

Scorecard on Reburning, 6/1/2004

Project Description/ Technology	Utility/Operator	Location	Reburning Technology Provider	Combustor	Coal	Size, MWe (gross)	Reburn Fuel Heat Input, %	Thermal Efficiency Loss, %	Baseline NOx, lb/ million Btu	Controlled NOx, lb/ million Btu	Target NOx Reduction, %	Actual NOx Reduction, %	Reburning Capital Cost, \$/kW	Reburning Levelized Cost with Gas at \$/million Btu	Current Status of Reburning	Comments
Gas Reburning (GR) + Sorbent Injection (SI)	Illinois Power (now Dynegy)	Hennepin Unit 1, Hennepin IL	Energy & Environmental Research Corp. (now GE Energy)	T-fired	IL bituminous	80	18	1	0.75	0.25	60	67	300 MWe: 17	300 MWe: \$2114/ton NOx	Demo 1/91-1/93 Not operating	DOE Clean Coal project. High price of natural gas. NOx reduction covered by other units.
Gas Reburning (GR) + Sorbent Injection (SI)	City Water, Light & Power	Lakeside Unit 7, Springfield IL	Energy & Environmental Research Corp. (now GE Energy)	Cyclone	IL bituminous	40	23	1	0.97	0.39	60	60	300 MWe: 17	300 MWe: \$2114/ton NOx	Demo 5/93-10/94 Not operating	DOE Clean Coal project. High price of natural gas. NOx reduction covered by other units.
Gas Reburning (GR) + Low-NOx Burners (LNB)	Public Service of Colorado (now Xcel)	Cherokee Unit 3, Denver CO	Energy & Environmental Research Corp. (now GE Energy)	Wall-fired	Colorado bituminous	172	12.5	1	0.73	0.26	70	64	300 MWe: 12	300 MWe: \$2535/ton NOx	Demo 11/92-1/95 Decommissioned	DOE Clean Coal project. LNB plus OFA meets NOx emissions requirement
Coal Reburning	Wisconsin Power & Light (now Alliant)	Nelson Dewey Unit 2, Cassville WI	Babcock & Wilcox	Cyclone	IL bituminous (Lamar) & PRB subbituminous	110	25 - 30	1	0.82	Lamar 0.39, PRB 0.34	50	Lamar 52, PRB 55	110 MWe: 66; 605 MWe: 43	110 MWe: 2.4 mls/kWh 605 MWe: 1.6 mls/kWh	Demo 12/91-12/92 Decommissioned	DOE Clean Coal project. Overfire air (OFA) meets requirement
Micronized Coal Reburning	NYSEG (now AES)	Miliken Unit 1 (now AES Cayuga), Lansing NY	Energy & Environmental Research Corp. (now GE Energy)	T-fired	Pittsburgh bituminous	148	14	1.5	0.35	0.25		29	300 MWe: 14	300 MWe: \$1023/ton NOx	Demo 3/97-4/99 Operating	DOE Clean Coal project. LNB provides 39% NOx reduction. Total NOx reduction = 68%.
Micronized Coal Reburning	Eastman Kodak	Kodak Park Unit 15, Rochester NY	Energy & Environmental Research Corp. (now GE Energy)	Cyclone	Pittsburgh bituminous	60	17	0.5	1.36	0.59	> 50	57	300 MWe: 56	300 MWe: \$571/ton NOx	Demo 4/97-10/98 Operating	DOE Clean Coal project. Meets N.Y. State RACT NOx/million Btu requirement of 0.60 lb
Gas Reburning	NYSEG (now AES)	Greenidge Unit 4, Dresden NY	Energy & Environmental Research Corp. (now GE Energy)	T-fired	Bituminous	109	10		0.50	0.25		50			Startup 1996 Not operating	High price of natural gas
Gas Reburning	Ohio Edison (now FirstEnergy)	Niles Station, Niles OH	Combustion Engineering/ Energy Systems Associates	Cyclone	Ohio bituminous	108	8-18		1.10	0.55	50	50			Installed and operated 1988 Decommissioned	First commercial application of reburning in U.S. Not operating due to high price of natural gas
Gas Reburning	Baltimore Gas & Electric (now Constellation)	C.P. Crane Unit 1, Baltimore MD	Energy & Environmental Research Corp. (now GE Energy)	Cyclone	Bituminous	200	25								Startup 1998	
Gas Reburning	Baltimore Gas & Electric (now Constellation)	C.P. Crane Unit 2, Baltimore MD	Energy & Environmental Research Corp. (now GE Energy)	Cyclone	Bituminous	205	25									
Gas Reburning	Tennessee Valley Authority	Allen Unit 1, Memphis TN	Energy & Environmental Research Corp. (now GE Energy)	Cyclone	Subbituminous	330	7		0.86			65				
Gas Reburning	Connectiv	Edge Moor Unit 4, Edge Moor DE	Energy & Environmental Research Corp. (now GE Energy)	T-fired	Bituminous	177										
Gas Reburning	Potomac Electric	Chalk Point Unit 1, Aquasco MD	Energy & Environmental Research Corp. (now GE Energy)	Wall-fired	Bituminous	364										
Gas Reburning	Potomac Electric	Chalk Point Unit 2, Aquasco MD	Energy & Environmental Research Corp. (now GE Energy)	Wall-fired	Bituminous	364										
