PJM Load Model Selection for 2021 RRS

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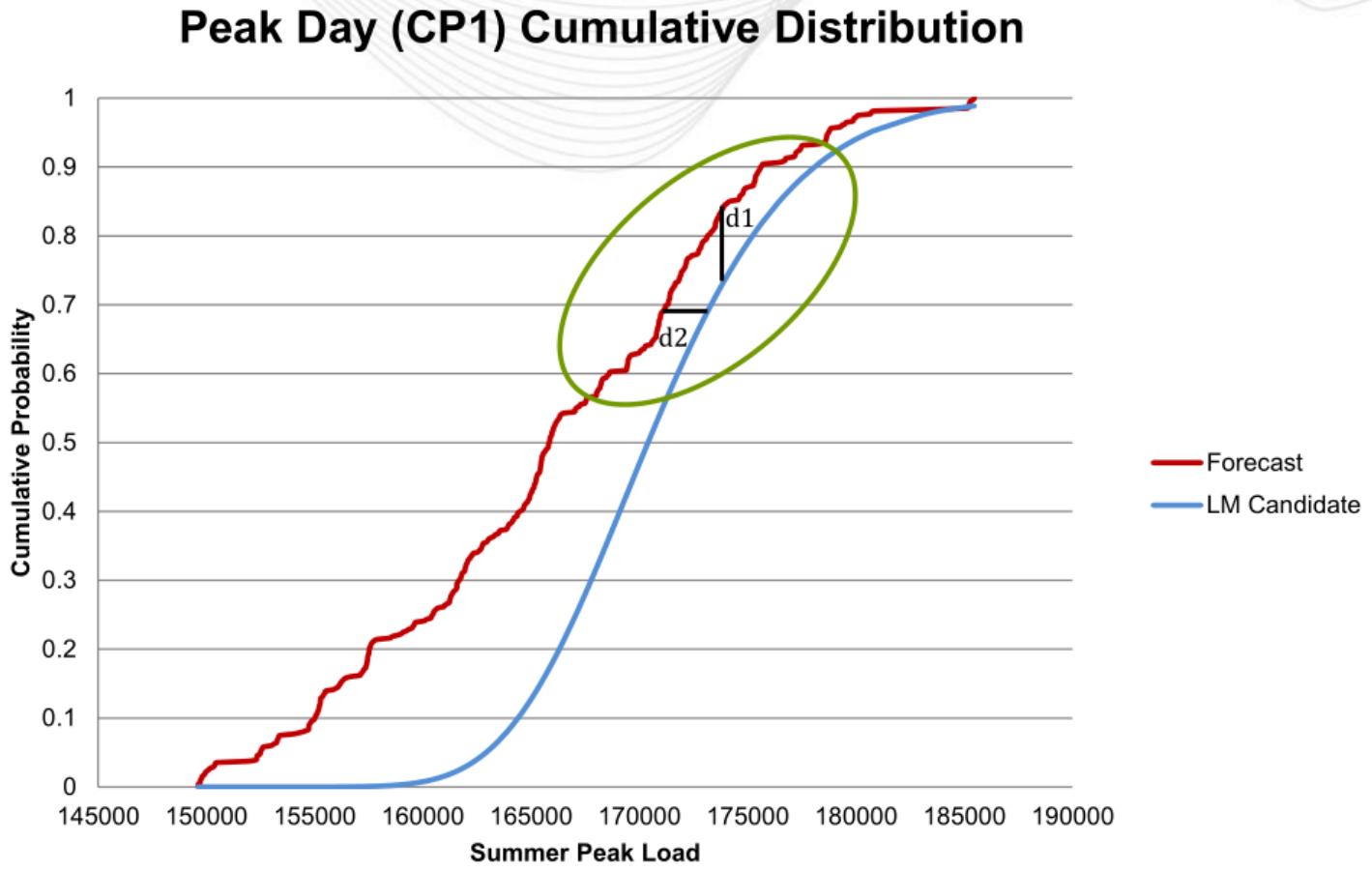
Background

- Load Model Selection is performed due to the fact that the Coincident Peak distributions from the PJM Load Forecast cannot be used directly in PRISM
- Analysis based on method approved at June 9, 2016 PC meeting (Appendix V in 2016 RRS Assumptions Letter)
  - Selected Load Model should be a good match of CP1 distribution from PJM load Forecast
  - Consideration of historical PJM / World load diversity
- This year the analysis is based on the 2021 Load Forecast Report. Focus is on 2025/26 Delivery Year.

