

NorthWestern Energy 2015 RPP
 Thermal Resource Heat Rate and Generation
 by Elevation and Technology

Resource	Technology	Elevation	Nameplate Capacity	Fuel Type	Min HR	Med Low HR	Med Pre HR	Med Post HR	Med High HR	Max HR	Min Gen	Med Low Gen	Med Pre Gen	Med Post Gen	Med High Gen	Max Gen
CCCT (1x1)	GE 7FA.05 ACC ¹	3500	308	Natural Gas	7107	6862	6712	6608	6554	6528	172	197	222	249	276	308
CCCT (1x1)	GE 7FA.05 ACC ¹	5000	308	Natural Gas	7128	6878	6724	6614	6558	6524	159	182	206	232	255	285
CCCT (1x1)	GE 7FA.05 DF ACC ¹	3500	40	Natural Gas	8546	8546	8546	8546	8546	8546	40	40	40	40	40	40
CCCT (1x1)	GE 7FA.05 DF ACC ¹	5000	40	Natural Gas	8497	8497	8497	8497	8497	8497	40	40	40	40	40	40
SCCT - Small Aeroderivative	PW FT8	3500	60	Natural Gas	14400	11700	11300	11000	10700	10500	12	20	28	37	45	53
SCCT - Small Aeroderivative	PW FT8	5000	60	Natural Gas	14400	11700	11300	11000	10700	10500	10	18	25	33	40	50
SCCT - Large Aeroderivative	GE LMS100	3500	110	Natural Gas	9979	9757	9534	9312	9090	8867	49	58	66	75	84	93
SCCT - Large Aeroderivative	GE LMS100	5000	110	Natural Gas	9979	9757	9534	9312	9090	8867	46	55	64	73	83	89
SCCT - Frame	GE 7EA	3500	90	Natural Gas	15000	14258	13516	12774	12032	11286	10	24	38	52	65	79
SCCT - Frame	GE 7EA	5000	90	Natural Gas	15000	14258	13516	12774	12032	11286	10	23	36	50	62	75
Internal Combustion	Wartsila 18V50SG	3500	18	Natural Gas	11000	9601	9049	8611	8437	8314	3.7	7	10	15	17	18
Internal Combustion	Wartsila 18V50SG	5000	18	Natural Gas	11000	9601	9049	8611	8437	8314	3.7	7	10	15	17	18

NorthWestern Energy 2015 RPP
Thermal Resource Operating Parameters
by Elevation and Technology

Resource	Technology	Elevation	Nameplate Capacity	Fuel Type	Capital Cost (\$/kW)	Fixed O&M (\$/kw-yr)	Variable O&M (\$/kw-yr)	Min. Up Time (hrs)	Min. Down Time (hrs)	Ramp Up Rate (MW/hr)	Ramp Down Rate (MW/hr)	EFOR (%)	CO2 Emissions (lbs/MMBtu)
CCCT (1x1)	GE 7FA.05 ACC ¹	3500	308	Natural Gas	\$1,400	\$9.75	\$2.50	16	7	260	480	3%	117
CCCT (1x1)	GE 7FA.05 ACC ¹	5000	308	Natural Gas	\$1,492	\$10.52	\$2.70	16	7	260	480	3%	117
CCCT (1x1)	GE 7FA.05 DF ACC ¹	3500	40	Natural Gas	\$0	\$0	\$0.08	1	1	240	240	3%	117
CCCT (1x1)	GE 7FA.05 DF ACC ¹	5000	40	Natural Gas	\$0	\$0	\$0.08	1	1	240	240	3%	117
SCCT - Small Aeroderivative	PW FT8	3500	60	Natural Gas	\$917	\$6.05	\$4.60	8	7	300	300	3%	117
SCCT - Small Aeroderivative	PW FT8	5000	60	Natural Gas	\$962	\$6.35	\$4.83	8	7	300	300	3%	117
SCCT - Large Aeroderivative	GE LMS100	3500	110	Natural Gas	\$1,087	\$17.06	\$3.47	8	7	600	600	3%	116
SCCT - Large Aeroderivative	GE LMS100	5000	110	Natural Gas	\$1,140	\$17.90	\$3.64	8	7	600	600	3%	116
SCCT - Frame	GE 7EA	3500	90	Natural Gas	\$997	\$11.73	\$3.20	8	7	240	240	3%	117
SCCT - Frame	GE 7EA	5000	90	Natural Gas	\$1,049	\$12.42	\$3.39	8	7	240	240	3%	117
Internal Combustion	Wartsila 18V50SG	3500	18	Natural Gas	\$1,280	\$10.50	\$6.00	1	1	220	220	3%	117
Internal Combustion	Wartsila 18V50SG	5000	18	Natural Gas	\$1,280	\$10.50	\$6.00	1	1	220	220	3%	117