

PACIFICORP'S 2017 CLASS 2 DEMAND-SIDE MANAGEMENT DECREMENT STUDY

This document presents the methodology and results of the valuation of Class 2 demand-side management (DSM) for 2018 through 2036. For this analysis, the 2017 Integrated Resource Plan (IRP)¹ preferred portfolio, Case FS-GW4, was used as the starting point to calculate the avoided cost of Class 2 DSM resources.

The avoided cost of a Class 2 DSM resource is representative of that resource's contribution to the reduction of total system production costs. To align with the Class 2 DSM costs applied for resource portfolio development in the 2017 IRP using the System Optimizer capacity expansion model (SO model), cost credits are applied to the Class 2 DSM avoided cost values reflecting (1) the transmission and distribution investment deferral benefit (T&D credit), and (2) the stochastic risk reduction benefit associated with resources that do not incur variable fuel costs that are subject to market volatility (stochastic risk reduction credit). Consistent with the 2017 IRP, the T&D credit is applied to the super-peak hours (12-20) in July.

Methodology for Determination of Class 2 DSM Avoided Costs

To determine the Class 2 DSM avoided cost values, PacifiCorp compared the cost of its 2017 IRP preferred portfolio (Base Case) to an alternate portfolio containing no new Class 2 DSM (Change Case). The SO model was used to perform studies to determine the impact on resource portfolios with and without Class 2 DSM. As in past decrement studies, the difference in total system production costs between a Base Case, where Class 2 DSM resources are available, and a Change Case, where the Class 2 DSM resources are not available (except 2017 planned DSM), indicates the value attributable to new Class 2 DSM resources. The methodology for this study was updated by generating avoided costs on an hourly basis to better align with the application of hourly values in PacifiCorp's cost-effectiveness analysis of Class 2 DSM programs. In order to produce hourly results, PacifiCorp used its Planning & Risk model (PaR model) to create deterministic runs for the Base Case and the Change Case. The T&D and risk reduction credits were then added to the hourly values, thereby increasing Class 2 DSM resource value consistent with modeling assumptions applied when developing the 2017 IRP preferred portfolio.

For the Change Case that excludes all new Class 2 DSM resources, the resource portfolio includes:

- 150 MW of additional wind in 2021
- 416 MW combined cycle combustion turbine (CCCTs) on the west side of PacifiCorp's system in 2028
- Two 200 MW Frames on the east side of PacifiCorp's system in 2028
- 477 MW CCCTs in 2029 and 2033

The Change Case portfolio also adds more Class 1 DSM and front office transactions (FOTs). All of these resources are incremental to the new resources included in the 2017 IRP preferred portfolio.

¹ PacifiCorp's 2017 IRP was published April 4, 2017, and is available here: <http://www.pacificorp.com/es/irp.html>.

The avoided cost for Class 2 DSM resources is derived by assuming that the Class 2 DSM selected in the preferred portfolio is available to PacifiCorp at no cost. This is achieved by removing the cost of the DSM resources from the Base Case before comparing against the Change Case to arrive at the hourly system cost difference. Changes in fixed costs due to differences in the resource portfolio and changes in variable costs due to re-dispatch of the respective resource portfolio are captured in the hourly total system costs for Class 2 DSM resources. The difference between the hourly total system production costs, along with the T&D credit and stochastic risk reduction credit, determines the total hourly value of Class 2 DSM resources.

Class 2 DSM Decrement Study Results

Table 1 reports the average annual nominal-dollar avoided cost, including the T&D and stochastic risk reduction cost credits.

As compared to the 2015 Class 2 DSM decrement study on a system basis, the updated avoided costs have decreased. The reduction in the avoided cost is the result of multiple factors, including reduced loads (see Figure 1), reduced market prices (see Figure 2), changes in the T&D credit value, and lower costs of CCCTs and renewable resources for the 2017 IRP as compared to the 2015 IRP.

Table 1 – Average Class 2 DSM Decrement Values including T&D and Risk Reduction Credits