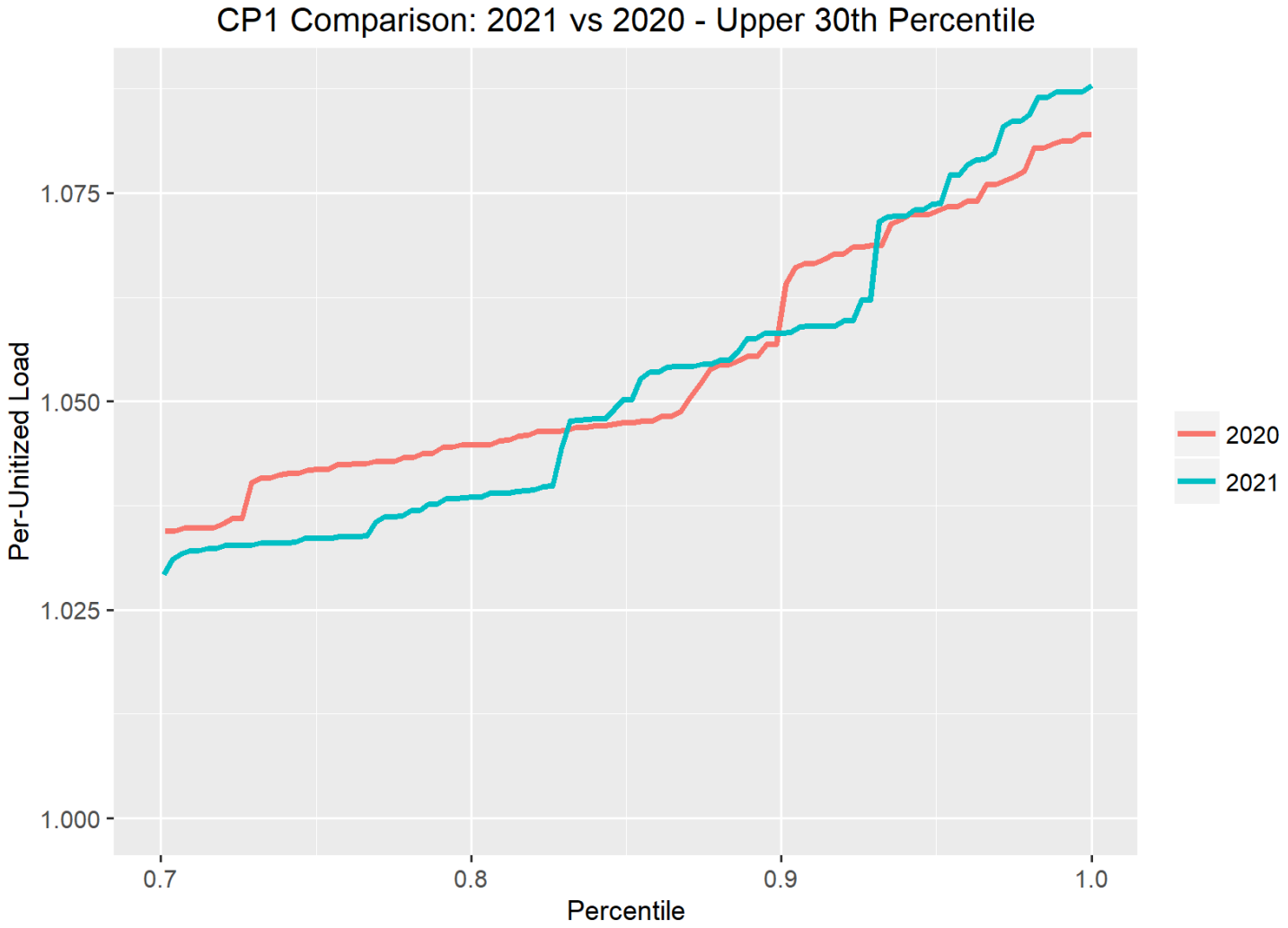
Load Model Candidate vs CP1 from Load Forecast



