



2011 Integrated Resource Plan

First Public Input Meeting
April 28, 2010



Pacific Power | Rocky Mountain Power | PacifiCorp Energy

Agenda

- **IRP Group and Support Team**
- **Discussion on the wind integration study methodology white paper**
- **IRP Regulatory Compliance (2008 IRP / 2011 IRP)**
- **IRP Preparation Schedule and Public Process**
- **IRP Modeling Plan and Initiatives**
- **2008 IRP Update**

IRP Group and Support Team

Greg Duvall

Director of Long-Range Planning and Net Power Costs

Pete Warnken - IRP Manager

Michael Liljenwall - *Project Coordinator*

IRP Modeling Team

Dan Swan

Brian Osborn

Eric Arzola

Connie Clonch

Market Assessment

Load and Revenue
Forecasting

Environmental Strategy

Transmission Planning

Commercial & Trading

Finance/Business Planning

Demand-side Management

Front Office

(Origination, Structuring &
Pricing, Short-Term Resource
Planning, Wholesale Trading)

Regulation

Resource Development &
Construction

Renewable Compliance
Officer

Regulatory Compliance

- **2008 IRP acknowledged in Oregon, Utah, Idaho, Washington**
 - California acknowledgment exemption
 - New Wyoming rule requires IRP filing and review
- **Significant new acknowledgment order requirements**
 - Utah
 - Evaluate risk of reliance on the market; stochastic modeling
 - Include cost of price hedging in portfolio analysis
 - Sensitivity analysis of price hedging strategies
 - Geothermal resource study
 - Investigate methods to improve “non-traditional” resource evaluation (distributed solar, storage)

Regulatory Compliance

- Utah, continued
 - Office of Consumer Services load forecasting methodology study (GDS Consulting): forecast scenarios, comprehensive standalone forecast report
 - Public process: earlier distribution of meeting materials, post-meeting report
- Oregon
 - Investigate modeling approaches that reduce out-year resource selection impacts on resource decisions covered in the IRP action plan
 - Analysis of CO₂ hard cap legislation and coal plant retirement scenarios
 - Incorporate transmission project financial analysis in the IRP
 - Wind integration study completed by August 2, 2010

Regulatory Compliance

- Oregon, continued
 - Intermediate-term market purchases as resource options
 - Incorporate assessment of distribution efficiency potential
- Washington
 - Discuss alternative transmission options and deployment schedules
 - Investigate modeling approaches that acknowledge resource selection flexibility mid-way through the planning period
 - Include more qualitative discussion of top-performing portfolios to augment portfolio preference scoring method
- Idaho
 - More rigorous approach to selection of importance weights for preference scoring method

Regulatory Compliance

- **Other New Requirements**

- Utah Commission's DSM Potential Study Order (April 2009)
 - Evaluate two methods for incorporating achievable potential estimates: (1) current method – adjust technical potential with achievable potential percentages, then determine cost-effectiveness with portfolio modeling, (2) determine cost-effectiveness using technical potential unadjusted for achievable potential; evaluate impact of achievable potential as part of acquisition path analysis
 - Sensitivity analysis of solar resource selection under different cost assumptions, including Utility Cost basis vs. Total Resource Cost basis
- Washington
 - Initiative Measure No. 937 Rules
 - Develop conservation targets/potential estimates using IRP, but need to be consistent with Northwest Power and Conservation Council methodology

IRP Preparation Schedule – Activity Timeline

	2010												2011		
	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	
IRP Public Meetings*															
General Public Meetings				X				X	X			X			X
State-specific public stakeholder meetings															
Wind integration study discussion/workshops	X			X											
Model tutorial	To Be Determined														
Status report/issue resolution conference calls	To Be Determined														
IRP Development Schedule															
Wind Integration Cost Study															
IRP Model Preparation															
Portfolio Development															
Portfolio Risk Assessment															
Preferred Portfolio Selection and Analysis															
Action Plan Development/Contingency Planning															
IRP Report Preparation, 1st Draft															
Public Review of Draft IRP Report (30 days)															
IRP Report Preparation, Final Draft															
Commission Filing, 3/31/2010															X

* Specific meeting dates will be determined after considering state regulatory calendars, participant availability, and meeting preparation requirements.

