DECA

Flexible Capacity Buckets Redux
October 15, 2013

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Addressing flexibility need by reintroducing the concept of load-matching RA "compliance buckets"

Repurposes the original intent of the Maximum Cumulative Capacity (MCC) buckets
- — Originally peak energy oriented
- — Balanced operational needs with generation fleet
- — Reflected both contractual and physical constraints

Replaces the Load Duration Curve with a Flexibility Duration Curve
- — Recognizes the transition away from peak-oriented capacity toward ramp mitigation capacity
- — Acknowledges that flexible capacity need is not uniform across the year
- — **Allows for the diversity of the fleet's ramp mitigation capabilities to be matched to the variable value of "flexible capacity" over time**

More likely to be non-discriminatory for preferred resources

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Matching the diversity of fleet flexible capability to need

The pool of flexible resources is widely variable.
- Cost of providing flexibility varies from resource to resource
- Reflects both contractual and physical constraints

Matching need as granularly as possible with fleet capability is economically efficient
- Acknowledges that flexible capacity need is not uniform across the year
- Acknowledges that different resources may be better suited to provide ramp mitigation at different times of the year
- Provides a mechanism for valuing a range of programs and policies based on their ability to "peak shave" future flexible capacity needs.

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An overview of load duration curves

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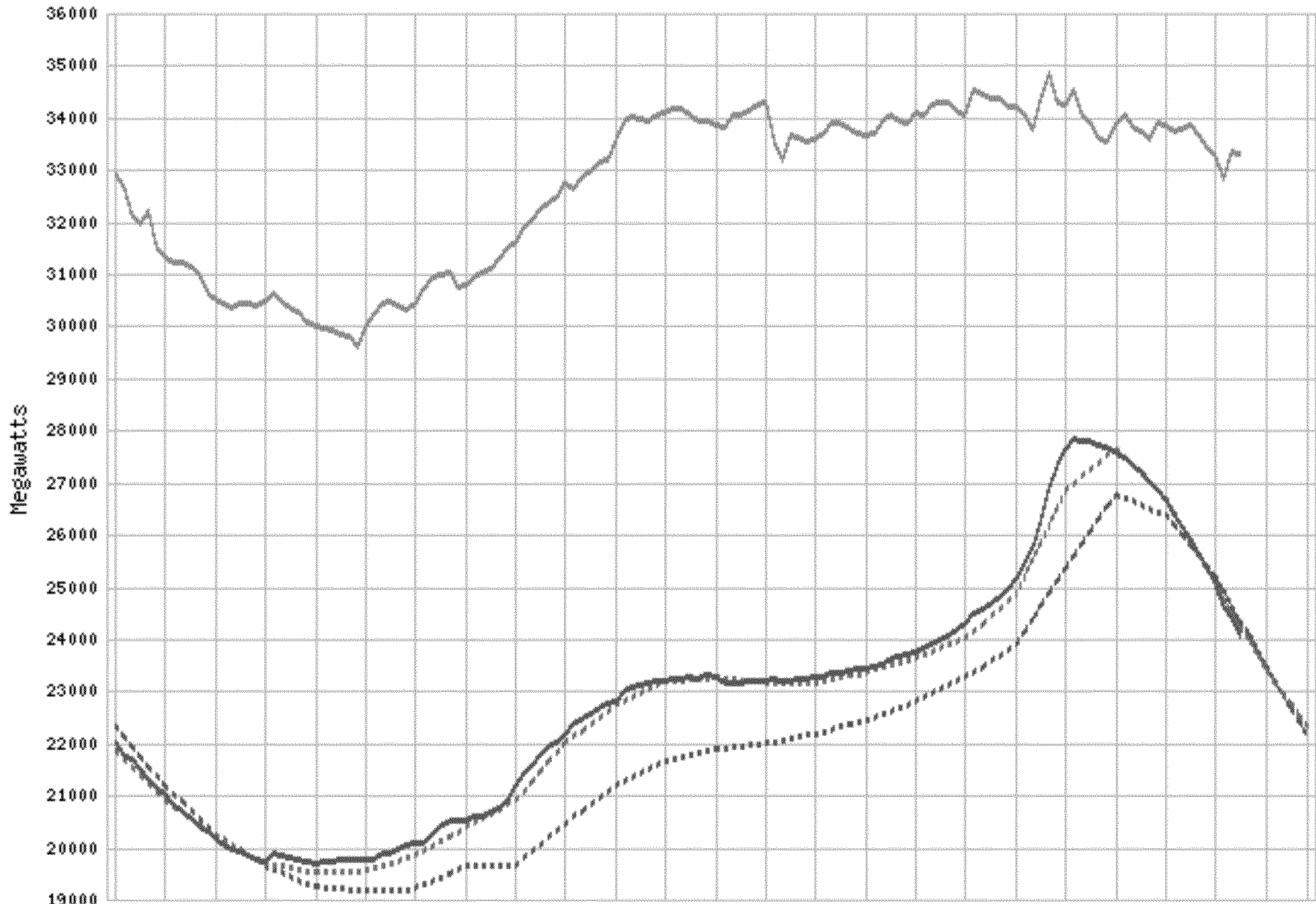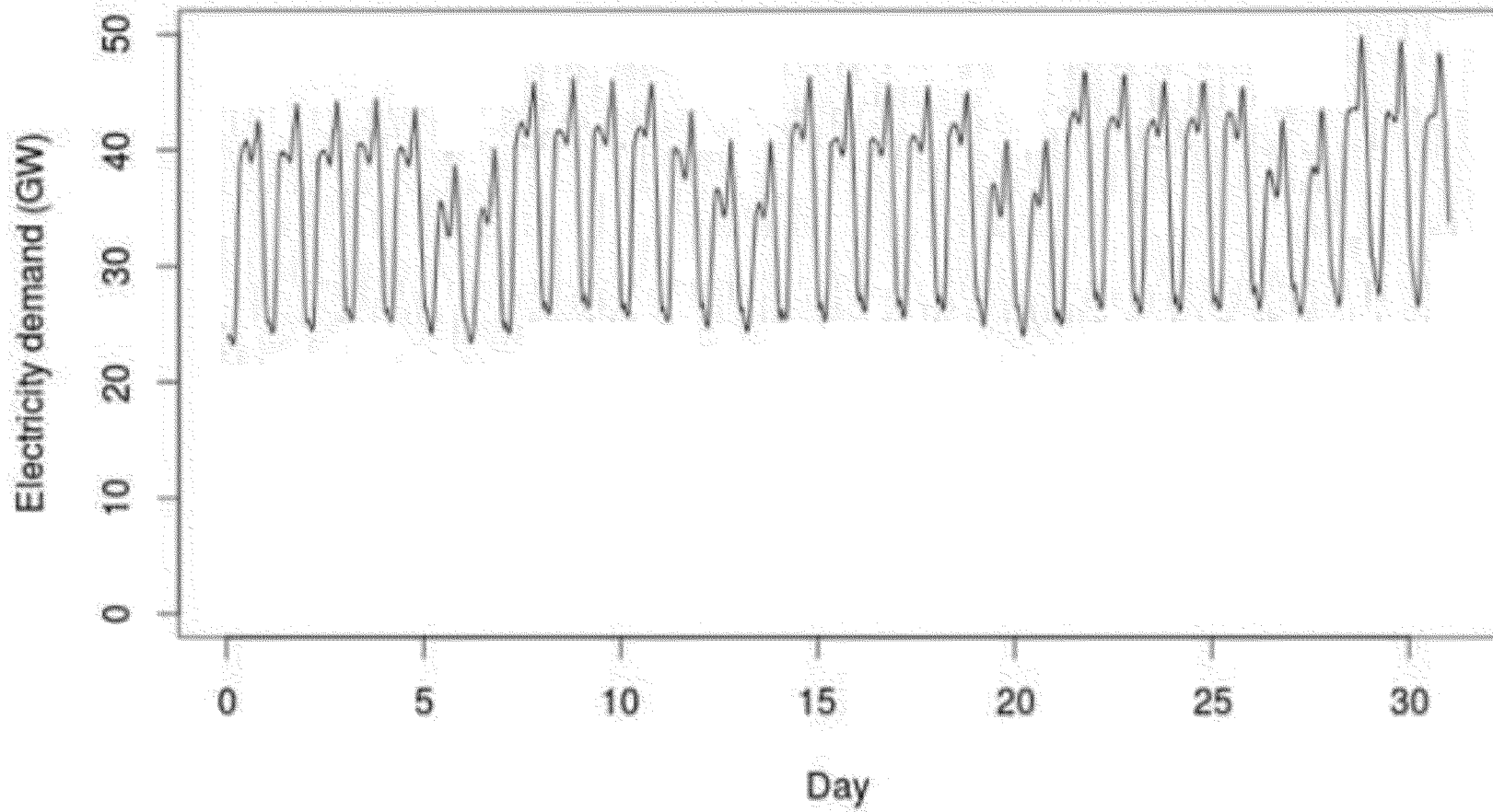# The Load Duration Curve – Daily, Chronological

