
Western Resource Planners' Forum

Session 6 Planning for Resource Adequacy

San Diego, CA

June 21-22, 2010



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Energy

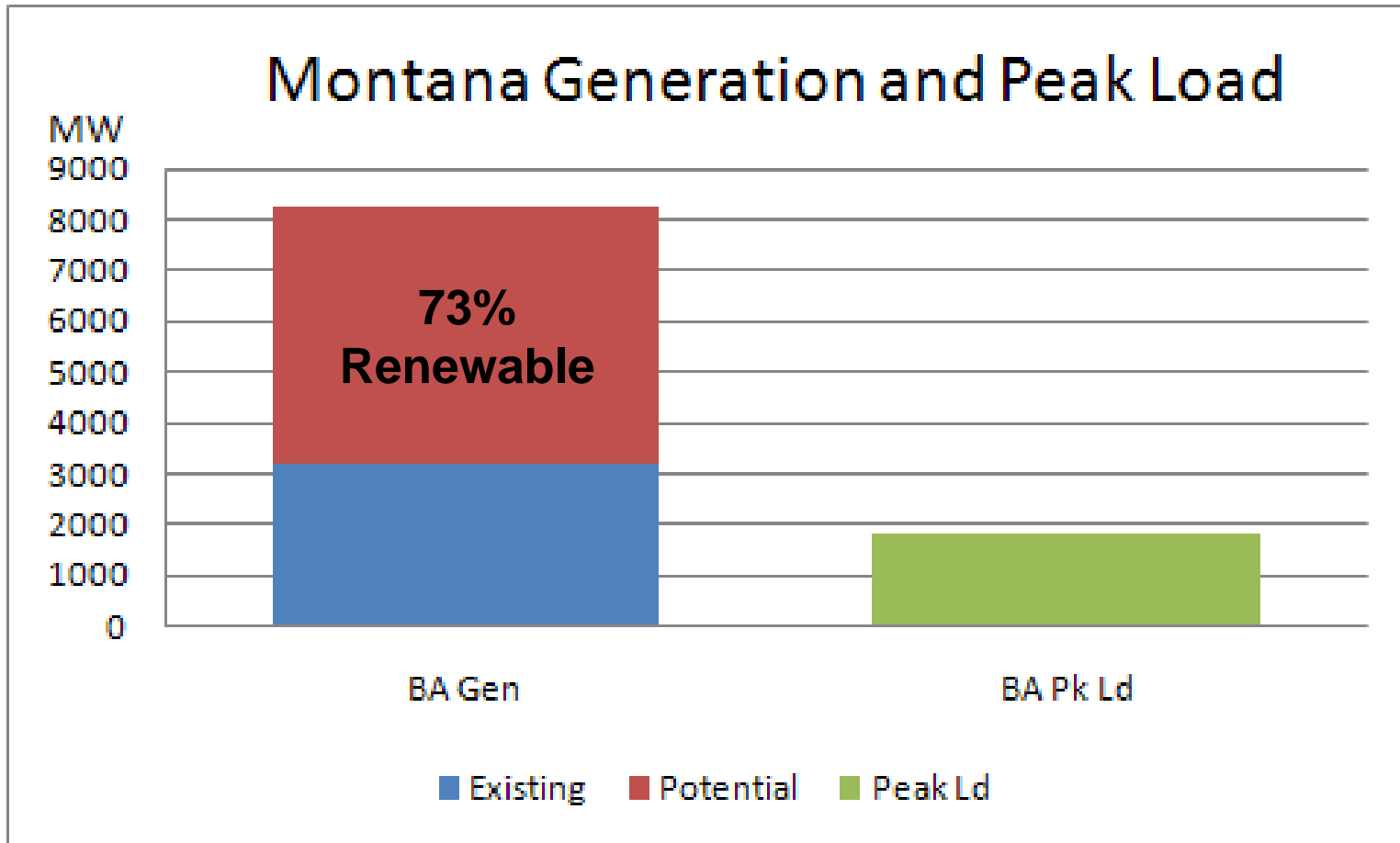
Delivering a Bright Future

Who We Are

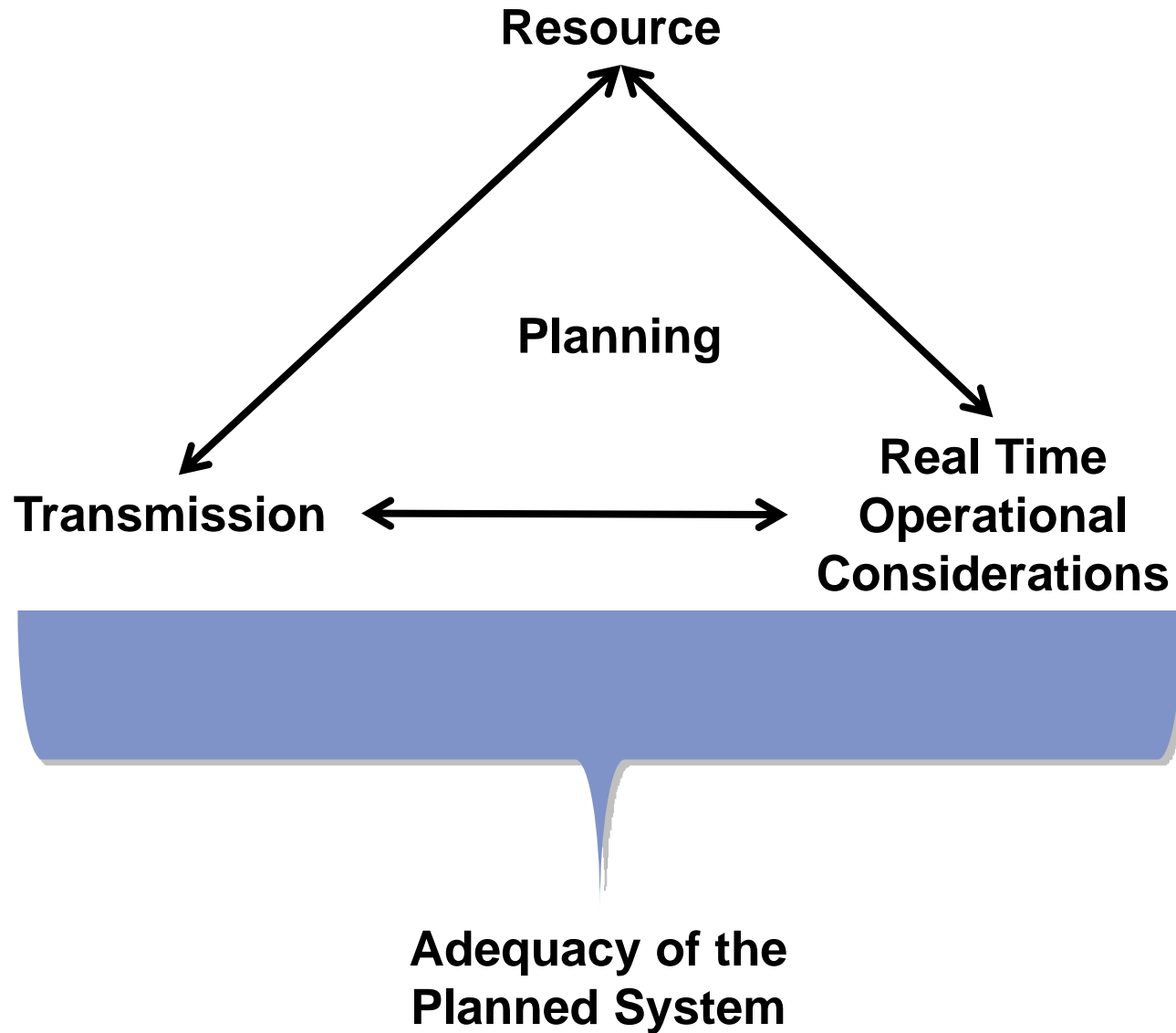
- ~ 123,000 sq miles service territory in MT, NB and SD
- ~ 7,000 miles of transmission
- Peak Load
 - Summer/Winter peaks
 - 1,805 MW peak
 - Serve ~ 70% of load
- MT generation
 - Existing: 222 MW coal regulated Jan 2009
 - Future: 3 - 50 MW natural gas turbines for regulating reserve



NWE Load and Resource



Planning



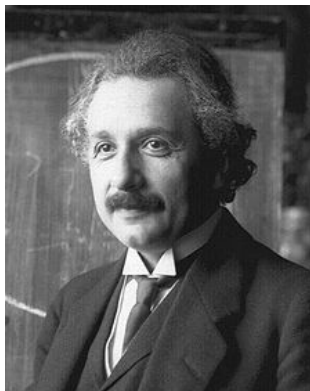
But ...

Plans are just plans

Must expect the unexpected

Must be flexible

Must be implementable



“The significant problems we face cannot be solved at the same level of thinking we were at when we created them.”

Albert Einstein

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WECC PSA 2009 Planning Reserve Guideline

