Table 11

Summary of Power Generation Technologies

Technology	Potential Capacity within the Region	Installed Cost[1] ($/MW)	CO2 Emissions[2] (tonnes/MWh)	Average Price of Electricity[3] (¢/kWh)
Wind	607,920 MWs[4]	$1,134,000	0	3.39
Conventional Hydro	16,000 MW	$1,451,000	0	2.99
Municipal Solid Waste/ Landfill Gas	Uncertain	$1,500,000	0	7.69
Biomass	77,000 MW	$1,757,000	0	5.56
Nuclear	Unconstrained	$1,957,000	0	3.19
Photovoltaic	Currently economically constrained	$4,467,000	0	18.6
Coal (IGCC w/CCS)	Uncertain	$2,006,000	0.09 – 0.1	4.62 – 5.25
NGCC	Uncertain	$567,000	0.36	10.6
Coal (IGCC)	Unconstrained	$1,402,000	0.77 – 0.81	2.76 – 3.29
Distillate Fuel Oil (steam)	Limited	$395,000	0.82	13.6
Coal (steam)	Unconstrained	$1,213,000	0.82 – 0.87	2.34 – 2.81

Notes:

[1] Installed costs were derived from EIA information and other sources where needed.

[2] For coal technologies, the range of values represents differences between bituminous, sub-

Table 10

Summary of Electric Power Production Technologies

Technology	Installed Cost ($/MW Capacity)	Fixed O&M ($/kW)	Heat Transfer Efficiency (%)	Net CO_2 Emissions (tonnes/ MWh)	Power Cost ($/MWh) (Plant gate)
Biomass	1,757,000	47.13	38%	0	$55.6
Municipal Solid Waste / Landfill Gas	1,500,000	101.07	25%	0	$76.9
Bituminous and Anthracite Coal (steam)	1,213,000	24.36	39%	0.82	$22.6
Sub-bituminous Coal (steam)	1,213,000	24.36	39%	0.85	$24.9
Lignite Coal (steam)	1,213,000	24.36	39%	0.87	$25.5
Bituminous Coal IGCC	1,402,000	34.21	41%	0.77	$27.6
Sub-bituminous Coal IGCC	1,402,000	34.21	41%	0.8	$29.9
Lignite IGCC	1,402,000	34.21	41%	0.81	$32.9
Bituminous IGCC w/CCS	2,006,000	40.26	35%	0.09	$48.1
Sub-bituminous IGCC w/CCS	2,006,000	40.26	35%	0.09	$48.0
Lignite IGCC w/CCS	2,006,000	40.26	35%	0.1	$52.5
Conventional Hydro (turbine)	1,451,000	12.35	N/A	0	$29.9
NGCC	567,000	11.04	52%	0.36	$105.9
Nuclear	1,957,000	68.96	N/A	0	$31.9
Distillate Fuel Oil (steam)	395,000	10.72	33%	0.82	$136.1
Solar Photovoltaic	4,467,000	10.34	N/A	0	$185.9
Wind	1,134,000	26.81	N/A	0	$33.9

The costs shown are in 2004 dollars. Overnight costs represent the cost of new projects, initiated in 2004, including a contingency factor of five to seven percent, and a technological optimism and learning factor, which reflects higher costs for first-of-a-kind or emerging technologies. Data on these factors was collected from the EIA's Annual Energy Outlook 2005."

Amit Surrebuttal, Dept. of Commerce, p. 43, PUC Excelsior Docket: 05-1993
Available online: http://legalectric.org/f/2006/11/amit-surrebuttal-1993-public.pdf

Table 5: PPAs Costs Including Sequestration Costs, Emission Costs and Transmission Cost

Alternative	Levelized Sequestration Cost Per MWh	Levelized Total Levelized Cost Per MWh
Excelsior Energy		
West Site (603 MW)	$50.02	$152.35
East Site (598 MW)	$50.02[3]	$161.22
West Site (450 MW)	$50.02[4]	$177.18
East Site (450 MW)	$50.02[5]	$187.07

$3,593,000

616 tons/hr
Mesaba = 5.4 million tons/yr.

Too low 10.2-13.7

Too low 17.7-18.7

41% too ↑

36-38% see MPCA analysis p3, figure 2

$1,402,000 too low

$/B 3,593,000

($2,155,860,763 for 600 MW