Pacificorp Energy Heat Rate Improvement Plan

Sys_2009_HRIP

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1. Revision History

Version	Status	Author	Reason for Issue	Date
1			2009 Plan Issue	March 31, 2009

2. Revision Control

This document is maintained by the PacifiCorp Energy Asset Management group.

3. Glossary of Terms

3.1. Actual Net Heat Rate (Btu/kWh)

Total actual heat input in Btu's divided by actual net generation.

3.2. As-built Net Heat Rate (Btu/kWh)

Total guaranteed heat input, from the design heat balances in Btu's divided by the guaranteed net generation, corrected for changes in equipment from design. This is the baseline number for the plant personnel when they make their annual reconciliation.

3.3. British thermal unit (Btu)

British thermal unit is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

3.4. Gross Heat Rate (Btu/kWh)

Total actual heat input in Btu's divided by actual gross generation.

3.5. Net Generation (kWh)

Gross generation minus auxiliary or station usage

3.6. Planned Net Heat Rate (Btu/kWh)

Total budgeted heat input in Btu's divided by the budgeted net generation. This number is the annual goal for the plant personnel to achieve.

4. Overall Plan and Objectives

The overall heat rate strategy is to 1) minimize heat rate losses in our operating plants, 2) add new resources that are more heat rate efficient.

4.1. Turbine Upgrades

Improve Pacificorp Energy overall system heat rate by replacement of major turbine components. Technology improvements in turbine steam path design should result in 1-3% more generated megawatts for the same amount of steam energy supplied. No changes to the boiler capacity, fuel consumed, or stack emissions are expected. These replacements are economical on the larger units, generally those over 350MW. Turbine

replacements will be done on the regular turbine/boiler outage cycle by unit.

4.2. Availability Improvements

Improvement in unit availability and reduction of forced outages will contribute to less low load operation (higher heat rate) and offline fuel use or offline electrical power use. This will affect overall heat rate less than ½%.

4.3. New Resources

Increased demand will be met with natural gas fired units. Coal fired units are already near their capacity, so any increase demand will be provided by increasing gas plant capacity factors.

5. Performance against last year's plan

Comparison of the planned heat rate and the actual heat rate is shown in Figure 1 in the Appendix.

6. Major Influences for Current Planned Net Heat Rate

This section of the heat rate plan identifies the system influences that will affect the Planned Net Heat Rate.

6.1. Increase in Demand Energy

Increases in demand electrical energy will probably be made up with gas-fired generation. This will result in a lowering (better) of the system fossil-fueled heat rate.

6.2. Displacement of Fossil-Fueled Generation with Non-Fossil Generation

Increases in available generation from non-fossil sources (Wind, Hydro, Geothermal, and Solar) will displace fossil-fueled generation. The displaced generation will tend to be gas-fired generation due to fuel costs and the rapid response of gas-fired generation to variable displacement. This will result in higher (worse) system fossil-fueled heat rate. The opposite of this effect is also possible, that less non-fossil generation available will result in lower (better) fossil-fueled system heat rate.

6.3. Environmental Plan Projects

Environmental projects will increase the unit's auxiliary load, which will result in an increase (worse) in heat rate. There are several environmental projects scheduled over the next 10 years.

7. Major Initiatives

This section identifies the major planned capital and operational activities to improve or regain lost heat rate for the current 10-year plan. See Table 1.

8. Annual Review and Update

This plan will be reviewed and updated annually by the Pacificorp Energy management team by March 31.

9. Appendix

Figure 1
Pacificorp Energy
10-year Plan Heat Rate Goals

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Planned Net Heat Rate - Btu/kWh	10,672	10,657	10,553	10,444	10,206	10,133	10,127	10,076	10,015	10,057	10,009	9,945	9,865	9,851	9,862	9,834
Actual Net Heat Rate - Btu/kWh	10,517	10,515	10,428	10,302	10,066											
Annual Deviation from Plan - %	-1.45%	-1.33%	-1.19%	-1.36%	-1.37%											
Four-year Average Deviation from Plan - %	-1.45%	-1.39%	-1.32%	-1.33%	-1.31%											