Resource Adequacy 13.7%

=

Contingency Reserve 6.0%

+

Regulating Reserve 2.0%

+

Forced Outage Reserve 2.6%

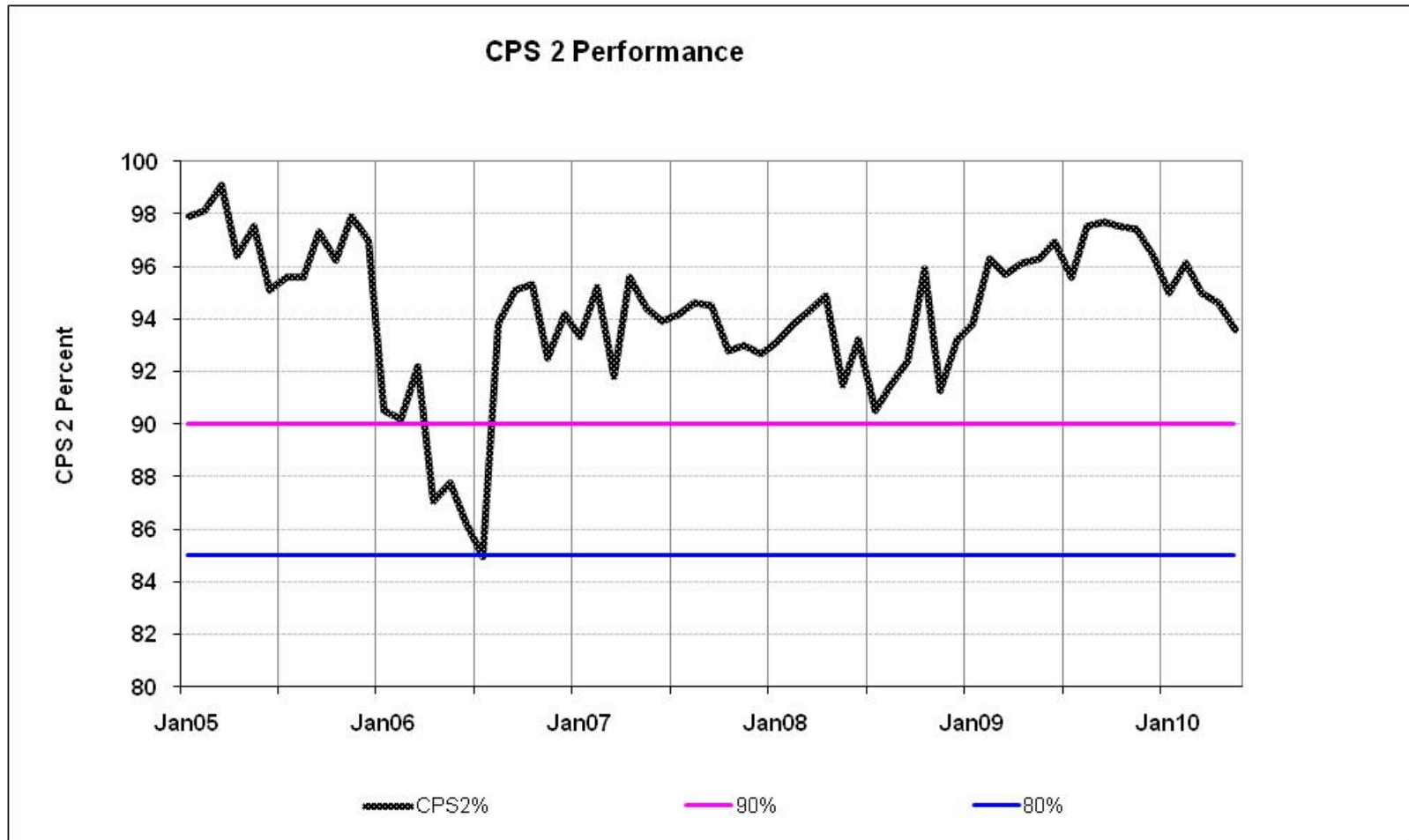
+

Weather Reserve 3.1%

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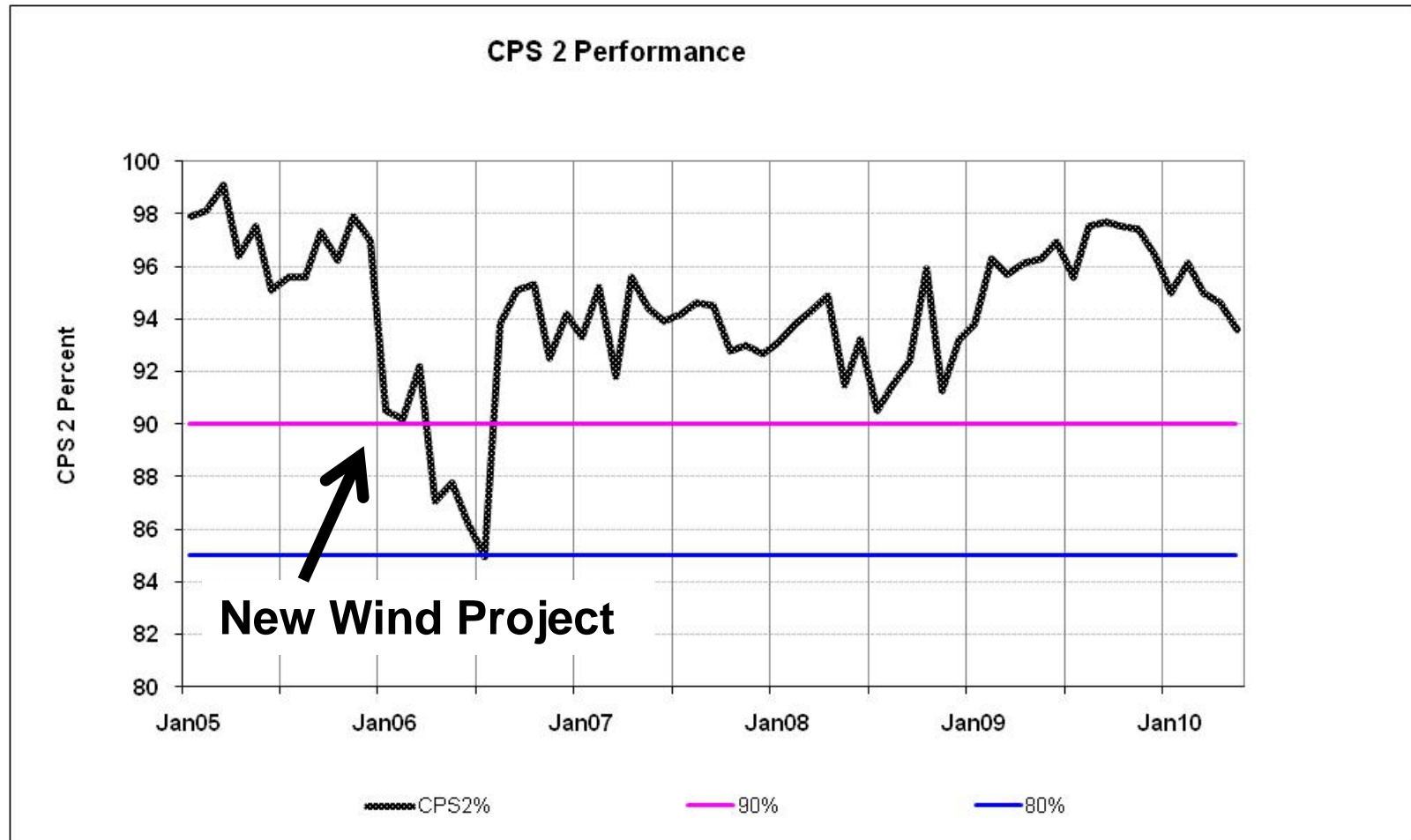
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Real Time Transmission Performance

