PJM Load Model Selection for 2020 RRS

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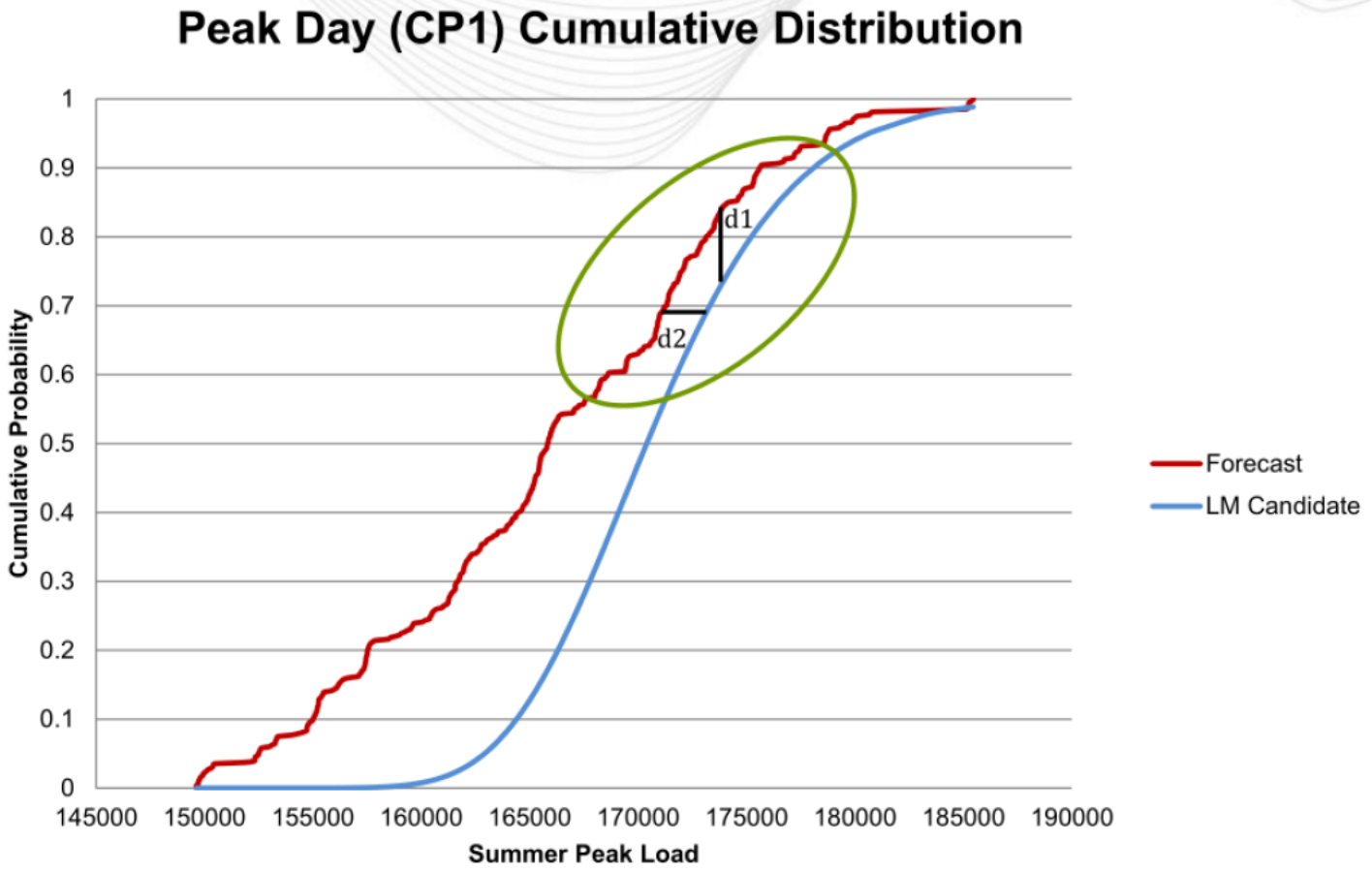
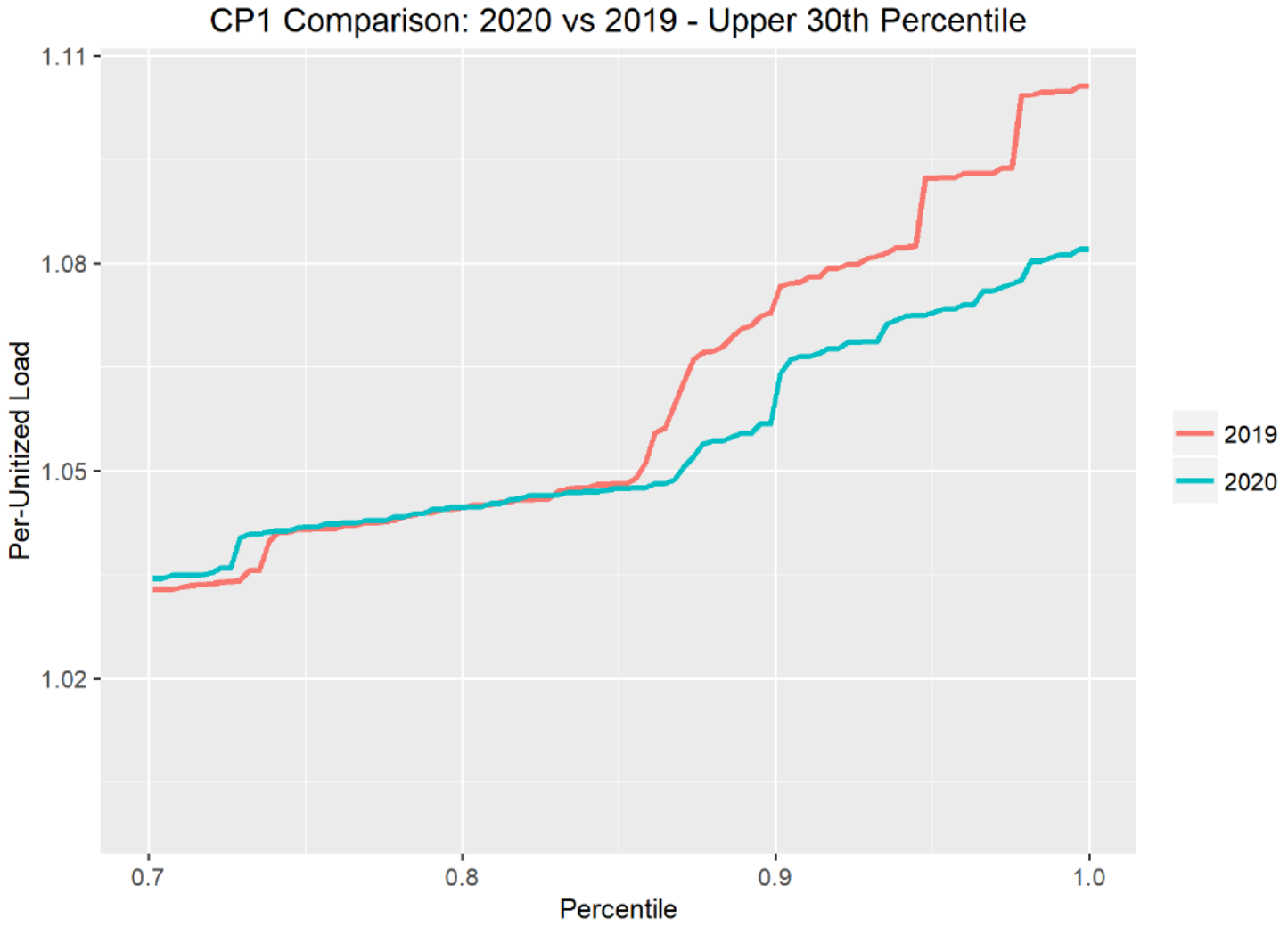
Background