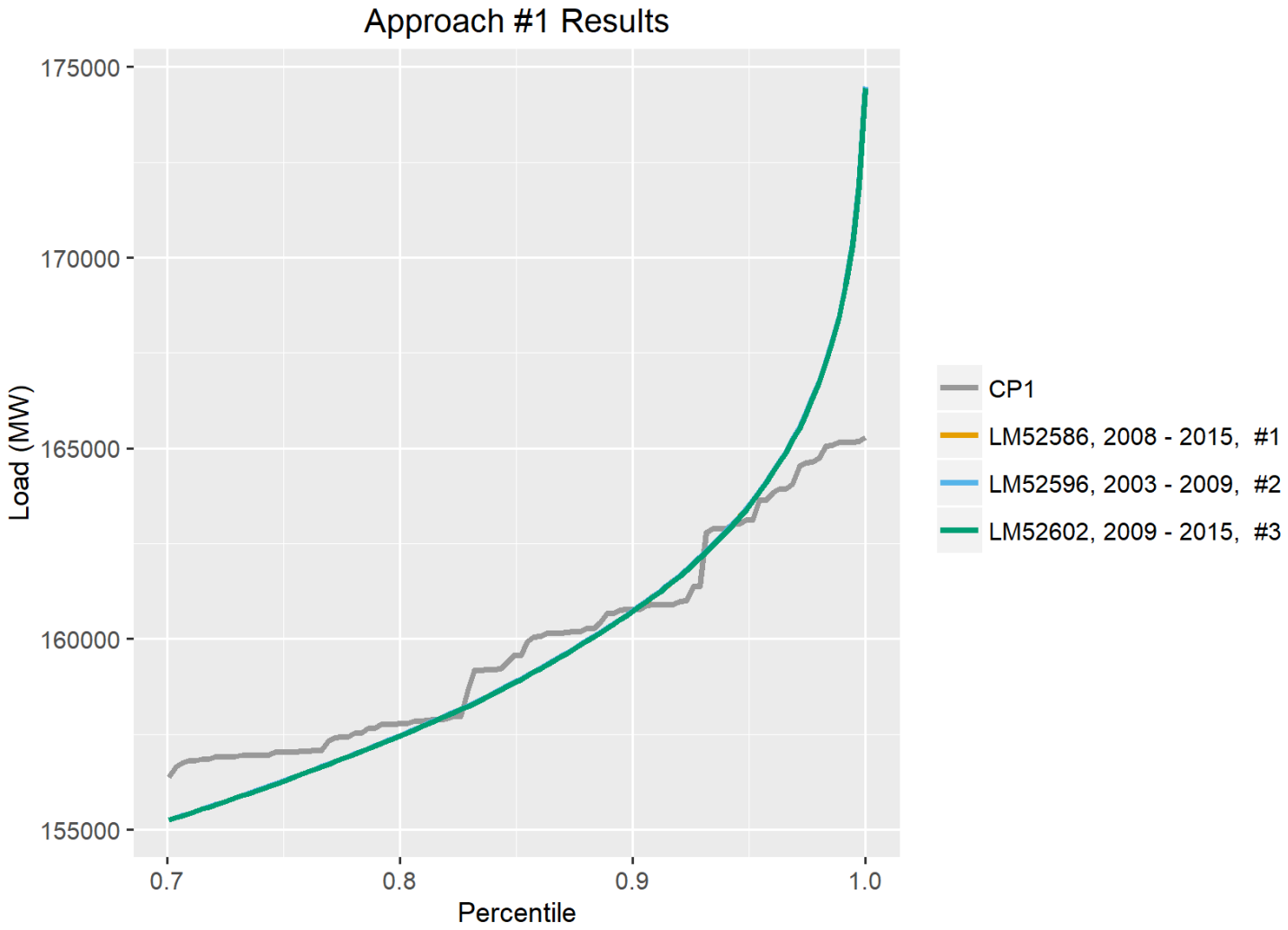
PJM Load Model Combinations to Assess

- A total of 120 Load Models are examined
  - Ranging from a 21-year Load Model to several 7-year Load Models
  - Load Models built with less than 7 years of data are not considered