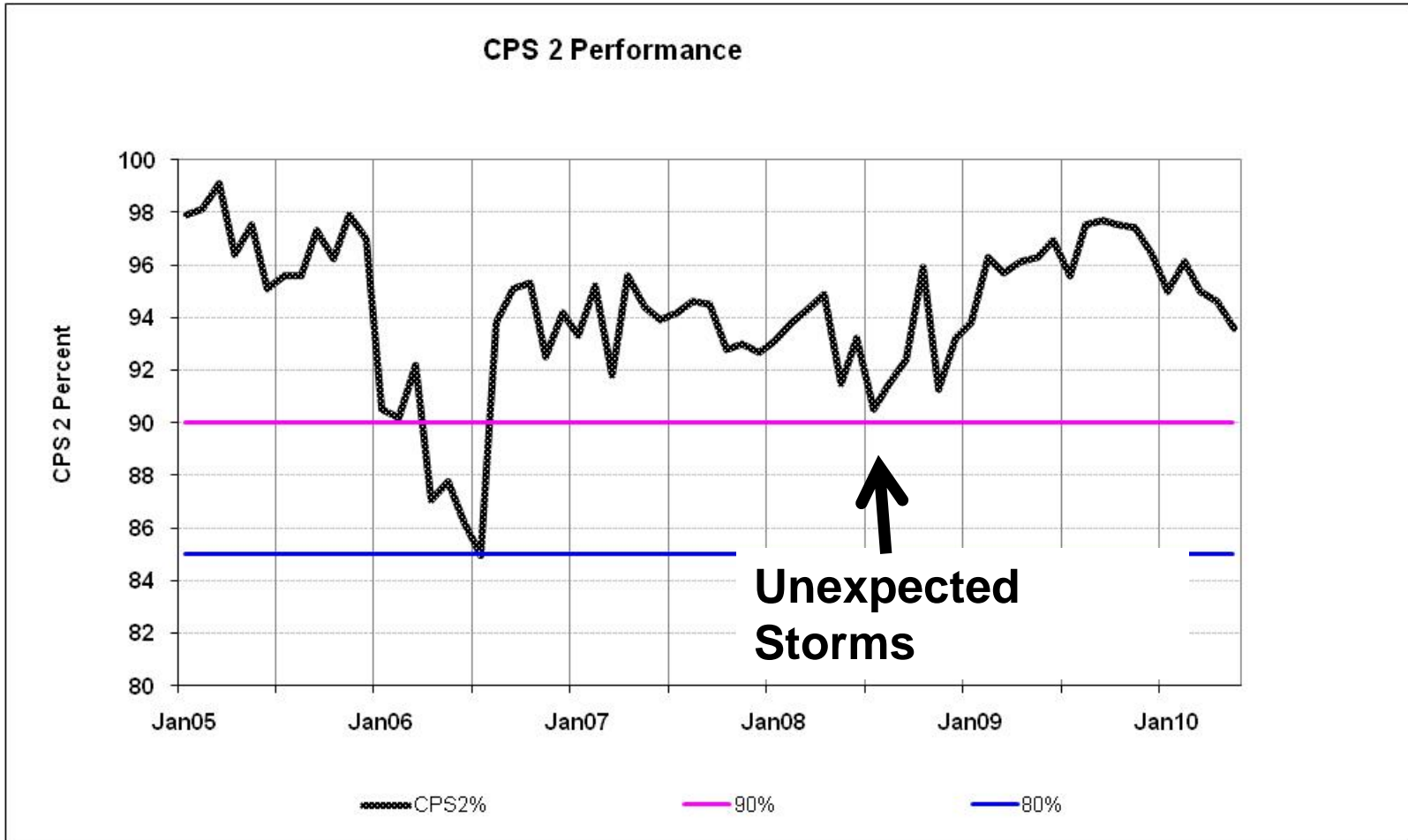


CPS2 measures the load/resource balance over each 10-minute period of each month; must “pass” this measurement in at least 90% of the 10-minute periods in every one-month period.