IRP Preparation Schedule – Public Process

- **General public meetings**

- July 22, 2010 (tentative date):

- Topics: DSM, distributed generation, market reliance impact analysis, supply-side resources

- August 31, 2010 (tentative date):

- Topics: resource adequacy, portfolio development cases (paper with preliminary cases distributed in July), load forecast, load & resource balance, CO₂ risk modeling and coal plant retirement scenario analysis

- October 2010:

- Topics: market price forecasting, portfolio development results, portfolio preference ranking approach

- January 2011:

- Topics: stochastic modeling results, portfolio assessment results

IRP Preparation Schedule – Public Process

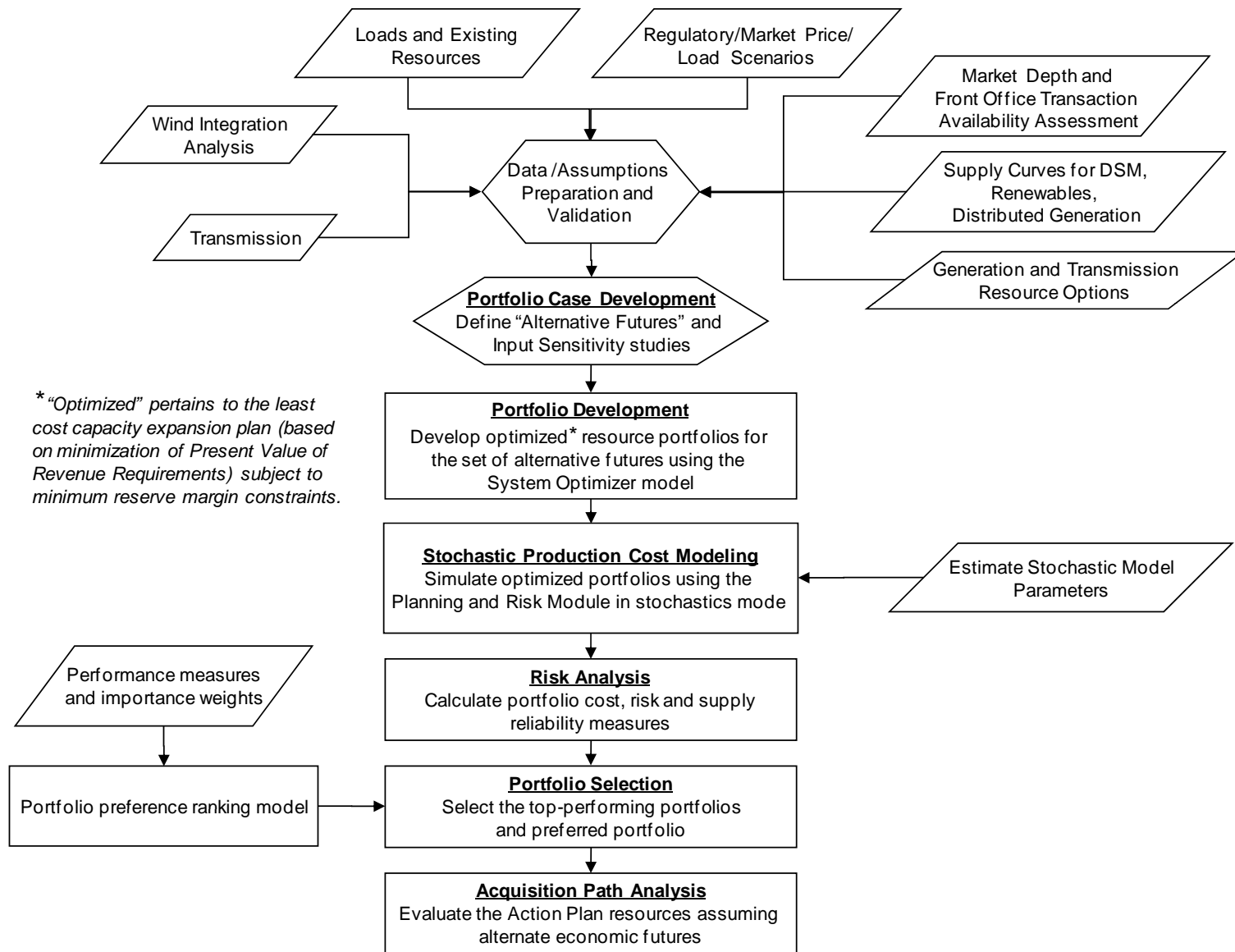
- **Other public meetings**

- May through June, 2010: State stakeholder meetings
- July 2010: Wind integration study update
- Tutorial on System Optimizer and Planning and Risk models
- Ad Hoc Conference Calls
 - Topic follow-up, issue resolution, significant events impacting the IRP