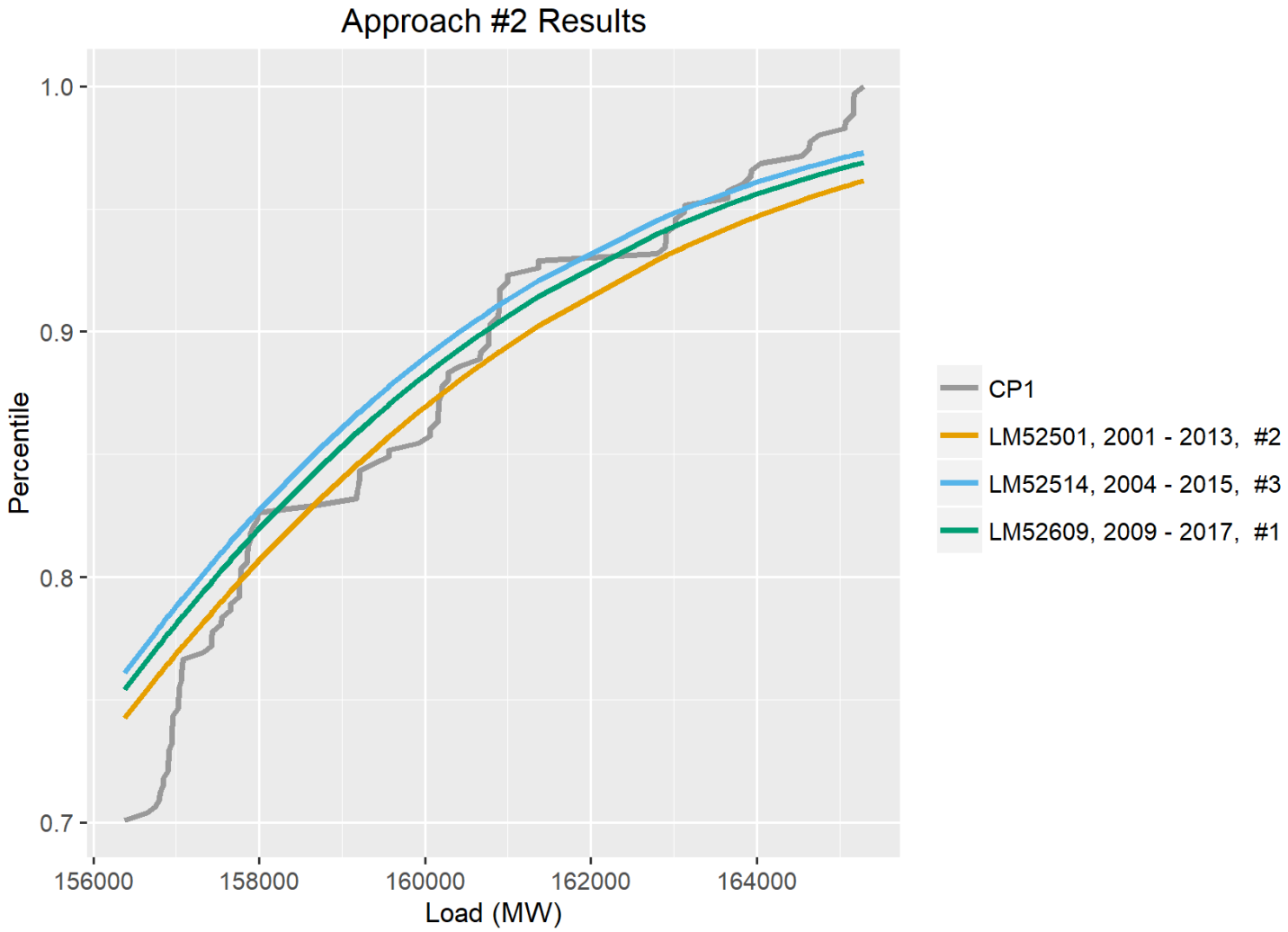
Load Forecast Model CP1 Distribution - 2021 vs 2020



