

## Perfect Dispatch Update

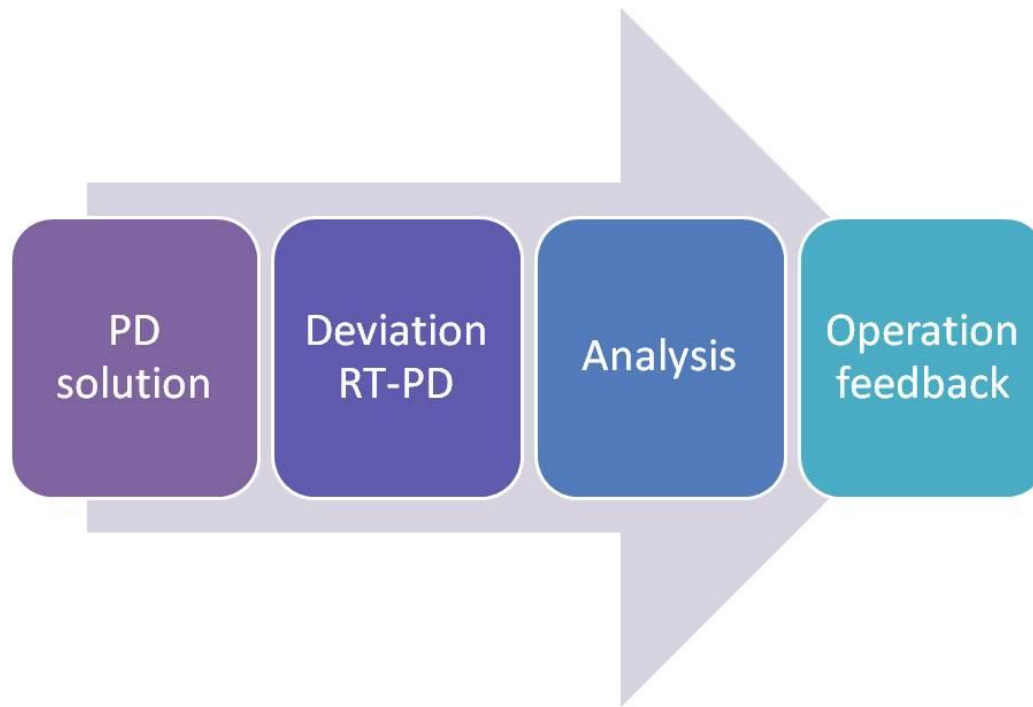
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PJM Interconnection

Operating Committee meeting  
March 16, 2010

- Perfect Dispatch Review
- Perfect Dispatch Performance Update
- Information out of Perfect Dispatch
- Next Steps

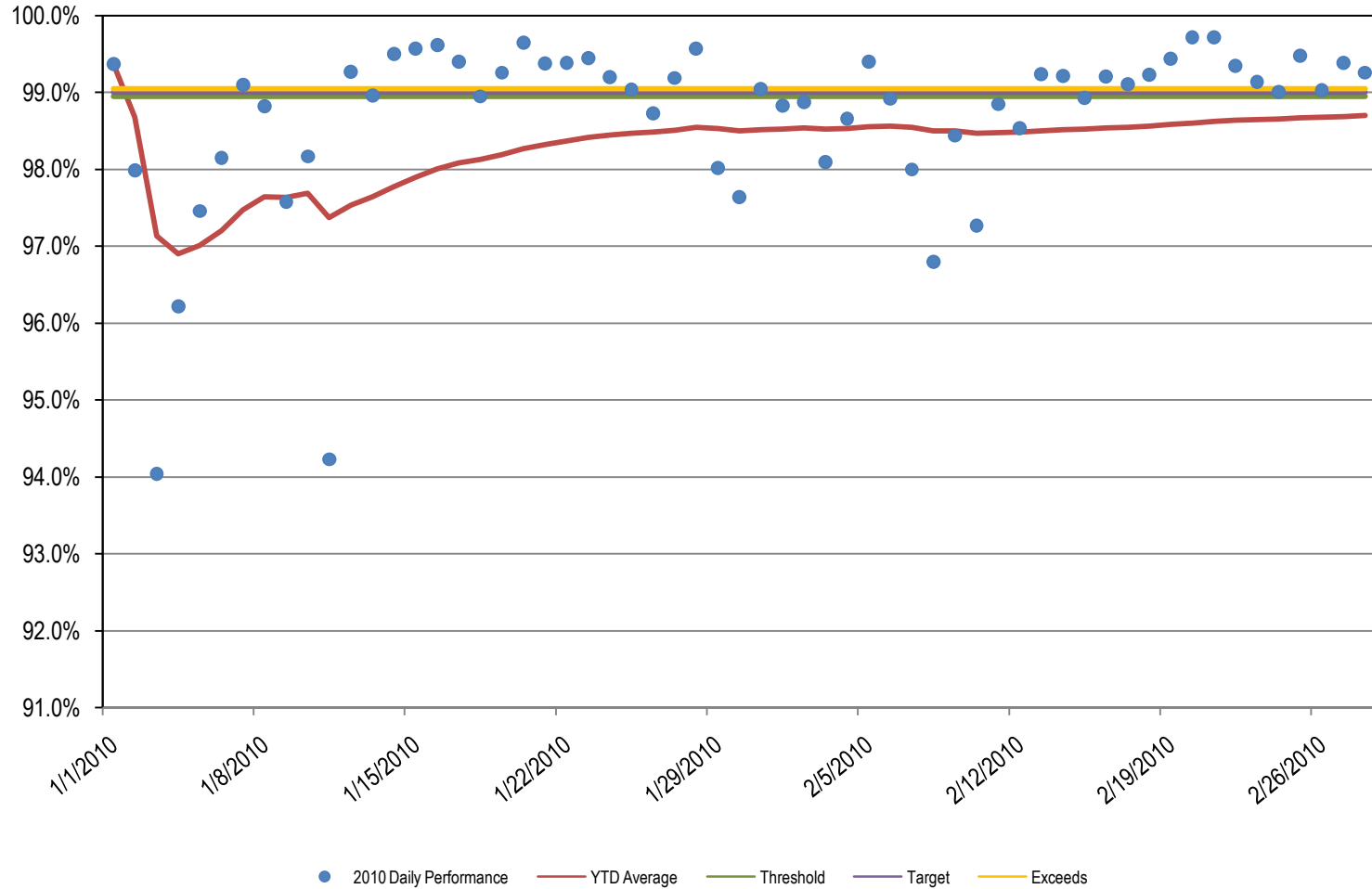
- Perfect Dispatch (PD) solution, a hypothetical least production cost solution with the following assumptions
  - all system conditions known in advance
  - “perfect” generation response
- Deviation of RT dispatch from PD solution

