

Appendix F: Industrial Measure Assumptions

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
1	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00166667	\$11.4	0.4	No	No	100%	100%	100%
2	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.025	\$39.0	0.6	No	No	100%	55%	60%
3	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0375	\$41.7	0.9	No	No	100%	27%	87%
4	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0125	\$22.2	0.4	No	No	100%	90%	33%
5	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
6	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0375	\$4.2	8.7	Yes	Yes	100%	27%	87%
7	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	90%	33%
8	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
9	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	0%	100%
10	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	0%	100%
11	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	0%	100%
12	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0125	\$0.4	21.9	Yes	Yes	100%	0%	100%
13	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.0425	\$85.9	0.5	No	No	100%	20%	84%
14	Industrial	Optimized Distribution System	Per kWh	100%	25	0.0075	\$22.4	0.4	No	No	100%	90%	83%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
15	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0225	\$117.9	0.1	No	No	100%	80%	89%
16	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.025	\$0.8	25.4	Yes	Yes	100%	20%	89%
17	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.005125	\$0.0	8.1	Yes	Yes	100%	80%	89%
18	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
19	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.015	\$0.0	23.8	Yes	Yes	100%	80%	89%
20	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.075	\$30.2	1.9	Yes	Yes	100%	80%	89%
21	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01	\$11.6	0.6	No	No	100%	35%	78%
22	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.0125	\$22.2	0.3	No	No	100%	80%	37%
23	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.005	\$22.4	0.3	No	No	100%	80%	96%
24	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.025	\$1.1	32.3	Yes	Yes	100%	15%	97%
25	Industrial	Optimization of pumping system	Per kWh	100%	15	0.0225	\$26.1	1.0	Yes	Yes	100%	80%	99%
26	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03333333	\$27.9	1.4	Yes	Yes	100%	70%	83%
27	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	48%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
28	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.005	\$37.5	0.1	No	No	100%	80%	96%
29	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.05	\$59.7	0.5	No	No	100%	70%	86%
30	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.005	\$5.6	0.5	No	No	100%	40%	100%
31	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	48%
32	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00333333	\$22.4	0.2	No	No	100%	80%	96%
33	Industrial	Correctly sized motors	Per kWh	100%	15	0.00333333	\$14.1	0.3	No	No	100%	70%	98%
34	Industrial	Optimized motor control	Per kWh	100%	15	0.00833333	\$0.9	10.9	Yes	Yes	100%	70%	77%
35	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	48%
36	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$161.6	0.1	No	No	100%	80%	75%
37	Industrial	Optimized Distribution System	Per kWh	100%	10	0.025	\$11.2	1.2	Yes	Yes	100%	80%	82%
38	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.05	\$0.0	26.5	Yes	Yes	100%	80%	72%
39	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.025	\$77.8	0.3	No	No	100%	70%	93%
40	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.03	\$40.2	0.4	No	No	100%	80%	56%
41	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.021	\$41.3	0.5	No	No	100%	80%	75%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
42	Industrial	Sequencing Control	Per kWh	100%	5	0.025	\$16.8	0.4	No	No	100%	60%	61%
43	Industrial	Eliminate air leaks	Per kWh	100%	3	0.0375	\$9.3	0.6	No	No	100%	100%	72%
44	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.005	\$2.7	1.0	Yes	Yes	100%	40%	93%
45	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.14	\$44.7	3.0	Yes	Yes	100%	10%	99%
46	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$97.7	0.2	No	No	100%	0%	100%
47	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.0125	\$20.4	0.6	No	No	100%	0%	100%
48	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.015	\$28.8	0.3	No	No	100%	100%	89%
49	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01258653	\$54.3	0.2	No	No	100%	10%	78%
50	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.02013845	\$2.4	5.0	Yes	Yes	3%	80%	70%
51	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.04195511	\$18.0	2.2	Yes	Yes	100%	80%	70%
52	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.11327879	\$719.6	0.2	No	No	100%	5%	84%
53	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,562.5	0.0	No	No	100%	40%	100%
54	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01468429	\$3.2	1.5	Yes	Yes	100%	80%	61%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
55	Industrial	Destratification Fans	Per kWh	100%	10	0.10488777	\$245.0	0.3	No	No	15%	40%	94%
56	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01258653	\$10.5	0.8	No	No	100%	30%	63%
57	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01048878	\$6.3	0.3	No	No	100%	100%	36%
58	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.03146633	\$184.9	0.2	No	No	5%	60%	60%
59	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0625	\$15.0	2.7	Yes	Yes	100%	100%	84%
60	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.115	\$169.5	0.3	No	No	100%	100%	84%
61	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.0375	\$11.9	2.0	Yes	Yes	100%	100%	92%
62	Industrial	Lighting controls	Per kWh	100%	8	0.0375	\$47.1	0.4	No	No	100%	80%	99%
63	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0	#DIV/0!	65535.0	Yes	Yes	100%	60%	89%
64	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0	#DIV/0!	65535.0	Yes	Yes	80%	60%	99%
65	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00209776	\$14.3	0.3	No	No	100%	100%	100%
66	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.025	\$39.0	0.6	No	No	100%	15%	87%
67	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0375	\$41.7	0.9	No	No	100%	9%	87%
68	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0125	\$22.2	0.4	No	No	100%	90%	33%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
69	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
70	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0375	\$4.2	8.7	Yes	Yes	100%	9%	87%
71	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	90%	33%
72	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
73	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	0%	100%
74	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	0%	100%
75	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	0%	100%
76	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0125	\$0.4	21.9	Yes	Yes	100%	0%	100%
77	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.0425	\$85.9	0.5	No	No	100%	10%	93%
78	Industrial	Optimized Distribution System	Per kWh	100%	25	0.0075	\$22.4	0.4	No	No	100%	93%	82%
79	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0225	\$117.9	0.1	No	No	100%	80%	90%
80	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.025	\$0.8	25.4	Yes	Yes	100%	10%	93%
81	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.005125	\$0.0	8.1	Yes	Yes	100%	80%	90%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
82	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
83	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.015	\$0.0	23.8	Yes	Yes	100%	80%	90%
84	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.075	\$30.2	1.9	Yes	Yes	100%	80%	90%
85	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01	\$11.6	0.6	No	No	100%	35%	70%
86	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.0125	\$22.2	0.3	No	No	100%	80%	57%
87	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.0075	\$33.5	0.2	No	No	100%	80%	84%
88	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.0375	\$19.6	1.8	Yes	Yes	100%	15%	99%
89	Industrial	Optimization of pumping system	Per kWh	100%	15	0.03375	\$39.1	0.7	No	No	100%	80%	95%
90	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.05	\$41.9	0.9	No	No	100%	70%	89%
91	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	53%
92	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00749906	\$56.3	0.1	No	No	100%	80%	44%
93	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.07499063	\$89.5	0.3	No	No	100%	70%	55%
94	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00749906	\$8.4	0.3	No	No	100%	40%	100%
95	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.01874766	\$0.0	19.8	Yes	Yes	100%	100%	53%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
96	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.005	\$33.5	0.1	No	No	100%	80%	44%
97	Industrial	Correctly sized motors	Per kWh	100%	15	0.005	\$21.2	0.2	No	No	100%	70%	98%
98	Industrial	Optimized motor control	Per kWh	100%	15	0.0125	\$1.3	7.3	Yes	Yes	100%	70%	77%
99	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	53%
100	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$161.6	0.1	No	No	100%	80%	89%
101	Industrial	Optimized Distribution System	Per kWh	100%	10	0.025	\$11.2	1.2	Yes	Yes	100%	80%	84%
102	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.05	\$0.0	26.5	Yes	Yes	100%	80%	36%
103	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.025	\$77.8	0.3	No	No	100%	70%	84%
104	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.03	\$40.2	0.4	No	No	100%	80%	45%
105	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.021	\$41.3	0.5	No	No	100%	80%	89%
106	Industrial	Sequencing Control	Per kWh	100%	5	0.025	\$16.8	0.4	No	No	100%	75%	72%
107	Industrial	Eliminate air leaks	Per kWh	100%	3	0.0375	\$9.3	0.6	No	No	100%	100%	36%
108	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.005	\$2.7	1.0	Yes	Yes	100%	40%	95%
109	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.14	\$44.7	3.0	Yes	Yes	100%	10%	96%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
110	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$97.7	0.2	No	No	100%	0%	100%
111	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.0125	\$20.4	0.6	No	No	100%	0%	100%
112	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.015	\$28.8	0.3	No	No	100%	100%	89%
113	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01258653	\$54.3	0.2	No	No	100%	10%	70%
114	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.02013845	\$2.4	5.0	Yes	Yes	3%	80%	70%
115	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.04195511	\$18.0	2.2	Yes	Yes	100%	80%	70%
116	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.11327879	\$719.6	0.2	No	No	100%	5%	95%
117	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,562.5	0.0	No	No	100%	40%	82%