- 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 2020 Load Forecast Report. Focus is on 2024/25 Delivery Year.

Load Model Candidate vs CP1 from Load Forecast



Load Forecast Model CP1 Distribution - 2020 vs 2019



PJM Selected Load Models based on Approaches #1 and #2

- Load Model (LM) Choices
  - 52100: 2011-2017
  - 52184: 2004-2014
  - 52224: 2002-2014
- Last year's selected LM (2003 – 2012) is **not** one of the top candidates this year.
  - This is because of the new CP1 distribution

PJM / World Load Diversity

- 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
- Comparison of the 3 PJM selected load models with the corresponding World load models results in PJM peaking in the same week as the World

Summary

- The 3 selected load models perform similarly under Approach 2 and under Approach #1 (70th to 95th percentiles)
- However, Load Model 52224: 2002-2014, is built with data from a longer time period
  - Also under Approach #1 (70th percentile and above), Load Model 52224: 2002-2014 performs better than the other 2 LMs
- There are no major differences between the 3 selected load models when it comes to PJM / World peak load diversity

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	3-Aug-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	21-Jul-16	No
2017	19-Jul-17	20-Jul-17	No
2018	28-Aug-18	29-Jun-18	No

In the last 21 years, PJM and the World **have not peaked** on the same day 13 times.

LM #52224 (2002-2014) - Switching of World peak week

Month	WK #	**PJM RTO** LM #52224 13 Yr Load Model - 2002 - 2014 Per-Unitized Peak	**World Region** LM #52279 Per-Unitized Peak
July	8	0.8806	0.9053
July	9	0.9072	0.9308
July	10	1.0000	0.9508
July	11	0.9296	1.0000

World peak week is now on Week 11. Originally, it was in Week 10.

2020 RRS Load Model Recommendation

- PJM recommendation to PC on selection of historical time period for load model:
  - **Use 13yr (2002-2014, #52224) Load Model for 2020 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

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PJM Load Model Selection for 2020 RRS