## Objective: improve operation efficiency



- What's new? Post-DA steam unit commitment
  - Evaluate steam units called outside of DA market
- The average Percentage of Perfect for January 1, 2010 through February 28, 2010 is 98.70%, which is under the metric goal of 99.00%.

**2010 Perfect Dispatch Performance  
Percentage of Perfect  
January 1, 2010 - February 28, 2010**



- Load forecasting error
- Expected high CT failure rate and gas curtailment
- Big unit tripping

- Post-DA steam unit commitment
- Real-time CT commitment
- Unit performance
- Constraint control



# Post-DA Steam Unit Commitment

## Steam units called outside of DA schedule

UNIT NAME	ON TIME	RT ON HOURS	RT MW	RT LMP	BID PRICE	% LMP >= BID	PD MW	PD LMP	PD SAVING	BOR	ON REASON	CONSTRAINT
Unit 1	3/8/2010 0:00	24	33	\$34.15	\$63.90	2.43%			\$64,915	\$37,803	OPD	Constraint 1
Unit 2	3/8/2010 0:00	1.9	45	\$28.51	\$40.29	0.00%	47	\$28.71	\$0	\$1,452	OPD	Constraint 1
Unit 3	3/8/2010 3:10	19.66	42	\$44.27	\$122.31	0.85%	41	\$44.78	\$110,713	\$108,674	OPD	Constraint 2
Unit 4	3/8/2010 0:00	20.66	113	\$135.17	\$275.27	36.69%	105	\$37.03	\$96,639	\$405,534	OPD	Constraint 3
Unit 5	3/8/2010 0:00	24	42	\$36.58	\$35.11	37.15%			\$43,641	\$5,638	OPD	Constraint 4
TOTOAL									\$315,909	\$559,100		