118	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01468429	\$3.2	1.5	Yes	Yes	100%	80%	59%
119	Industrial	Destratification Fans	Per kWh	100%	10	0.10488777	\$245.0	0.3	No	No	15%	30%	93%
120	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01258653	\$10.5	0.8	No	No	100%	30%	64%
121	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01048878	\$6.3	0.3	No	No	100%	100%	36%
122	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.03146633	\$184.9	0.2	No	No	5%	60%	87%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
123	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0625	\$15.0	2.7	Yes	Yes	100%	100%	87%
124	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.115	\$169.5	0.3	No	No	100%	100%	87%
125	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.0375	\$11.9	2.0	Yes	Yes	100%	100%	92%
126	Industrial	Lighting controls	Per kWh	100%	8	0.0375	\$47.1	0.4	No	No	100%	80%	99%
127	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.075	\$59.3	1.0	No	No	100%	80%	89%
128	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.025	\$344.2	0.0	No	No	80%	80%	99%
129	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0017507	\$12.0	0.3	No	No	100%	100%	100%
130	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0	#DIV/0!	65535.0	Yes	Yes	100%	30%	84%
131	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0262605	\$29.2	1.2	Yes	Yes	100%	35%	81%
132	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0087535	\$15.6	0.6	No	No	100%	90%	38%
133	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
134	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0262605	\$2.9	12.4	Yes	Yes	100%	30%	81%
135	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	90%	38%
136	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
137	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
138	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	90%	38%
139	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	0%	100%
140	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0087535	\$0.3	31.3	Yes	Yes	100%	0%	100%
141	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.04553978	\$92.0	0.5	No	No	100%	8%	99%
142	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00773994	\$23.1	0.4	No	No	100%	80%	63%
143	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0241093	\$126.4	0.1	No	No	100%	80%	100%
144	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.02678811	\$0.9	23.7	Yes	Yes	100%	8%	63%
145	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00549156	\$0.0	8.1	Yes	Yes	100%	40%	100%
146	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.01339405	\$0.0	19.8	Yes	Yes	100%	100%	30%
147	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01607286	\$0.0	23.8	Yes	Yes	100%	40%	100%
148	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.08036432	\$32.4	1.8	Yes	Yes	100%	80%	100%
149	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01071524	\$12.4	0.5	No	No	100%	35%	83%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
150	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.01339405	\$23.8	0.3	No	No	100%	80%	63%
151	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00558971	\$25.0	0.2	No	No	100%	80%	99%
152	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.02794857	\$14.6	2.5	Yes	Yes	100%	15%	95%
153	Industrial	Optimization of pumping system	Per kWh	100%	15	0.02515372	\$29.2	0.9	No	No	100%	80%	90%
154	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03726477	\$31.2	1.2	Yes	Yes	100%	70%	94%
155	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00931619	\$0.0	19.8	Yes	Yes	100%	100%	48%
156	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00445633	\$33.5	0.1	No	No	100%	80%	100%
157	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.04456328	\$53.2	0.5	No	No	100%	70%	86%
158	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00445633	\$5.0	0.6	No	No	100%	40%	78%
159	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.01114082	\$0.0	19.8	Yes	Yes	100%	100%	48%
160	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00389636	\$26.1	0.1	No	No	100%	80%	100%
161	Industrial	Correctly sized motors	Per kWh	100%	15	0.00389636	\$16.5	0.2	No	No	100%	70%	98%
162	Industrial	Optimized motor control	Per kWh	100%	15	0.00974089	\$1.0	9.3	Yes	Yes	100%	70%	77%
163	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00974089	\$0.0	19.8	Yes	Yes	100%	100%	48%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
164	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03224974	\$166.8	0.1	No	No	100%	80%	82%
165	Industrial	Optimized Distribution System	Per kWh	100%	10	0.02579979	\$11.5	1.2	Yes	Yes	100%	90%	68%
166	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.05159959	\$0.0	26.5	Yes	Yes	100%	80%	59%
167	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.02579979	\$80.3	0.3	No	No	100%	70%	91%
168	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.03095975	\$41.5	0.4	No	No	100%	80%	55%
169	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.02167183	\$42.7	0.5	No	No	100%	80%	82%
170	Industrial	Sequencing Control	Per kWh	100%	5	0.02579979	\$17.3	0.4	No	No	100%	75%	57%
171	Industrial	Eliminate air leaks	Per kWh	100%	3	0.03869969	\$9.6	0.6	No	No	100%	100%	59%
172	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00515996	\$2.8	1.0	No	No	100%	40%	96%
173	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.14447884	\$46.1	2.9	Yes	Yes	100%	10%	96%
174	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03224974	\$100.8	0.2	No	No	100%	0%	100%
175	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.0128999	\$21.0	0.6	No	No	100%	0%	100%
176	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01071429	\$20.6	0.4	No	No	100%	100%	89%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
177	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.0206044	\$88.8	0.1	No	No	100%	10%	83%
178	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.03296703	\$3.9	3.1	Yes	Yes	3%	80%	70%
179	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.06868132	\$29.5	1.3	Yes	Yes	100%	80%	70%
180	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.18543956	\$1,178.1	0.1	No	No	100%	5%	78%
181	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$2,557.8	0.0	No	No	100%	40%	99%
182	Industrial	Automated Temperature Control	Per kWh	100%	5	0.02403846	\$5.3	0.9	No	No	100%	80%	53%
183	Industrial	Destratification Fans	Per kWh	100%	10	0.1717033	\$401.1	0.2	No	No	15%	40%	96%
184	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.0206044	\$17.2	0.5	No	No	100%	30%	70%
185	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01717033	\$10.4	0.2	No	No	100%	100%	36%
186	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.05151099	\$302.7	0.1	No	No	5%	60%	84%
187	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.06009615	\$14.4	2.8	Yes	Yes	100%	100%	47%
188	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.11057692	\$163.0	0.3	No	No	100%	100%	81%
189	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.03605769	\$11.4	2.1	Yes	Yes	100%	100%	72%
190	Industrial	Lighting controls	Per kWh	100%	8	0.03605769	\$45.3	0.4	No	No	100%	80%	99%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
191	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05589715	\$44.2	1.3	Yes	Yes	100%	80%	89%
192	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01863238	\$256.5	0.1	No	No	80%	80%	99%
193	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00209776	\$14.3	0.3	No	No	100%	100%	100%
194	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.025	\$39.0	0.6	No	No	100%	55%	75%
195	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0375	\$41.7	0.9	No	No	100%	35%	76%
196	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0125	\$22.2	0.4	No	No	100%	90%	36%
197	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
198	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0375	\$4.2	8.7	Yes	Yes	100%	30%	76%
199	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	90%	36%
200	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
201	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
202	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0125	\$2.2	4.4	Yes	Yes	100%	90%	36%
203	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	0%	100%
204	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0125	\$0.4	21.9	Yes	Yes	100%	0%	100%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
205	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.0425	\$85.9	0.5	No	No	100%	15%	94%
206	Industrial	Optimized Distribution System	Per kWh	100%	25	0.0075	\$22.4	0.4	No	No	100%	80%	96%
207	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0225	\$117.9	0.1	No	No	100%	80%	93%
208	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.025	\$0.8	25.4	Yes	Yes	100%	15%	100%
209	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.005125	\$0.0	8.1	Yes	Yes	100%	40%	93%
210	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
211	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.015	\$0.0	23.8	Yes	Yes	100%	40%	93%
212	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.075	\$30.2	1.9	Yes	Yes	100%	80%	93%
213	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01	\$11.6	0.6	No	No	100%	35%	81%
214	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.0125	\$22.2	0.3	No	No	100%	80%	61%
215	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.0075	\$33.5	0.2	No	No	100%	80%	91%
216	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.0375	\$19.6	1.8	Yes	Yes	100%	15%	99%
217	Industrial	Optimization of pumping system	Per kWh	100%	15	0.03375	\$39.1	0.7	No	No	100%	80%	98%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
218	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.05	\$41.9	0.9	No	No	100%	70%	94%
219	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	52%
220	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00749906	\$56.3	0.1	No	No	100%	80%	99%
221	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.07499063	\$89.5	0.3	No	No	100%	70%	78%
222	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00749906	\$8.4	0.3	No	No	100%	40%	100%
223	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.01874766	\$0.0	19.8	Yes	Yes	100%	100%	52%
224	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.005	\$33.5	0.1	No	No	100%	80%	99%
225	Industrial	Correctly sized motors	Per kWh	100%	15	0.005	\$21.2	0.2	No	No	100%	70%	98%
226	Industrial	Optimized motor control	Per kWh	100%	15	0.0125	\$1.3	7.3	Yes	Yes	100%	70%	77%
227	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	52%
228	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$161.6	0.1	No	No	100%	80%	75%
229	Industrial	Optimized Distribution System	Per kWh	100%	10	0.025	\$11.2	1.2	Yes	Yes	100%	80%	53%
230	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.05	\$0.0	26.5	Yes	Yes	100%	80%	56%
