

Distributed Generation (DG) MSBACT Cost Analysis (HBL 5-12-04)

Technology	Unc ICE	Rich, 3-way	Fuel Cell	LADWP A-3-C	SCE TOU-8	Unc ICE	Rich, 3-way	KHI	LADWP A-3-C	SCE TOU-8	Unc ICE	SCR+CatOx	KHI	LADWP A-3-C	SCE TOU-8
MW	0.500	0.500	0.500	0.500	0.500	1.298	1.298	1.298	1.298	1.298	2.596	2.596	2.596	2.596	2.596
hrs/yr	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664	8664
Elec Effic HHV	27.3	27.3	41.0			26.9	26.9	19.7			33.5	33.5	19.7		
Thermal Effic HHV	45.8	45.8	37.2			46.1	46.1	49.9			41.9	41.9	49.9		
FERC Effic	49.1	49.1	58.7			48.8	48.8	43.4			53.4	53.4	43.4		
Installed Cost Incl Maint. Contr.	\$887,500	\$910,000	\$3,350,000			\$2,356,317	\$2,414,738	\$2,944,829			\$4,569,840	\$4,829,477	\$5,889,658		
ERC Cost	\$7,184,934	\$0	\$0			\$20,094,475	\$372,094	\$2,318			\$31,097,228	\$537,696	\$4,636		
CEMS Cost						\$100,000	\$100,000	\$100,000			\$100,000	\$100,000	\$100,000		
Total Installed Cost	\$8,072,434	\$910,000	\$3,350,000			\$22,550,792	\$2,886,833	\$3,047,147			\$35,767,068	\$5,467,173	\$5,994,294		
CPUC Rebate	\$0	\$0	\$1,340,000			\$0	\$0	\$704,138			\$0	\$0	\$0		
Net Installed Cost	\$8,072,434	\$910,000	\$2,010,000			\$22,550,792	\$2,886,833	\$2,343,010			\$35,767,068	\$5,467,173	\$5,994,294		
Length of Maint. Contract, years	3	3	5			3	3	3			3	3	3		
Maint. , \$/yr (after Mnt. Contr)	\$64,980	\$69,730	\$50,684			\$168,720	\$181,052	\$153,920			\$337,440	\$392,746	\$307,840		
Fuel Cell Restack (Year 8)			\$378,500												
Emission Fees, \$/yr	\$14,916	\$454	-\$44			\$39,302	\$1,174	-\$151			\$107,772	\$1,690	-\$302		
CEMS Mntnc & Testing, \$/yr						\$10,000	\$10,000	\$10,000			\$10,000	\$10,000	\$10,000		
Fuel Price, \$/MMBtu	\$5.90	\$5.90	\$5.90			\$5.90	\$5.90	\$5.90			\$5.90	\$5.90	\$5.90		
Fuel or Power Cost, \$/yr	\$145,669	\$145,669	\$118,789	\$308,190	\$415,798	\$381,333	\$381,333	\$467,341	\$800,213	\$1,079,615	\$679,144	\$679,144	\$934,683	\$1,600,427	\$2,159,231
DL Charges (SCE only) \$/yr	\$35,869	\$35,869	\$14,512			\$93,134	\$93,134	\$93,134			\$186,267	\$186,267	\$186,267		
10-yr Present Value (SCE)	\$10,091,136	\$2,833,011	\$3,615,430		\$3,509,331	\$27,907,799	\$7,990,478	\$8,010,798		\$9,111,954	\$45,937,921	\$15,049,641	\$17,245,472		\$18,223,908
10-yr Present Value (DWP)	\$9,788,402	\$2,530,277	\$3,492,947	\$2,601,124		\$27,121,752	\$7,204,431	\$7,224,752	\$6,753,801		\$44,365,828	\$13,477,547	\$15,673,378	\$13,507,602	
Differential 10-yr PV (SCE) (Avg)			-\$6,475,707	-\$7,187,278	-\$6,581,805			-\$19,897,000	-\$20,367,951	-\$18,795,845			-\$28,692,449	-\$30,858,226	-\$27,714,014