- **Web site**

- Already posting wind integration study information
- Post stakeholder comments, data requests/responses

Modeling Process



Modeling Initiatives Planned

- **Implement custom System Optimizer functionality (“enhanced SO model”)**
 - Enables representation of state-specific CO₂ emission control policies along with system-wide / federal policies
 - Tracks CO₂ emissions from spot market transaction activity
 - Allows representation of state-specific Renewable Portfolio Standards, as well as ability to layer in regional or federal RPS requirements

Modeling Initiatives Planned

- **Imputation of stochastic cost risk reduction benefits for resources modeled in System Optimizer**
 - Combined cycle CT value relative to simple cycle CT as measured by the PaR model
 - Energy conservation: market/gas price risk reduction
 - Analogous to Northwest Power and Conservation Council's "market price adder" concept
- **DSM and distributed generation**
 - Update to DSM potential study, including distribution generation resources
 - Update transmission & distribution investment deferral credit

Modeling Initiatives Planned

- **Carbon risk analysis: investigate adding stochastic CO₂ cost variable in the Planning and Risk stochastic model**
 - Goal is to eliminate multiple PaR scenario runs with various CO₂ price levels; Correlations between CO₂ prices and other stochastic variables needed
- **Update stochastic parameters**
- **IRP / Business Plan Alignment**
 - Enforce capital budget constraints for 10-year business planning period
 - System Optimizer includes annual capital budget constraint feature; tested, but need to evaluate modeling implementation process

Modeling Initiatives Planned

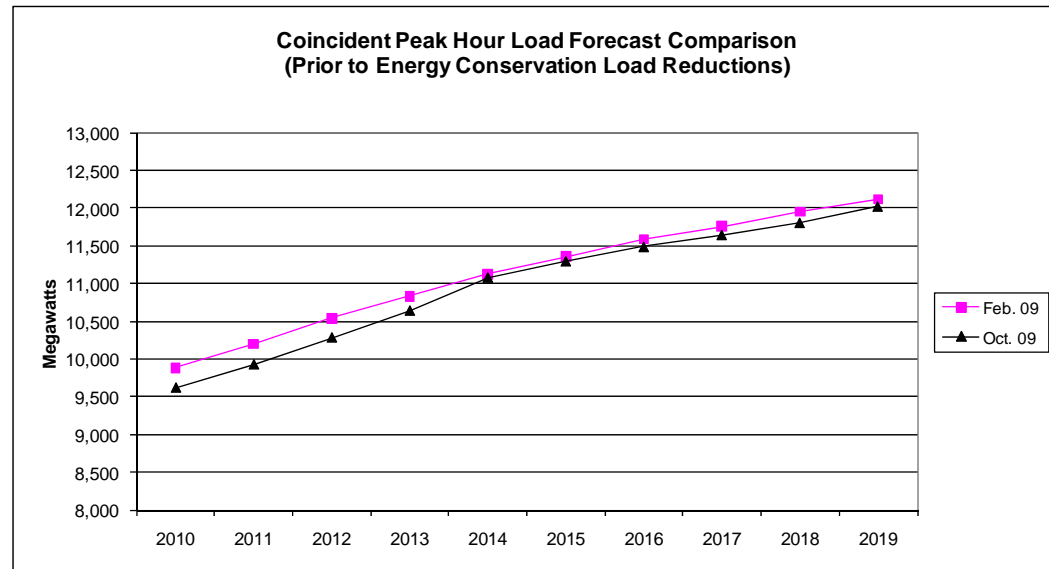
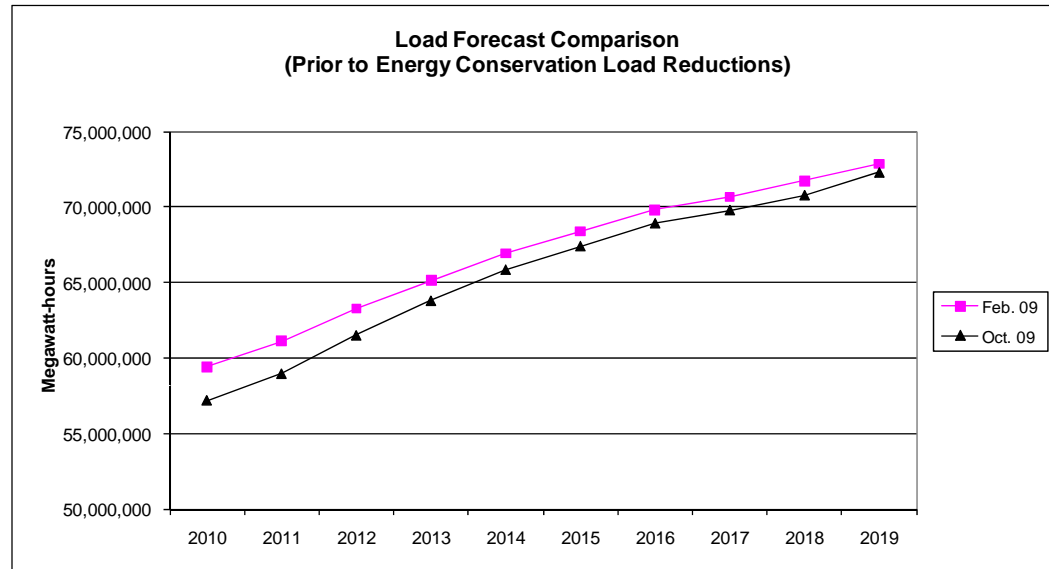
- **Resource Adequacy**