231	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.025	\$77.8	0.3	No	No	100%	70%	81%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
232	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.03	\$40.2	0.4	No	No	100%	80%	44%
233	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.021	\$41.3	0.5	No	No	100%	80%	75%
234	Industrial	Sequencing Control	Per kWh	100%	5	0.025	\$16.8	0.4	No	No	100%	75%	64%
235	Industrial	Eliminate air leaks	Per kWh	100%	3	0.0375	\$9.3	0.6	No	No	100%	100%	56%
236	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.005	\$2.7	1.0	Yes	Yes	100%	40%	93%
237	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.14	\$44.7	3.0	Yes	Yes	100%	10%	98%
238	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03125	\$97.7	0.2	No	No	100%	0%	100%
239	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.0125	\$20.4	0.6	No	No	100%	0%	100%
240	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.015	\$28.8	0.3	No	No	100%	100%	89%
241	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01258653	\$54.3	0.2	No	No	100%	10%	81%
242	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.02013845	\$2.4	5.0	Yes	Yes	3%	80%	70%
243	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.04195511	\$18.0	2.2	Yes	Yes	100%	80%	70%
244	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.11327879	\$719.6	0.2	No	No	100%	5%	93%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
245	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,562.5	0.0	No	No	100%	40%	94%
246	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01468429	\$3.2	1.5	Yes	Yes	100%	80%	67%
247	Industrial	Destratification Fans	Per kWh	100%	10	0.10488777	\$245.0	0.3	No	No	15%	40%	91%
248	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01258653	\$10.5	0.8	No	No	100%	30%	57%
249	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01048878	\$6.3	0.3	No	No	100%	100%	36%
250	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.03146633	\$184.9	0.2	No	No	5%	60%	75%
251	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0625	\$15.0	2.7	Yes	Yes	100%	100%	83%
252	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.115	\$169.5	0.3	No	No	100%	100%	80%
253	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.0375	\$11.9	2.0	Yes	Yes	100%	100%	92%
254	Industrial	Lighting controls	Per kWh	100%	8	0.0375	\$47.1	0.4	No	No	100%	80%	99%
255	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.075	\$59.3	1.0	No	No	100%	80%	89%
256	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.025	\$344.2	0.0	No	No	80%	80%	99%
257	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0017507	\$12.0	0.3	No	No	100%	100%	100%
258	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0	#DIV/0!	65535.0	Yes	Yes	100%	15%	87%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
259	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0262605	\$29.2	1.2	Yes	Yes	100%	9%	87%
260	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0087535	\$15.6	0.6	No	No	100%	90%	33%
261	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
262	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0262605	\$2.9	12.4	Yes	Yes	100%	9%	87%
263	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	90%	33%
264	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
265	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	0%	100%
266	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	0%	100%
267	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	0%	100%
268	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0087535	\$0.3	31.3	Yes	Yes	100%	0%	100%
269	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.04553978	\$92.0	0.5	No	No	100%	10%	93%
270	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00773994	\$23.1	0.4	No	No	100%	93%	82%
271	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0241093	\$126.4	0.1	No	No	100%	80%	90%
272	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.02678811	\$0.9	23.7	Yes	Yes	100%	10%	93%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
273	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00549156	\$0.0	8.1	Yes	Yes	100%	80%	90%
274	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.01339405	\$0.0	19.8	Yes	Yes	100%	100%	36%
275	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01607286	\$0.0	23.8	Yes	Yes	100%	80%	90%
276	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.08036432	\$32.4	1.8	Yes	Yes	100%	80%	90%
277	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01071524	\$12.4	0.5	No	No	100%	35%	70%
278	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.01339405	\$23.8	0.3	No	No	100%	80%	57%
279	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00558971	\$25.0	0.2	No	No	100%	80%	84%
280	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.02794857	\$14.6	2.5	Yes	Yes	100%	15%	99%
281	Industrial	Optimization of pumping system	Per kWh	100%	15	0.02515372	\$29.2	0.9	No	No	100%	80%	95%
282	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03726477	\$31.2	1.2	Yes	Yes	100%	70%	86%
283	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00931619	\$0.0	19.8	Yes	Yes	100%	100%	48%
284	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00445633	\$33.5	0.1	No	No	100%	80%	44%
285	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.04456328	\$53.2	0.5	No	No	100%	70%	86%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
286	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00445633	\$5.0	0.6	No	No	100%	40%	100%
287	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.01114082	\$0.0	19.8	Yes	Yes	100%	100%	48%
288	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00389636	\$26.1	0.1	No	No	100%	80%	44%
289	Industrial	Correctly sized motors	Per kWh	100%	15	0.00389636	\$16.5	0.2	No	No	100%	70%	98%
290	Industrial	Optimized motor control	Per kWh	100%	15	0.00974089	\$1.0	9.3	Yes	Yes	100%	70%	77%
291	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00974089	\$0.0	19.8	Yes	Yes	100%	100%	48%
292	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03224974	\$166.8	0.1	No	No	100%	80%	89%
293	Industrial	Optimized Distribution System	Per kWh	100%	10	0.02579979	\$11.5	1.2	Yes	Yes	100%	80%	84%
294	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.05159959	\$0.0	26.5	Yes	Yes	100%	80%	36%
295	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.02579979	\$80.3	0.3	No	No	100%	70%	84%
296	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.03095975	\$41.5	0.4	No	No	100%	80%	45%
297	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.02167183	\$42.7	0.5	No	No	100%	80%	89%
298	Industrial	Sequencing Control	Per kWh	100%	5	0.02579979	\$17.3	0.4	No	No	100%	75%	72%
299	Industrial	Eliminate air leaks	Per kWh	100%	3	0.03869969	\$9.6	0.6	No	No	100%	100%	36%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
300	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00515996	\$2.8	1.0	No	No	100%	40%	95%
301	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.14447884	\$46.1	2.9	Yes	Yes	100%	10%	96%
302	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.03224974	\$100.8	0.2	No	No	100%	0%	100%
303	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.0128999	\$21.0	0.6	No	No	100%	0%	100%
304	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01071429	\$20.6	0.4	No	No	100%	100%	89%
305	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01123806	\$48.4	0.2	No	No	100%	10%	70%
306	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.0179809	\$2.1	5.6	Yes	Yes	3%	80%	70%
307	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.0374602	\$16.1	2.4	Yes	Yes	100%	80%	70%
308	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.10114254	\$642.5	0.2	No	No	100%	5%	95%
309	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,395.1	0.0	No	No	100%	40%	82%
310	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01311107	\$2.9	1.7	Yes	Yes	100%	80%	59%
311	Industrial	De-stratification Fans	Per kWh	100%	10	0.0936505	\$218.8	0.3	No	No	15%	30%	93%
312	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01123806	\$9.4	0.9	No	No	100%	30%	64%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
313	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00936505	\$5.7	0.4	No	No	100%	100%	36%
314	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02809515	\$165.1	0.2	No	No	5%	60%	87%
315	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.06009615	\$14.4	2.8	Yes	Yes	100%	100%	87%
316	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.11057692	\$163.0	0.3	No	No	100%	100%	80%
317	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.03605769	\$11.4	2.1	Yes	Yes	100%	100%	92%
318	Industrial	Lighting controls	Per kWh	100%	8	0.03605769	\$45.3	0.4	No	No	100%	80%	99%
319	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05589715	\$44.2	1.3	Yes	Yes	100%	80%	89%
320	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01863238	\$256.5	0.1	No	No	80%	80%	99%
321	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0017507	\$12.0	0.3	No	No	100%	100%	100%
322	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.017507	\$27.3	0.9	No	No	100%	90%	81%
323	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.0262605	\$29.2	1.2	Yes	Yes	100%	9%	85%
324	Industrial	Insulation (Oven)	Per kWh	100%	15	0.0087535	\$15.6	0.6	No	No	100%	90%	55%
325	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
326	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.0262605	\$2.9	12.4	Yes	Yes	100%	9%	85%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
327	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	95%	55%
328	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	100%	36%
329	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	0%	100%
330	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.0087535	\$1.6	6.3	Yes	Yes	100%	0%	100%
331	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.0087535	\$0.0	19.8	Yes	Yes	100%	0%	100%
332	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.0087535	\$0.3	31.3	Yes	Yes	100%	0%	100%
333	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.04553978	\$92.0	0.5	No	No	100%	10%	97%
334	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00663423	\$19.8	0.4	No	No	100%	80%	98%
335	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.0241093	\$126.4	0.1	No	No	100%	80%	90%
336	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.02678811	\$0.9	23.7	Yes	Yes	100%	10%	93%
337	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00549156	\$0.0	8.1	Yes	Yes	100%	35%	90%
338	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.01339405	\$0.0	19.8	Yes	Yes	100%	100%	36%
339	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01607286	\$0.0	23.8	Yes	Yes	100%	35%	90%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
340	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.08036432	\$32.4	1.8	Yes	Yes	100%	80%	90%
341	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.01071524	\$12.4	0.5	No	No	100%	35%	100%