Approach 1 – 70th percentile and above



Approach 2 – 70th percentile and above



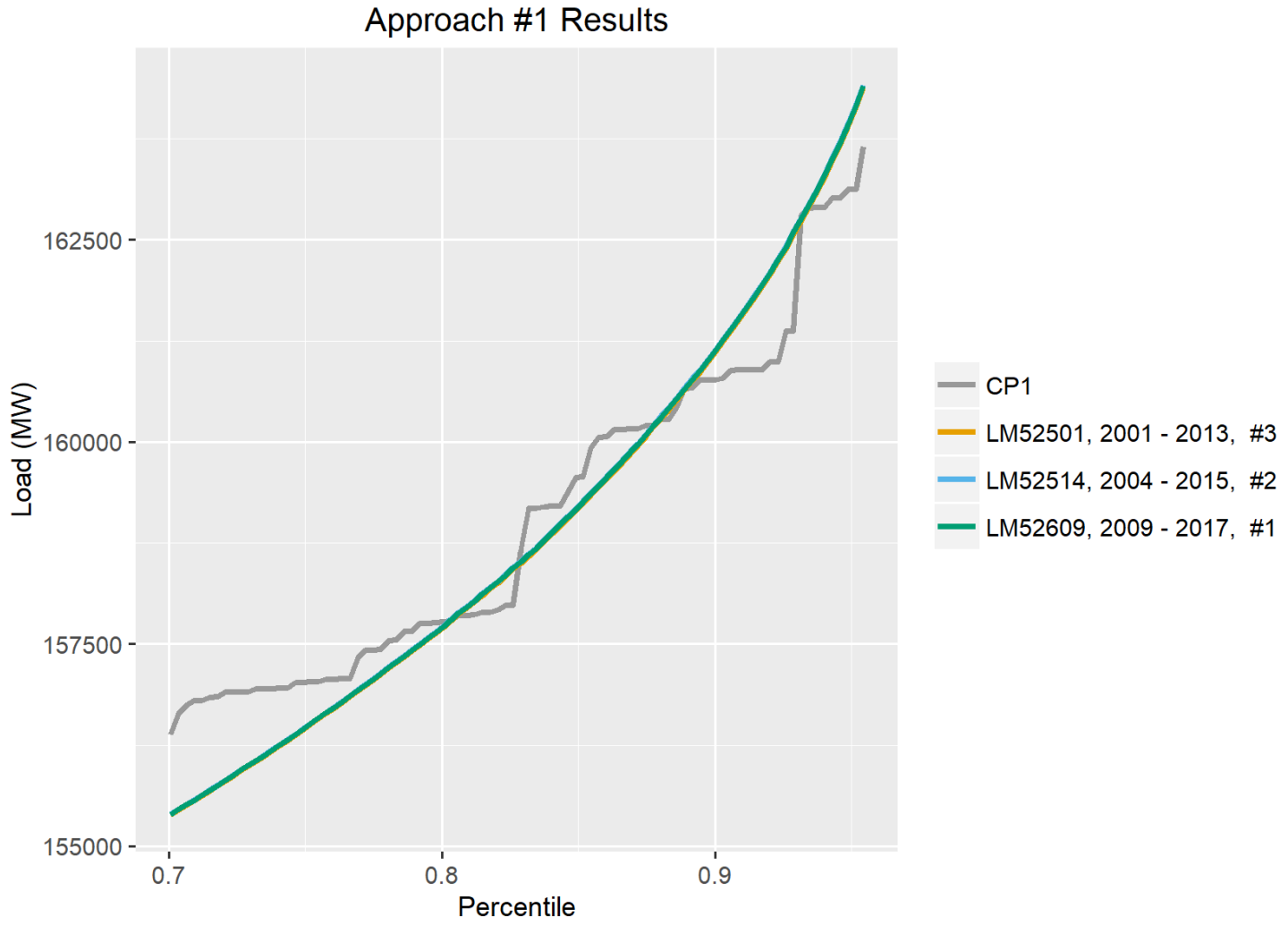
Results from Approaches #1 and #2

- The top ranked models from Approaches 1 and 2 do not match
- Approach #1. Top ranked
  - 52586: 2008-2015
  - 52596: 2003-2009
  - 52602: 2009-2015
- Approach #2. Top Ranked
  - 52609: 2009-2017
  - 52501: 2001-2013
  - 52514: 2004-2015

Comments about Approaches #1 and #2

- Approach #1 relies on sampling
- Approach #2 relies on an analytical approach
- Approach #2 is superior to Approach #1. Sampling is usually used when analytical approaches are not available.
- This suggests that the results from Approach 2 should take precedence

Approach 1 – Between 70th and 95th percentiles



If we discard the upper 5th percentile in Approach 1, there is convergence between the results from Approaches 1 and 2

PJM Selected Load Models

- Load Model (LM) Choices
  - 52609: 2009-2017
  - 52501: 2001-2013
  - 52514: 2004-2015
- Last year's selected LM (2002 – 2014) is **not** one of the top candidates this year.
  - This is because of the new CP1 distribution

World Load Models

- World Load Models were created using PLOTS program, observing the same historic time periods. In so doing, we consider the PJM/World diversity.
  - Uses historic Coincident Peak pattern
  - World defined as MISO, NY, TVA, and VACAR.