- Loss of Load Probability (LOLP) constraints in System Optimizer
 - New functionality that is being tested by PacifiCorp
 - Model performs Monte Carlo simulation using load and plant availability distributions to determine Peak Load Carrying Capability (PLCC) for each resource using Z-statistic method
 - Uses PLCCs to enforce monthly LOLP targets set up as system constraints
 - Evaluate functionality as a complement to Planning Reserve Margin approach
- WECC Building Block Guideline for Reserve Margin
 - Accounts for Contingency Reserves, Regulating Reserves, “Additional” Forced Outages, demand forecast Temperature Adder (1-in-10 exceedence)

2008 IRP Update Resource Portfolio

2008 IRP Update: Load Forecast Comparisons to the 2008 IRP

**Differences
attributable to
reduced customer
load levels as a
result of economic
downturn**



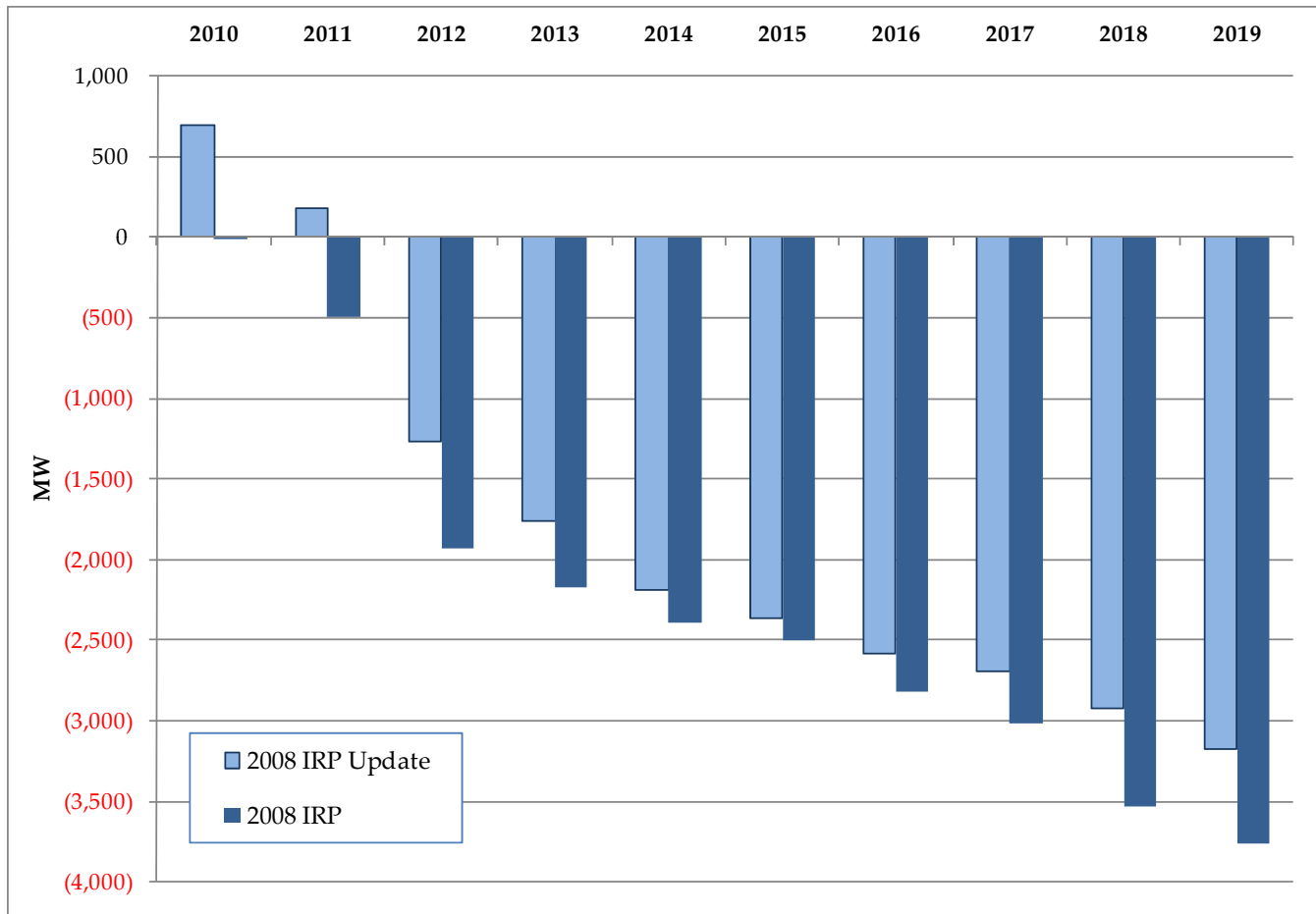
2008 IRP Update: Peak Load Forecast Comparisons to the 2008 IRP (by State)