342	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.01339405	\$23.8	0.3	No	No	100%	80%	81%
343	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00558971	\$25.0	0.2	No	No	100%	80%	96%
344	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.02794857	\$14.6	2.5	Yes	Yes	100%	15%	96%
345	Industrial	Optimization of pumping system	Per kWh	100%	15	0.02515372	\$29.2	0.9	No	No	100%	80%	94%
346	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03726477	\$31.2	1.2	Yes	Yes	100%	70%	66%
347	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00931619	\$0.0	19.8	Yes	Yes	100%	100%	48%
348	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00445633	\$33.5	0.1	No	No	100%	80%	97%
349	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.04456328	\$53.2	0.5	No	No	100%	70%	92%
350	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00445633	\$5.0	0.6	No	No	100%	40%	100%
351	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.01114082	\$0.0	19.8	Yes	Yes	100%	100%	48%
352	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00504159	\$33.8	0.1	No	No	100%	80%	97%
353	Industrial	Correctly sized motors	Per kWh	100%	15	0.00504159	\$21.4	0.2	No	No	100%	70%	96%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
354	Industrial	Optimized motor control	Per kWh	100%	15	0.01260398	\$1.4	7.2	Yes	Yes	100%	70%	93%
355	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.01260398	\$0.0	19.8	Yes	Yes	100%	100%	48%
356	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02764264	\$142.9	0.1	No	No	100%	80%	96%
357	Industrial	Optimized Distribution System	Per kWh	100%	10	0.02211411	\$9.9	1.4	Yes	Yes	100%	90%	87%
358	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.04422822	\$0.0	26.5	Yes	Yes	100%	80%	59%
359	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.02211411	\$68.8	0.4	No	No	100%	70%	95%
360	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02653693	\$35.6	0.5	No	No	100%	80%	55%
361	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.01857585	\$36.6	0.6	No	No	100%	80%	96%
362	Industrial	Sequencing Control	Per kWh	100%	5	0.02211411	\$14.8	0.5	No	No	100%	75%	89%
363	Industrial	Eliminate air leaks	Per kWh	100%	3	0.03317116	\$8.2	0.7	No	No	100%	100%	59%
364	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00442282	\$2.4	1.1	Yes	Yes	100%	40%	98%
365	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.12383901	\$39.5	3.4	Yes	Yes	100%	10%	99%
366	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02764264	\$86.4	0.2	No	No	100%	0%	100%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
367	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.01105705	\$18.0	0.7	No	No	100%	0%	100%
368	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01071429	\$20.6	0.4	No	No	100%	100%	89%
369	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.0206044	\$88.8	0.1	No	No	100%	10%	100%
370	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.03296703	\$3.9	3.1	Yes	Yes	3%	80%	70%
371	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.06868132	\$29.5	1.3	Yes	Yes	100%	80%	70%
372	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.18543956	\$1,178.1	0.1	No	No	100%	5%	96%
373	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$2,557.8	0.0	No	No	100%	40%	98%
374	Industrial	Automated Temperature Control	Per kWh	100%	5	0.02403846	\$5.3	0.9	No	No	100%	80%	85%
375	Industrial	Destratification Fans	Per kWh	100%	10	0.1717033	\$401.1	0.2	No	No	15%	20%	96%
376	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.0206044	\$17.2	0.5	No	No	100%	30%	70%
377	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01717033	\$10.4	0.2	No	No	100%	100%	36%
378	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.05151099	\$302.7	0.1	No	No	5%	60%	81%
379	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.06009615	\$14.4	2.8	Yes	Yes	100%	100%	89%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
380	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.11057692	\$163.0	0.3	No	No	100%	100%	89%
381	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.03605769	\$11.4	2.1	Yes	Yes	100%	100%	95%
382	Industrial	Lighting controls	Per kWh	100%	8	0.03605769	\$45.3	0.4	No	No	100%	80%	99%
383	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0	#DIV/0!	65535.0	Yes	Yes	100%	0%	89%
384	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0	#DIV/0!	65535.0	Yes	Yes	80%	0%	99%
385	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00116713	\$8.0	0.5	No	No	100%	100%	100%
386	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01167134	\$18.2	1.3	Yes	Yes	100%	70%	69%
387	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.04180602	\$46.5	0.8	No	No	100%	9%	79%
388	Industrial	Insulation (Oven)	Per kWh	100%	15	0.01393534	\$24.8	0.4	No	No	100%	90%	42%
389	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.01393534	\$0.0	19.8	Yes	Yes	100%	100%	36%
390	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.04180602	\$4.6	7.8	Yes	Yes	100%	9%	79%
391	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.01393534	\$2.5	3.9	Yes	Yes	100%	90%	42%
392	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.01393534	\$0.0	19.8	Yes	Yes	100%	100%	36%
393	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.01393534	\$0.0	19.8	Yes	Yes	100%	100%	36%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
394	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.01393534	\$2.5	3.9	Yes	Yes	100%	90%	42%
395	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.01393534	\$0.0	19.8	Yes	Yes	100%	100%	36%
396	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.01393534	\$0.5	19.6	Yes	Yes	100%	90%	42%
397	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.03541667	\$71.6	0.6	No	No	100%	15%	82%
398	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00631579	\$18.8	0.4	No	No	100%	90%	94%
399	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.01875	\$98.3	0.2	No	No	100%	80%	84%
400	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.02083333	\$0.7	30.4	Yes	Yes	100%	15%	87%
401	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00427083	\$0.0	8.1	Yes	Yes	100%	60%	84%
402	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.01041667	\$0.0	19.8	Yes	Yes	100%	100%	42%
403	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.0125	\$0.0	23.8	Yes	Yes	100%	60%	84%
404	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.0625	\$25.2	2.3	Yes	Yes	100%	80%	84%
405	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00833333	\$9.7	0.7	No	No	100%	35%	80%
406	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.01041667	\$18.5	0.4	No	No	100%	80%	61%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
407	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00521739	\$23.3	0.3	No	No	100%	80%	99%
408	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.02608696	\$13.6	2.7	Yes	Yes	100%	15%	99%
409	Industrial	Optimization of pumping system	Per kWh	100%	15	0.02347826	\$27.2	1.0	No	No	100%	80%	99%
410	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03478261	\$29.2	1.3	Yes	Yes	100%	70%	86%
411	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00869565	\$0.0	19.8	Yes	Yes	100%	100%	46%
412	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00356506	\$26.8	0.1	No	No	100%	80%	99%
413	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.03565062	\$42.5	0.6	No	No	100%	70%	94%
414	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00356506	\$4.0	0.7	No	No	100%	40%	100%
415	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.00891266	\$0.0	19.8	Yes	Yes	100%	100%	46%
416	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00470588	\$31.6	0.1	No	No	100%	80%	99%
417	Industrial	Correctly sized motors	Per kWh	100%	15	0.00470588	\$20.0	0.2	No	No	100%	70%	99%
418	Industrial	Optimized motor control	Per kWh	100%	15	0.01176471	\$1.3	7.7	Yes	Yes	100%	70%	96%
419	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.01176471	\$0.0	19.8	Yes	Yes	100%	100%	46%
420	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02631579	\$136.1	0.1	No	No	100%	80%	89%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
421	Industrial	Optimized Distribution System	Per kWh	100%	10	0.02105263	\$9.4	1.5	Yes	Yes	100%	80%	81%
422	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.04210526	\$0.0	26.5	Yes	Yes	100%	80%	61%
423	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.02105263	\$65.5	0.4	No	No	100%	70%	93%
424	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02526316	\$33.9	0.5	No	No	100%	80%	45%
425	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.01768421	\$34.8	0.6	No	No	100%	80%	89%
426	Industrial	Sequencing Control	Per kWh	100%	5	0.02105263	\$14.1	0.5	No	No	100%	60%	69%
427	Industrial	Eliminate air leaks	Per kWh	100%	3	0.03157895	\$7.8	0.8	No	No	100%	100%	61%
428	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00421053	\$2.3	1.2	Yes	Yes	100%	40%	94%
429	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.11789474	\$37.6	3.6	Yes	Yes	100%	10%	98%
430	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02631579	\$82.2	0.2	No	No	100%	70%	85%
431	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.01052632	\$17.2	0.7	No	No	100%	50%	70%
432	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01470588	\$28.3	0.3	No	No	100%	100%	89%
433	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.0103022	\$44.4	0.2	No	No	100%	10%	80%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
434	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01648352	\$2.0	6.2	Yes	Yes	3%	80%	70%
435	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.03434066	\$14.8	2.6	Yes	Yes	100%	80%	70%
436	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.09271978	\$589.0	0.2	No	No	100%	5%	89%
437	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,278.9	0.0	No	No	100%	40%	92%
438	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01201923	\$2.7	1.9	Yes	Yes	100%	80%	46%
439	Industrial	Destratification Fans	Per kWh	100%	10	0.08585165	\$200.6	0.3	No	No	15%	40%	94%
440	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.0103022	\$8.6	1.0	No	No	100%	30%	66%
441	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00858516	\$5.2	0.4	No	No	100%	100%	36%
442	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02575549	\$151.4	0.2	No	No	5%	60%	69%
443	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0462963	\$11.1	3.6	Yes	Yes	100%	100%	86%
444	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.08518519	\$125.5	0.4	No	No	100%	100%	74%
445	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.02777778	\$8.8	2.7	Yes	Yes	100%	100%	96%
446	Industrial	Lighting controls	Per kWh	100%	8	0.02777778	\$34.9	0.5	No	No	100%	80%	99%
447	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05217391	\$41.2	1.4	Yes	Yes	100%	80%	89%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