LM #52609 (2009-2017) - PJM vs World Assessment

		PJM RTO LM #52609 9 Yr Load Model - 2009 - 2017	**World Region** LM #52616
Month	WK #	Per-Unitized Peak	Per-Unitized Peak
June	5	0.8348	0.9038
June	6	0.9443	0.9564
June	7	0.8712	0.9326
July	8	0.9705	0.9702
July	9	0.8971	0.9650
July	10	1.0000	1.0000
July	11	0.9362	0.9517
August	12	0.8904	0.9938
August	13	0.9642	0.9698
August	14	0.9094	0.9236
August	15	0.8478	0.8847

LM #52501 (2001-2013) - PJM vs World Assessment

Month	WK #	**PJM RTO** LM #52501 13 Yr Load Model - 2001 - 2013 Per-Unitized Peak	**World Region** LM #52618 Per-Unitized Peak
June	5	0.8449	0.8796
June	6	0.8915	0.9343
June	7	0.9443	0.9564
July	8	0.8565	0.8941
July	9	0.9004	0.9514
July	10	1.0000	1.0000
July	11	0.9214	0.9731
August	12	0.9642	0.9938
August	13	0.9275	0.9483
August	14	0.8736	0.8709
August	15	0.8272	0.8938

LM #52514 (2004-2015) - PJM vs World Assessment

Month	WK #	**PJM RTO** LM #52514 12 Yr Load Model - 2004 - 2015 Per-Unitized Peak	**World Region** LM #52617 Per-Unitized Peak
June	5	0.8488	0.8815
June	6	0.9322	0.9441
June	7	0.9443	0.9564
July	8	0.8622	0.8692
July	9	0.9046	0.9280
July	10	1.0000	1.0000
July	11	0.9346	0.9567
August	12	0.9642	0.9938
August	13	0.9269	0.9698
August	14	0.8314	0.9022
August	15	0.8129	0.8714

Summary

- All 3 selected load models have PJM peaking on the same week as the World
- The 3 selected load models perform similarly under Approach 2 and under Approach #1 (70^{th} to 95^{th} percentiles)
- However, Load Model 52501: 2001-2013, is built with data from a longer time period

Historical Peak Load Coincidence PJM / World

Year	PJM Peak - Actual Date	World Peak - Actual Date	Peak Coincidence?
1998	21-Jul-98	21-Jul-98	Yes
1999	30-Jul-99	28-Jul-99	No
2000	9-Aug-00	31-Aug-00	No
2001	9-Aug-01	8-Aug-01	No
2002	1-Aug-02	1-Aug-02	Yes
2003	21-Aug-03	14-Aug-03	No
2004	3-Aug-04	2-Aug-04	No
2005	26-Jul-05	25-Jul-05	No
2006	2-Aug-06	1-Aug-06	No
2007	8-Aug-07	8-Aug-07	Yes
2008	9-Jun-08	21-Jul-08	No
2009	10-Aug-09	10-Aug-09	Yes
2010	7-Jul-10	4-Aug-10	No
2011	21-Jul-11	20-Jul-11	No
2012	17-Jul-12	17-Jul-12	Yes
2013	18-Jul-13	18-Jul-13	Yes
2014	7-Jan-14	7-Jan-14	Yes
2015	28-Jul-15	28-Jul-15	Yes
2016	11-Aug-16	22-Jul-16	No
2017	19-Jul-17	20-Jul-17	No
2018	28-Aug-18	29-Jun-18	No
2019	19-Jul-19	19-Jul-19	Yes

In the last 22 years, PJM and the World **have not peaked** on the same day 13 times.

LM #52501 (2001-2013) - Switching of World peak week

Month	WK #	**PJM RTO** LM #52501 13 Yr Load Model - 2001 - 2013 Per-Unitized Peak	**World Region** LM #52618 Per-Unitized Peak
July	8	0.8565	0.8941
July	9	0.9004	0.9514
July	10	1.0000	0.9731
July	11	0.9214	1.0000

2021 RRS Load Model Recommendation

- PJM recommendation to RAAS on selection of historical time period for load model:
  - **Use 13yr (2001-2013, #52501) Load Model for 2021 RRS Base Case and switch World peak to a different July week so that PJM and World peak in the same month but not in the same week.**
    - Switch in World peak week is performed to match historical diversity observed between PJM and World