Image: CAISO Aggregated Demand Chart, Sunday Oct 13, 2013

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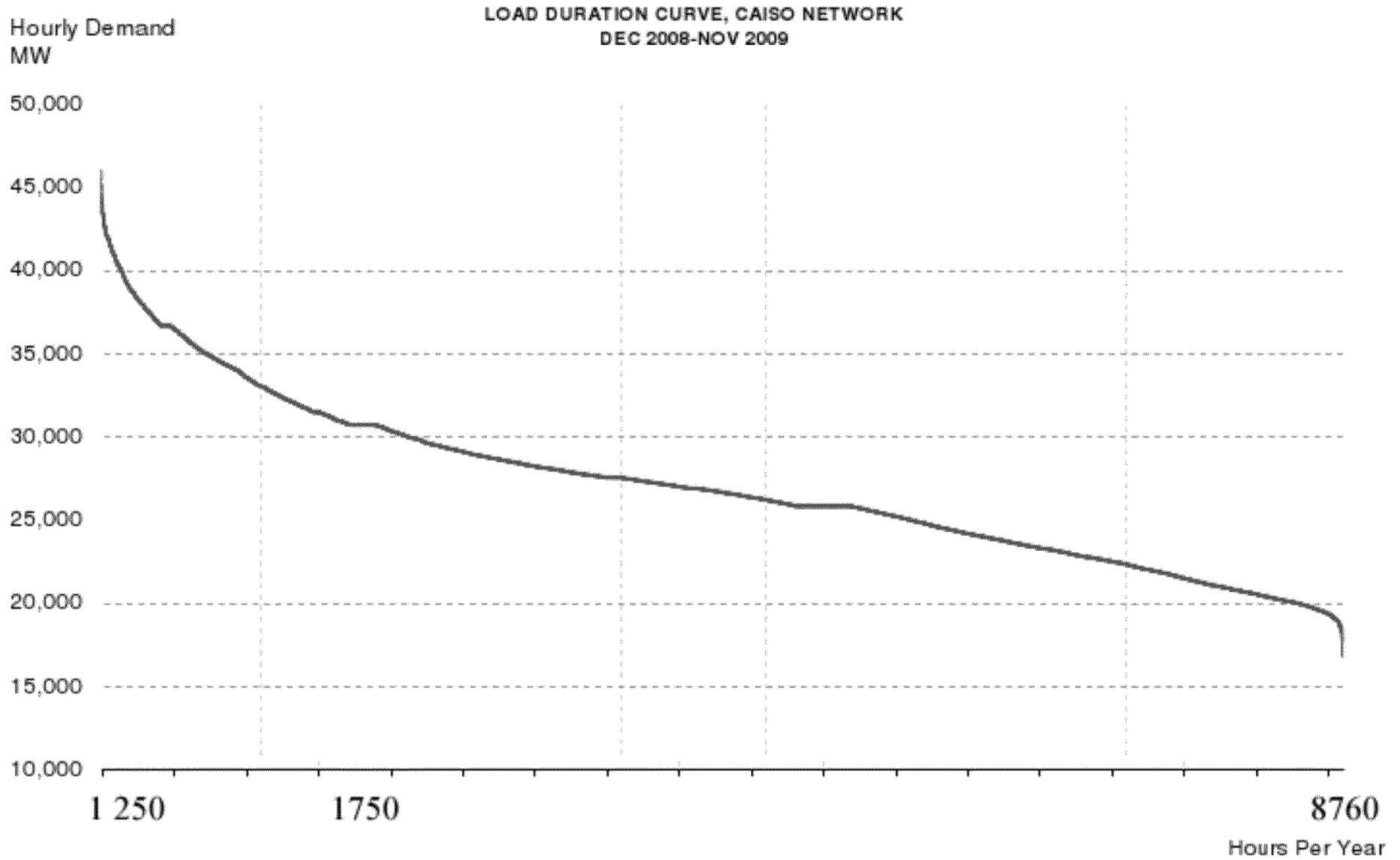# The Load Duration Curve – Monthly, Chronological