448	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.0173913	\$239.4	0.1	No	No	80%	80%	99%
449	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0013986	\$9.6	0.4	No	No	100%	100%	100%
450	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01666667	\$21.6	1.1	Yes	Yes	100%	55%	60%
451	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.025	\$27.8	1.3	Yes	Yes	100%	27%	83%
452	Industrial	Insulation (Oven)	Per kWh	100%	15	0.008333333	\$14.8	0.7	No	No	100%	90%	10%
453	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	15%
454	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.025	\$2.8	13.0	Yes	Yes	100%	27%	83%
455	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.008333333	\$1.5	6.6	Yes	Yes	100%	90%	10%
456	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	15%
457	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	0%	100%
458	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.008333333	\$1.5	6.6	Yes	Yes	100%	0%	100%
459	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	0%	100%
460	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.008333333	\$0.3	32.8	Yes	Yes	100%	0%	100%
461	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.028333333	\$57.2	0.8	No	No	100%	20%	79%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
462	Industrial	Optimized Distribution System	Per kWh	100%	25	0.005	\$14.9	0.6	No	No	100%	90%	77%
463	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.015	\$78.6	0.2	No	No	100%	80%	85%
464	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.01666667	\$0.5	38.1	Yes	Yes	100%	20%	85%
465	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00341667	\$0.0	8.1	Yes	Yes	100%	80%	85%
466	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	15%
467	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01	\$0.0	23.8	Yes	Yes	100%	80%	85%
468	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05	\$20.2	2.9	Yes	Yes	100%	80%	85%
469	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00666667	\$7.7	0.8	No	No	100%	35%	71%
470	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.00833333	\$14.8	0.5	No	No	100%	80%	16%
471	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.005	\$22.4	0.3	No	No	100%	80%	94%
472	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.025	\$13.0	2.8	Yes	Yes	100%	15%	96%
473	Industrial	Optimization of pumping system	Per kWh	100%	15	0.0225	\$26.1	1.0	Yes	Yes	100%	80%	98%
474	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03333333	\$27.9	1.4	Yes	Yes	100%	70%	77%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
475	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	31%
476	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.003333333	\$25.0	0.2	No	No	100%	80%	95%
477	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.033333333	\$39.8	0.7	No	No	100%	70%	81%
478	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.003333333	\$3.7	0.7	No	No	100%	40%	100%
479	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	31%
480	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.003333333	\$22.4	0.2	No	No	100%	80%	95%
481	Industrial	Correctly sized motors	Per kWh	100%	15	0.003333333	\$14.1	0.3	No	No	100%	70%	98%
482	Industrial	Optimized motor control	Per kWh	100%	15	0.008333333	\$0.9	10.9	Yes	Yes	100%	70%	77%
483	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	31%
484	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.020833333	\$107.7	0.2	No	No	100%	80%	66%
485	Industrial	Optimized Distribution System	Per kWh	100%	10	0.016666667	\$7.5	1.8	Yes	Yes	100%	80%	76%
486	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.033333333	\$0.0	26.5	Yes	Yes	100%	80%	63%
487	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.016666667	\$51.9	0.5	No	No	100%	70%	90%
488	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02	\$26.8	0.6	No	No	100%	80%	41%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
489	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.014	\$27.6	0.7	No	No	100%	80%	66%
490	Industrial	Sequencing Control	Per kWh	100%	5	0.01666667	\$11.2	0.6	No	No	100%	60%	48%
491	Industrial	Eliminate air leaks	Per kWh	100%	3	0.025	\$6.2	1.0	No	No	100%	100%	63%
492	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00333333	\$1.8	1.5	Yes	Yes	100%	40%	90%
493	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.09333333	\$29.8	4.5	Yes	Yes	100%	10%	99%
494	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02083333	\$65.1	0.3	No	No	100%	0%	100%
495	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00833333	\$13.6	0.9	No	No	100%	0%	100%
496	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01	\$19.2	0.4	No	No	100%	100%	85%
497	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.00839161	\$36.2	0.2	No	No	100%	10%	71%
498	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01342657	\$1.6	7.6	Yes	Yes	3%	80%	60%
499	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.03356643	\$12.0	3.9	Yes	Yes	100%	80%	60%
500	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.07552448	\$479.8	0.3	No	No	100%	5%	78%
501	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,041.7	0.0	No	No	100%	40%	100%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
502	Industrial	Automated Temperature Control	Per kWh	100%	5	0.00979021	\$2.2	2.3	Yes	Yes	100%	80%	48%
503	Industrial	Destratification Fans	Per kWh	100%	10	0.06993007	\$163.4	0.4	No	No	15%	40%	92%
504	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.00839161	\$7.0	1.2	Yes	Yes	100%	30%	51%
505	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00699301	\$4.2	0.5	No	No	100%	100%	15%
506	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02097902	\$123.3	0.2	No	No	5%	60%	60%
507	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.04166667	\$10.0	4.0	Yes	Yes	100%	100%	79%
508	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07666667	\$113.0	0.4	No	No	100%	100%	79%
509	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.025	\$7.9	3.0	Yes	Yes	100%	100%	89%
510	Industrial	Lighting controls	Per kWh	100%	8	0.025	\$31.4	0.6	No	No	100%	80%	99%
511	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0	#DIV/0!	65535.0	Yes	Yes	100%	60%	85%
512	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0	#DIV/0!	65535.0	Yes	Yes	20%	60%	98%
513	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0013986	\$9.6	0.4	No	No	100%	100%	100%
514	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01666667	\$21.6	1.1	Yes	Yes	100%	15%	83%
515	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.025	\$27.8	1.3	Yes	Yes	100%	9%	83%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
516	Industrial	Insulation (Oven)	Per kWh	100%	15	0.008333333	\$14.8	0.7	No	No	100%	90%	10%
517	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	15%
518	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.025	\$2.8	13.0	Yes	Yes	100%	9%	83%
519	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.008333333	\$1.5	6.6	Yes	Yes	100%	90%	10%
520	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	15%
521	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	0%	100%
522	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.008333333	\$1.5	6.6	Yes	Yes	100%	0%	100%
523	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	0%	100%
524	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.008333333	\$0.3	32.8	Yes	Yes	100%	0%	100%
525	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.028333333	\$57.2	0.8	No	No	100%	10%	91%
526	Industrial	Optimized Distribution System	Per kWh	100%	25	0.005	\$14.9	0.6	No	No	100%	93%	76%
527	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.015	\$78.6	0.2	No	No	100%	80%	86%
528	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.016666667	\$0.5	38.1	Yes	Yes	100%	10%	91%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
529	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00341667	\$0.0	8.1	Yes	Yes	100%	80%	86%
530	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	15%
531	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01	\$0.0	23.8	Yes	Yes	100%	80%	86%
532	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05	\$20.2	2.9	Yes	Yes	100%	80%	86%
533	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00666667	\$7.7	0.8	No	No	100%	35%	60%
534	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.00833333	\$14.8	0.5	No	No	100%	80%	43%
535	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.005	\$22.4	0.3	No	No	100%	80%	78%
536	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.025	\$13.0	2.8	Yes	Yes	100%	15%	98%
537	Industrial	Optimization of pumping system	Per kWh	100%	15	0.0225	\$26.1	1.0	Yes	Yes	100%	80%	93%
538	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03333333	\$27.9	1.4	Yes	Yes	100%	70%	85%
539	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	37%
540	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.005	\$37.5	0.1	No	No	100%	80%	25%
541	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.05	\$59.7	0.5	No	No	100%	70%	40%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
542	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.005	\$5.6	0.5	No	No	100%	40%	100%
543	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	37%
544	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00333333	\$22.4	0.2	No	No	100%	80%	25%
545	Industrial	Correctly sized motors	Per kWh	100%	15	0.00333333	\$14.1	0.3	No	No	100%	70%	98%
546	Industrial	Optimized motor control	Per kWh	100%	15	0.00833333	\$0.9	10.9	Yes	Yes	100%	70%	77%
547	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	37%
548	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02083333	\$107.7	0.2	No	No	100%	80%	85%
549	Industrial	Optimized Distribution System	Per kWh	100%	10	0.01666667	\$7.5	1.8	Yes	Yes	100%	80%	79%
550	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.03333333	\$0.0	26.5	Yes	Yes	100%	80%	15%
551	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.01666667	\$51.9	0.5	No	No	100%	70%	79%
552	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02	\$26.8	0.6	No	No	100%	80%	27%
553	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.014	\$27.6	0.7	No	No	100%	80%	85%
554	Industrial	Sequencing Control	Per kWh	100%	5	0.01666667	\$11.2	0.6	No	No	100%	75%	63%
555	Industrial	Eliminate air leaks	Per kWh	100%	3	0.025	\$6.2	1.0	No	No	100%	100%	15%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
556	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00333333	\$1.8	1.5	Yes	Yes	100%	40%	93%
557	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.09333333	\$29.8	4.5	Yes	Yes	100%	10%	95%
558	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02083333	\$65.1	0.3	No	No	100%	0%	100%
559	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00833333	\$13.6	0.9	No	No	100%	0%	100%
560	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01	\$19.2	0.4	No	No	100%	100%	85%
561	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.00839161	\$36.2	0.2	No	No	100%	10%	60%