System Annual Coincident Peak-Hour Load Forecast Differences (Megawatts)

Year	Total	OR	WA	CA	UT	WY	ID
2010	(271)	(149)	13	(5)	7	(56)	(80)
2011	(276)	(135)	13	(8)	(35)	(80)	(31)
2012	(258)	(98)	10	(9)	4	(97)	(70)
2013	(192)	(75)	14	(9)	38	(87)	(72)
2014	(43)	(67)	13	(11)	41	(74)	55
2015	(60)	(65)	13	(11)	20	(60)	44
2016	(98)	(65)	12	(12)	36	(66)	(3)
2017	(109)	(68)	11	(12)	45	(77)	(8)
2018	(143)	(75)	7	(12)	46	(89)	(20)
2019	(86)	(74)	11	(12)	62	(68)	(5)
Annual Average Change for 2010-2019							
	(154)	(87)	12	(10)	26	(75)	(19)

2008 IRP Update: Capacity Position Change

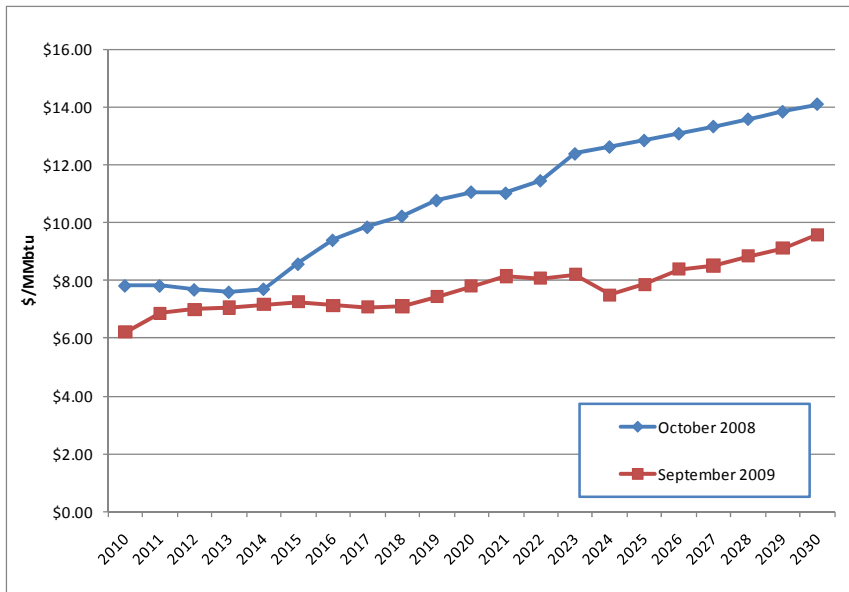
The system capacity deficit shifts from 2011 to 2012