Differential 10-yr PV (SCE) (Incr)			\$782,419	\$70,848	\$676,321			\$20,321	-\$450,630	\$1,121,476			\$2,195,831	\$30,054	\$3,174,267
Emissions: lb/MWH:															
NOx	27.6	0.466	0.0057	0.07	0.07	28.0	0.466	0.162	0.07	0.07	41.6	0.344	0.162	0.07	0.07
CO	46.5	1.864	0	0.1	0.1	47.2	1.864	0.237	0.1	0.1	3.2	0.767	0.237	0.1	0.1
NMHC	3.3	0.466	0.02	0.02	0.02	3.4	0.466	0.045	0.02	0.02	2.7	0.332	0.045	0.02	0.02
NH3	0	0	0	0	0	0	0	0.000	0	0	0	0.141	0.000	0	0
10-yr tons:															
Nox	598.45	10.09	0.12	1.52	1.52	1,576.96	26.21	9.74	3.94	3.94	4,675.49	38.68	19.48	7.87	7.87
CO	1,007.34	40.38	0.00	2.17	2.17	2,654.44	104.84	14.23	5.62	5.62	363.27	86.32	28.45	11.25	11.25
NMHC	72.30	10.09	0.43	0.43	0.43	190.52	26.21	2.71	1.12	1.12	305.97	37.37	5.42	2.25	2.25
NH3	0	0	0	0	0	0	0	0	0	0	0	15.88	0	0	0
Displaced Boiler Emissions:															
Boiler Nox, ppmvd@3%O2	30	30	30	0	0	30	30	30	0	0	30	30	30	0	0
Boiler CO, ppmvd@3%O2	109	109	109	0	0	109	109	109	0	0	109	109	109	0	0
Boiler NOx, 10-yr tons	-5.52	-5.52	-2.98	0	0	-14.63	-14.63	-21.63	0	0	-21.38	-21.38	-43.26	0	0
Boiler CO, 10-yr tons	-12.21	-12.21	-6.60	0	0	-32.36	-32.36	-47.84	0	0	-47.28	-47.28	-95.68	0	0
Total 10-yr tons:															
NOx	592.92	4.57	-2.86	1.52	1.52	1,562.33	11.58	-11.89	3.94	3.94	4,654.11	17.30	-23.79	7.87	7.87
CO	995.12	28.16	-6.60	2.17	2.17	2,622.07	72.48	-33.61	5.62	5.62	315.98	39.04	-67.23	11.25	11.25
NMHC	72.30	10.09	0.43	0.43	0.43	190.52	26.21	2.71	1.12	1.12	305.97	37.37	5.42	2.25	2.25
NH3	0	0	0	0	0	0	0	0	0	0	0	15.88	0.00	0	0
Max 10-yr PV (Avg)			\$13,231,875	\$13,144,764	\$13,144,764			\$34,923,719	\$34,637,690	\$34,637,690			\$95,572,248	\$95,000,191	\$95,000,191
Max 10-yr PV (Incr)			\$1,053,049	\$791,715	\$791,715			\$2,896,181	\$2,038,097	\$2,038,097			\$4,632,033	\$2,915,863	\$2,915,863
Pass/Fail (Avg)			PASS	PASS	PASS			PASS	PASS	PASS			PASS	PASS	PASS
Pass/Fail (Incr)			PASS	PASS	PASS			PASS	PASS	PASS			PASS	PASS	FAIL
Effect of Increase in Price of Gas of 50 %															
Differential 10-yr PV (SCE) (Avg)			-6,589,137	-7,801,999	-7,196,526			-19,534,046	-21,977,177	-20,405,071			-27,614,074	-33,724,212	-30,579,999
Differential 10-yr PV (SCE) (Incr)			668,989	-543,874	61,599			383,275	-2,059,856	-487,750			3,274,207	-2,835,931	308,281
Pass/Fail (Avg)			PASS	PASS	PASS			PASS	PASS	PASS			PASS	PASS	PASS
Pass/Fail (Incr)			PASS	PASS	PASS			PASS	PASS	PASS			PASS	PASS	PASS

Conclusion:
CARB 2007 standards are justified as MSBACT for DG now.

See Notes