562	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01342657	\$1.6	7.6	Yes	Yes	3%	80%	60%
563	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.03356643	\$12.0	3.9	Yes	Yes	100%	80%	60%
564	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.07552448	\$479.8	0.3	No	No	100%	5%	93%
565	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,041.7	0.0	No	No	100%	40%	76%
566	Industrial	Automated Temperature Control	Per kWh	100%	5	0.00979021	\$2.2	2.3	Yes	Yes	100%	80%	45%
567	Industrial	Destratification Fans	Per kWh	100%	10	0.06993007	\$163.4	0.4	No	No	15%	30%	90%
568	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.00839161	\$7.0	1.2	Yes	Yes	100%	30%	52%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
569	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00699301	\$4.2	0.5	No	No	100%	100%	15%
570	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02097902	\$123.3	0.2	No	No	5%	60%	83%
571	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.04166667	\$10.0	4.0	Yes	Yes	100%	100%	83%
572	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07666667	\$113.0	0.4	No	No	100%	100%	83%
573	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.025	\$7.9	3.0	Yes	Yes	100%	100%	89%
574	Industrial	Lighting controls	Per kWh	100%	8	0.025	\$31.4	0.6	No	No	100%	80%	98%
575	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05	\$39.8	1.5	Yes	Yes	100%	80%	85%
576	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01666667	\$229.5	0.1	No	No	20%	80%	98%
577	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00116713	\$8.0	0.5	No	No	100%	100%	100%
578	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0	#DIV/0!	65535.0	Yes	Yes	100%	30%	79%
579	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.017507	\$19.5	1.9	Yes	Yes	100%	35%	75%
580	Industrial	Insulation (Oven)	Per kWh	100%	15	0.00583567	\$10.4	0.9	No	No	100%	90%	17%
581	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
582	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.017507	\$1.9	18.6	Yes	Yes	100%	30%	75%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
583	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	90%	17%
584	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
585	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
586	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	90%	17%
587	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	0%	100%
588	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.00583567	\$0.2	46.9	Yes	Yes	100%	0%	100%
589	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.03035714	\$61.3	0.7	No	No	100%	8%	98%
590	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00442282	\$13.2	0.6	No	No	100%	80%	50%
591	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.01607143	\$84.2	0.2	No	No	100%	80%	100%
592	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.01785714	\$0.6	35.5	Yes	Yes	100%	8%	50%
593	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00366071	\$0.0	8.1	Yes	Yes	100%	40%	100%
594	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.00892857	\$0.0	19.8	Yes	Yes	100%	100%	7%
595	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01071429	\$0.0	23.8	Yes	Yes	100%	40%	100%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
596	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05357143	\$21.6	2.7	Yes	Yes	100%	80%	100%
597	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00714286	\$8.3	0.8	No	No	100%	35%	77%
598	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.00892857	\$15.8	0.4	No	No	100%	80%	50%
599	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00372671	\$16.7	0.4	No	No	100%	80%	99%
600	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.01863354	\$9.7	3.7	Yes	Yes	100%	15%	93%
601	Industrial	Optimization of pumping system	Per kWh	100%	15	0.01677019	\$19.4	1.4	Yes	Yes	100%	80%	86%
602	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.02484472	\$20.8	1.9	Yes	Yes	100%	70%	92%
603	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00621118	\$0.0	19.8	Yes	Yes	100%	100%	31%
604	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00254647	\$19.1	0.2	No	No	100%	80%	100%
605	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.02546473	\$30.4	0.9	No	No	100%	70%	81%
606	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00254647	\$2.8	1.0	No	No	100%	40%	71%
607	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.00636618	\$0.0	19.8	Yes	Yes	100%	100%	31%
608	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.0025974	\$17.4	0.2	No	No	100%	80%	100%
609	Industrial	Correctly sized motors	Per kWh	100%	15	0.0025974	\$11.0	0.4	No	No	100%	70%	97%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
610	Industrial	Optimized motor control	Per kWh	100%	15	0.00649351	\$0.7	14.0	Yes	Yes	100%	70%	69%
611	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00649351	\$0.0	19.8	Yes	Yes	100%	100%	31%
612	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$95.3	0.2	No	No	100%	80%	76%
613	Industrial	Optimized Distribution System	Per kWh	100%	10	0.01474274	\$6.6	2.1	Yes	Yes	100%	90%	57%
614	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.02948548	\$0.0	26.5	Yes	Yes	100%	80%	45%
615	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.01474274	\$45.9	0.5	No	No	100%	70%	88%
616	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.01769129	\$23.7	0.7	No	No	100%	80%	40%
617	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.0123839	\$24.4	0.8	No	No	100%	80%	76%
618	Industrial	Sequencing Control	Per kWh	100%	5	0.01474274	\$9.9	0.7	No	No	100%	75%	43%
619	Industrial	Eliminate air leaks	Per kWh	100%	3	0.02211411	\$5.5	1.1	Yes	Yes	100%	100%	45%
620	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00294855	\$1.6	1.7	Yes	Yes	100%	40%	94%
621	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.08255934	\$26.4	5.1	Yes	Yes	100%	10%	95%
622	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$57.6	0.3	No	No	100%	0%	100%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
623	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00737137	\$12.0	1.0	Yes	Yes	100%	0%	100%
624	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.00714286	\$13.7	0.6	No	No	100%	100%	85%
625	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01373626	\$59.2	0.1	No	No	100%	10%	77%
626	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.02197802	\$2.6	4.6	Yes	Yes	3%	80%	60%
627	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.05494505	\$19.6	2.4	Yes	Yes	100%	80%	60%
628	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.12362637	\$785.4	0.2	No	No	100%	5%	71%
629	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,705.2	0.0	No	No	100%	40%	98%
630	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01602564	\$3.5	1.4	Yes	Yes	100%	80%	37%
631	Industrial	Destratification Fans	Per kWh	100%	10	0.11446886	\$267.4	0.3	No	No	15%	40%	95%
632	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01373626	\$11.5	0.7	No	No	100%	30%	60%
633	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01144689	\$6.9	0.3	No	No	100%	100%	15%
634	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.03434066	\$201.8	0.1	No	No	5%	60%	79%
635	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0400641	\$9.6	4.2	Yes	Yes	100%	100%	29%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
636	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07371795	\$108.6	0.4	No	No	100%	100%	74%
637	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.02403846	\$7.6	3.2	Yes	Yes	100%	100%	62%
638	Industrial	Lighting controls	Per kWh	100%	8	0.02403846	\$30.2	0.6	No	No	100%	80%	99%
639	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.03726708	\$29.7	2.0	Yes	Yes	100%	80%	85%
640	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01242236	\$171.0	0.1	No	No	20%	80%	98%
641	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.0013986	\$9.6	0.4	No	No	100%	100%	100%
642	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01666667	\$21.6	1.1	Yes	Yes	100%	55%	66%
643	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.025	\$27.8	1.3	Yes	Yes	100%	35%	68%
644	Industrial	Insulation (Oven)	Per kWh	100%	15	0.00833333	\$14.8	0.7	No	No	100%	90%	14%
645	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	15%
646	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.025	\$2.8	13.0	Yes	Yes	100%	30%	68%
647	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.00833333	\$1.5	6.6	Yes	Yes	100%	90%	14%
648	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	15%
649	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	15%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
650	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.008333333	\$1.5	6.6	Yes	Yes	100%	90%	14%
651	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	0%	100%
652	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.008333333	\$0.3	32.8	Yes	Yes	100%	0%	100%
653	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.028333333	\$57.2	0.8	No	No	100%	15%	92%
654	Industrial	Optimized Distribution System	Per kWh	100%	25	0.005	\$14.9	0.6	No	No	100%	80%	95%
655	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.015	\$78.6	0.2	No	No	100%	80%	90%
656	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.016666667	\$0.5	38.1	Yes	Yes	100%	15%	100%
657	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.003416667	\$0.0	8.1	Yes	Yes	100%	40%	90%
658	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.008333333	\$0.0	19.8	Yes	Yes	100%	100%	15%
659	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01	\$0.0	23.8	Yes	Yes	100%	40%	90%
660	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05	\$20.2	2.9	Yes	Yes	100%	80%	90%
661	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.006666667	\$7.7	0.8	No	No	100%	35%	74%
662	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.008333333	\$14.8	0.5	No	No	100%	80%	48%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
663	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.005	\$22.4	0.3	No	No	100%	80%	88%
664	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.025	\$13.0	2.8	Yes	Yes	100%	15%	99%
665	Industrial	Optimization of pumping system	Per kWh	100%	15	0.0225	\$26.1	1.0	Yes	Yes	100%	80%	97%
666	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03333333	\$27.9	1.4	Yes	Yes	100%	70%	92%
667	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	36%
668	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.005	\$37.5	0.1	No	No	100%	80%	98%
669	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.05	\$59.7	0.5	No	No	100%	70%	70%
670	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.005	\$5.6	0.5	No	No	100%	40%	100%
671	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.0125	\$0.0	19.8	Yes	Yes	100%	100%	36%
672	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00333333	\$22.4	0.2	No	No	100%	80%	98%