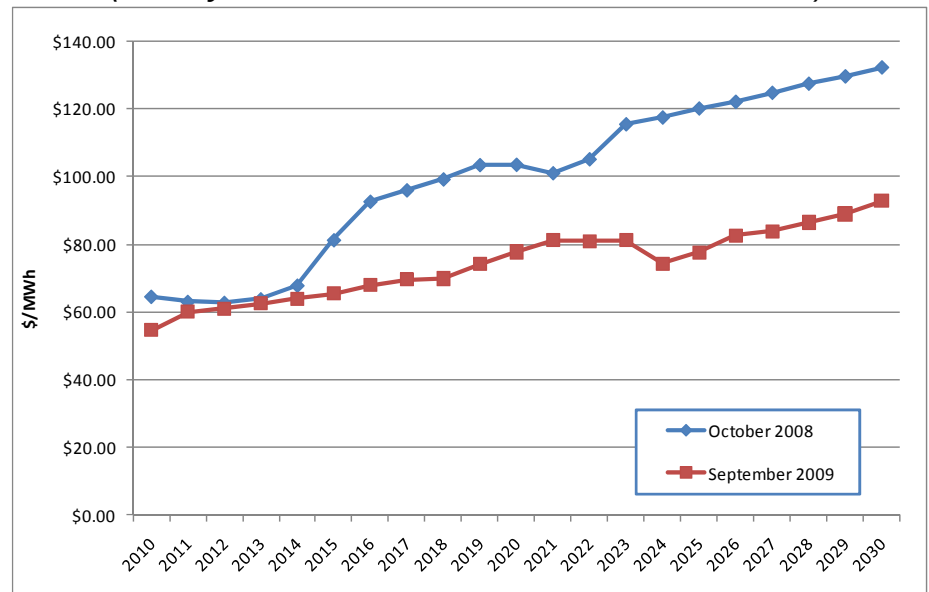
2010 Business Plan: Market Price Comparisons to the 2008 IRP

September 2009 natural gas curves reflect more current short-term and external long-term gas price forecasts; lower prices driven by higher growth in unconventional shale gas development.

Henry Hub Natural Gas Prices
(Annual Ave., Nominal \$)



Palo Verde Electricity Prices
(Heavy Load Hour, Annual Ave., Nominal \$)



2008 IRP Update: Resource Portfolio

Resource	Capacity, MW											Cumulative Total (2010-19)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
East												
CCCT F 2x1, Utah (North 2015, South 2018)	-	-	-	-	-	-	607	-	-	536	-	1,143
East PPA	-	-	-	200	-	-	-	-	-	-	-	200
Coal & Gas Capacity Upgrades	2	16	20		2		11	37	-	-	-	86
Wind *	128	227	200	-	-	-	-	-	160	100	200	887
DSM, Class 1, Utah Cool Keeper Load Control	-	18	6	5	-	-	-	-	-	-	-	28
DSM, Class 1, Other **	-	25	5	15	20	10	3	-	-	-	-	78
DSM Class 2	56	65	65	66	68	68	49	50	51	50	53	585
Front Office Transaction - 3Qtr HLH	75	-	-	200	338	519	300	300	350	347	350	
West												
Coal Plant Turbine Upgrades	-	4	-	-	-			12	12	8	12	48
Wind	75	-	-	-	-	-	-	-	-	-	-	-
DSM, Class 1, Other **	-	-	5	17	18	5	-	-	-	-	-	45
DSM Class 2	39	40	40	39	40	40	37	37	27	27	27	353
Solar Photovoltaic (utility-scale)	-	-	1.8	1.8	1.8	1.8	1.8	-	-	-	-	8.8
Front Office Transaction-3Qtr HLH	-	-	-	404	594	704	494	623	608	289	444	
Annual Additions, Long Term Resources	299	394	342	344	149	125	708	136	251	721	292	
Annual Additions, Short Term Resources	75	-	-	604	932	1,223	794	923	958	636	794	
Total Annual Additions	374	394	342	948	1,081	1,348	1,503	1,059	1,208	1,357	1,087	

* The 2011 wind resource is the Top of the World project (200 MW), with an in-service date of December 31, 2010.

