rules governing exceptions to the parameter limited schedules, in addition, explicitly and consciously treat different unit types in different ways as a result of their actual operational characteristics and capabilities. The rules treat steam units differently from combined cycle units and from combustion turbine units. Paragraphs 29 and 30 allow steam units, typically baseload units powered by coal or oil, to support a request for an exception to the operational limits in the default parameter matrix using historical offer data from a specific year (2006) that preceded discussion of parameter limits, rather than historical operating data.

The Market Monitor accepted this because the historical data show that steam units do not generally pose a high level of risk for exercising market power to increase operating reserve payments using modification of offer parameters. Such units are generally 40 to 50 years old with correspondingly lengthy operational histories, such units generally have stable operating parameters over time, such units tend to be somewhat unique, such units do not cycle on and off frequently and such units do not have the physical flexibility to modify their operating parameters in order to affect their operating reserve payments.

Paragraph 31 of the Approved Rules provides specific and detailed procedures that permit combined-cycle units to use 2006 offer data, but the rules are substantially more restrictive than those applying to the steam units. In addition, the rules are carefully structured so as to prevent the use of parameters submitted for the purposes of exercising market power by increasing operating reserves payments. Combined cycle units are relatively new and are based on similar technology across units.

Paragraph 23 of the Approved Rules covers all units, including combustion turbines (CTs) and requires that generation suppliers “must supply the required historical unit operating data in support of the exception.” This is the default rule for all generators unless there is an exception (i.e., paras. 29–30). There is no exemption for CTs because it was the explicit and conscious intention of the drafters that paragraph 23 apply to CTs.

In its compliance filing, PJM simply ignored paragraph 23 and instead proposed to treat CTs like steam units. In addition, PJM proposed to eliminate the use of 2006 data and to permit the use of offer data from the prior data, while ignoring the reasons for reliance on 2006 data and the ongoing ability of any unit to submit an exception request based on physical operational limitations..

It should be understood that there is no reason why the default rule in paragraph 23 could not apply equally to all types of units, and it would better protect the integrity

of the markets if the rules accorded the same level of scrutiny to all units rather than to extend the approach allowed for steam units to all units. Consequently, it is important that this compliance filing not become a vehicle to undermine the protections against market power secured through the stakeholder process without according these rules reasoned consideration.

The purpose of rules in differentiating the treatment afforded to different classes of units is to afford more flexibility for the steam units whose characteristics raise less concern about their potential to exercise market power. Although it was not the Market Monitor's preferred position, in a spirit of compromise and due to the broad acceptance by stakeholders of provisions that would restrain the unit types most likely to be used to exercise market power to increase operating reserve payments, the Market Monitor did not oppose provisions allow steam units to make limited use of market offers in verifying the scheduling limitations included in their offers.

In its order the Commission discusses Rules 29 and 31, agreeing with PJM that these rules address AEP's concern that PJM "[a]llow the use of historical operating data as a clear indicator of reasonable operating parameters to be used in the future" (emphasis added). PJM claimed correctly that these rules "already permit[] the use of historic data," and the Commission found (at P 39) that PJM had thereby "addressed AEP's protests." PJM, however, pointed to the wrong provisions in its rules. Paragraph 23 and paragraph 27 establish the obligation (not option) to provide historical operating

data. Paragraphs 29–31, the paragraphs cited by PJM, provide exceptions for certain units to use less reliable historical offer data.

In contrast to the rules it addressed separately in the following paragraph, the Commission did not order PJM to incorporate any of these rules, or any other rules, into the OA. The Commission apparently relied on PJM's affirmation that historical operating data was acceptable and its incorrect citation to the Approved Rules. Ironically, however, in electing to file revisions on compliance to these rules concerning which the Commission required no action, PJM actually creates the problem that the Commission was asked to fix, e.g. an over-reliance on subjective data. As explained in more detail below, the compliance filing materially changes the rules in the course of filing them. The result is an inappropriate weakening of the rules governing the potential exercise of market power via a reduction in reliance on objective historical operating data and an increase in reliance on inherently subjective offer data.

There is no dispute that PJM has changed paragraph 29 of the Approved Rules in the course of incorporating it into the OA. PJM explains its course of action as follows:

PJM has also incorporated into Section 6.6 of Schedule 1, not only the substance of Operating Reserve Construct business rules 29, 30 and 31, but PJM has also drafted the revision to allow for the use of historical offer data for units other than steam units and combined cycle units, which are the only types of units that are specifically referenced in business rules 29 through 31. PJM understands that this is a compliance filing that is to address the issues specifically incorporated into PJM's Tariff. However, making this additional proposed revision is its Operating Agreement is consistent with the purpose and intent of the

November 26th Order's requirement that PJM incorporate business rules allowing historical offer data to be utilized by generators.

Furthermore, PJM believes that to incorporate into its Operating Agreement provisions allowing for the use of historical offer data for steam units and combined cycle units, but not for other units, would be illogical and would lead to unfair treatment of units that are other than combined cycle or steam units.³

PJM admits that the November 26th Order did not require it to file to incorporate rules 29–30 into the OA; it admits that it has unilaterally changed those rules in the proposed revisions; it then explains that it did so in order to treat all units the same, contrary to the explicit design of these rules to provide more flexible rules for steam units based on an analysis of steam unit behavior and operating characteristics. PJM claims that the Commission should accept this change because of PJM's mistaken reference to the Commission's requirement that PJM incorporate rules allowing subjective historical offer data when the Commission has actually ruled in favor of PJM's claims that the rules should apply objective historical operating data. PJM justified this approach on the grounds that this alleged inequity requires immediate relief and that "forcing" it to go through the stakeholder process would result in a six-month delay.⁴

³ PJM transmittal letter for compliance filing in ER08-1569-000, filed December 24, 2008.

⁴ *Id.*

Thus, the compliance filing ignores both the scope and substance of the Commission's directive. This violates long-standing Commission precedent holding "that compliance filings must be limited to the specific directives ordered by the Commission."⁵ The Commission has rejected portions of compliance filings that fail to adhere to this requirement.⁶ The Commission should reject the revisions proposed here to Section 6.6(c) as beyond the scope of the compliance filing directed in the November 26th Order, while accepting the revisions properly proposed for Section 3.2.3(b) of the OA.

2. The Commission Should Reject Those Portions of the Compliance Filing That Violate the Commission's Directive

If the Commission determines that it did intend PJM to file rules 29–31, it should require PJM to file them in the form approved by the Members Committee. This would not only bring the filing with the scope of a proper compliance filing, it would restore the basis on which the Commission approved the provision. To accept this filing, the Commission would need to revisit the issue raised by AEP on the merits. Of course, nothing would be gained from this because the Commission has decided the issue correctly.

⁵ See, e.g., *Xcel Energy Services*, 125 FERC ¶ 61,284, at P 5 (2008), citing *Pacific Gas and Electric Company*, 109 FERC ¶61,336, at P 5 (2004); *Midwest Independent Transmission System Operator, Inc.*, 99 FERC ¶61,302, at 62,264 (2002); *ISO New England, Inc.*, 91 FERC ¶ 61,016, at 61,060 (2000); *Sierra Pacific Power Company*, 80 FERC ¶61,376, at 62,271 (1997); *Delmarva Power & Light Company*, 63 FERC ¶61,321, at 63,160 (1993).

⁶ *Id.*

B. If the Commission Does Not Reject the Offending Portions of the Compliance Filing as Beyond the Proper Scope of a Compliance Filing, the Commission Should Reject the Changes to Section 6.6(c) on the Merits

1. The Origin of the Rule Requiring Historical Operating Data for CTs

Withholding is a well understood method for exercising market power. The Market Monitor is often concerned with attempting to detect and prevent economic withholding, where an entity withholds its output by pricing it out-of-market while appearing to make it available. Operating parameters, on the other hand, involve physical withholding, on the basis of claimed limitations on how a unit should be dispatched.

One way in which a market participant can withhold supply is to place unreasonable or unjustified limitations on how strategically situated units operate. An owner can attempt to increase operating reserve credits by setting artificial limitations on its operating parameters, including turn-down ratios, minimum down time, minimum run time, maximum daily starts and maximum weekly starts.

A parameter limitation may force PJM dispatch to continue to use a unit for operating reserves that it could release if the parameters that govern operation of the unit conformed to its true operational characteristics. The primary data on which the Market Monitor prefers to rely in order to make this determination of an acceptable operational limit are actual operational data. Actual operational data show how the owner of a particular unit actually operated such unit when it was subject to its owner's

operational discretion and there were no ulterior motives for unduly restricting its operations.

Abusive behavior is not easy to detect, as it requires close scrutiny of the data by analysts with appropriate expertise to determine whether limitations on a unit are bona fide. The use of operating parameters as a method of exercising market power to increase operating reserve payments has long been a concern of the Market Monitor. In the course of its review of PJM market data concerning the concentration of operating reserve payments among a relatively small number of units/owners, the Market Monitor determined that inflexible operating parameters were a significant contributor to the highly concentrated payments of operating reserves credits to a small number of units.⁷ At the urging of the Market Monitor, PJM and its stakeholders began to discuss the issue. The Market Monitor explained its concerns and the data constituting the basis for those concerns in a number of presentations to the Reserve Market Working Group (“RMWG”), which was tasked to consider the issue and find a solution. One such presentation, presented by the Market Monitor to the RPWG on November 16, 2005, is provided as an attachment.

⁷ See the 2007 *State of the Market Report*, Volume II, (section 3), Energy Market, Part 2, “Operating Reserve”, 2006 *State of the Market Report*, Volume II, (section 3), Energy Market, Part 2, “Operating Reserve”, 2005 *State of the Market Report*, (section 3), Energy Market, Part 2 “Operating Reserves”, 2004 *State of the Market Report*, (section 2), Energy Market, “Operating Reserves”, 2003 *State of the Market Report*, (section 2), Energy Market, “Operating Reserve Payments”.

Over the course of the years devoted to consideration of this issue, the RMWG developed the Approved Rules, including the provisions at issue here, in order to have objective and easily applied means for deterring the use of operating parameter limitations to physically withhold output. These rules also had a secondary objective of easing the administrative burden on generators. The Market Monitor develops defaults minimums by class that a generator can use without any administrative expense or inconvenience. Generators who support with data different values are, subject to verification by PJM and the Market Monitor, able to use those values.

In order to have any confidence that proposed operating parameters are valid, they must be subject to verification by an independent observer, using objective standards.

In the course of the stakeholder process, some generators advocated the use of offer data instead of, or supplemental to, historic operational data. Offer data is inherently less reliable as an indicator of how a unit can actually perform because a unit may not run in a manner consistent with offer parameters. More fundamentally, the use of offer data from periods after it was widely understood that PJM would calculate a baseline from historical operating data provide a gaming opportunity. Offer data reflects the owner's choice about how they would like PJM to dispatch the unit. But offer data does not constitute a separate basis for offering specific parameters. The only supportable basis for operating parameters is the actual physical capability of the unit.

The only offer data that could be a meaningful support for an exception to the parameter limited schedules would be based on operating data or new operational facts. But this means that direct reliance on such operating data or new operational facts is the only rational basis for accepting required exceptions to the parameter limited schedules. Offer data provides no independent information. Operational data reveals what a unit actually did, while offer data does not reflect any actual use of the unit. This makes operational data much more objective, and a considerably more reliable source of information about the physical operating limitations for a particular unit. The Market Monitor favors the use of operational data in all contexts.

The framework developed and approved by PJM stakeholders is logical, appropriate and non-discriminatory. This framework does not provide the most effective protection possible, but it is acceptable. PJM also supported these rules as proposed.

2. PJM Fails to Show That the Proposed Changes to Section 6.6(c) are Just and Reasonable and Not Unduly Discriminatory

In light of the above, it is a mystery why PJM would suddenly reverse the result of years of deliberation and compromise on this issue and, without consulting anyone as far as the Market Monitor knows, unilaterally determine that it is “illogical” or “discriminatory” to make these distinctions among different types of generating units. These distinctions were made explicitly and consciously by the participants after

literally years of discussions that were triggered by the documented concerns of the Market Monitor. The participants did not do this by mistake. PJM itself concurred, presumably with full awareness of the details of the rules. The basis of those distinctions has been thoroughly vetted. It is not illogical to provide a more relaxed standard for steam units based on a review of multiple years of operating data, based on lengthy discussions with owners of steam units and based on the operational facts of these units. What would be illogical would be to apply this relaxed standard to units for which none of the reasons associated with steam units apply. PJM makes no attempt to explain why uniform treatment necessitated the reduction to the lowest common denominator of standards meant to protect the integrity of its market against the exercise of market power. The Market Monitor supports, on the merits, uniform requirements that all units departing from the default matrix values support the requested values on the basis of historical operating data.

Finally, PJM's proposal is itself illogical in the form in which it has been filed. The Market Monitor was not aware of PJM's intention to make this compliance filing until it received service, and it has no reason to believe that stakeholders had any advance notice either.