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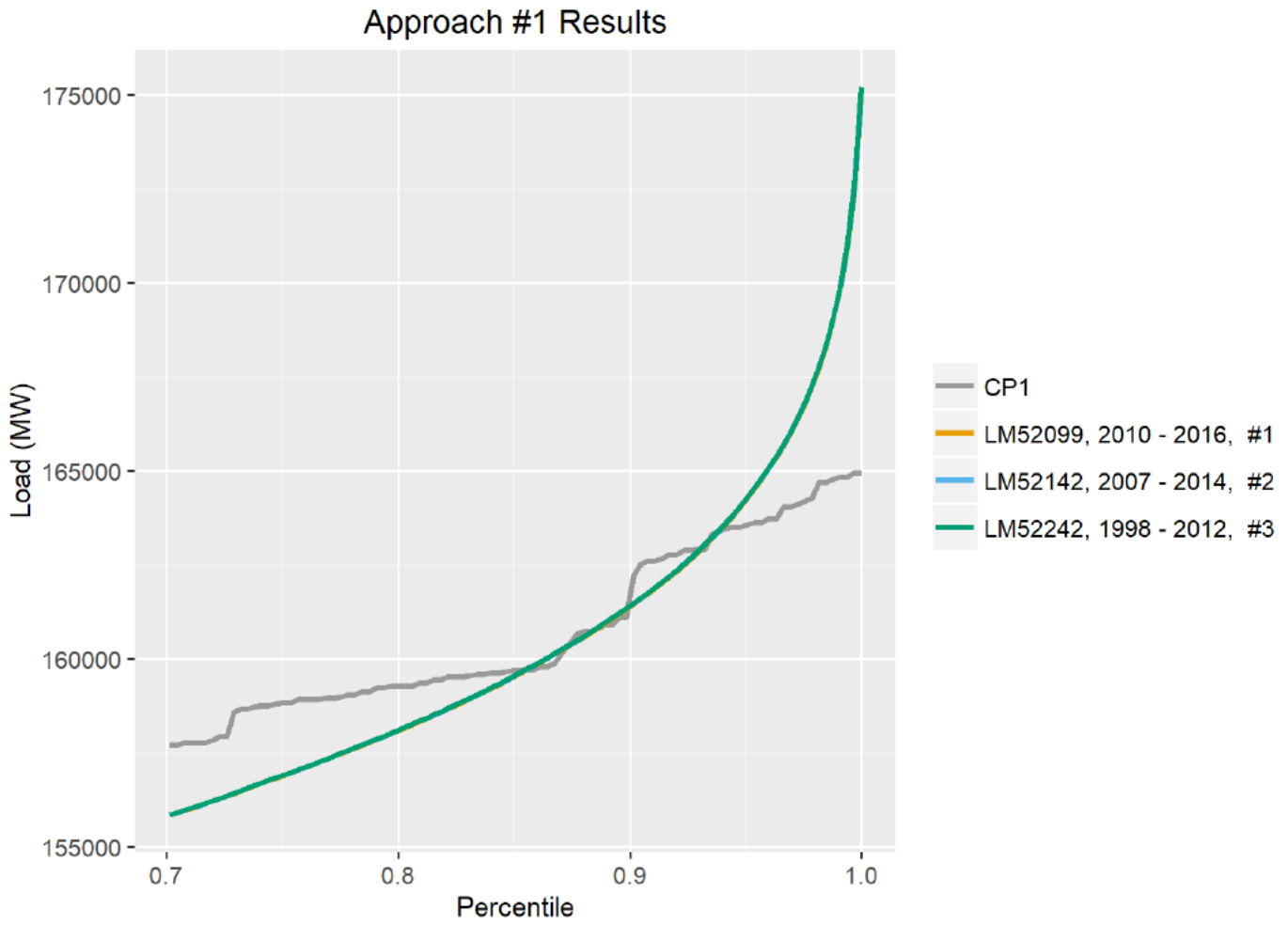
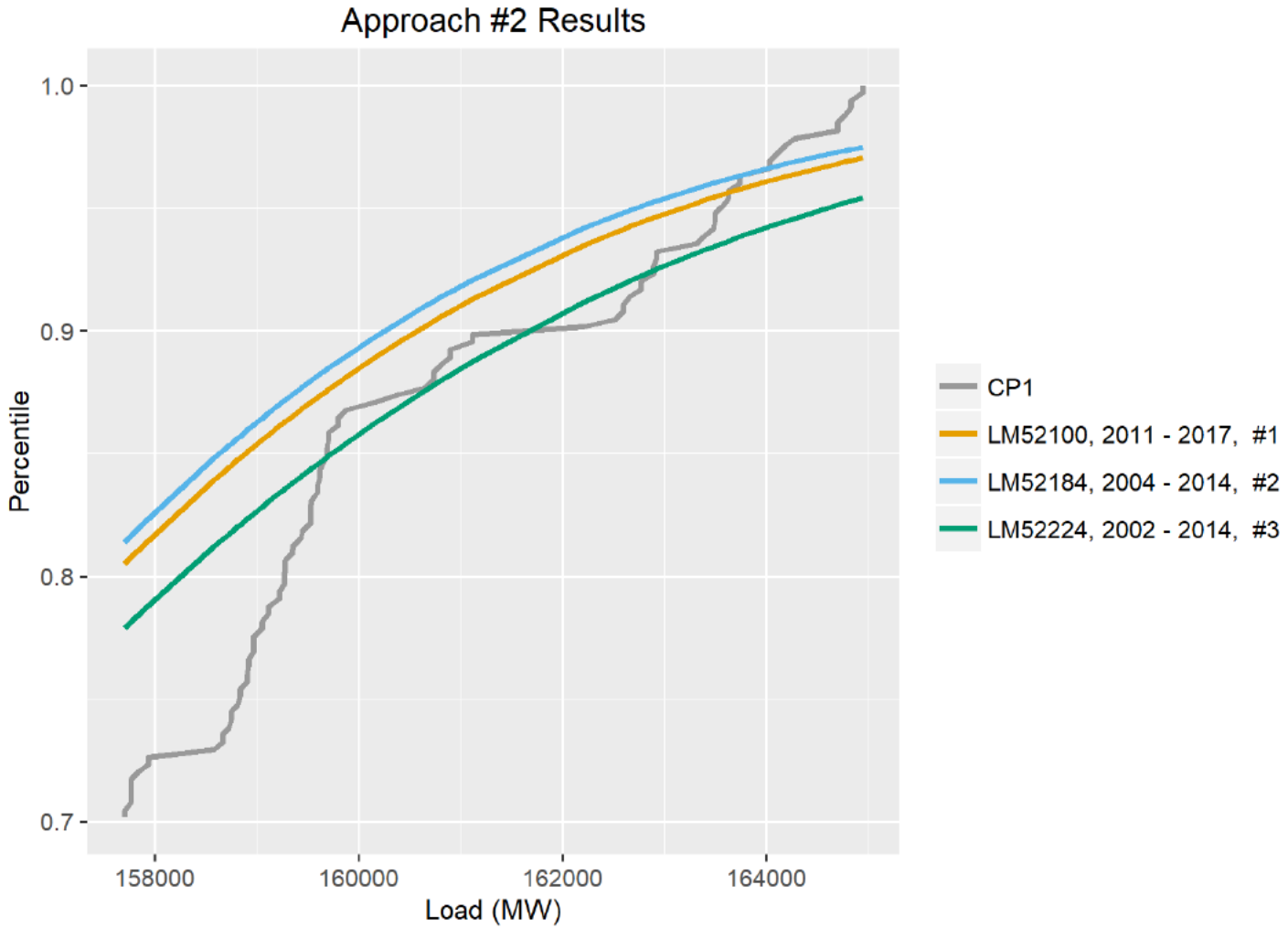
Appendix