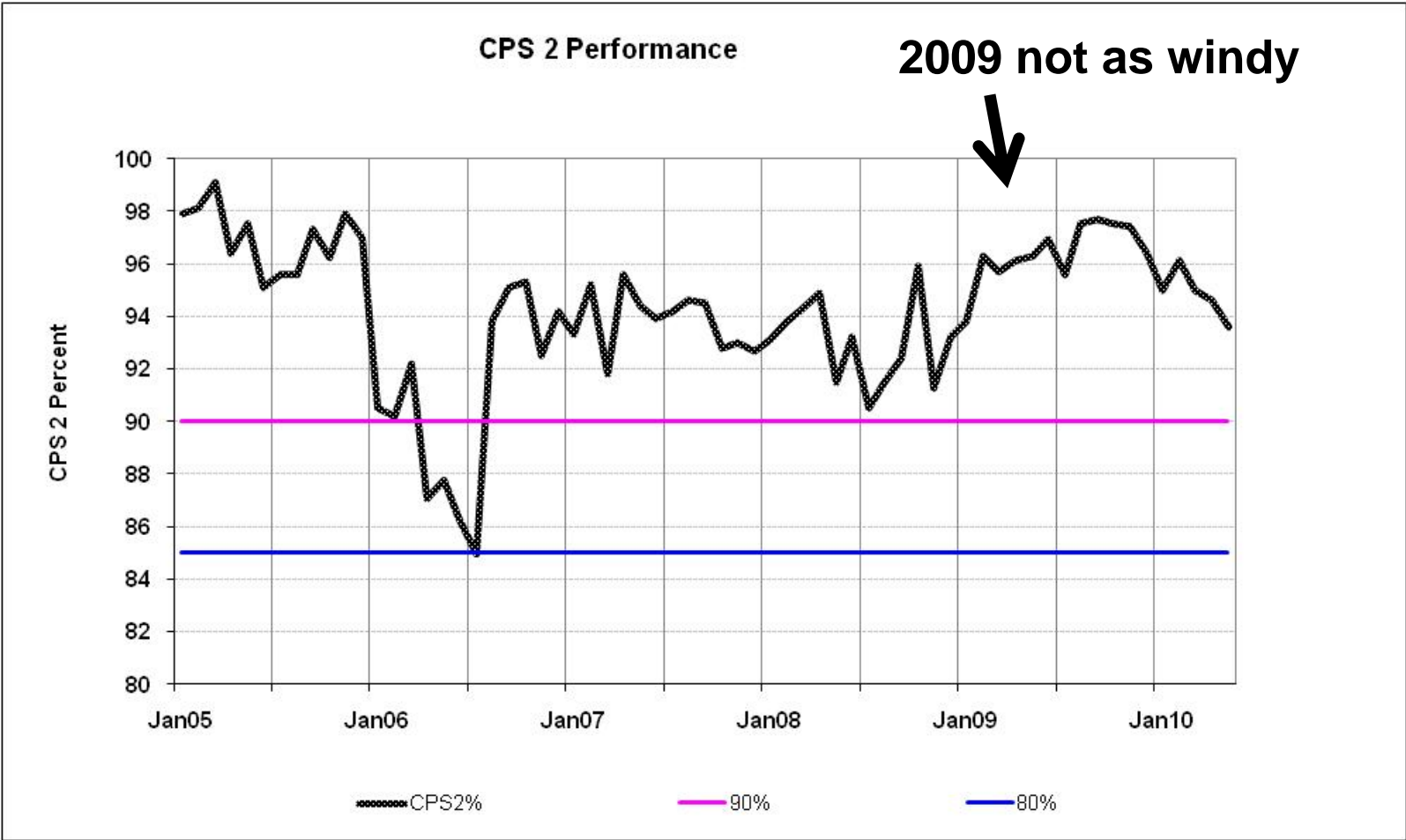
Real Time Transmission Performance



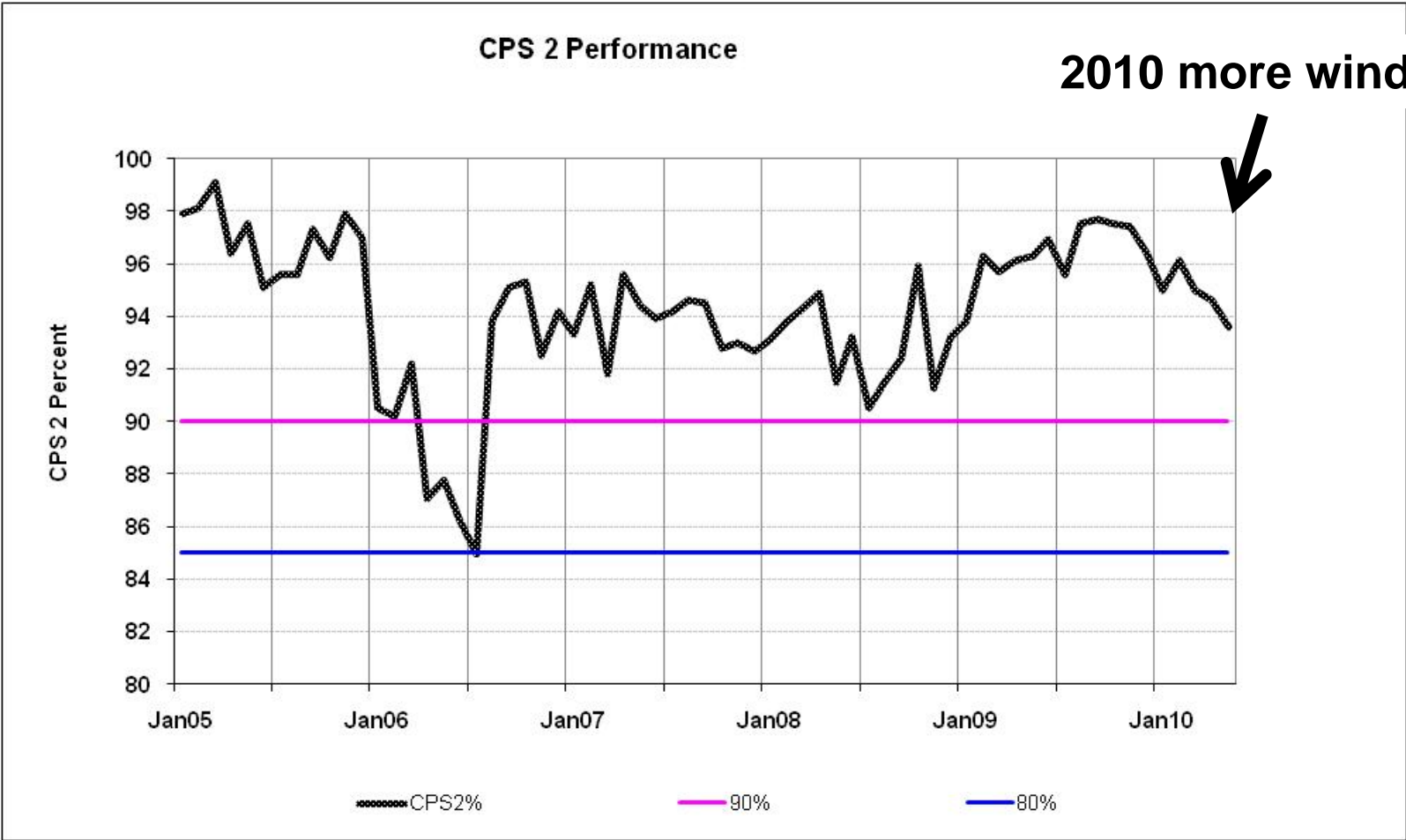
Why



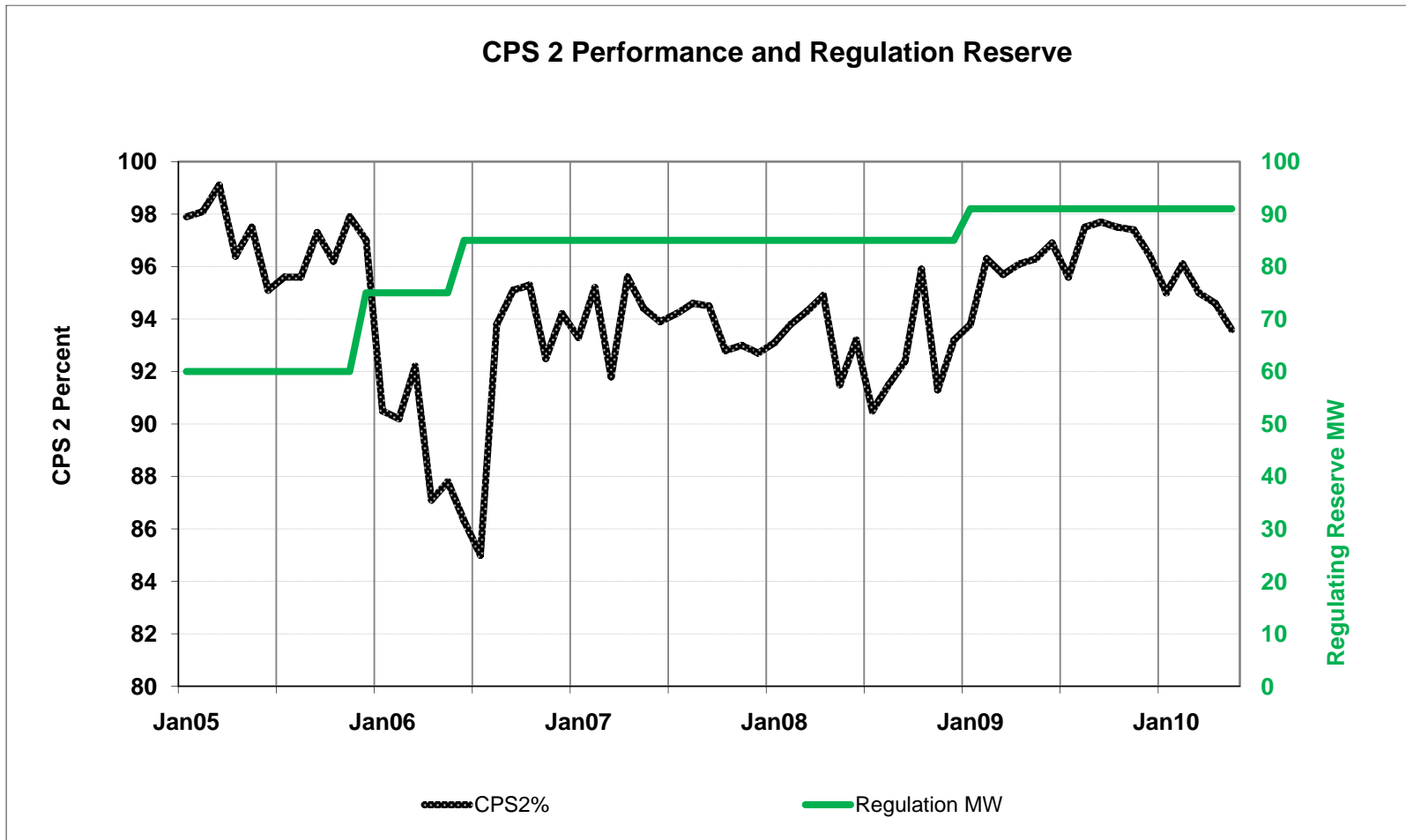