PJM also drops from the approved rules without explanation the requirement that steam and combined-cycle units use historical data from calendar year 2006. The Approved Rules specify 2006 for the explicitly stated reason that, during the discussions

in the RMWG, 2006 was the most recent year for which PJM had offer data that did not reflect the knowledge that average historical offer data would be used to support requested exceptions to the default parameter limitations. The referenced offer data was used with the explicit assumption that it reflected the actual operational capabilities of the units in question. Use of operational data should provide the same result and would be consistent and preferable. Use of data from 2006 prevents a generator from building a track record of offers specifying parameter limits that skew the data used as a basis for future requested exceptions. This seriously weakens the usefulness of historical offer data, creating a problem of potential gaming in addition to the inherent subjectivity of the data. If Commission directs PJM to incorporate this rule, it should require that it restore this important protection on the usefulness of such data by specifying that only data from calendar year 2006 may be used.

II. CONCLUSION

The Market Monitor respectfully requests that the Commission afford due consideration to this protest, and urges the Commission to reject those portions of PJM's compliance filing that are beyond the scope and substance of the directive for compliance in the November 26th Order, or, at a minimum, require that such incorporation of these rules remain true to the Approved Rules. Should the Commission determine that further investigation is appropriate, the Market Monitor

recommends setting this matter for hearing, and holding such hearing in abeyance pending settlement proceedings.

Respectfully submitted,



Jeffrey W. Mayes

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Dated: January 21, 2009

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Eagleville, Pennsylvania,
this 21st day of January, 2009.



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Attachment



Operating Reserves Rules

RMWG

November 16, 2005

Revised

Joseph Bowring

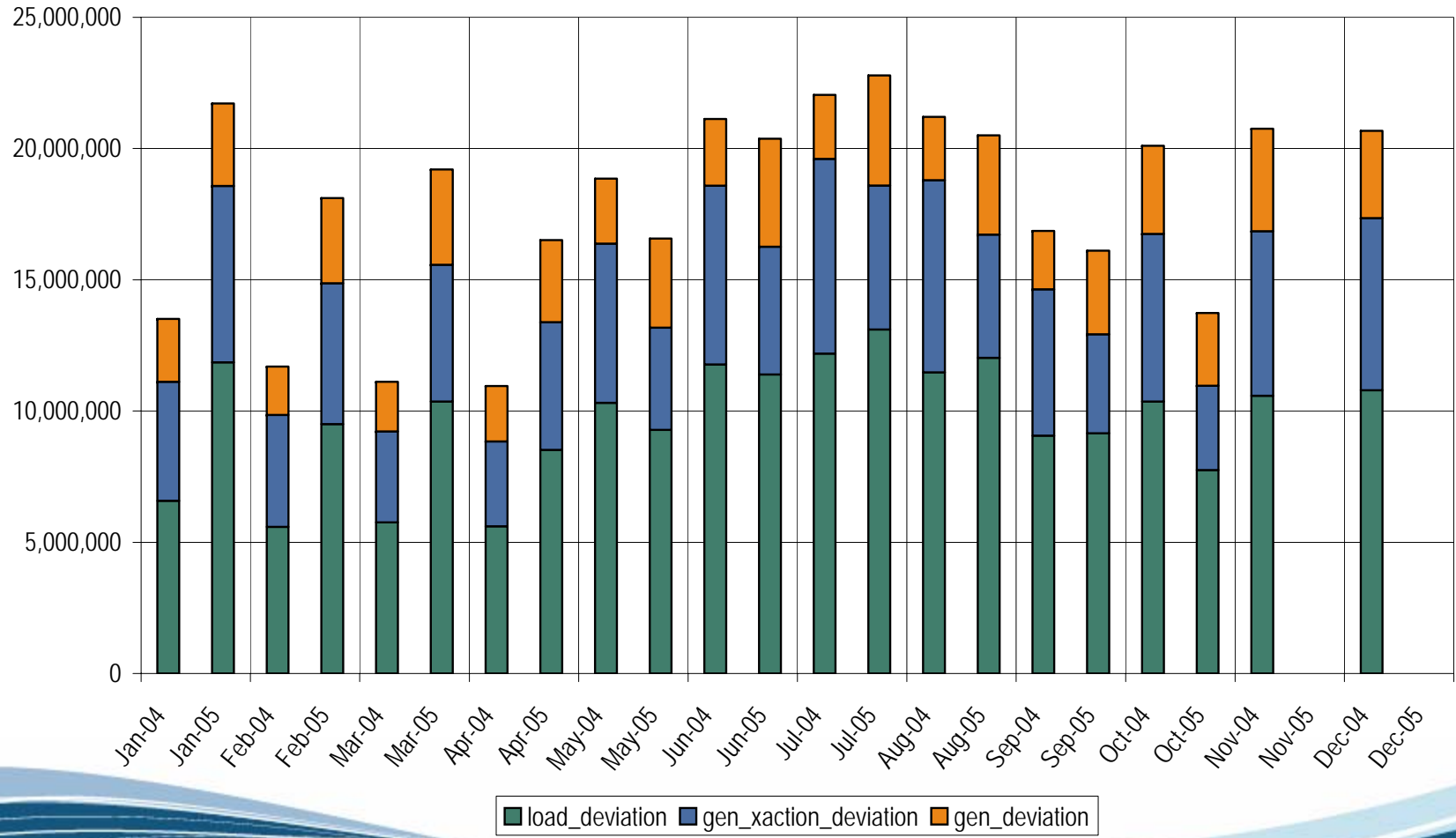
Market Monitoring Unit



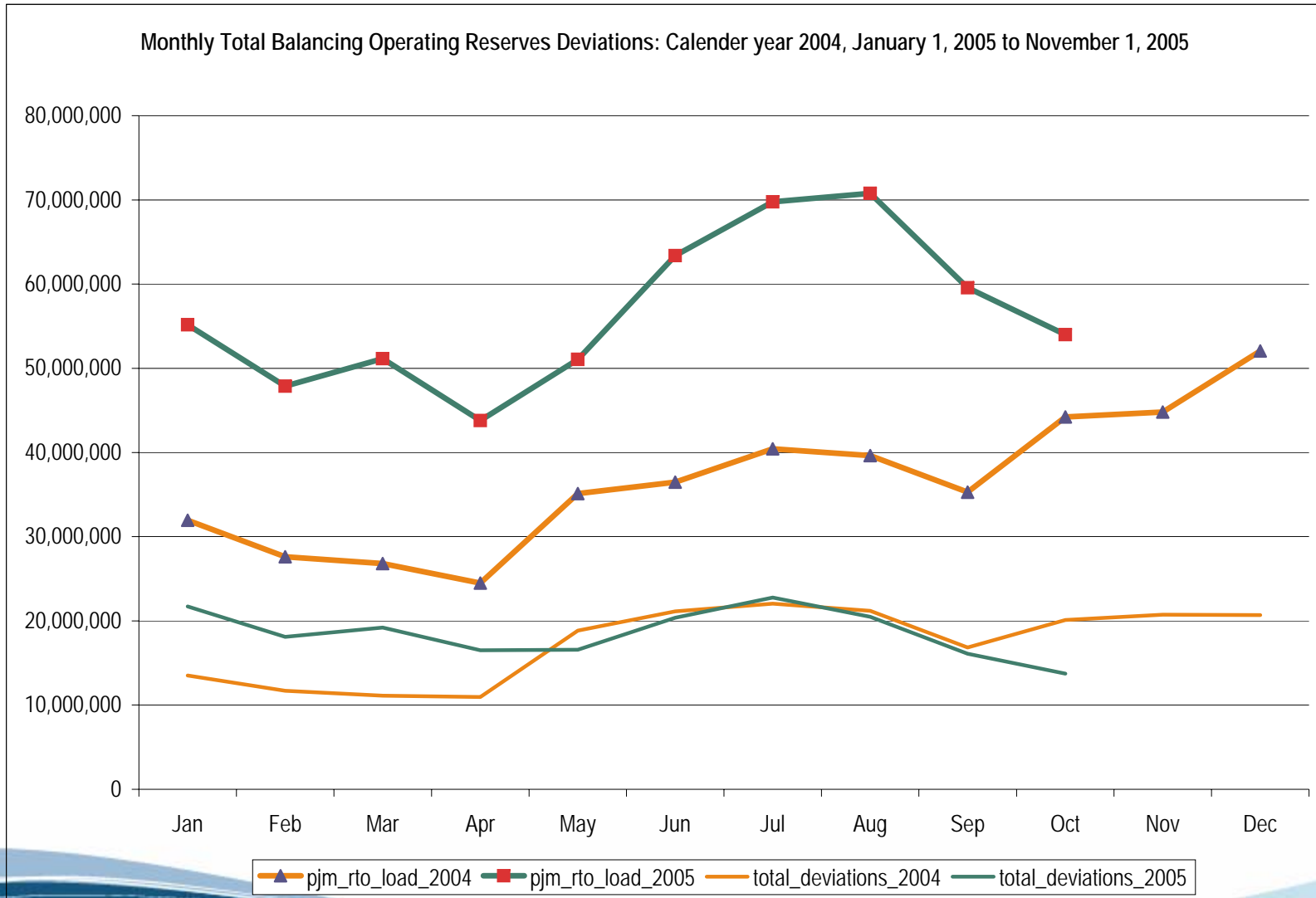
Operating Reserves Payments and Monthly Average Balancing Operating Reserves Rates

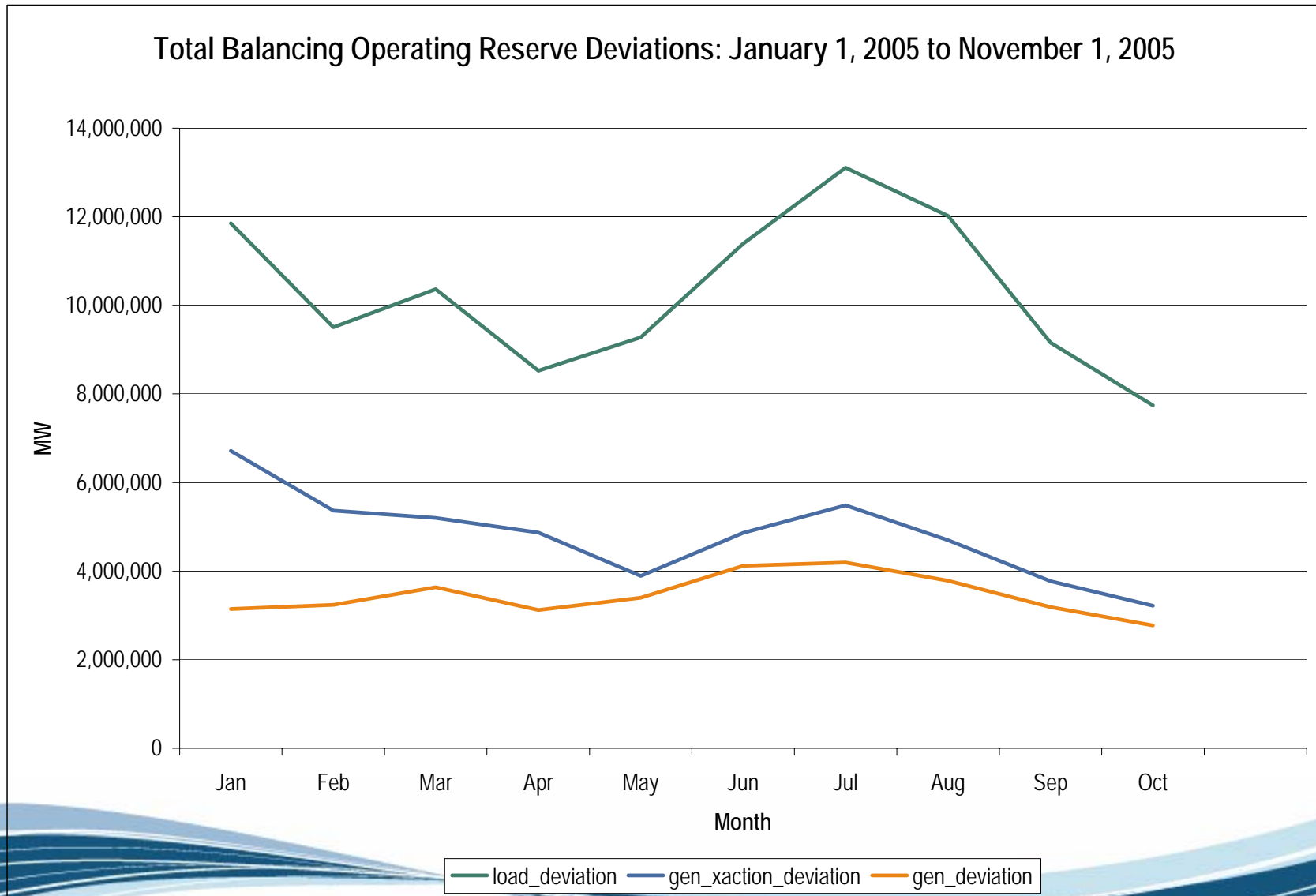
Month	Operating Reserve Payments (\$)	Operating Reserve Payment as a percent of Total PJM Billings	Average Monthly Balancing Operating Reserves Rates
Jan-04	52,614,260.35	6.57%	2.97
Feb-04	18,606,774.01	3.35%	1.01
Mar-04	10,900,284.08	2.03%	0.46
Apr-04	15,384,926.93	2.96%	0.96
May-04	35,060,648.55	4.90%	1.41
Jun-04	44,365,902.56	6.13%	1.40
Jul-04	39,212,547.83	4.36%	1.11
Aug-04	37,548,758.69	4.45%	1.09
Sep-04	25,549,623.45	3.68%	0.89
Oct-04	31,332,037.76	4.55%	0.57
Nov-04	35,350,526.10	4.56%	0.75
Dec-04	68,978,719.92	6.95%	2.21
Jan-05	54,710,092.89	4.64%	1.72
Feb-05	26,818,691.15	3.09%	1.04
Mar-05	20,898,195.79	2.01%	0.81
Apr-05	16,365,871.44	1.91%	0.73
May-05	23,631,406.86	1.96%	0.90
Jun-05	64,192,257.80	3.11%	2.80
Jul-05	104,948,671.39	3.79%	4.32
Aug-05	87,785,171.96	2.75%	3.82
Sep-05	83,563,440.07	3.24%	4.78
Oct-05	103,833,680.75	4.60%	6.70