Gas Reburning	Allegheny Power	Hatfield Unit 2, Masontown PA	Energy & Environmental Research Corp. (now GE Energy)	Cell burner	Bituminous	576										Brief test; successful
Gas Reburning	Allegheny Power	Hatfield Unit 3, Masontown PA	Energy & Environmental Research Corp. (now GE Energy)	Cell burner	Bituminous	576										Installed, never tested
Fuel Lean Gas Reburning (FLGR)	Duquesne Light	Eirama Units 1-3, Elizabeth PA	Energy Systems Associates	Roof-fired	Bituminous	3x100	5-10					25-30			Startup 1999 Not operating	High price of natural gas
Amine-Enhanced FLGR	Public Service Electric & Gas	Mercer Units 1-2, Trenton NJ	Fuel Tech/ Energy Systems Associates	Wall-fired	Bituminous	2x320	5-10					25-30			Startup 1999 Not operating	High price of natural gas
Amine-Enhanced FLGR	Public Service Electric & Gas	Hudson Unit 2, Jersey City NJ	Fuel Tech/ Energy Systems Associates	Opposed-fired	Bituminous	600	5-10					25-30			Startup 2000 Not operating	High price of natural gas
FLGR	Duke Energy	Riverbend, Mt Holly NC	Energy Systems Associates	T-fired	Bituminous	140	5-10					25-30			Startup 1998 Decommissioned	High price of natural gas
FLGR	Ontario Power	Nanticoke Unit 6, Canada	ESA Environmental Solutions	Wall-fired	Bituminous/ PRB blend	500	5-10					25-30			Startup 2000 Decommissioned	High price of natural gas
FLGR	Commonwealth Edison	Joliet, Joliet IL	Energy Systems Associates	Cyclone	Bituminous	340	5-10					25-30			Startup 1997 Decommissioned	High price of natural gas
Amine-Enhanced FLGR	Carolina Power & Light	Asheville, Arden NC	Energy Systems Associates	Wall-fired	Bituminous	207	5-10					25-30			Startup 2000 Not operating	High price of natural gas
FLGR	Wisconsin Electric Power (We Energies)	Pleasant Prairie, Pleasant Prairie WI	Fuel Tech/ Energy Systems Associates	Wall-fired	Bituminous	616	5-10					25-30			Startup 1999 Not operating	High price of natural gas
Coal Reburning	Louisville Gas & Electric (E.ON US Holdings)	R.D. Green Units 1 & 2, Sebree KY	Energy & Environmental Research Corp. (now GE Energy)	Wall-fired	Bituminous	2x293			0.45	0.25		44			Operating	
Gas Reburning	Eastman Kodak	Kodak Park, Rochester NY	Babcock & Wilcox	Cyclone	Pittsburgh bituminous	2x50	18		1.25	0.60		52			Startup 1998 Operating	Meets N.Y. State RACT requirement of 0.60 lb NOx/million Btu
Gas Reburning	Eastman Kodak	Kodak Park Unit 43, Rochester NY	Babcock & Wilcox	Cyclone	Pittsburgh bituminous	62	18		1.35	0.60		56			Startup 1999 Operating	Meets N.Y. State RACT requirement of 0.60 lb NOx/million Btu
Gas Reburning	Long Island Electric (now KeySpan)	E.F. Barrett Station, Island Park NY	ABB Combustion Engineering		Gas/oil	200						50				
Gas Reburning	Scottish Power	Longannet, Scotland		Wall-fired		700						42-49				
Gas Reburning		Ladyzhin Unit 2, Ukraine	ABB Combustion Engineering	Wall-fired, wet bottom	Ukraine bituminous	300	15-18		0.82	0.41	50	50			Startup 1992 Operating	
Coal Reburning		Ladyzhin Unit 6, Ukraine	GE Energy	Wall-fired, wet bottom	Ukraine bituminous	300	15-18				50				Planned	
Gas Reburning		Johban-Kyoudo Unit 9, Japan	IHI		Oil/coal	600									Operating	
Gas Reburning	Tokyo Electric Power	Yokohama Units 2 & 4, Japan	IHI		Gas/oil	175									Operating	
Gas Reburning	Tohso Co.	Unit 3, Japan	IHI		Coal	150									Operating	
Coal Reburning	Cheng Loong Corp.	Taiwan				20						55			Startup 9/2002 Operating	
Coal Reburning	Corn Belt Energy	Elkhart IL	Riley Power	Slagging	IL bituminous	91	10-15		0.6	0.2	67				Startup Spring 2007	Part of DOE-sponsored Low-Emissions Boiler System (LEBS) project
Coal Reburning	Beilun Power	Ningbo, China				5x600					50					Potential project
Coal Reburning	ENEL (now Interpower)	Vado Ligure Unit 4, Savona, Italy	Powergen, UK		Ashland (US)	320	20	Minimal	0.50	0.27	50	46			Decommissioned	LOI high due to restricted combustion zone
Oil Reburning	New Brunswick Power	Coleson Cove, St. John, NB	Babcock & Wilcox	Opposed wall-fired	Bunker C/ Ornmulsion	3x350	25		1.00	0.22	78				Commissioning in progress	