Transmission – CPS2



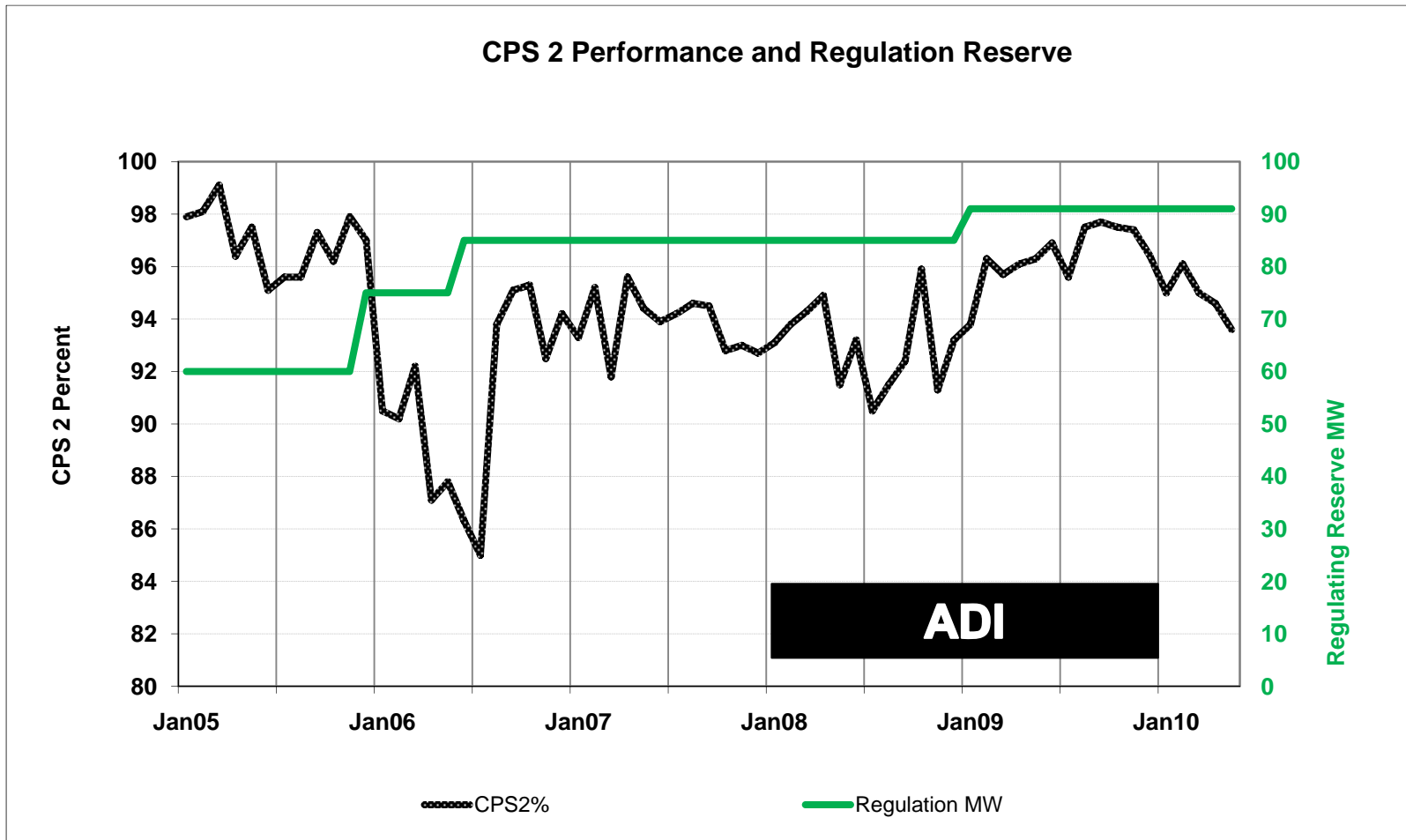
Transmission – CPS2



OPTION: Acquired More Regulating Reserve



OPTION: Participate in ADI



ADI = ACE Diversity Interchange

NWE Current Regulation Requirement

Must provide, if requested, for projects in Balancing Area

MW requirement:

Ability to meet CPS2 - measured by actual performance

~ 18% of wind resource

~ 7% of peak load

Thus - 3,000 MW new renewable resource

Will need ~540 MW of regulating reserve @ 18%

Impact to resource and transmission requirements

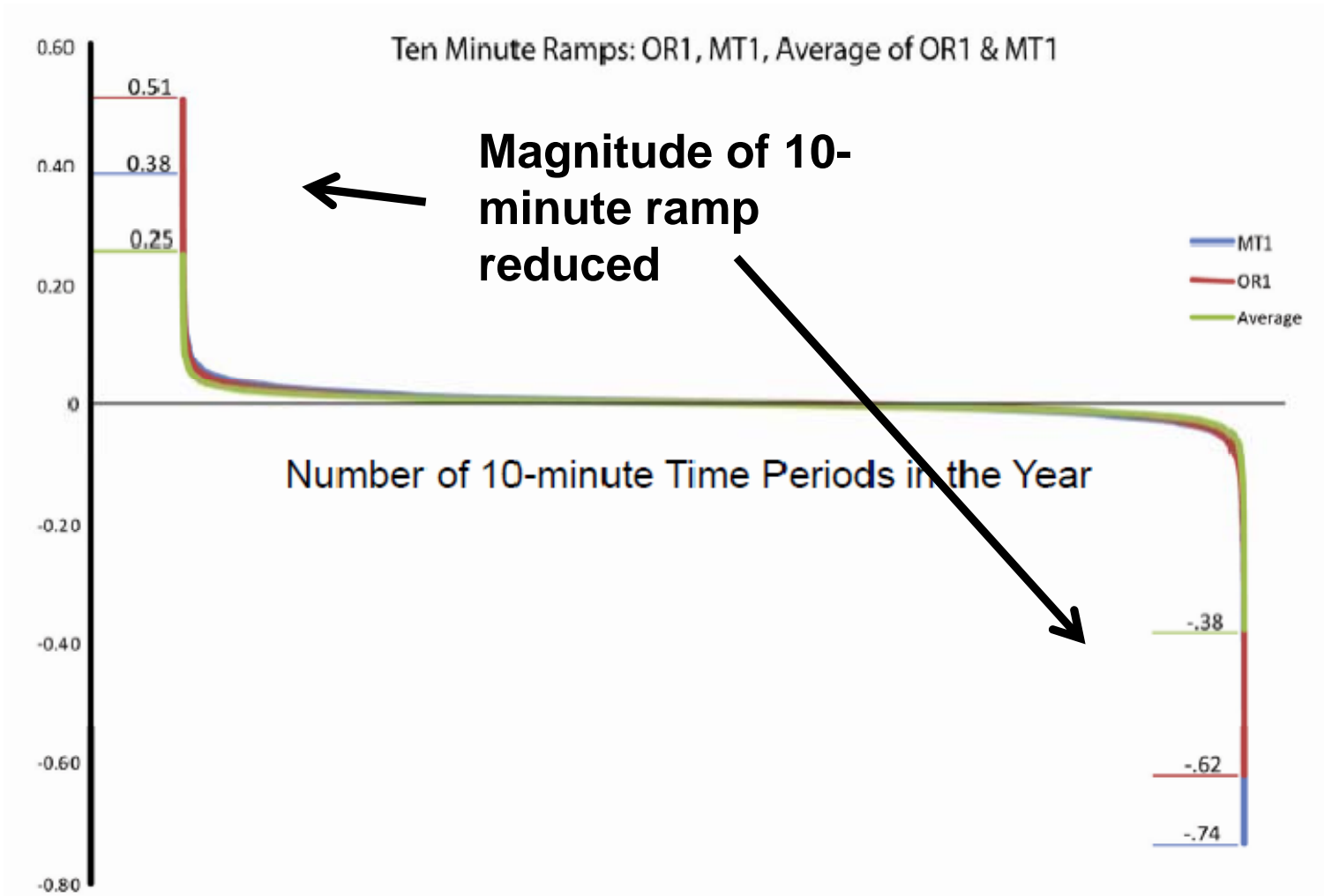
OPTION: Regional Wind Zone Diversity

ID1	MT1	MT2	MT3	OR1	OR2	OR3	OR4	OR5	WA1	WA2	WA3	WA4	WY1	WY2	WY3	WY4	CA2	NM2	
1.000	0.156	0.275	0.293	0.351	0.406	0.166	0.385	0.407	0.364	0.308	0.447	0.327	0.481	0.432	0.364	0.388	0.210	0.226	ID1
	1.000	0.453	0.289	0.041	0.093	0.057	0.073	0.063	0.165	0.141	0.150	0.124	0.164	0.322	0.286	0.317	0.056	0.152	MT1
		1.000	0.746	0.150	0.337	0.203	0.311	0.220	0.356	0.233	0.387	0.235	0.309	0.631	0.523	0.583	-0.002	0.132	MT2
			1.000	0.212	0.354	0.189	0.324	0.261	0.337	0.264	0.371	0.268	0.335	0.639	0.498	0.551	0.005	0.115	MT3
				1.000	0.670	0.164	0.290	0.262	0.482	0.729	0.550	0.745	0.286	0.184	0.141	0.134	0.227	0.115	OR1
					1.000	0.306	0.541	0.456	0.648	0.578	0.704	0.670	0.301	0.335	0.292	0.322	0.135	0.107	OR2
						1.000	0.420	0.462	0.361	0.120	0.476	0.159	0.015	0.251	0.203	0.296	0.022	0.003	OR3
							1.000	0.716	0.473	0.267	0.535	0.402	0.316	0.385	0.327	0.403	0.167	0.162	OR4
								1.000	0.429	0.196	0.473	0.338	0.313	0.353	0.297	0.352	0.158	0.134	OR5
									1.000	0.598	0.631	0.646	0.266	0.317	0.220	0.244	0.115	0.094	WA1
										1.000	0.517	0.713	0.284	0.210	0.145	0.137	0.218	0.142	WA2
											1.000	0.528	0.338	0.402	0.306	0.368	0.188	0.147	WA3
												1.000	0.340	0.254	0.205	0.186	0.190	0.124	WA4
													1.000	0.488	0.530	0.455	0.218	0.230	WY1
														1.000	0.673	0.703	0.019	0.124	WY2
															1.000	0.808	0.097	0.195	WY3
																1.000	0.067	0.223	WY4
																	1.000	0.342	CA2
																		1.000	NM2