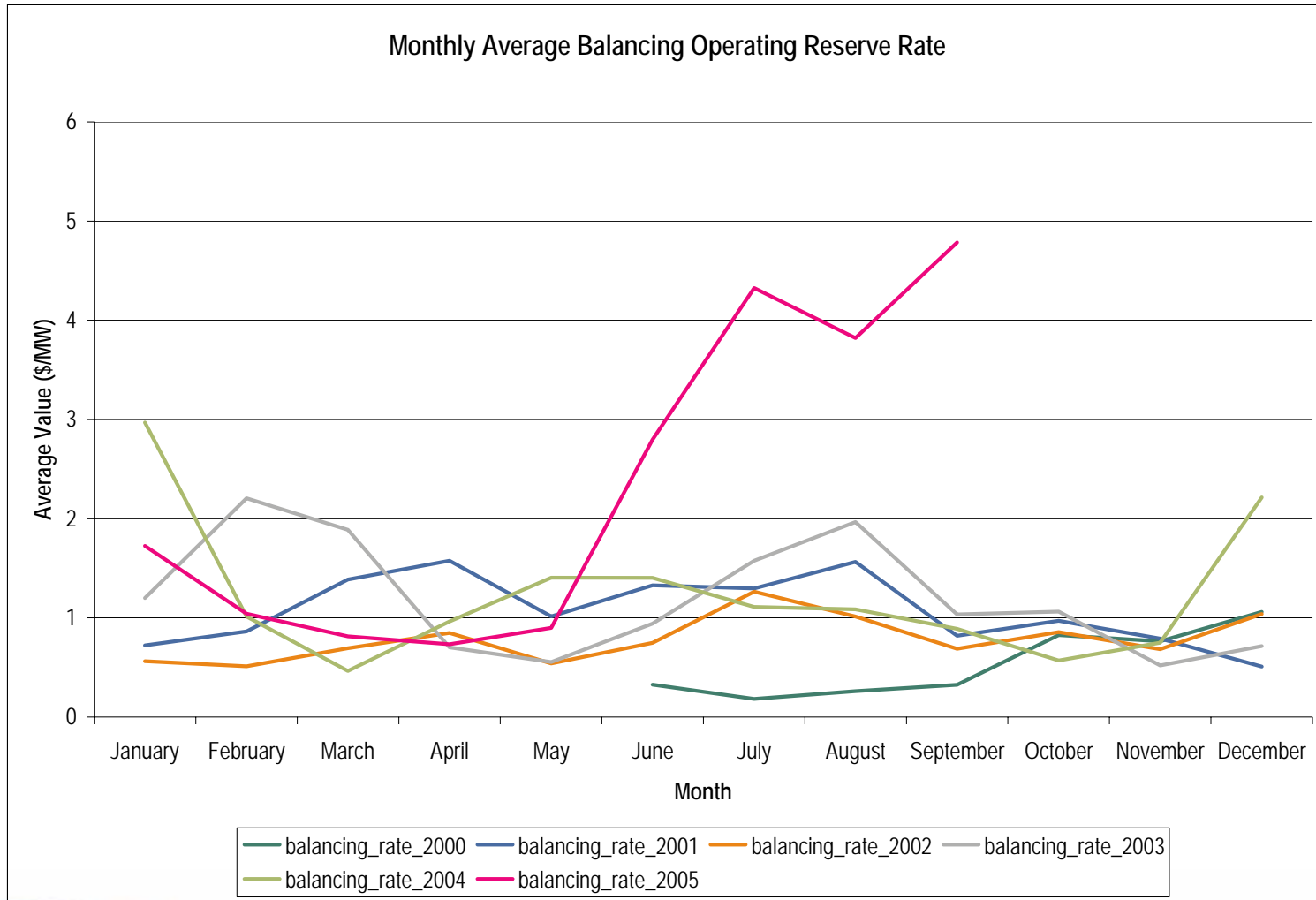
Balancing Operating Reserve Deviations:
Calendar year 2004 and January 1, 2005 to November 1, 2005