Hypothetical monthly aggregated demand chart

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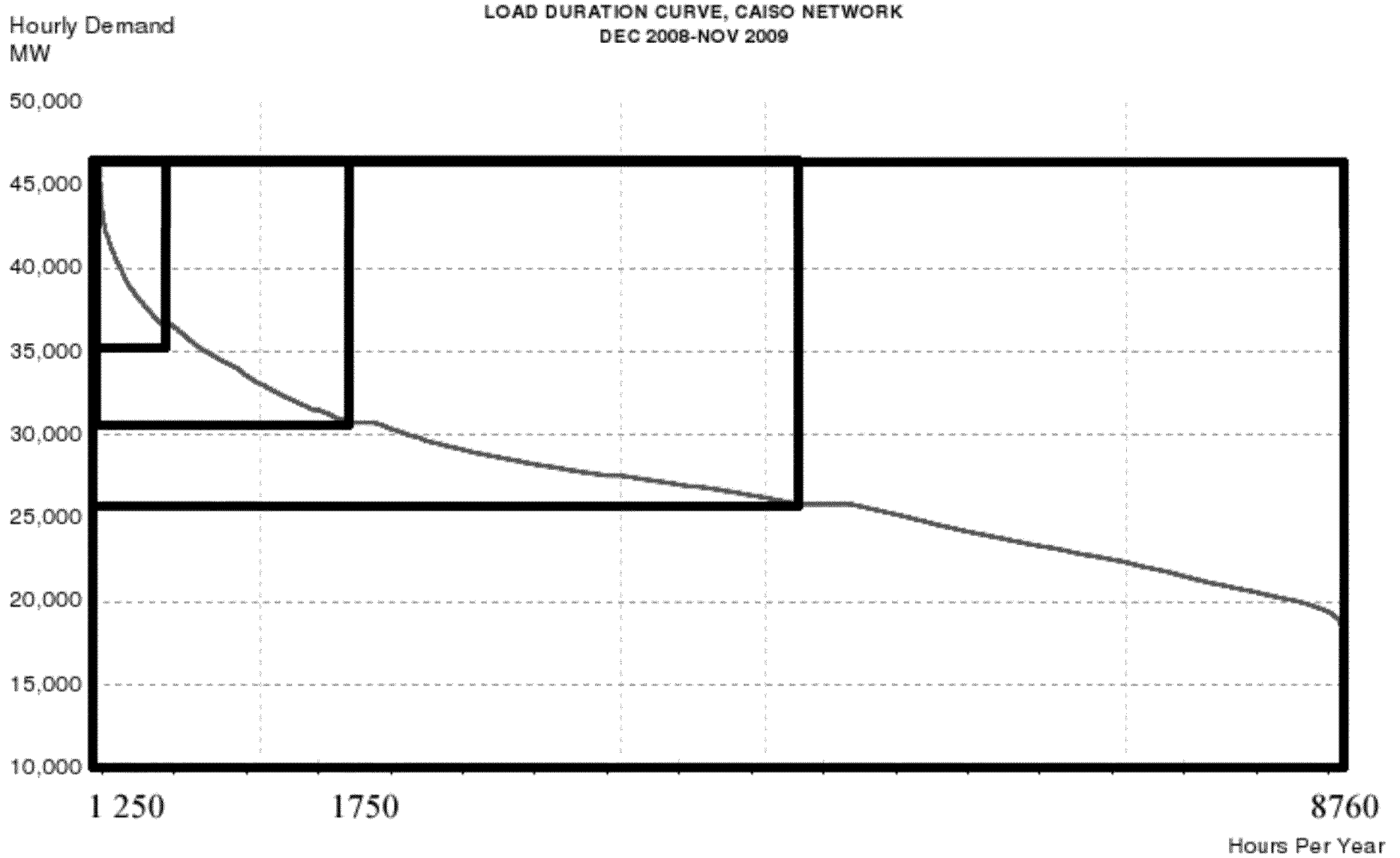# The Load Duration Curve – Annual, Peak-Oriented