**Correlation of MT
wind with
Columbia Gorge
Wind**

Wind Integration Study Team Analysis, May 2009

OPTION: Wind Zone 10 Minute Ramp



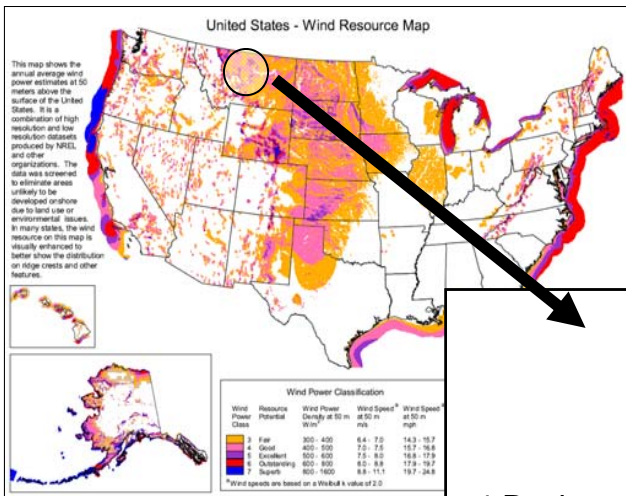
Wind Integration Study Team Analysis, May 2009

OPTION: Correlation Wind Zone to Load

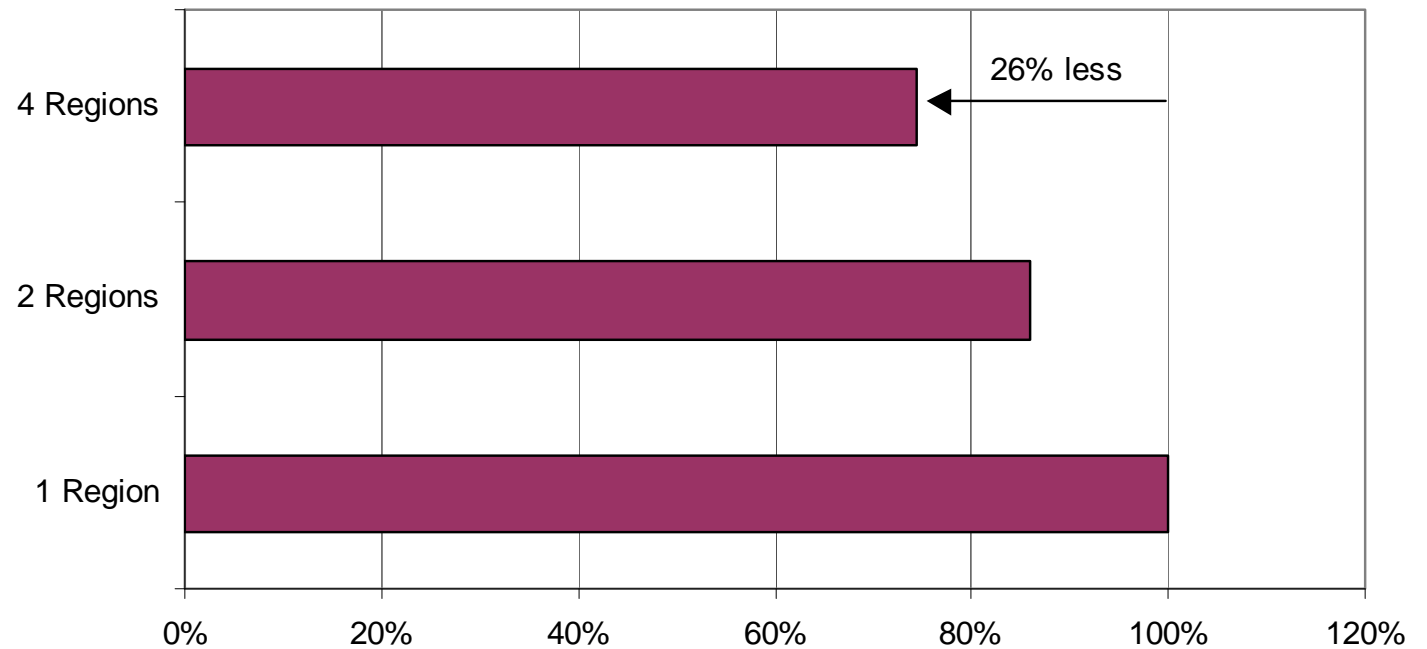
Correlation of 2002 Oregon and Washington Load with Wind Generation Zones

	WY234	WA24OR12	OR45	MT23	MT1	WY1	WA3
All hours	0.227	0.031	0.146	0.201	0.093	0.073	0.388
Summer 3-6 PM	-0.109	0.113	0.263	-0.177	-0.086	0.41	0.36
Dec/Feb 6-9 AM	0.075	-0.184	-0.242	0.075	0.091	-0.062	-0.056
Jan/Feb 6-9 AM	0.135	-0.148	-0.205	0.074	0.06	0.042	0.066
Dec 6-9 AM	-0.143	-0.411	-0.39	0.08	0.19	-0.322	-0.367
Dec/Feb 4-7 PM	-0.036	-0.197	-0.023	0.127	-0.033	-0.156	0.031

OPTION: Diversity – Regulation Needs



Geographic Diversity - Regulating Reserves for 1450 MW



Actions **May Reduce** Regulation Requirements

- ACE Diversity Interchange (ADI)** – multi party sharing of Area Control Error (ACE)
- Other diversity measures** – e.g., pooling generation from different entities
- Intra-Hour Scheduling** – allowing with-in hour schedule changes
- Dynamic Scheduling System (DSS)** – multi party dynamic schedule exchange
- Intra-Hour Transaction Accelerator Platform (I-TAP)** – facilitate intra-hour bilateral transactions within and outside of BA's area through electronic platform that provides information
- Better wind forecasting methods**
- Existing transmission and generation utilization**
- Understand/model the “big” picture**
- Smart Grid application**
- Other?**

Questions?



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