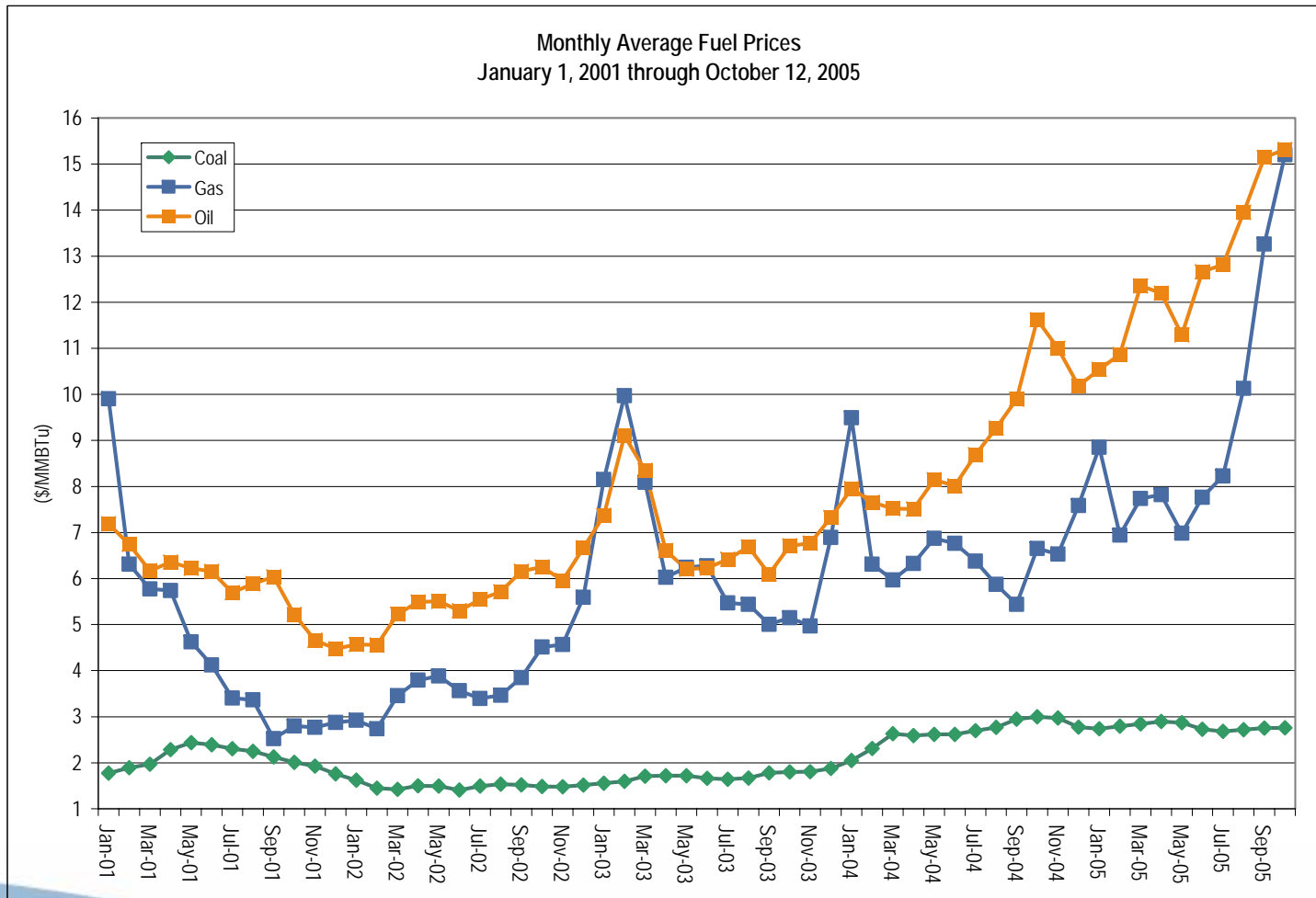


Balancing Operating Reserve Deviations





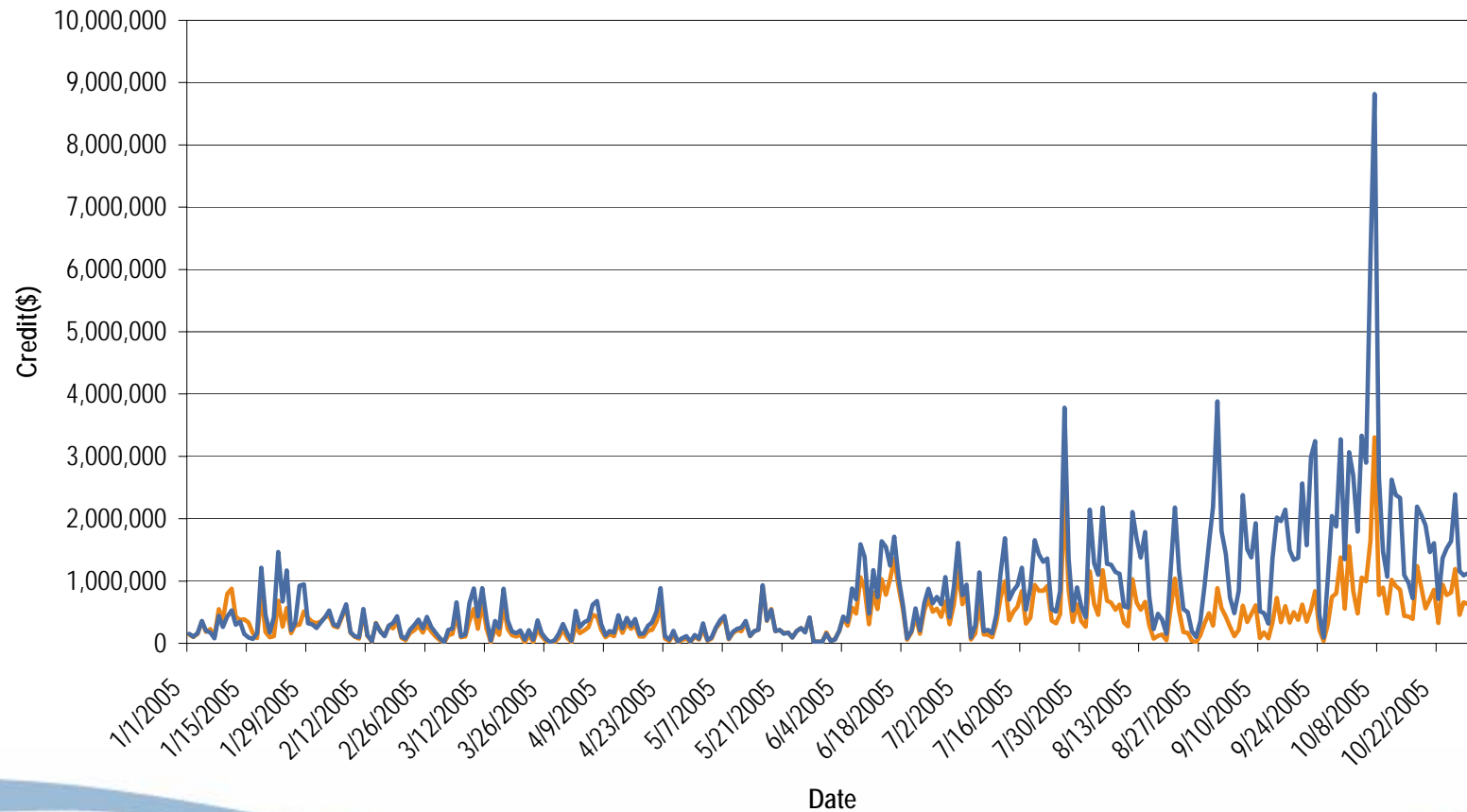






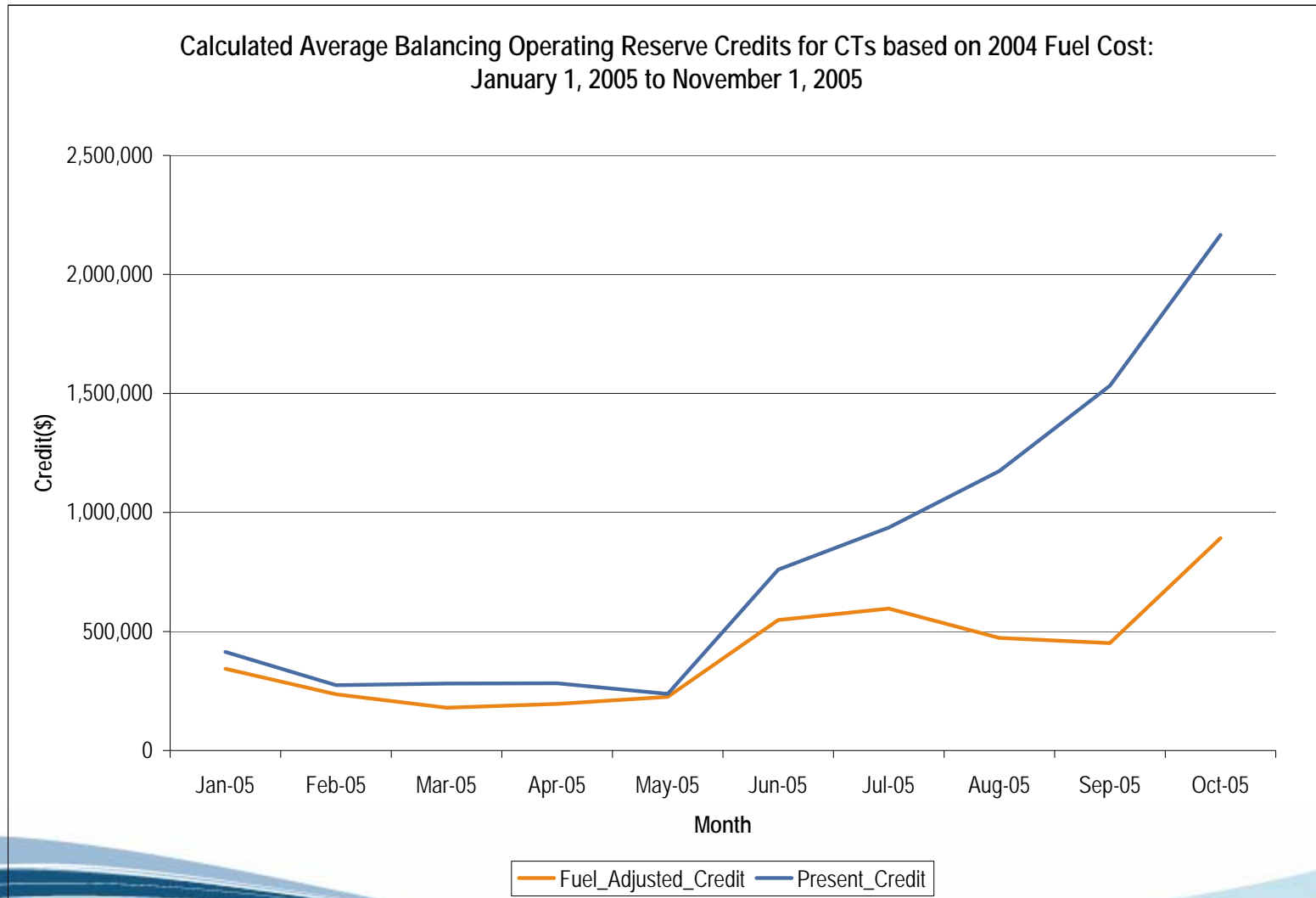
Estimated Fuel Cost Impact on CT's Balancing Operating Reserve Credits in 2005

Calculated Daily Balancing Operating Reserve Credits for CTs based on 2004 Fuel Cost : January 1, 2005 to November 1, 2005





Estimated Fuel Cost Impact on CT's Balancing Operating Reserve Credits in 2005





Monthly Average Rates Adjusted for CT Fuel Costs

Month	Present_Rate	Fuel_Adjusted_Rate
Jan-05	1.72	1.64
Feb-05	1.04	0.98
Mar-05	0.81	0.65
Apr-05	0.73	0.58
May-05	0.90	0.88
Jun-05	2.80	2.50
Jul-05	4.32	3.87
Aug-05	3.82	2.78
Sep-05	4.78	2.78
Oct-05	6.70	3.96

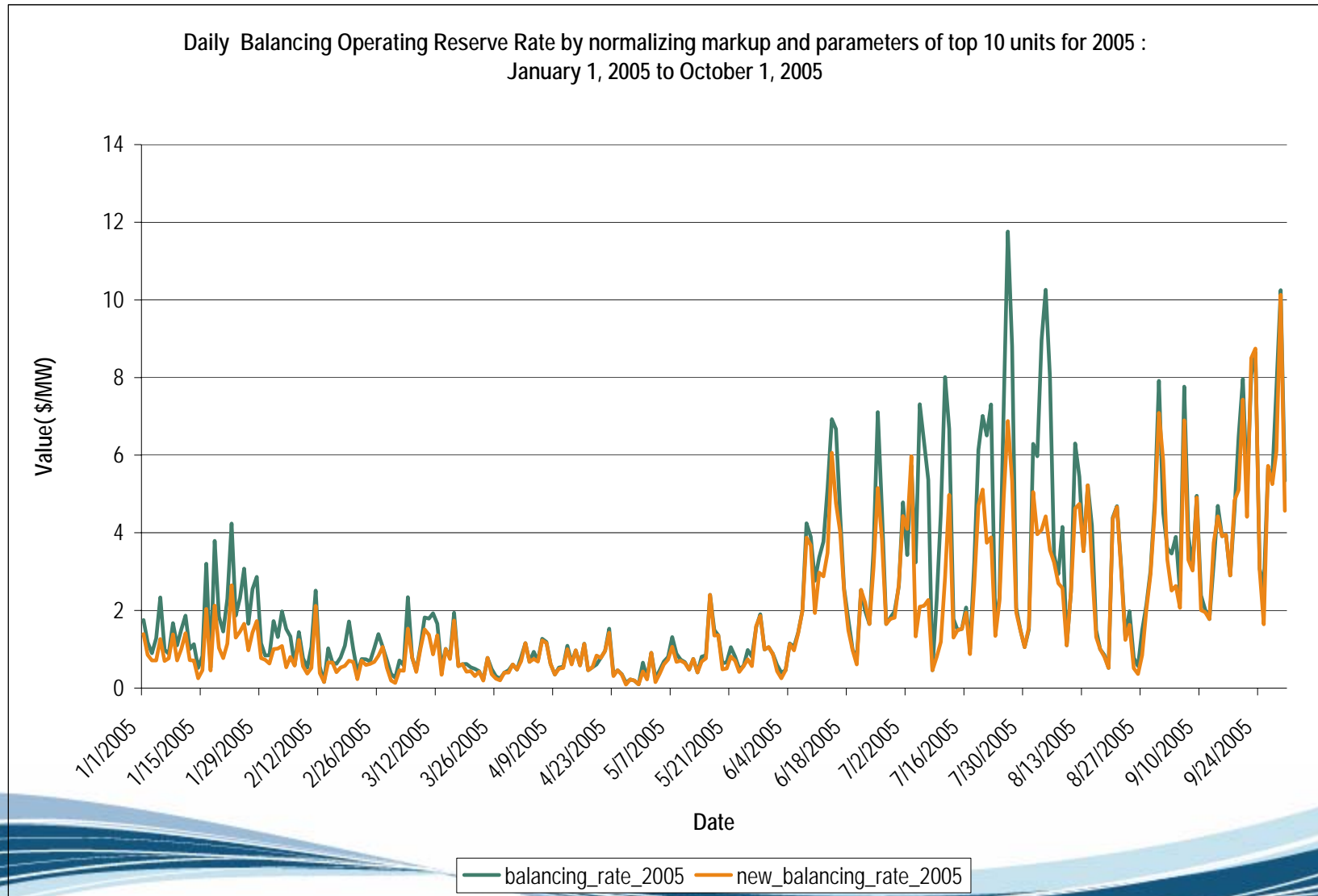


Monthly Credits Adjusted for CT Fuel Costs

Month	Fuel_Adjusted Credit	Fuel_Adjusted Cumulative Credit	Present_Balancing Credit	Present_Balancing Cumulative Credit
Jan-05	\$35,697,829	\$35,697,829	\$37,895,417	\$37,895,417
Feb-05	\$17,927,146	\$53,624,974	\$18,965,471	\$56,860,889
Mar-05	\$12,209,993	\$65,834,967	\$15,360,115	\$72,221,003
Apr-05	\$9,507,413	\$75,342,380	\$12,110,506	\$84,331,509
May-05	\$14,278,329	\$89,620,709	\$14,646,225	\$98,977,734
Jun-05	\$51,717,278	\$141,337,988	\$58,066,578	\$157,044,312
Jul-05	\$89,054,383	\$230,392,370	\$99,637,963	\$256,682,275
Aug-05	\$59,310,260	\$289,702,630	\$81,020,541	\$337,702,816
Sep-05	\$43,715,856	\$333,418,486	\$76,143,552	\$413,846,368
Oct-05	\$56,880,659	\$390,299,145	\$96,352,636	\$510,199,003

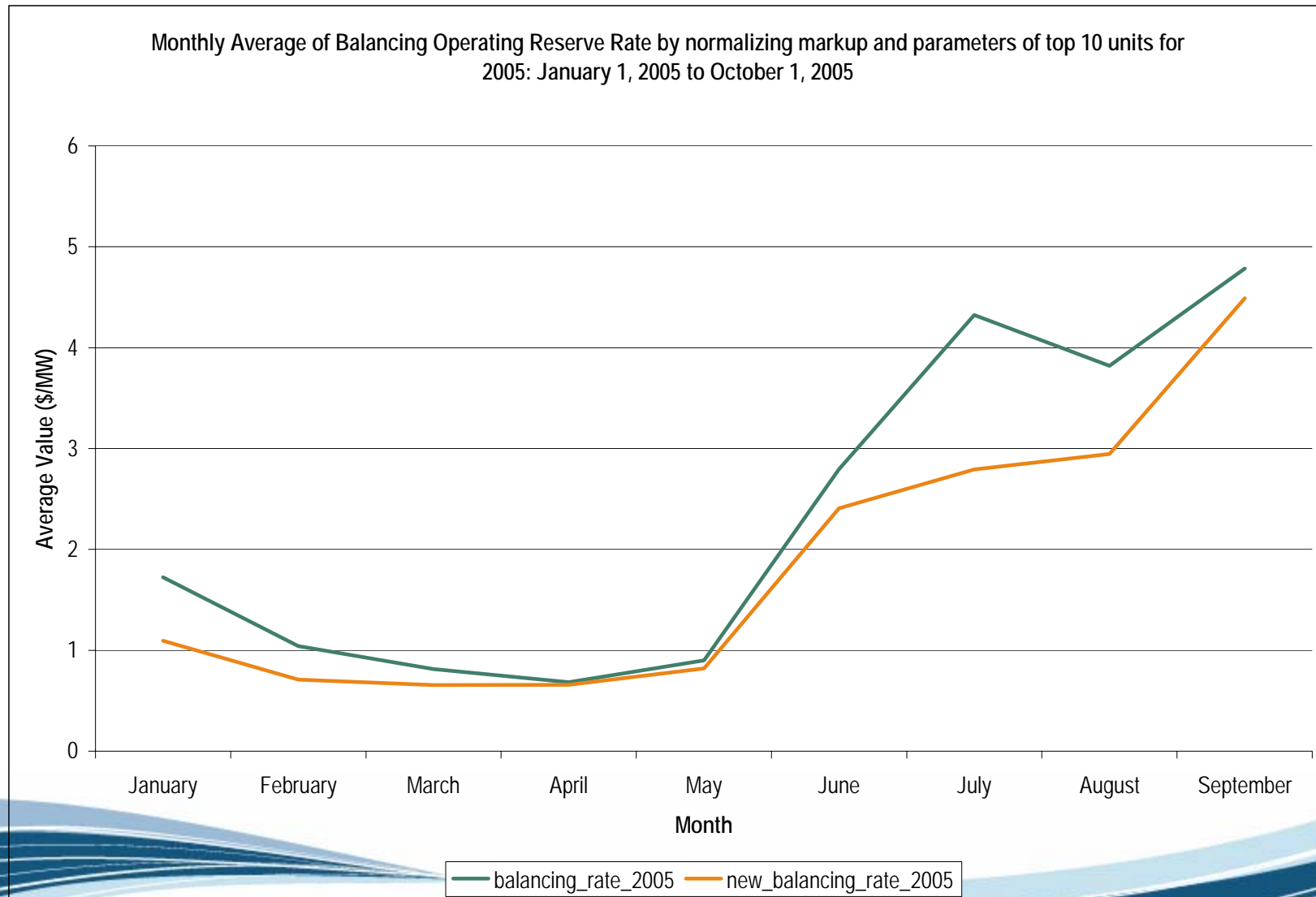


Balancing Operating Reserve Rate by normalizing markup and parameters of top 10 units for 2005