Hourly Demand
MW

LOAD DURATION CURVE, CAISO NETWORK
DEC 2008-NOV 2009

Hours Per Year

Source: California Independent System Operator (CAISO), OASIS database.

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Load Duration Curve with MCC Buckets

Hourly Demand
MW

**LOAD DURATION CURVE, CAISO NETWORK
DEC 2008-NOV 2009**

50,000

45,000

40,000

35,000

30,000

25,000

20,000

15,000

10,000

1 250   1750   8760

Hours Per Year

Source: California Independent System Operator (CAISO), OASIS database.

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MCC Bucket details

Original MCC buckets were described in a 2004 workshop report and adopted via Commission decision via reference:

http://docs.cpuc.ca.gov/word_pdf/REPORT/37456.pdf

Availability for the smallest bucket ran from May through September, respectively: 30, 40, 40, 60, and 40 hours, totaling 210 hours; defined as the number of hours ISO aggregate load is greater than 90% of the monthly peak for those months

2012 Saw the creation of a Demand Response Bucket in D.12-06-025

DR resources are required to be available 24 hours a month

All DR resources are required to be available a minimum of four hours per day, and three days in a row to be available as RA credit
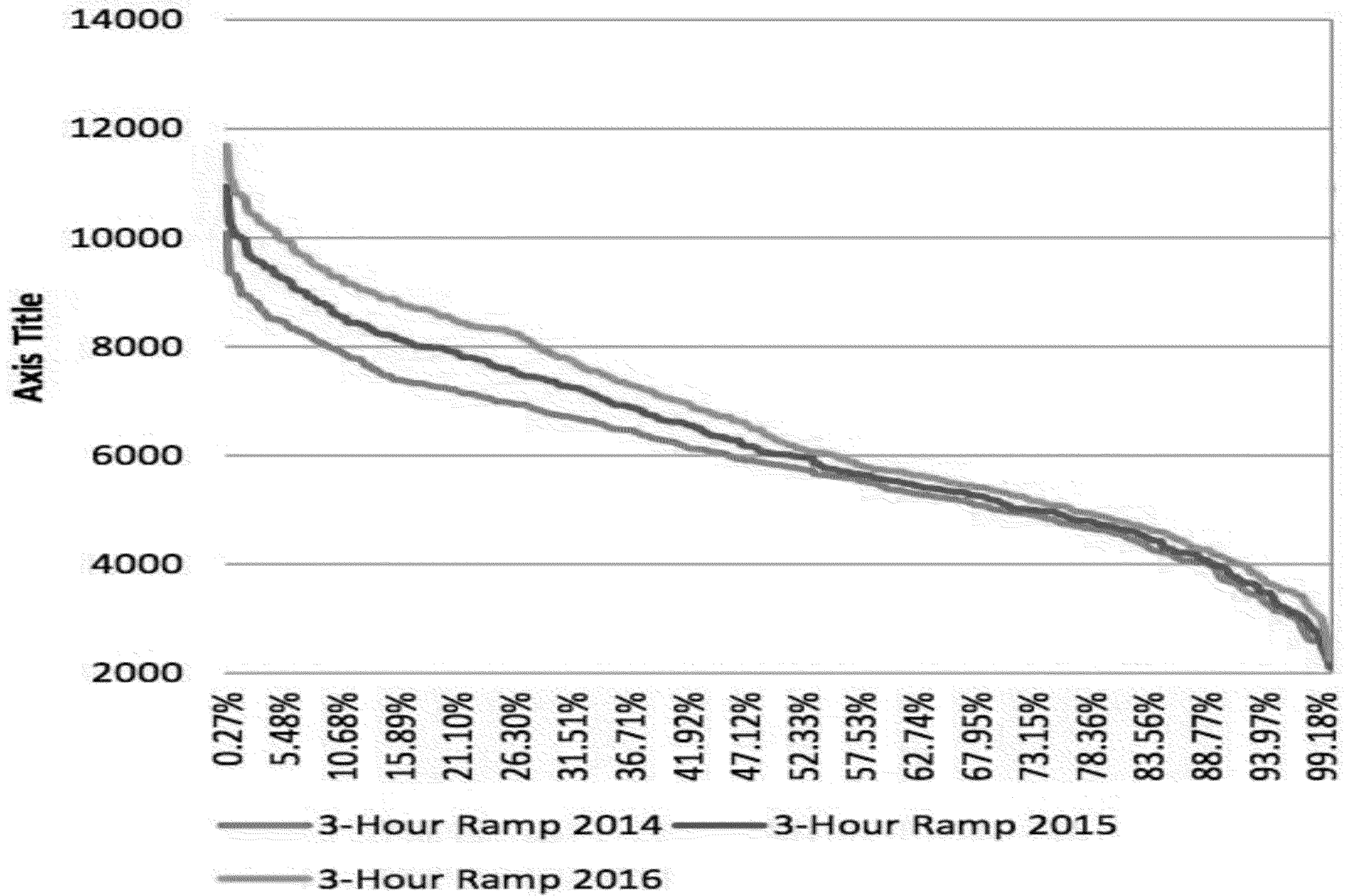
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The Flexibility Duration Curve:
The (discredited) duck as a jumping off point