** Other Class 1 DSM consists of (1) irrigation and residential air conditioning control, and (2) commercial curtailment, including customer-owned standby generation.

Key Drivers of Resource Capacity Changes from the 2008 IRP Preferred Portfolio

- Lower load growth and resource updates reduce overall capacity expansion need by over 300 MW on an average annual basis
- Lower load growth combined with greater near-term import capability from Nevada enable deferral of gas resources
- Energy Gateway West transmission in-service date adjustments prompted deferral of Wyoming wind acquisitions to 2017
- Reexamination of need and timing for capital investments in light of economic conditions

2008 IRP Update: Resource Capacity Differences relative to the 2008 IRP

Resource	Capacity, MW											Cumulative Total (2010-18)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
East												
CCCT F 2x1, Utah	-	-	-	-	-	(570)	607	-	-	536	-	573
IC Aero SCCT	-	-	-	-	-	-	-	(261)	-	-	-	(261)
Coal & Gas Capacity Upgrades	(2)	(28)	(13)	(25)	-	(14)	11	29	-	-	-	(39)
Blundell Geothermal 3	-	-	-	-	(35)	-	-	-	-	-	-	(35)
Wind	29	(23)	200	(100)	(100)	(100)	(150)	(100)	60	50	-	(262)
CHP	(2)	(2)	(2)	(3)	(3)	(3)	(4)	(4)	(4)	(4)	(2)	(28)
Distributed Standby Generation	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	-	(35)
DSM, Class 1, Utah Cool Keeper Load Control	(25)	(33)	(35)	(25)	(10)	(10)	(10)	(10)	(10)	(10)	-	(152)
DSM, Class 1, Other *	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	(13)
DSM Class 2	14	15	16	14	13	13	(7)	(6)	(6)	(9)	(5)	42
Front Office Transaction - 3Qtr HLH	-	(50)	(150)	(194)	(154)	319	98	72	(367)	(453)	(450)	
West												
Coal Plant Turbine Upgrades	-	(5)	(9)	(12)	(12)	-	-	12	12	8	12	(6)
Swift Hydro Upgrades	-	-	-	(25)	(25)	(25)	-	-	-	-	-	(75)
Wind	30	(20)	(200)	-	-	-	-	-	-	-	-	(220)
CHP	(1)	(1)	(1)	(1)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	(15)
Distributed Standby Generation	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	-	(11)
DSM, Class 1, Other *	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15
DSM Class 2	3	3	1	0	2	1	(2)	(2)	(12)	(2)	(1)	(11)
Solar Photovoltaic (utility-scale)	-	-	1.8	1.8	1.8	1.8	1.8	-	-	-	-	8.8
Front Office Transaction-3 Qtr HLH / Flat Annual	-	-	(59)	(435)	(245)	(35)	(245)	(67)	319	(292)	(277)	
Annual Additions, Long Term Resources	41	(74)	(36)	(147)	(137)	(698)	442	(348)	33	563	3	
Annual Additions, Short Term Resources	-	(50)	(209)	(630)	(400)	284	(147)	5	(48)	(745)	(727)	
Total Annual Additions	41	(124)	(245)	(777)	(536)	(414)	295	(343)	(15)	(183)	(724)	

* The 2008 IRP Preferred Portfolio table cited a range of "up to 120 MW" for other Class 1 DSM (90 MW east, 30 MW west), and excluded customer-owned standby generation. A resource difference is only reported for the 2009-2018 cumulative amounts assuming that the upper east-side and west-side maximums are reached by 2018.

2008 IRP Action Plan Update

- **Reflects acquisition of less wind and front office transactions, and deferrals of thermal assets and wind**
- **Demand-side Management**
 - **Class 1, Dispatchable Load Control:** minimal change in overall level; irrigation program expansions and expected commercial curtailment product introduction offsets lower expected Utah Cool Keeper program expansion
 - **Class 2, Energy Efficiency:** no change
- **Continued emphasis on re-evaluation of resource need and timing**
- **Pursuit of attractive renewable energy projects**

Contact Information

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- We prefer written questions be sent to the IRP email address for tracking purposes
- Please alert us of email address changes or in-bound security restrictions