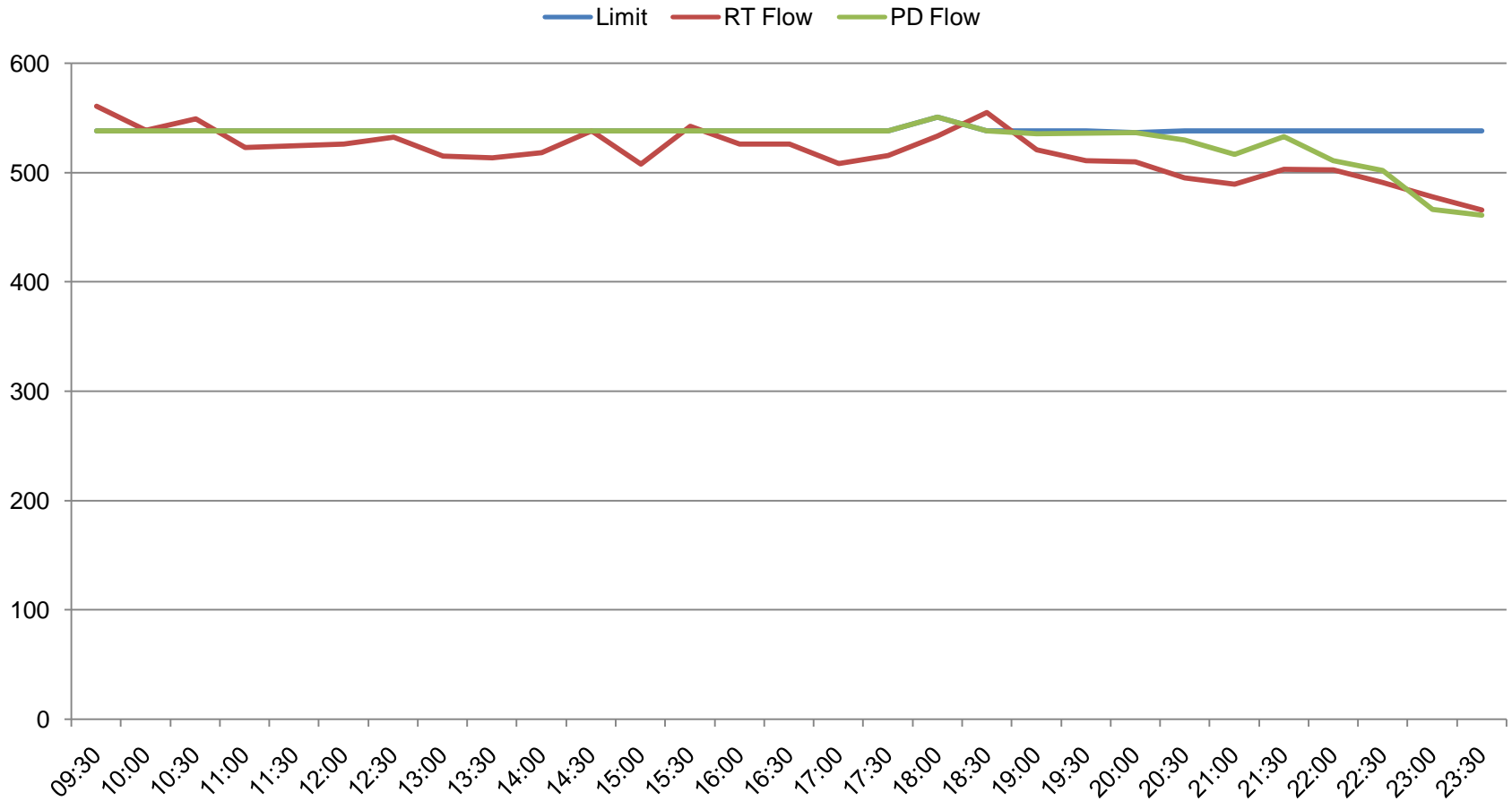
# Real-time CT Commitment; CTs NOT in Perfect Dispatch solution

UNIT NAME	ON TIME	RT ON HOURS	RT MW	RT LMP	BID PRICE	% LMP >= BID	PD SAVING	BOR	ON REASON
CT 100	3/8/2010 6:49	2.08	40	\$48.98	\$61.42	28.00%	\$5,505	\$1,511	Economic
CT 101	3/8/2010 6:49	2.08	47	\$49.88	\$57.90	28.00%	\$11,654	\$2,552	Economic
CT 102	3/8/2010 6:59	1.17	33	\$52.62	\$60.28	42.86%	\$3,462	\$1,715	Economic
CT 103	3/8/2010 7:04	1.08	20	\$52.54	\$60.24	46.15%	\$2,387	\$1,435	Economic
CT 104	3/8/2010 7:04	1.08	32	\$52.54	\$60.28	46.15%	\$3,239	\$1,614	Economic
CT 105	3/8/2010 7:09	1	30	\$51.49	\$60.35	41.67%	\$2,956	\$1,557	Economic
CT 106	3/8/2010 18:49	1.25	40	\$44.73	\$65.00	0.00%	\$2,967	\$927	Constraint 2
CT 107	3/8/2010 18:44	1.15	40	\$47.99	\$72.90	0.00%	\$4,159	\$2,457	Economic
CT 108	3/8/2010 18:44	1.15	41	\$47.99	\$72.92	0.00%	\$4,175	\$2,461	Economic
CT 109	3/8/2010 18:49	0.67	34	\$53.27	\$124.15	0.00%	\$4,310	\$3,608	Economic
CT 110	3/8/2010 18:49	0.67	31	\$53.27	\$124.14	0.00%	\$3,866	\$3,578	Economic
CT 111	3/8/2010 18:49	0.66	35	\$54.50	\$124.15	0.00%	\$4,044	\$3,409	Economic
CT 112	3/8/2010 18:49	0.75	30	\$54.41	\$124.15	0.00%	\$4,009	\$3,353	Economic
CT 113	3/8/2010 18:49	3	46	\$68.48	\$123.96	0.00%	\$17,181	\$9,576	Economic
CT 114	3/8/2010 18:44	3.16	34	\$67.52	\$123.96	0.00%	\$14,750	\$7,657	Economic
CT 115	3/8/2010 18:49	2.91	34	\$69.45	\$123.96	0.00%	\$14,689	\$7,318	Economic
CT 116	3/8/2010 18:49	2.91	35	\$69.45	\$123.96	0.00%	\$14,883	\$7,485	Economic
CT 117	3/8/2010 18:44	1.5	43	\$81.02	\$72.99	94.44%	\$5,909	\$369	Constraint 1
CT 118	3/8/2010 7:04	2.33	160	\$45.84	\$75.65	3.57%	\$35,336	\$19,304	Economic