673	Industrial	Correctly sized motors	Per kWh	100%	15	0.00333333	\$14.1	0.3	No	No	100%	70%	98%
674	Industrial	Optimized motor control	Per kWh	100%	15	0.00833333	\$0.9	10.9	Yes	Yes	100%	70%	77%
675	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00833333	\$0.0	19.8	Yes	Yes	100%	100%	36%
676	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02083333	\$107.7	0.2	No	No	100%	80%	66%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
677	Industrial	Optimized Distribution System	Per kWh	100%	10	0.01666667	\$7.5	1.8	Yes	Yes	100%	80%	37%
678	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.03333333	\$0.0	26.5	Yes	Yes	100%	80%	41%
679	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.01666667	\$51.9	0.5	No	No	100%	70%	75%
680	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02	\$26.8	0.6	No	No	100%	80%	25%
681	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.014	\$27.6	0.7	No	No	100%	80%	66%
682	Industrial	Sequencing Control	Per kWh	100%	5	0.01666667	\$11.2	0.6	No	No	100%	75%	52%
683	Industrial	Eliminate air leaks	Per kWh	100%	3	0.025	\$6.2	1.0	No	No	100%	100%	41%
684	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00333333	\$1.8	1.5	Yes	Yes	100%	40%	90%
685	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.09333333	\$29.8	4.5	Yes	Yes	100%	10%	97%
686	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02083333	\$65.1	0.3	No	No	100%	0%	100%
687	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00833333	\$13.6	0.9	No	No	100%	0%	100%
688	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01	\$19.2	0.4	No	No	100%	100%	85%
689	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.00839161	\$36.2	0.2	No	No	100%	10%	74%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
690	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01342657	\$1.6	7.6	Yes	Yes	3%	80%	60%
691	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.03356643	\$12.0	3.9	Yes	Yes	100%	80%	60%
692	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.07552448	\$479.8	0.3	No	No	100%	5%	90%
693	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,041.7	0.0	No	No	100%	40%	92%
694	Industrial	Automated Temperature Control	Per kWh	100%	5	0.00979021	\$2.2	2.3	Yes	Yes	100%	80%	56%
695	Industrial	Destratification Fans	Per kWh	100%	10	0.06993007	\$163.4	0.4	No	No	15%	40%	88%
696	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.00839161	\$7.0	1.2	Yes	Yes	100%	30%	43%
697	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00699301	\$4.2	0.5	No	No	100%	100%	15%
698	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02097902	\$123.3	0.2	No	No	5%	60%	66%
699	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.04166667	\$10.0	4.0	Yes	Yes	100%	100%	77%
700	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07666667	\$113.0	0.4	No	No	100%	100%	74%
701	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.025	\$7.9	3.0	Yes	Yes	100%	100%	89%
702	Industrial	Lighting controls	Per kWh	100%	8	0.025	\$31.4	0.6	No	No	100%	80%	99%
703	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05	\$39.8	1.5	Yes	Yes	100%	80%	85%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
704	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01666667	\$229.5	0.1	No	No	20%	80%	98%
705	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00116713	\$8.0	0.5	No	No	100%	100%	100%
706	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0	#DIV/0!	65535.0	Yes	Yes	100%	15%	83%
707	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.017507	\$19.5	1.9	Yes	Yes	100%	9%	83%
708	Industrial	Insulation (Oven)	Per kWh	100%	15	0.00583567	\$10.4	0.9	No	No	100%	90%	10%
709	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
710	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.017507	\$1.9	18.6	Yes	Yes	100%	9%	83%
711	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	90%	10%
712	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
713	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	0%	100%
714	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	0%	100%
715	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	0%	100%
716	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.00583567	\$0.2	46.9	Yes	Yes	100%	0%	100%
717	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.03035714	\$61.3	0.7	No	No	100%	10%	91%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
718	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00442282	\$13.2	0.6	No	No	100%	93%	76%
719	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.01607143	\$84.2	0.2	No	No	100%	80%	87%
720	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.01785714	\$0.6	35.5	Yes	Yes	100%	10%	91%
721	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00366071	\$0.0	8.1	Yes	Yes	100%	80%	87%
722	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.00892857	\$0.0	19.8	Yes	Yes	100%	100%	15%
723	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01071429	\$0.0	23.8	Yes	Yes	100%	80%	87%
724	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05357143	\$21.6	2.7	Yes	Yes	100%	80%	87%
725	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00714286	\$8.3	0.8	No	No	100%	35%	60%
726	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.00892857	\$15.8	0.4	No	No	100%	80%	43%
727	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00372671	\$16.7	0.4	No	No	100%	80%	78%
728	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.01863354	\$9.7	3.7	Yes	Yes	100%	15%	98%
729	Industrial	Optimization of pumping system	Per kWh	100%	15	0.01677019	\$19.4	1.4	Yes	Yes	100%	80%	93%
730	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.02484472	\$20.8	1.9	Yes	Yes	100%	70%	81%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
731	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00621118	\$0.0	19.8	Yes	Yes	100%	100%	31%
732	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00254647	\$19.1	0.2	No	No	100%	80%	25%
733	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.02546473	\$30.4	0.9	No	No	100%	70%	81%
734	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00254647	\$2.8	1.0	No	No	100%	40%	100%
735	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.00636618	\$0.0	19.8	Yes	Yes	100%	100%	31%
736	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.0030303	\$20.3	0.2	No	No	100%	80%	25%
737	Industrial	Correctly sized motors	Per kWh	100%	15	0.0030303	\$12.9	0.3	No	No	100%	70%	98%
738	Industrial	Optimized motor control	Per kWh	100%	15	0.00757576	\$0.8	12.0	Yes	Yes	100%	70%	77%
739	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00757576	\$0.0	19.8	Yes	Yes	100%	100%	31%
740	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$95.3	0.2	No	No	100%	80%	85%
741	Industrial	Optimized Distribution System	Per kWh	100%	10	0.01474274	\$6.6	2.1	Yes	Yes	100%	80%	79%
742	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.02948548	\$0.0	26.5	Yes	Yes	100%	80%	15%
743	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.01474274	\$45.9	0.5	No	No	100%	70%	79%
744	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.01769129	\$23.7	0.7	No	No	100%	80%	27%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
745	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.0123839	\$24.4	0.8	No	No	100%	80%	85%
746	Industrial	Sequencing Control	Per kWh	100%	5	0.01474274	\$9.9	0.7	No	No	100%	75%	63%
747	Industrial	Eliminate air leaks	Per kWh	100%	3	0.02211411	\$5.5	1.1	Yes	Yes	100%	100%	15%
748	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00294855	\$1.6	1.7	Yes	Yes	100%	40%	93%
749	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.08255934	\$26.4	5.1	Yes	Yes	100%	10%	95%
750	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$57.6	0.3	No	No	100%	0%	100%
751	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00737137	\$12.0	1.0	Yes	Yes	100%	0%	100%
752	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.00714286	\$13.7	0.6	No	No	100%	100%	85%
753	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.00749251	\$32.3	0.3	No	No	100%	10%	60%
754	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01198801	\$1.4	8.5	Yes	Yes	3%	80%	60%
755	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.02997003	\$10.7	4.4	Yes	Yes	100%	80%	60%
756	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.06743257	\$428.4	0.3	No	No	100%	5%	93%
757	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$930.1	0.0	No	No	100%	40%	76%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
758	Industrial	Automated Temperature Control	Per kWh	100%	5	0.00874126	\$1.9	2.5	Yes	Yes	100%	80%	45%
759	Industrial	Destratification Fans	Per kWh	100%	10	0.06243756	\$145.9	0.5	No	No	15%	30%	90%
760	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.00749251	\$6.2	1.3	Yes	Yes	100%	30%	52%
761	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00624376	\$3.8	0.5	No	No	100%	100%	15%
762	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.01873127	\$110.1	0.3	No	No	5%	60%	83%
763	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0400641	\$9.6	4.2	Yes	Yes	100%	100%	83%
764	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07371795	\$108.6	0.4	No	No	100%	100%	80%
765	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.02403846	\$7.6	3.2	Yes	Yes	100%	100%	89%
766	Industrial	Lighting controls	Per kWh	100%	8	0.02403846	\$30.2	0.6	No	No	100%	80%	99%
767	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.03726708	\$29.7	2.0	Yes	Yes	100%	80%	85%
768	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.01242236	\$171.0	0.1	No	No	20%	80%	98%
769	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00116713	\$8.0	0.5	No	No	100%	100%	100%
770	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01167134	\$15.1	1.6	Yes	Yes	100%	90%	75%
771	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.017507	\$19.5	1.9	Yes	Yes	100%	9%	80%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
772	Industrial	Insulation (Oven)	Per kWh	100%	15	0.00583567	\$10.4	0.9	No	No	100%	90%	40%
773	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
774	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.017507	\$1.9	18.6	Yes	Yes	100%	9%	80%
775	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	95%	40%
776	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	100%	15%
777	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	0%	100%
778	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.00583567	\$1.0	9.4	Yes	Yes	100%	0%	100%
779	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.00583567	\$0.0	19.8	Yes	Yes	100%	0%	100%
780	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.00583567	\$0.2	46.9	Yes	Yes	100%	0%	100%
781	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.03035714	\$61.3	0.7	No	No	100%	10%	96%
782	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00442282	\$13.2	0.6	No	No	100%	80%	97%
783	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.01607143	\$84.2	0.2	No	No	100%	80%	87%