Net load
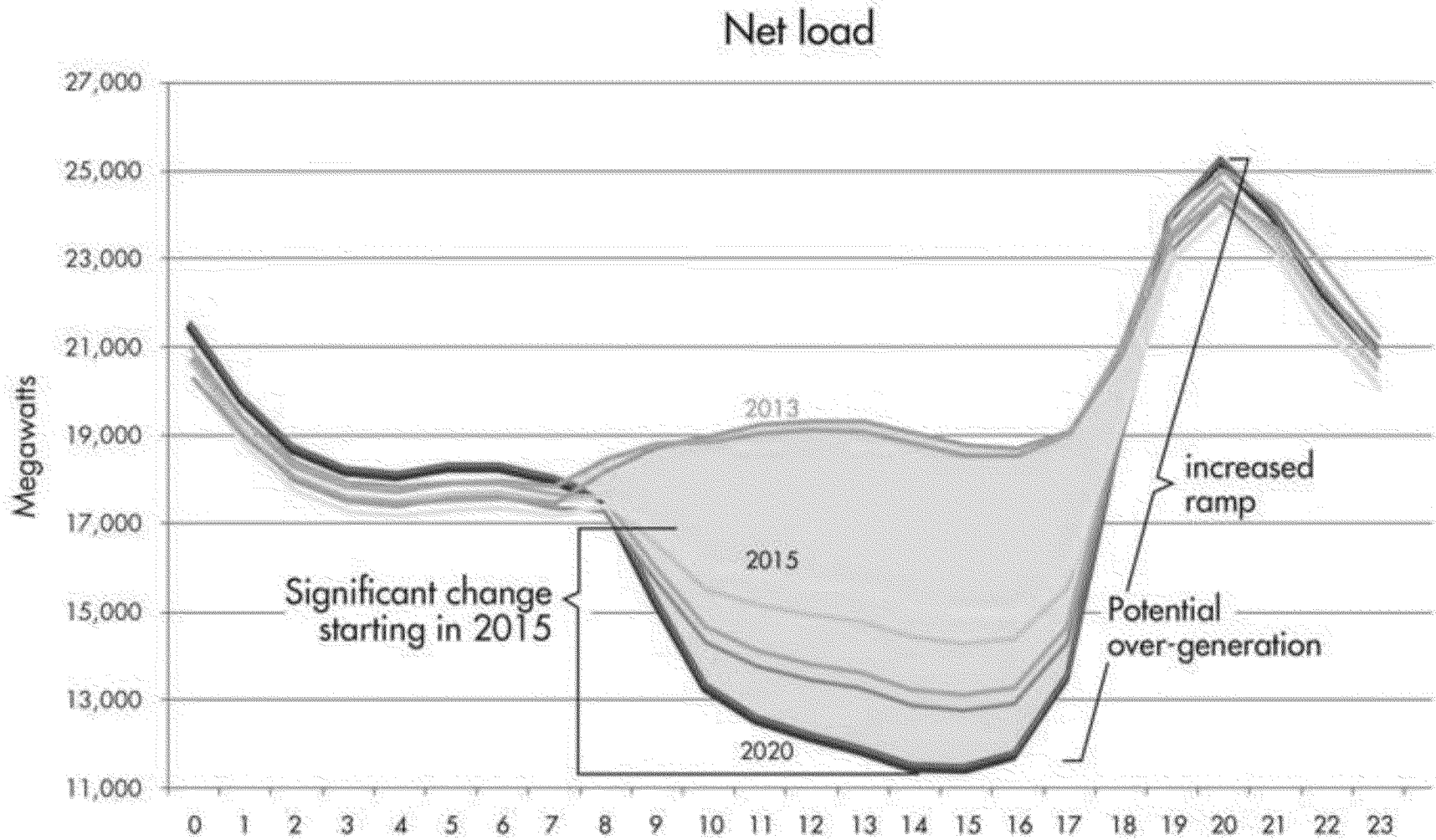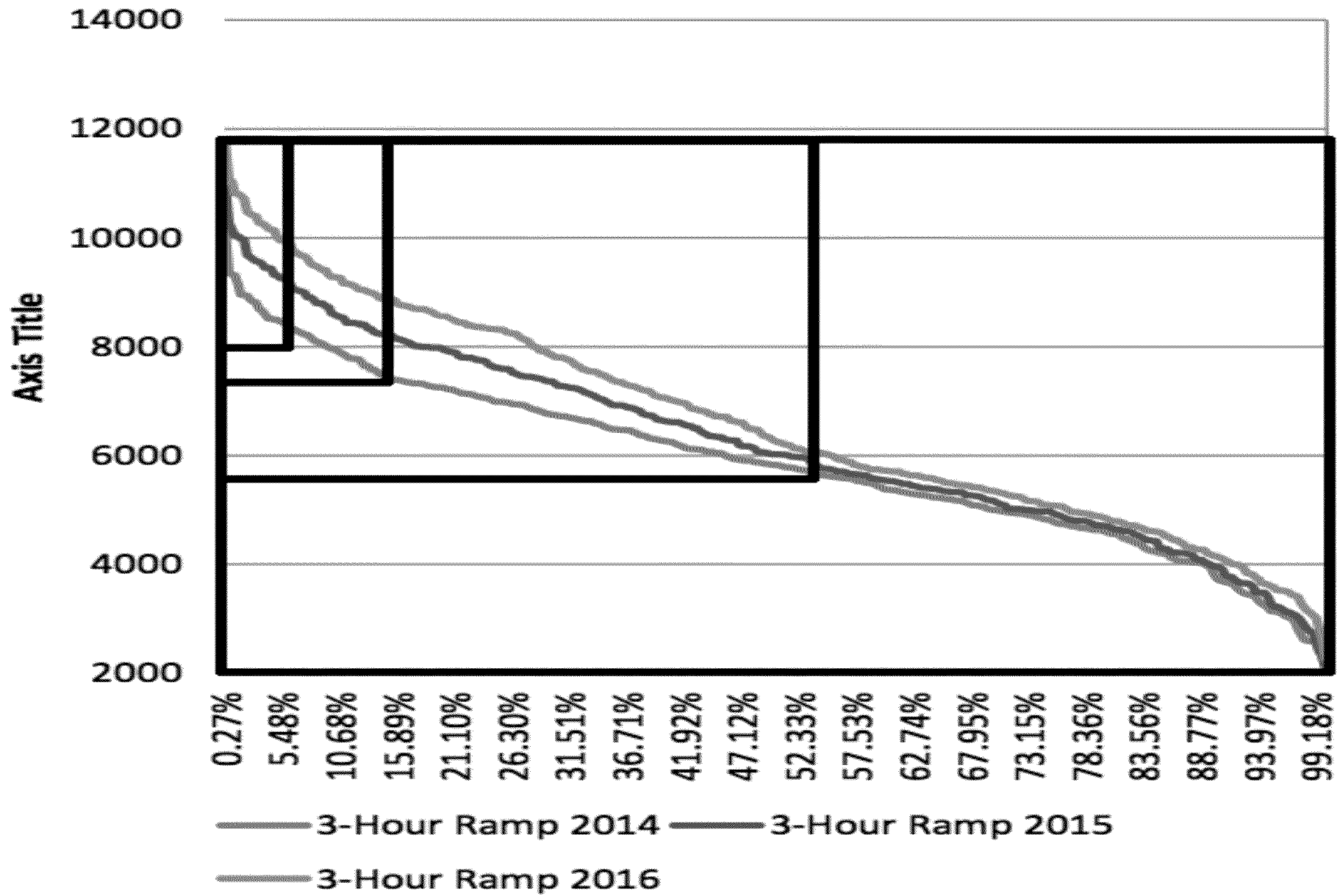
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The Flexibility Duration Curve – Annual flexibility demand