Approach 1 – 70th percentile and above



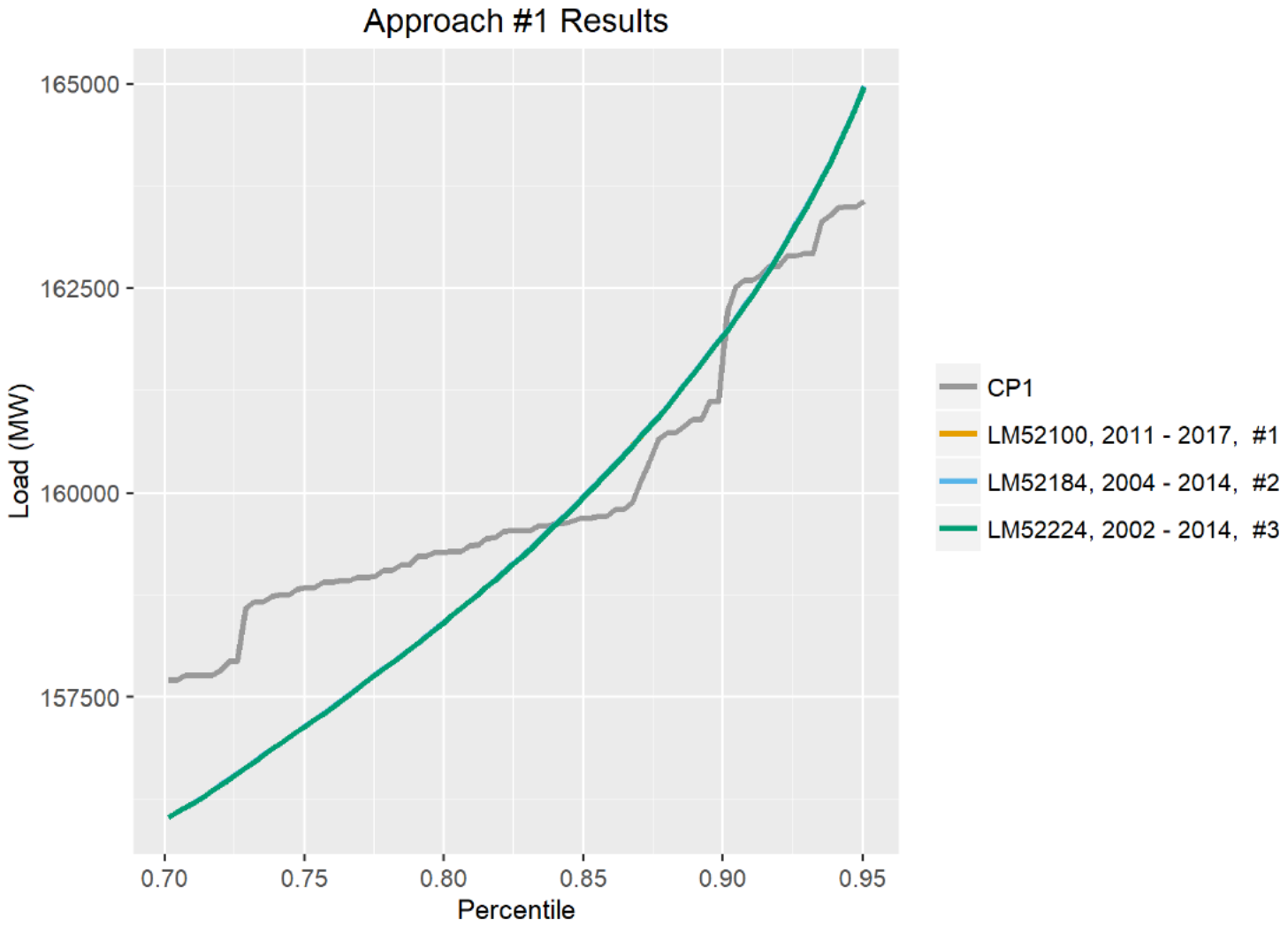
Approach 2 - 70th percentile and above



Results from Approaches #1 and #2

- The top ranked models from Approaches 1 and 2 do not match
- Approach #1. Top ranked
  - 52099: 2010-2016 (#38 in Approach #2)
  - 52142: 2007-2014 (#36 in Approach #2)
  - 52242: 1998-2012 (#35 in Approach #2)
- Approach #2. Top Ranked
  - 52100: 2011-2017 (#74 in Approach #1)
  - 52184: 2004-2014 (#75 in Approach #1)
  - 52224: 2002-2014 (#73 in Approach #1)

Approach 1 – Between 70th and 95th percentiles



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

LM #52100 (2011-2017) - PJM vs World Assessment

Month	WK #	**PJM RTO** LM #52100 7 Yr Load Model - 2011 - 2017 Per-Unitized Peak	**World Region** LM #52277 Per-Unitized Peak
June	5	0.8442	0.9056
June	6	0.9462	0.9389
June	7	0.9111	0.9544
July	8	0.9670	0.9662
July	9	0.9247	0.9494
July	10	1.0000	1.0000
July	11	0.9306	0.9338
August	12	0.9194	0.9928
August	13	0.9677	0.9585
August	14	0.9033	0.9291
August	15	0.8533	0.9099

LM #52184 (2004-2014) - PJM vs World Assessment

Month	WK #	**PJM RTO** LM #52184 11 Yr Load Model - 2004 - 2014 Per-Unitized Peak	**World Region** LM #52278 Per-Unitized Peak
June	5	0.8482	0.8782
June	6	0.9140	0.9419
June	7	0.9462	0.9541
July	8	0.8744	0.8891
July	9	0.9002	0.9282
July	10	1.0000	1.0000
July	11	0.9226	0.9446
August	12	0.9677	0.9943
August	13	0.9382	0.9830
August	14	0.8461	0.9003
August	15	0.8131	0.8688

LM #52224 (2002-2014) - PJM vs World Assessment

Month	WK #	**PJM RTO** LM #52224 13 Yr Load Model - 2002 - 2014 Per-Unitized Peak	**World Region** LM #52279 Per-Unitized Peak
June	5	0.8443	0.8748
June	6	0.8932	0.9090
June	7	0.9462	0.9541
July	8	0.8806	0.9053
July	9	0.9072	0.9308
July	10	1.0000	1.0000
July	11	0.9296	0.9508
August	12	0.9677	0.9943
August	13	0.9360	0.9819
August	14	0.8638	0.9163
August	15	0.8341	0.9037