Balancing Operating Reserve Rate by normalizing markup and parameters of top 10 units 2005



- Current:
 - No rules that address the operating parameters of units selected for operating reserves
- Proposed:
 - Maintain unit parameters at levels based on physical characteristics – defined by actual PJM market offers
 - PJM calculations based on actual market data, excluding outliers
 - Notification of PJM in instances of parameter changes
 - PJM defines a set of unit parameter levels with an acceptable range
 - Operating Reserves Credits limited to units with defined parameters
 - Exceptions on a case by case basis



Definitions of Operating Parameters

- **Minimum Down Time** — The minimum number of hours between starts, calculated as the difference between when the unit shuts-down and the next time the unit is put online, as measured by telemetry available to PJM.
- **Minimum Run Time** — The minimum number of hours a unit must run, from the time the unit is put online to the time the unit is shut down (as measured by PJM's state estimator).
- **Maximum Daily Starts** — The maximum number of times that a unit can be started in a day under normal operating conditions.
- **Hot to Cold Time** — The amount of time, in hours, after shutdown that a hot temperature state unit takes to cool down to cold temperature state.
- **Hot to Warm Time** — The amount of time, in hours, after shutdown that a hot temperature state unit takes to cool down to warm temperature state.
- **Warm Start Time** — The time interval, measured in hours, from the actual unit start sequence to the unit breaker closing for a generating unit in its warm temperature state.



Definitions of Operating Parameters

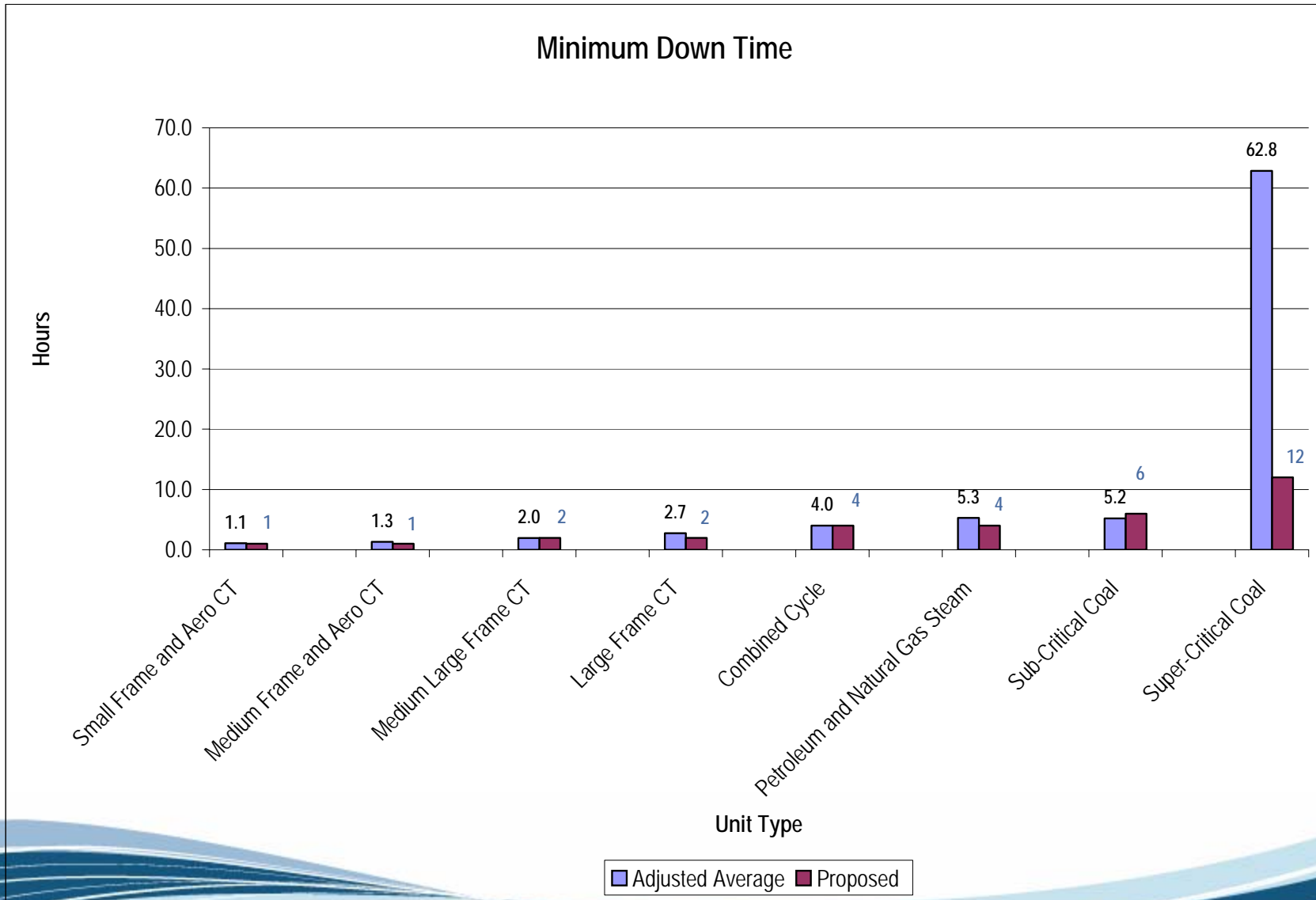
- **Cold Start Time** — The time interval, measured in hours, from the actual unit start sequence to the unit breaker closing for a generating unit in its cold temperature state.
- **Hot Start Time** — The time interval, measured in hours, from the actual unit start sequence to the unit breaker closing for a generating unit in its hot temperature state.
- **Warm Notification Time** — The time interval between PJM notification and the start sequence of a generating unit that is currently in its warm temperature state.
- **Cold Notification Time** — The time interval between PJM notification and the start sequence of a generating unit that is currently in its cold temperature state.
- **Hot Notification Time** — The time interval between PJM notification and the start sequence of a generating unit that is currently in its hot temperature state.
- **Ramp Time** — Change in MW per minute as a percent of ICAP capability in a generators output level.

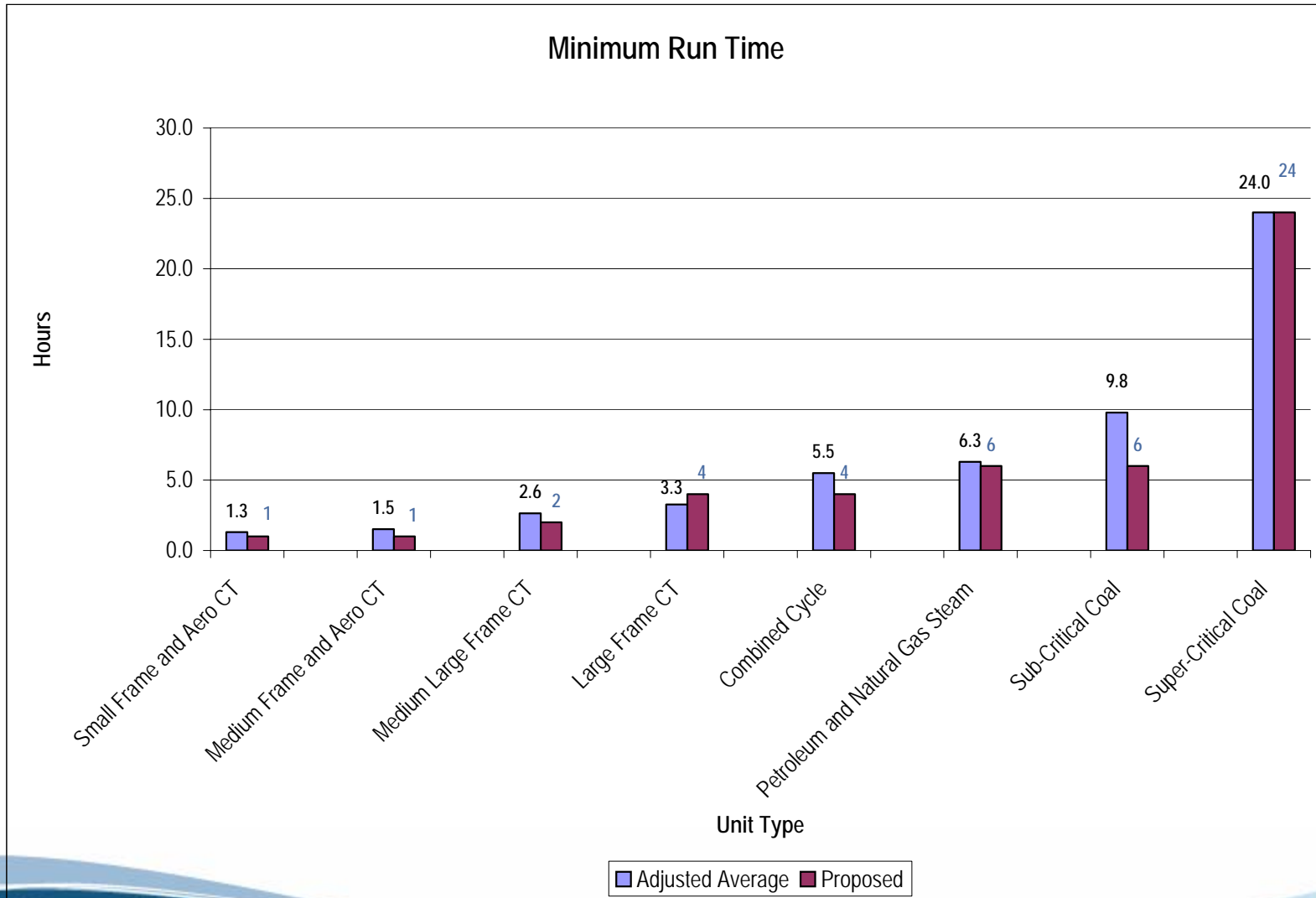
eMKT User Guide - <http://www.pjm.com/etools/downloads/emkt/ts-userguide.pdf>