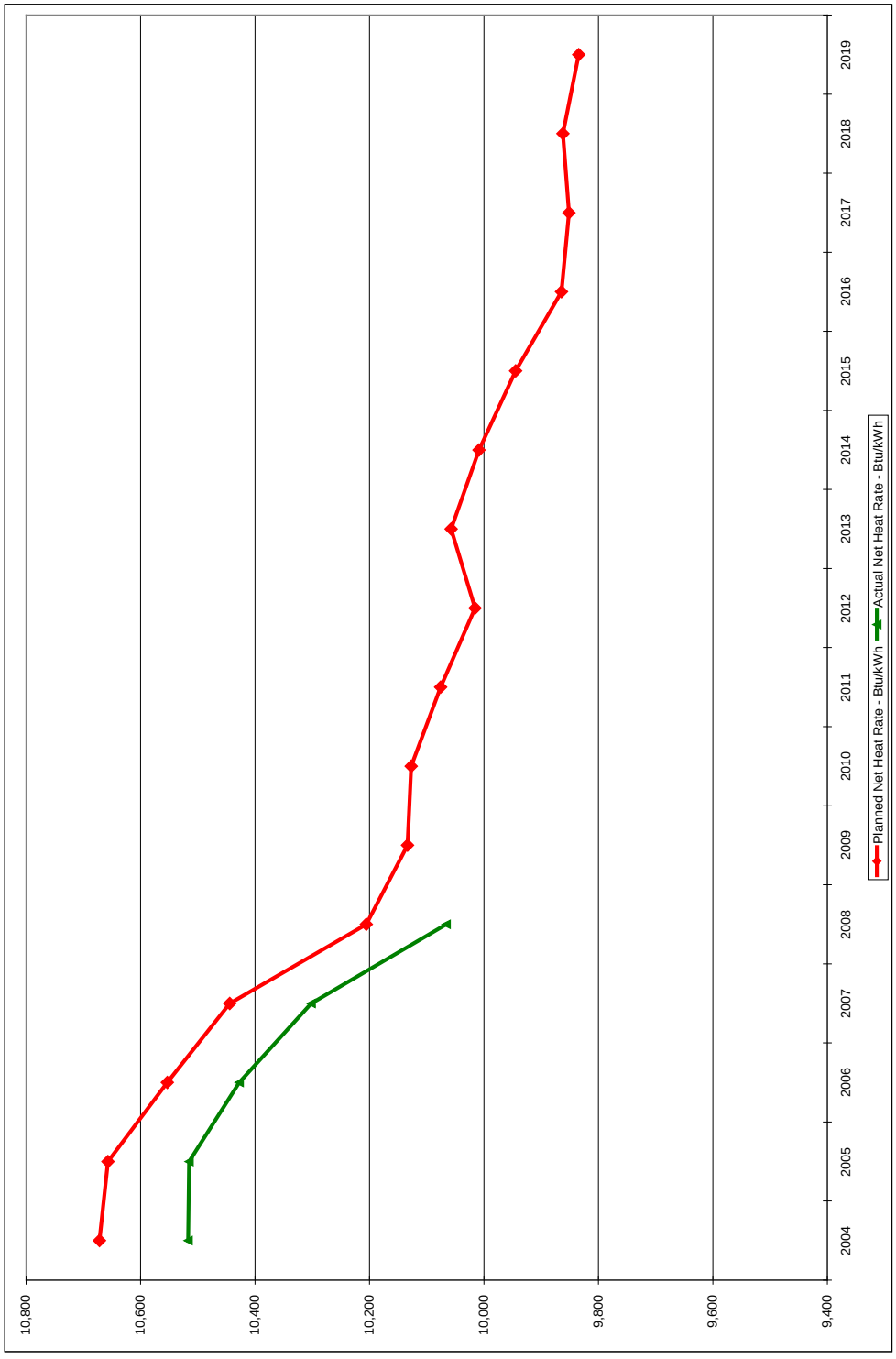

Table 1
Pacificorp Energy
10-year Plan Heat Rate Improvement Projects

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Budgeted / Planned Heat Rate Changes, Net basis (Improvements are negative)												
System HR benefit of Turbine Upgrades (difference)	Btu/kWh	0	(23)	(95)	(178)	(212)	(222)	(222)	(221)	(219)	(218)	(214)
System HR effect of Environmental Projects (difference)	Btu/kWh	2	(0)	0	12	15	2	25	31	34	36	34
System HR effect of Other Heat Rate Improvement Projects (difference)	Btu/kWh	(17)	(23)	(28)	(30)	(32)	2	(30)	(31)	(31)	(30)	(31)
Total Adjustments	Btu/kWh	(15)	(47)	(122)	(196)	(229)	(218)	(226)	(221)	(216)	(213)	(211)

10. Required Signatures

Corporate Heat Rate Engineer		Alan Jackson	
Signature:	(on file)	Date:	27Mar09

Director, Asset Management & Compliance		Dave Godfrey	
Signature:	(on file)	Date:	3/30/09

Managing Director, Generation Support		Rod Roberts	
Signature:	(on file)	Date:	3/30/09