	Average Decrement Values (Nominal \$/MWh)																		
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Month																			
Jan	\$21.67	\$25.17	\$26.04	\$30.71	\$32.06	\$34.48	\$39.33	\$40.86	\$43.66	\$46.18	\$65.28	\$80.01	\$79.71	\$77.33	\$81.33	\$89.13	\$89.10	\$88.73	\$88.12
Feb	\$26.47	\$26.31	\$25.32	\$29.55	\$29.65	\$32.65	\$40.33	\$40.09	\$41.76	\$48.81	\$68.34	\$83.20	\$80.14	\$79.37	\$82.50	\$89.54	\$90.69	\$89.30	\$90.06
Mar	\$31.09	\$23.93	\$24.15	\$29.25	\$28.74	\$30.06	\$38.09	\$39.19	\$37.21	\$42.83	\$66.29	\$82.95	\$82.12	\$78.48	\$79.94	\$90.98	\$92.35	\$92.69	\$93.25
Apr	\$21.57	\$20.94	\$22.64	\$26.69	\$27.06	\$27.16	\$37.31	\$39.41	\$39.34	\$42.52	\$68.08	\$89.80	\$85.62	\$78.31	\$82.54	\$94.97	\$93.71	\$95.73	\$94.85
May	\$21.84	\$22.40	\$23.62	\$27.44	\$30.11	\$32.79	\$37.79	\$40.33	\$40.17	\$40.25	\$64.37	\$85.82	\$84.62	\$77.16	\$80.39	\$90.36	\$91.04	\$95.52	\$91.98
Jun	\$23.13	\$26.78	\$23.56	\$28.15	\$30.18	\$33.35	\$38.25	\$39.14	\$42.62	\$42.63	\$65.81	\$81.74	\$77.45	\$72.32	\$74.48	\$83.69	\$85.45	\$91.00	\$88.66
Jul	\$44.85	\$48.13	\$49.28	\$55.33	\$55.99	\$59.36	\$66.97	\$67.37	\$68.26	\$66.62	\$84.32	\$91.50	\$93.27	\$88.71	\$89.65	\$99.24	\$100.34	\$106.16	\$104.24
Aug	\$26.65	\$28.55	\$29.03	\$33.07	\$35.60	\$38.39	\$44.32	\$47.31	\$45.68	\$49.72	\$72.20	\$74.36	\$74.82	\$71.57	\$72.30	\$81.24	\$81.76	\$87.38	\$85.07
Sep	\$24.71	\$24.93	\$25.11	\$30.64	\$32.43	\$35.81	\$40.02	\$40.32	\$42.49	\$45.16	\$69.78	\$79.26	\$79.65	\$72.93	\$76.64	\$88.67	\$88.01	\$93.19	\$89.90
Oct	\$23.38	\$25.13	\$22.48	\$30.89	\$29.79	\$31.42	\$37.01	\$35.16	\$42.21	\$42.14	\$68.81	\$83.86	\$80.10	\$78.55	\$81.00	\$93.77	\$92.08	\$95.97	\$91.80
Nov	\$25.92	\$23.91	\$24.73	\$27.58	\$30.23	\$32.37	\$41.98	\$36.26	\$38.36	\$44.78	\$66.18	\$86.10	\$82.70	\$81.98	\$83.35	\$93.55	\$92.31	\$93.33	\$92.58
Dec	\$27.33	\$27.27	\$25.48	\$30.16	\$33.21	\$34.70	\$36.06	\$38.94	\$41.31	\$47.49	\$66.08	\$80.89	\$79.48	\$77.26	\$80.85	\$89.15	\$87.69	\$88.25	\$87.87

Figure 1 – 2017 IRP vs. 2015 IRP Forecasted Load Comparisons

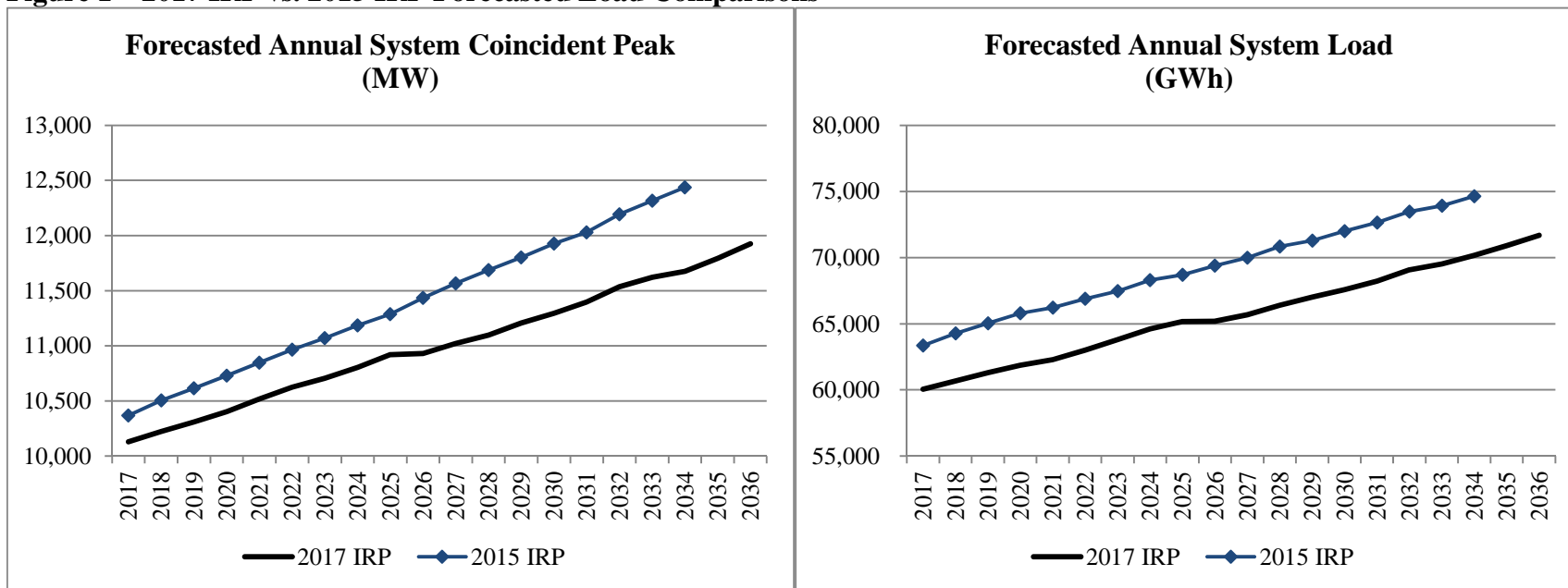


Figure 2 – 2017 IRP vs. 2015 IRP Forecasted Market Prices