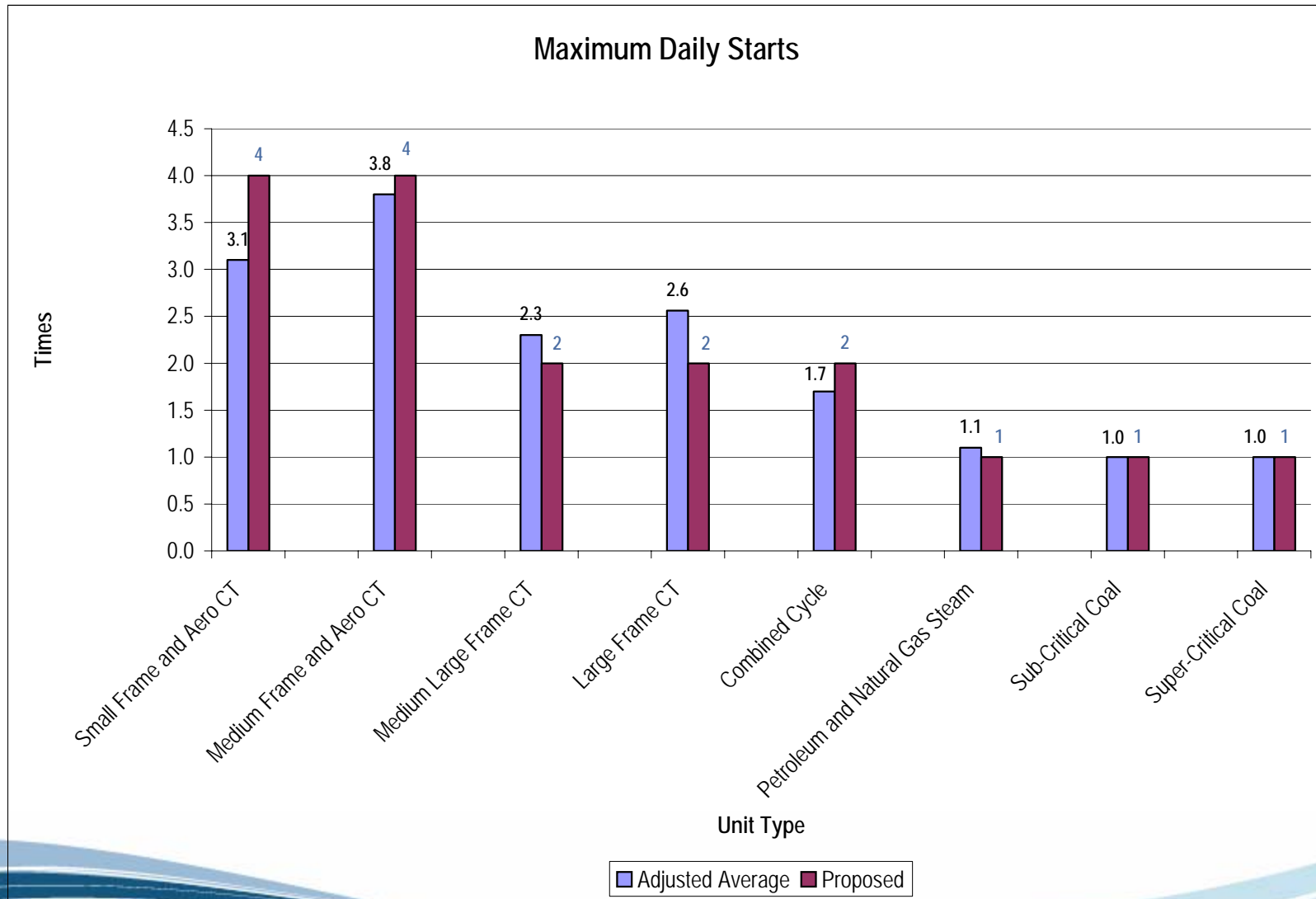


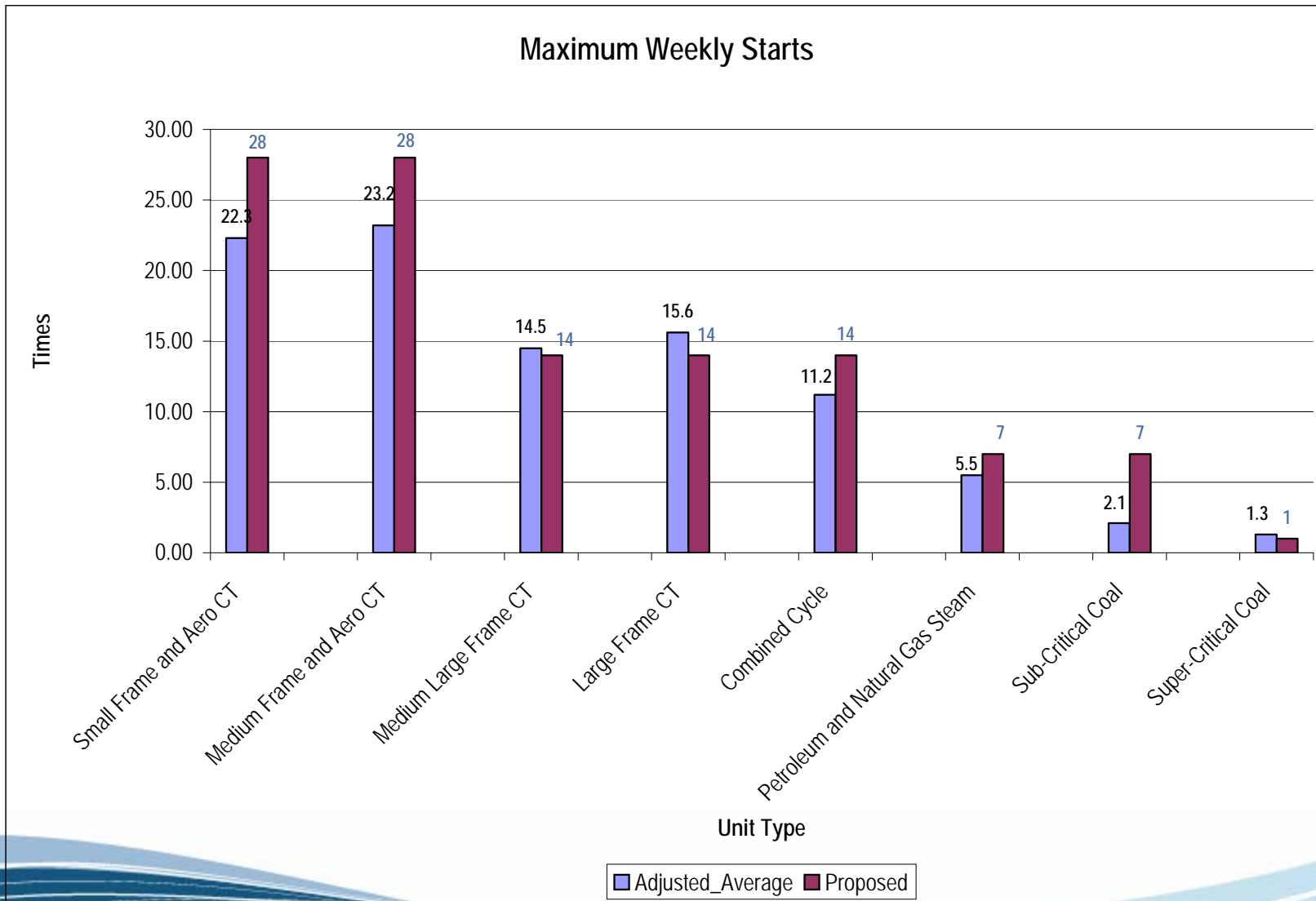
Number of Units Analyzed for Proposed Changes

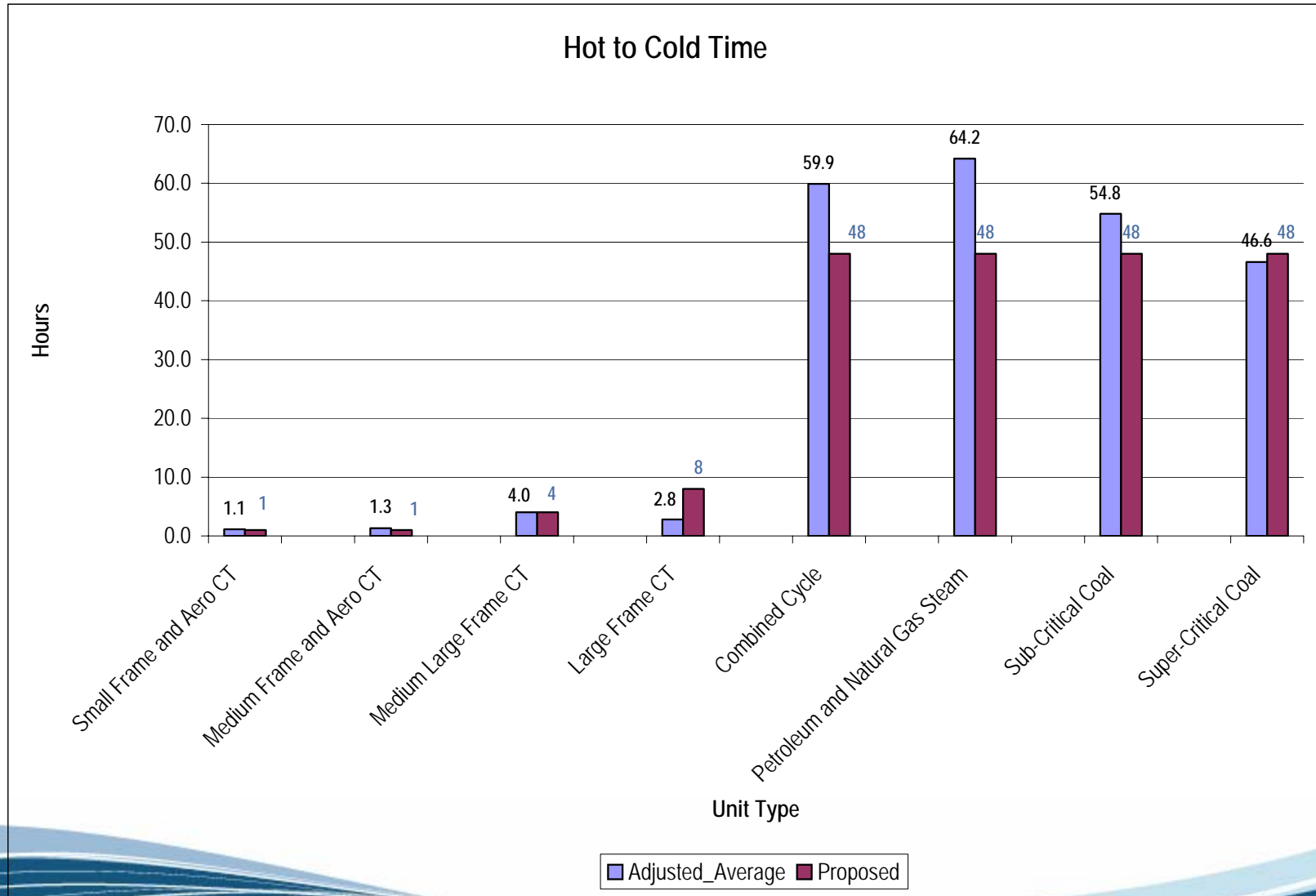
PJM Units Surveyed	No. of Units	MW
Small Frame and Aero CT Units Up to 29 MW	133	2,462
Medium Frame and Aero CT Units 30 MW to 65 MW	154	7,190
Medium Large Frame CT Units 65 MW to 125 MW	99	8,907
Large Frame CT Units 135 MW to 180 MW	66	10,346
Combined Cycle Plants	45	19,922
Petroleum and Natural Gas Steam Plants	91	12,835
Sub-Critical Coal Plants	194	44,647
Super-Critical Coal Plants	38	24,601
Total Surveyed	820	130,910
Units Not Surveyed		
Hydro	157	
Nuclear	31	
Diesel	58	
Outside PJM	40	
Wind	6	
On Outage or No Offer	40	
Retired	47	
Total Units Not Surveyed	379	
Total Units	1,199	