BidID	BidName	PD_MW	PD_startup	Diff_BPC	Offer	TTS
89142104	CT 1	55	402	20347	\$135	0.3
86302101	CT 2	55	253	5718	\$72	0.2
86302103	CT 3	55	253	5498	\$72	0.2
86092103	CT 4	90	2596	17103	\$83	2.5
86092101	CT 5	90	6492	37049	\$77	2.5
86352102	CT 6	150	6500	62956	\$64	0.5
86132107	CT 7	158	5746	101922	\$54	5.0
86132108	CT 8	160	5746	109264	\$62	5.0
86132105	CT 9	159	5746	96647	\$59	5.0
86132106	CT 10	160	5746	97123	\$59	5.0
20172202	CT 11	3	0	1026	\$51	0.5
20172201	CT 12	3	0	1021	\$51	0.5

**Top 20 units redispatched to achieve Total System Savings (PD suggested low)**

Unit Name	RT startup	PD startup	Saving startup	RT BPC	PD BPC	Saving BPC	DGP Mean	On Reason
Unit 1	\$0	\$0	\$0	\$115,724	\$0	\$115,724	0.59	OPD
Unit 2	\$0	\$0	\$0	\$64,604	\$0	\$64,604	0.58	OPD
Unit 3	\$0	\$0	\$0	\$358,995	\$326,316	\$32,679	0.35	Comp Dispatchable
Unit 4	\$0	\$0	\$0	\$595,220	\$563,462	\$31,760	0.01	Run Thru Co
Unit 5	\$0	\$0	\$0	\$283,944	\$252,975	\$30,969	0.8	Run Thru PJM
Unit 6	\$0	\$0	\$0	\$139,494	\$108,545	\$30,949	0.33	Run Thru Co
Unit 7	\$0	\$0	\$0	\$290,716	\$260,498	\$30,218	0.06	Economic
Unit 8	\$0	\$0	\$0	\$103,749	\$76,729	\$27,021	0.63	Run Thru PJM
Unit 9	\$0	\$0	\$0	\$770,485	\$747,337	\$23,148	0.52	Run Thru Co
Unit 10	\$0	\$0	\$0	\$393,272	\$373,536	\$19,736	0.64	Run Thru PJM
Unit 11	\$0	\$0	\$0	\$131,775	\$113,741	\$18,035		Run Thru PJM
Unit 12	\$0	\$0	\$0	\$44,244	\$28,320	\$15,924		Run Thru PJM
Unit 13	\$0	\$0	\$0	\$191,369	\$175,524	\$15,844	0.93	Run Thru PJM
Unit 14	\$0	\$0	\$0	\$507,782	\$493,377	\$14,406	0.95	Run Thru PJM
Unit 15	\$0	\$0	\$0	\$43,441	\$29,693	\$13,748	0.37	Comp
Unit 16	\$0	\$0	\$0	\$27,698	\$15,160	\$12,538	0.59	Comp
Unit 17	\$18,000	\$18,000	\$0	\$178,019	\$167,370	\$10,650	0.6	Economic
Unit 18	\$0	\$0	\$0	\$536,955	\$526,403	\$10,551	0.83	Run Thru PJM
Unit 19	\$0	\$0	\$0	\$607,388	\$597,021	\$10,367	0.74	Run Thru PJM
Unit 20	\$0	\$0	\$0	\$39,304	\$29,546	\$9,758	0.03	Run Thru Co



- Continue to provide operation feedback for operation efficiency
  - Evaluate post-DA steam unit commitment
  - Model PD closer to RT to provide realistic feedback
    - Real-time CT commitment evaluation
    - Enhance steam unit modeling

# Questions ?