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The Flexibility Duration Curve with MCC buckets

Axis Title (y-axis): 2000, 4000, 6000, 8000, 10000, 12000, 14000

X-axis: 0.27%, 5.48%, 10.68%, 15.89%, 21.10%, 26.30%, 31.51%, 36.71%, 41.92%, 47.12%, 52.33%, 57.53%, 62.74%, 67.95%, 73.15%, 78.36%, 83.56%, 88.77%, 93.97%, 99.18%

Legend: 3-Hour Ramp 2014 — 3-Hour Ramp 2015 — 3-Hour Ramp 2016

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Applying the old MCC bucket rules to flexible capacity

Requires only minor changes:

Re-orient the buckets toward the months with the greatest flexible capacity need.

Require availability for ramp mitigation "events" rather than "generic hours of availability".

Utilize (as an example) 90% threshold for magnitude of 3 hour ramp instead of peak load.

Existing Demand Response treatment can be applied to Demand Response and preferred resources or 50 hour bucket can be created for peak flexible demand shaving.

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Other benefits?

Compliance mechanism is consistent with a migration away from peak-oriented N/QC based flexible capacity quantification. (Flexible Capacity not necessarily dependent on peak deliverability determination.)

Flexibility Duration Curve can change over time (see 2012 revisions to original MCC buckets as example).

"Ramp event availability" can be compartmentalized in upward or downward direction to allow aggregating of resources.

Compatible with ELCC for flexibility.

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Next Steps?

Need to create the (e.g.) 90% threshold to help establish key monthly need levels.
- this can very easily be accomplished before the 2015 compliance year.

Begin critical inquiry into how preferred and nontraditional ramp mitigation tools can be valued relative to peak ramp need.
- e.g. curtailment, energy efficiency.

Scope "ELCC for ramp mitigation" timeline.

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Thank You

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