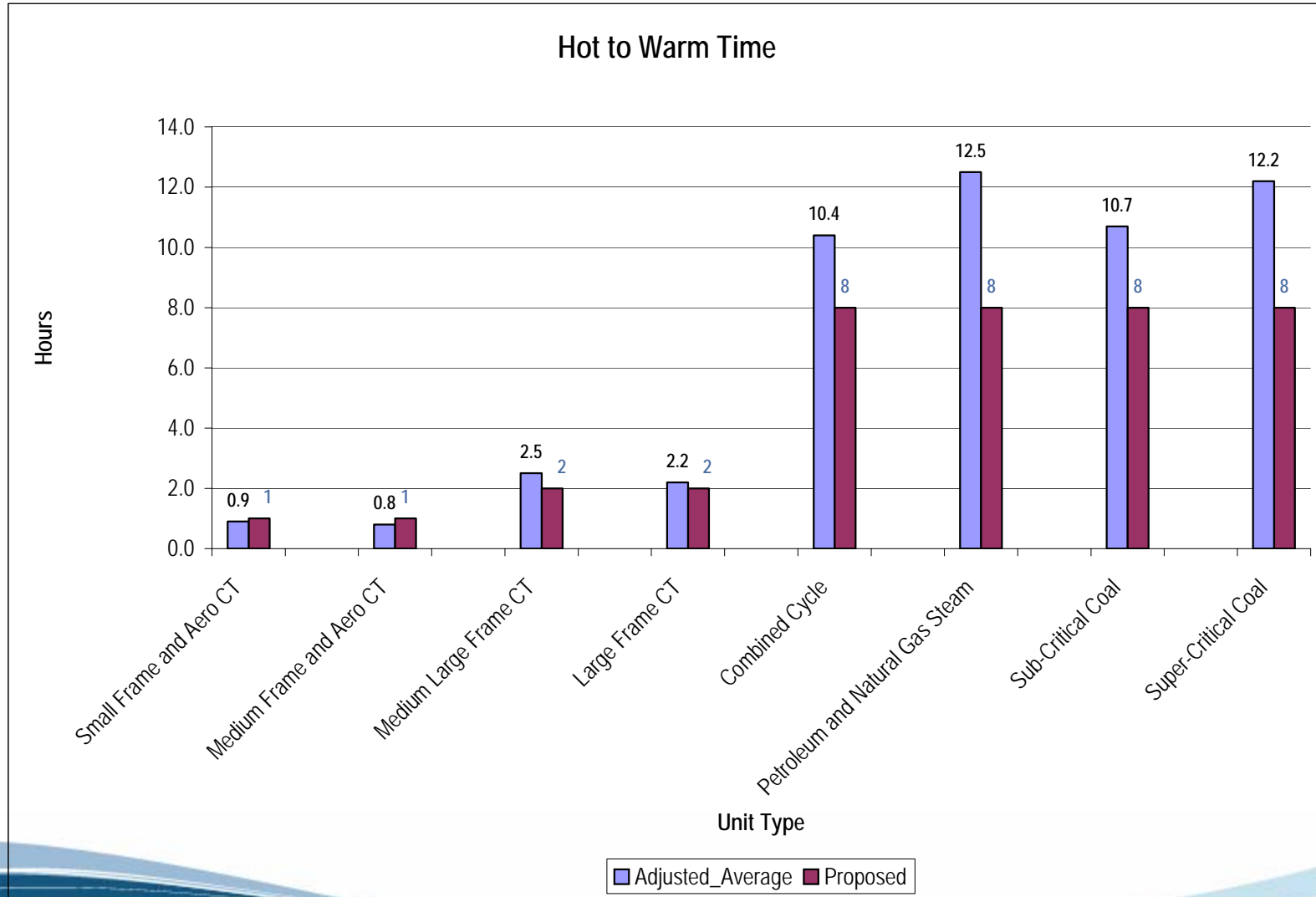


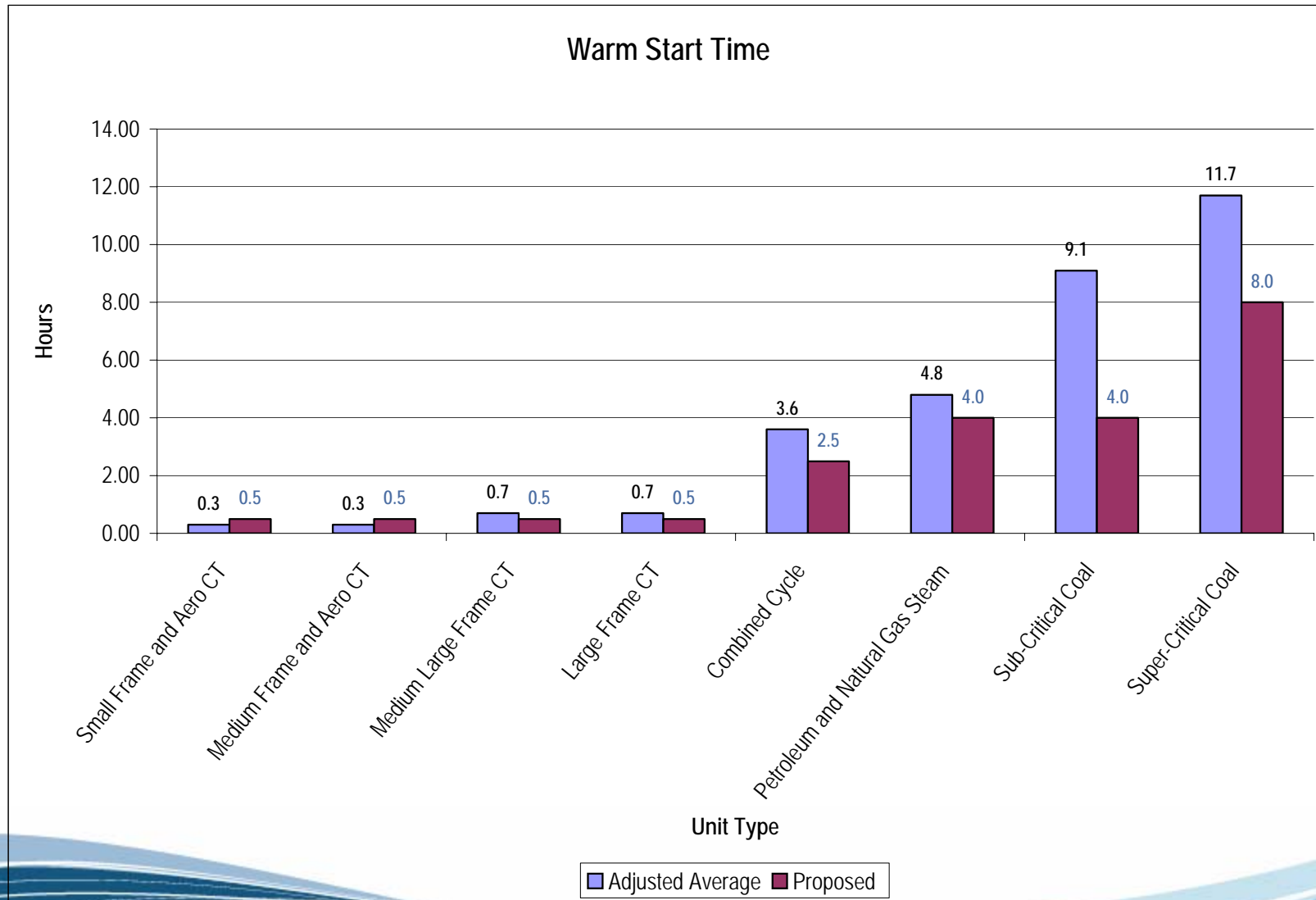


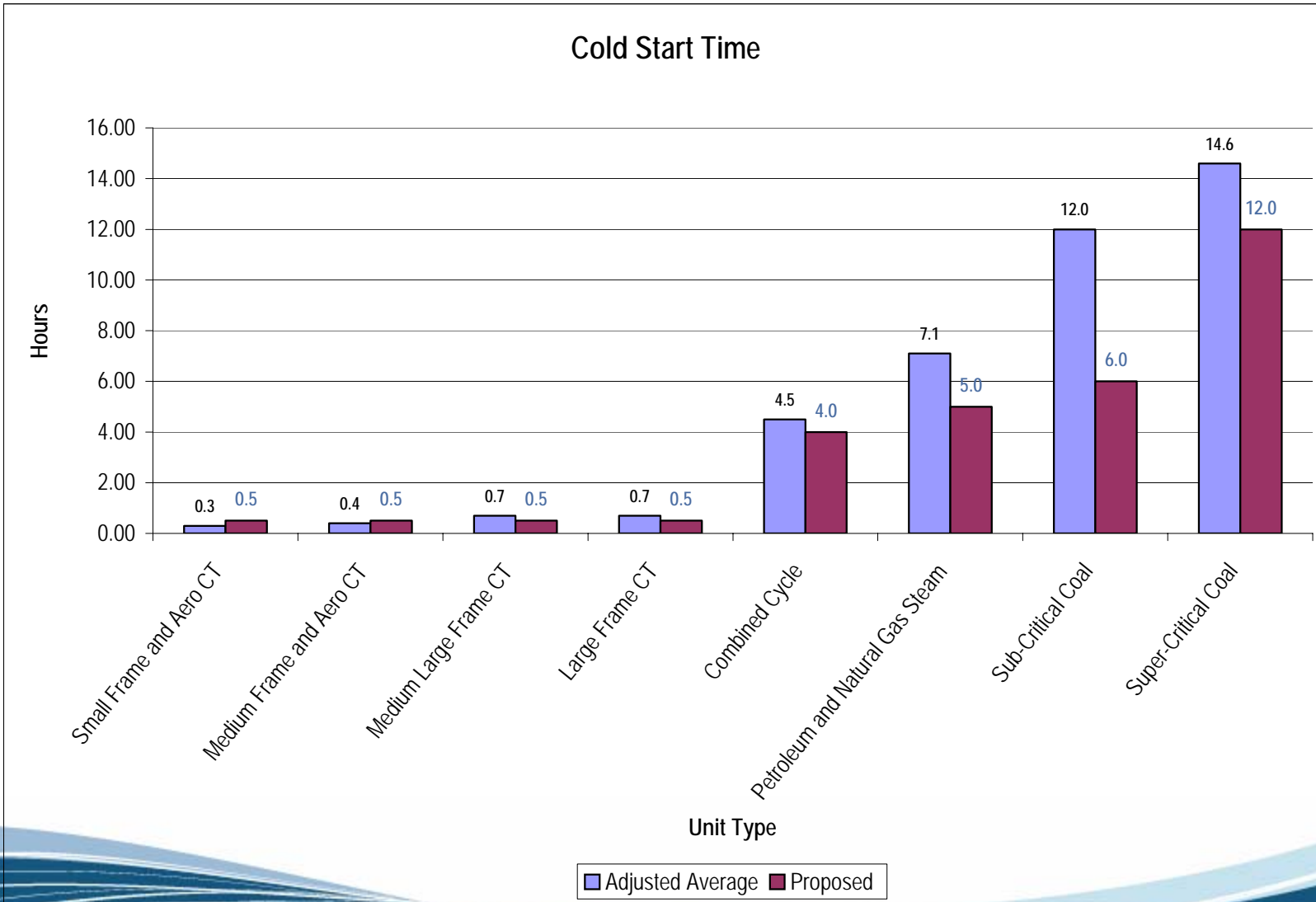


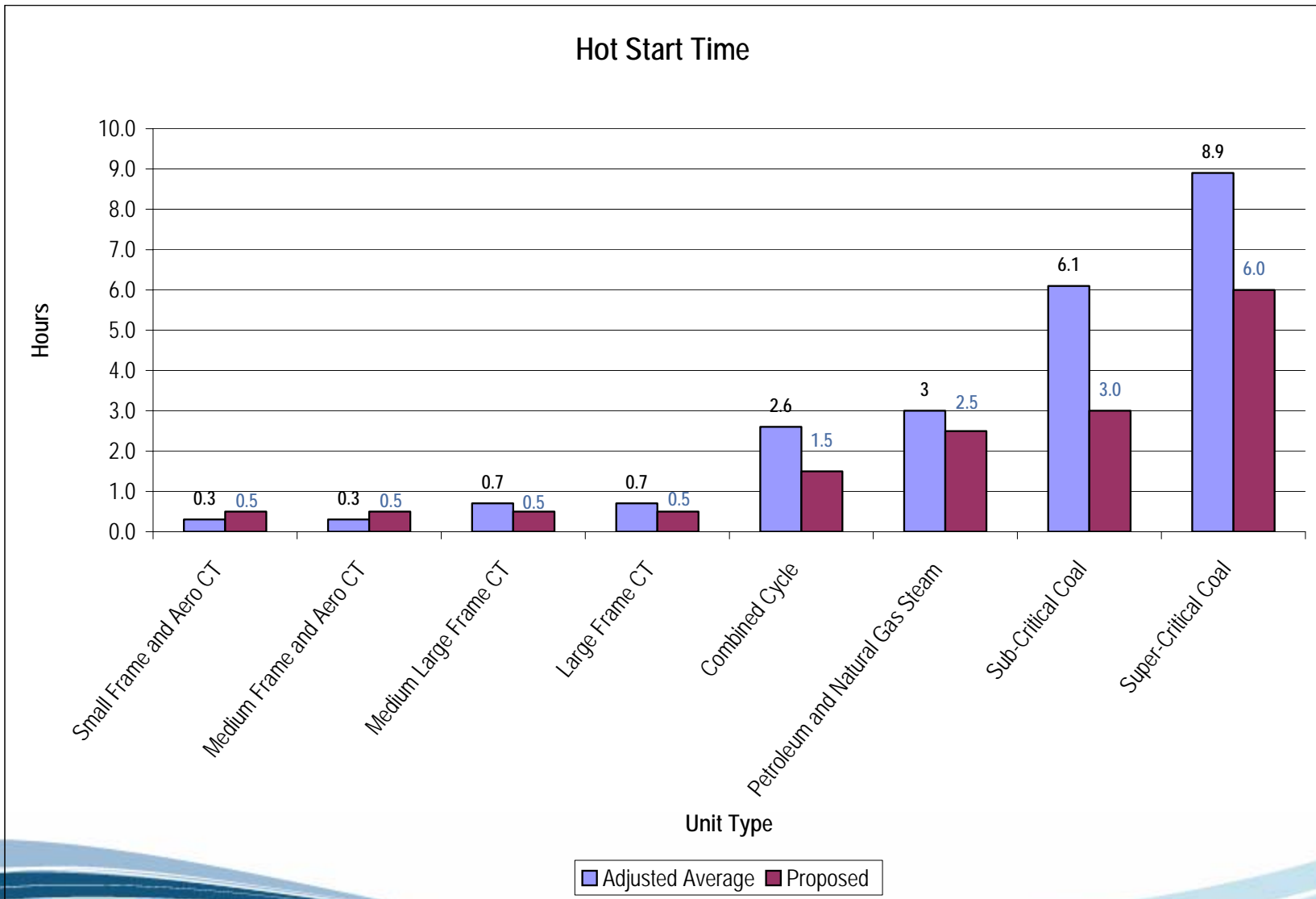


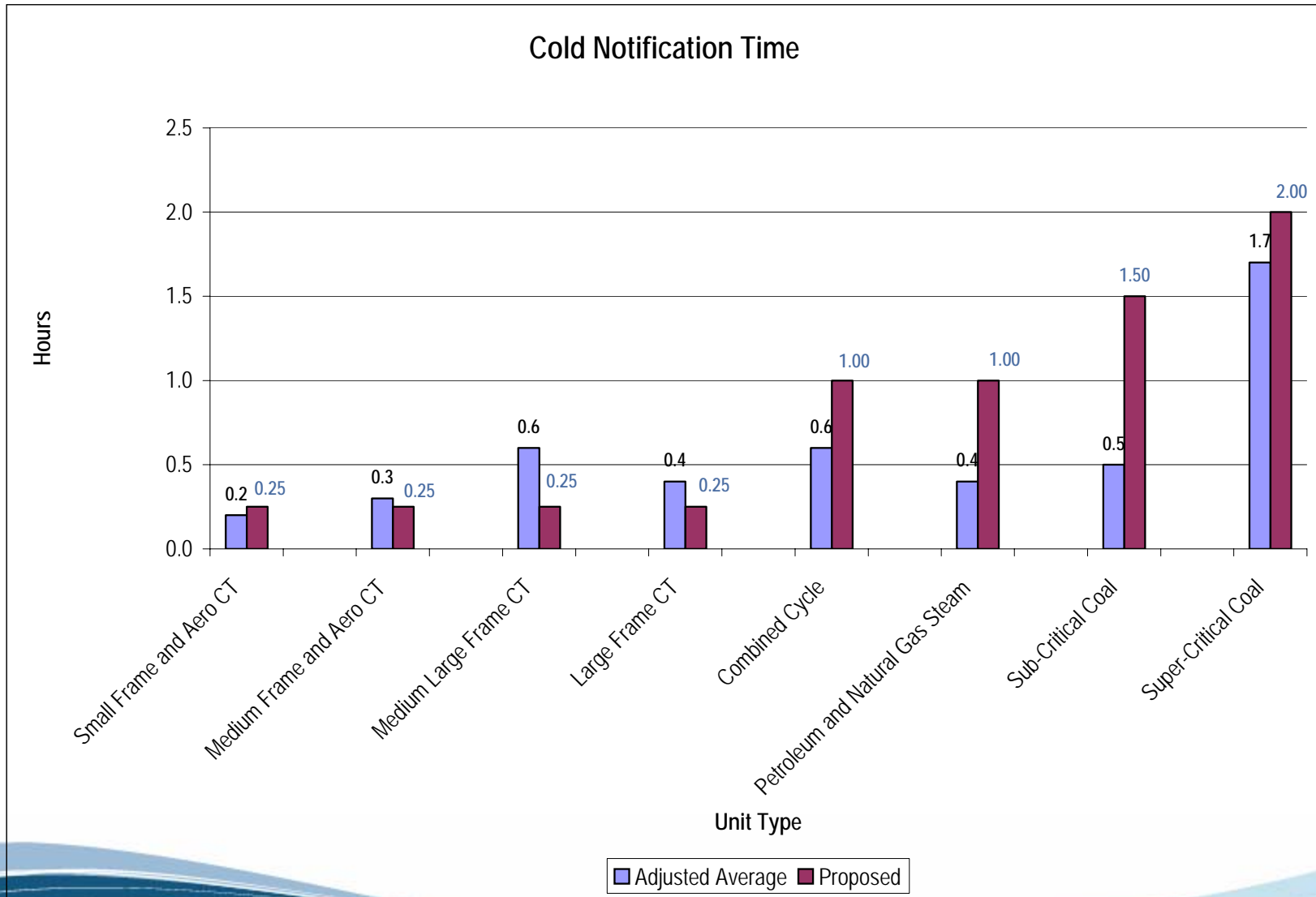


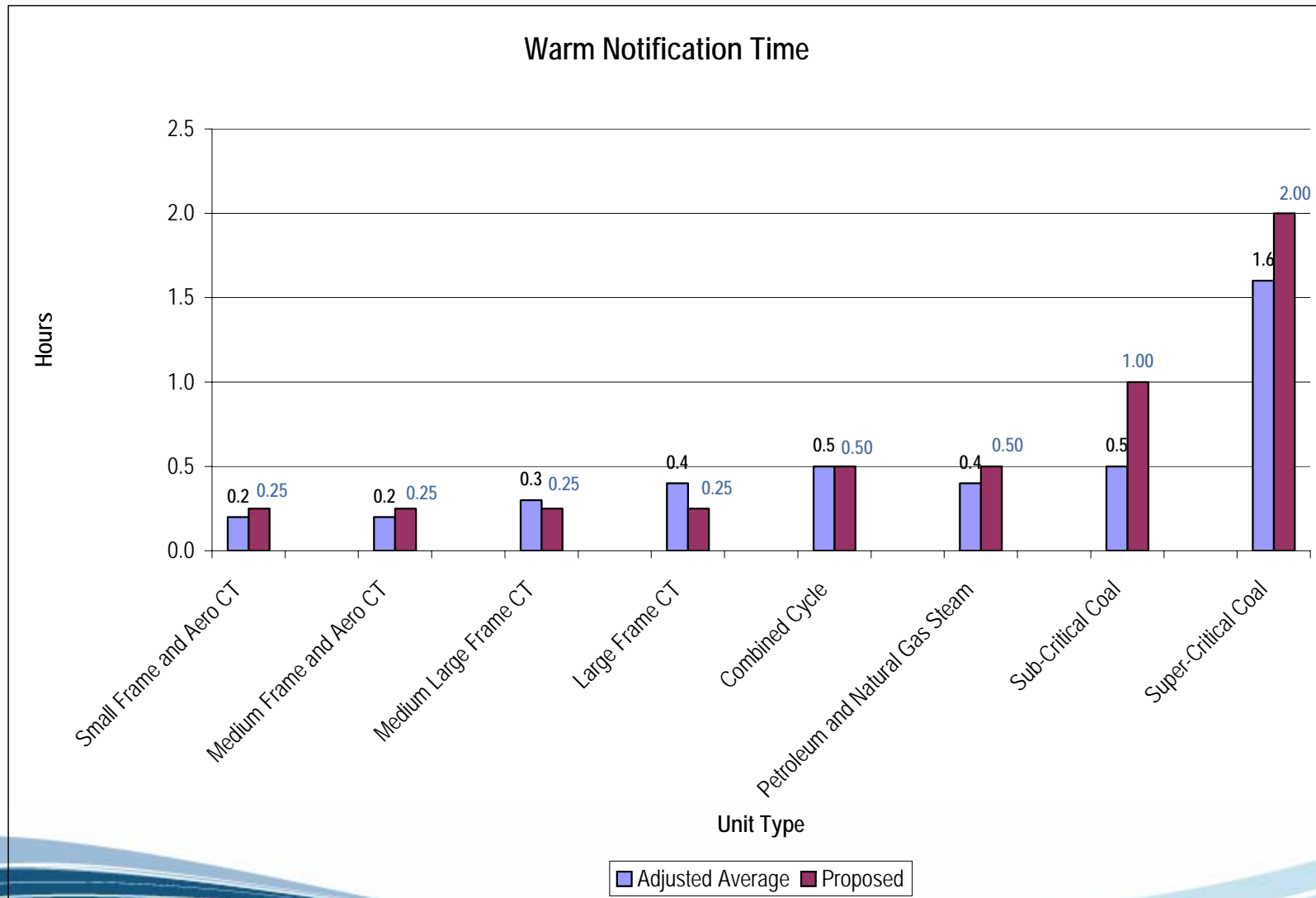


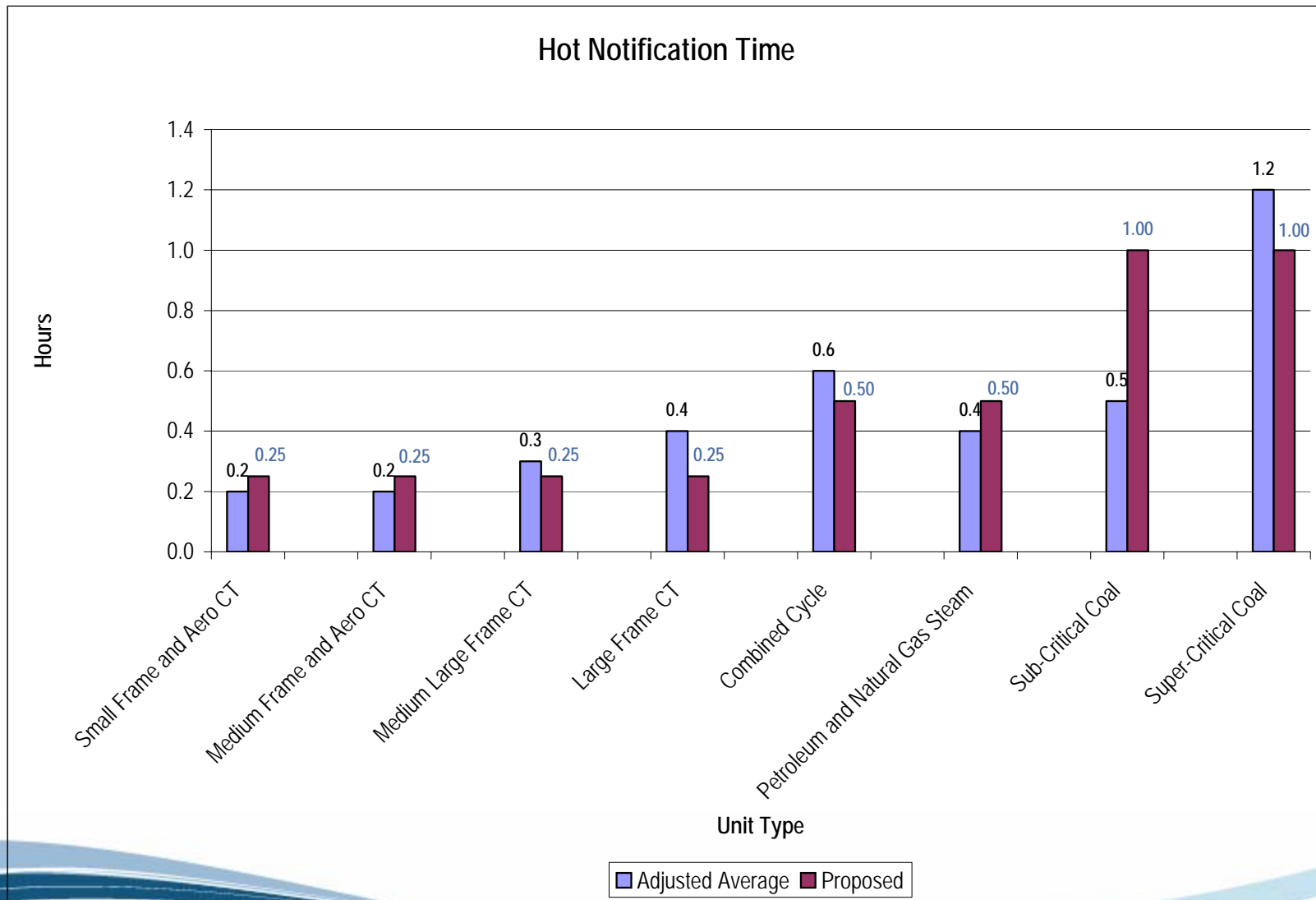














Ramp Time

Unit Category	Ramp Time %ICAP per Minute	
	Current Average	Proposed
Small Frame and Aero CT	21.3%	
Small Frame CT		7.5%
Small Aero CT		22.5%
Medium Frame and Aero CT	18.3%	
Medium Frame		7.5%
Medium Aero CT		22.5%
Medium Large Frame CT	8.3%	7.5%
Large Frame CT	6.6%	7.5%
Combined Cycle	1.6%	2.0%
Petroleum and Natural Gas Steam	2.7%	
Petroleum and Natural Gas Steam Hot Start		1.0%
Petroleum and Natural Gas Steam Cold Start		0.5%
Sub-Critical Coal	1.8%	0.5%
Super-Critical Coal	0.6%	0.5%

- Operating reserve payments concentrated among a relatively small number of units/owners
- The top ten units generally have:
 - Relatively high mark ups
 - Price offer over cost offer
 - Relatively inflexible operating parameters
 - Long minimum run times
 - Small number of starts per day
 - Long minimum down time
- Need to define market for units providing operating reserves
 - Aggregate market
 - Locational issues



Summary Data for Top Ten Operating Reserves Units

- The top ten units receiving operating reserve payments
 - Average = 41 percent of total operating reserve payments over last four years
 - Maximum = 47 percent
 - Minimum = 32 percent
- The mark up for all top ten units
 - Average = 9 percent
 - Maximum = 17 percent
 - Minimum = 3 percent
- The maximum mark up among the top ten units receiving operating reserve payments
 - Average = 44 percent over last four years
 - Maximum > 40 percent in each year

- Limit exercise of market power in operating reserve market
 - Limit mark up
- Ensure that only flexible units are paid operating reserves
 - Require flexible operating parameters

- When units have market power
 - Limit operating reserves payments to the higher of LMP or cost-based offer
- Issues
 - Market needs to be clearly defined
 - Definition of market is determined by the interaction of operator actions and system constraints
- Proposal
 - Market power exists for units when they are used for operating reserves on a repeated basis and competitive supply options do not exist
 - Mark up should be limited for units taken for operating reserves on a repeated basis if competitive supply options do not exist

- Operating reserve payments are payments for flexibility
- Proposal
 - Limit operating reserve payments to units with operating parameters based on the physical characteristics of the units
 - Operating parameters based on actual PJM market offers by unit class
 - Specify operating parameters range for unit classes