784	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.01785714	\$0.6	35.5	Yes	Yes	100%	10%	90%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
785	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00366071	\$0.0	8.1	Yes	Yes	100%	35%	87%
786	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.00892857	\$0.0	19.8	Yes	Yes	100%	100%	15%
787	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.01071429	\$0.0	23.8	Yes	Yes	100%	35%	87%
788	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.05357143	\$21.6	2.7	Yes	Yes	100%	80%	87%
789	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00714286	\$8.3	0.8	No	No	100%	35%	100%
790	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.00892857	\$15.8	0.4	No	No	100%	80%	75%
791	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00372671	\$16.7	0.4	No	No	100%	80%	94%
792	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.01863354	\$9.7	3.7	Yes	Yes	100%	15%	95%
793	Industrial	Optimization of pumping system	Per kWh	100%	15	0.01677019	\$19.4	1.4	Yes	Yes	100%	80%	92%
794	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.02484472	\$20.8	1.9	Yes	Yes	100%	70%	54%
795	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00621118	\$0.0	19.8	Yes	Yes	100%	100%	31%
796	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00254647	\$19.1	0.2	No	No	100%	80%	96%
797	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.02546473	\$30.4	0.9	No	No	100%	70%	89%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
798	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00254647	\$2.8	1.0	No	No	100%	40%	100%
799	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.00636618	\$0.0	19.8	Yes	Yes	100%	100%	31%
800	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00392157	\$26.3	0.1	No	No	100%	80%	96%
801	Industrial	Correctly sized motors	Per kWh	100%	15	0.00392157	\$16.6	0.2	No	No	100%	70%	95%
802	Industrial	Optimized motor control	Per kWh	100%	15	0.00980392	\$1.1	9.2	Yes	Yes	100%	70%	90%
803	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.00980392	\$0.0	19.8	Yes	Yes	100%	100%	31%
804	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$95.3	0.2	No	No	100%	80%	95%
805	Industrial	Optimized Distribution System	Per kWh	100%	10	0.01474274	\$6.6	2.1	Yes	Yes	100%	90%	83%
806	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.02948548	\$0.0	26.5	Yes	Yes	100%	80%	45%
807	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.01474274	\$45.9	0.5	No	No	100%	70%	93%
808	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.01769129	\$23.7	0.7	No	No	100%	80%	40%
809	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.0123839	\$24.4	0.8	No	No	100%	80%	95%
810	Industrial	Sequencing Control	Per kWh	100%	5	0.01474274	\$9.9	0.7	No	No	100%	75%	85%
811	Industrial	Eliminate air leaks	Per kWh	100%	3	0.02211411	\$5.5	1.1	Yes	Yes	100%	100%	45%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
812	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00294855	\$1.6	1.7	Yes	Yes	100%	40%	97%
813	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.08255934	\$26.4	5.1	Yes	Yes	100%	10%	99%
814	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.01842842	\$57.6	0.3	No	No	100%	0%	100%
815	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.00737137	\$12.0	1.0	Yes	Yes	100%	0%	100%
816	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.00714286	\$13.7	0.6	No	No	100%	100%	85%
817	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.01373626	\$59.2	0.1	No	No	100%	10%	100%
818	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.02197802	\$2.6	4.6	Yes	Yes	3%	80%	60%
819	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.05494505	\$19.6	2.4	Yes	Yes	100%	80%	60%
820	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.12362637	\$785.4	0.2	No	No	100%	5%	95%
821	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,705.2	0.0	No	No	100%	40%	97%
822	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01602564	\$3.5	1.4	Yes	Yes	100%	80%	80%
823	Industrial	Destratification Fans	Per kWh	100%	10	0.11446886	\$267.4	0.3	No	No	15%	20%	95%
824	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.01373626	\$11.5	0.7	No	No	100%	30%	60%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
825	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.01144689	\$6.9	0.3	No	No	100%	100%	15%
826	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.03434066	\$201.8	0.1	No	No	5%	60%	75%
827	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0400641	\$9.6	4.2	Yes	Yes	100%	100%	85%
828	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.07371795	\$108.6	0.4	No	No	100%	100%	85%
829	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.02403846	\$7.6	3.2	Yes	Yes	100%	100%	93%
830	Industrial	Lighting controls	Per kWh	100%	8	0.02403846	\$30.2	0.6	No	No	100%	80%	99%
831	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0	#DIV/0!	65535.0	Yes	Yes	100%	0%	85%
832	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0	#DIV/0!	65535.0	Yes	Yes	20%	0%	98%
833	Industrial	HE Dry-Type Transformers	Per kWh	100%	30	0.00116713	\$8.0	0.5	No	No	100%	100%	100%
834	Industrial	Process Heat Recovery to Preheat Makeup Water	Per kWh	100%	20	0.01167134	\$15.1	1.6	Yes	Yes	100%	70%	59%
835	Industrial	Air Curtains (Oven)	Per kWh	100%	20	0.02787068	\$31.0	1.2	Yes	Yes	100%	9%	72%
836	Industrial	Insulation (Oven)	Per kWh	100%	15	0.00929023	\$16.5	0.6	No	No	100%	90%	23%
837	Industrial	Preventative Oven Maintenance	Per kWh	100%	3	0.00929023	\$0.0	19.8	Yes	Yes	100%	100%	15%
838	Industrial	Air Curtains (Dryer)	Per kWh	100%	20	0.02787068	\$3.1	11.7	Yes	Yes	100%	9%	72%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
839	Industrial	Insulation (Dryer)	Per kWh	100%	15	0.00929023	\$1.7	5.9	Yes	Yes	100%	90%	23%
840	Industrial	Preventative Dryer Maintenance	Per kWh	100%	3	0.00929023	\$0.0	19.8	Yes	Yes	100%	100%	15%
841	Industrial	Preventative Furnace Maintenance	Per kWh	100%	3	0.00929023	\$0.0	19.8	Yes	Yes	100%	100%	15%
842	Industrial	Insulation (Furnace)	Per kWh	100%	15	0.00929023	\$1.7	5.9	Yes	Yes	100%	90%	23%
843	Industrial	Preventative Kiln Maintenance	Per kWh	100%	3	0.00929023	\$0.0	19.8	Yes	Yes	100%	100%	15%
844	Industrial	Insulation (Kiln)	Per kWh	100%	15	0.00929023	\$0.3	29.5	Yes	Yes	100%	90%	23%
845	Industrial	High Efficiency Chiller	Per kWh	100%	23	0.03541667	\$71.6	0.6	No	No	100%	15%	76%
846	Industrial	Optimized Distribution System	Per kWh	100%	25	0.00631579	\$18.8	0.4	No	No	100%	90%	92%
847	Industrial	Premium efficiency refrigeration control system	Per kWh	100%	15	0.01875	\$98.3	0.2	No	No	100%	80%	79%
848	Industrial	Smart Defrost Controls	Per kWh	100%	16	0.02083333	\$0.7	30.4	Yes	Yes	100%	15%	83%
849	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Per kWh	100%	3	0.00427083	\$0.0	8.1	Yes	Yes	100%	60%	79%
850	Industrial	Preventative refrigeration/cooling system maintenance	Per kWh	100%	3	0.01041667	\$0.0	19.8	Yes	Yes	100%	100%	22%
851	Industrial	Optimized condenser pressure	Per kWh	100%	3	0.0125	\$0.0	23.8	Yes	Yes	100%	60%	79%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
852	Industrial	VSD on chiller compressor	Per kWh	100%	15	0.0625	\$25.2	2.3	Yes	Yes	100%	80%	79%
853	Industrial	Cooling Tower Optimization	Per kWh	100%	12	0.00833333	\$9.7	0.7	No	No	100%	35%	73%
854	Industrial	Improve insulation of refrigeration system	Per kWh	100%	10	0.01041667	\$18.5	0.4	No	No	100%	80%	48%
855	Industrial	High/Premium Efficiency Motors (Pumps)	Per kWh	100%	15	0.00521739	\$23.3	0.3	No	No	100%	80%	99%
856	Industrial	Impeller Trimming (Pump)	Per kWh	100%	20	0.02608696	\$13.6	2.7	Yes	Yes	100%	15%	98%
857	Industrial	Optimization of pumping system	Per kWh	100%	15	0.02347826	\$27.2	1.0	No	No	100%	80%	99%
858	Industrial	Premium Efficiency Control with ASDs (Pumps)	Per kWh	100%	15	0.03478261	\$29.2	1.3	Yes	Yes	100%	70%	81%
859	Industrial	Preventative Pump Maintenance	Per kWh	100%	3	0.00869565	\$0.0	19.8	Yes	Yes	100%	100%	28%
860	Industrial	High/Premium Efficiency Motors (Fans)	Per kWh	100%	15	0.00356506	\$26.8	0.1	No	No	100%	80%	99%
861	Industrial	Premium efficiency control, with ASD (Fans)	Per kWh	100%	10	0.03565062	\$42.5	0.6	No	No	100%	70%	92%
862	Industrial	Synchronous Belts (Fans)	Per kWh	100%	10	0.00356506	\$4.0	0.7	No	No	100%	40%	100%
863	Industrial	Preventative Fan Maintenance	Per kWh	100%	3	0.00891266	\$0.0	19.8	Yes	Yes	100%	100%	28%
864	Industrial	High/Premium Efficiency Motors	Per kWh	100%	15	0.00470588	\$31.6	0.1	No	No	100%	80%	99%
865	Industrial	Correctly sized motors	Per kWh	100%	15	0.00470588	\$20.0	0.2	No	No	100%	70%	99%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
866	Industrial	Optimized motor control	Per kWh	100%	15	0.01176471	\$1.3	7.7	Yes	Yes	100%	70%	95%
867	Industrial	Preventative Motor Maintenance	Per kWh	100%	3	0.01176471	\$0.0	19.8	Yes	Yes	100%	100%	28%
868	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02631579	\$136.1	0.1	No	No	100%	80%	85%
869	Industrial	Optimized Distribution System	Per kWh	100%	10	0.02105263	\$9.4	1.5	Yes	Yes	100%	80%	74%
870	Industrial	Minimize operating air pressure	Per kWh	100%	1	0.04210526	\$0.0	26.5	Yes	Yes	100%	80%	48%
871	Industrial	Optimized sizing of compressor system	Per kWh	100%	20	0.02105263	\$65.5	0.4	No	No	100%	70%	90%
872	Industrial	Optimized sizes of air receiver tanks	Per kWh	100%	10	0.02526316	\$33.9	0.5	No	No	100%	80%	26%
873	Industrial	Premium Efficiency Air Dryer (compressors)	Per kWh	100%	20	0.01768421	\$34.8	0.6	No	No	100%	80%	85%
874	Industrial	Sequencing Control	Per kWh	100%	5	0.02105263	\$14.1	0.5	No	No	100%	60%	58%
875	Industrial	Eliminate air leaks	Per kWh	100%	3	0.03157895	\$7.8	0.8	No	No	100%	100%	48%
876	Industrial	Synchronous Belts for Air Compressors	Per kWh	100%	10	0.00421053	\$2.3	1.2	Yes	Yes	100%	40%	92%
877	Industrial	Replace compressed air use with mechanical or electrical	Per kWh	100%	20	0.11789474	\$37.6	3.6	Yes	Yes	100%	10%	97%
878	Industrial	Premium efficiency ASD compressor	Per kWh	100%	10	0.02631579	\$82.2	0.2	No	No	100%	70%	80%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
879	Industrial	Retrofit internal parts of existing centrifugal compressors	Per kWh	100%	20	0.01052632	\$17.2	0.7	No	No	100%	50%	60%
880	Industrial	High efficiency battery charger (for forklifts)	Per kWh	100%	10	0.01470588	\$28.3	0.3	No	No	100%	100%	85%
881	Industrial	Economizers for Packaged Air-Conditioning Units	Per kWh	100%	10	0.0103022	\$44.4	0.2	No	No	100%	10%	73%
882	Industrial	High efficiency non-packaged HVAC equipment	Per kWh	100%	9	0.01648352	\$2.0	6.2	Yes	Yes	3%	80%	60%
883	Industrial	High Efficiency Unitary AC	Per kWh	100%	15	0.04120879	\$14.7	3.2	Yes	Yes	100%	80%	60%
884	Industrial	Ground Source Heat Pump	Per kWh	100%	20	0.09271978	\$589.0	0.2	No	No	100%	5%	85%
885	Industrial	Ventilation Heat Recovery	Per kWh	#DIV/0!	15	0	\$1,278.9	0.0	No	No	100%	40%	89%
886	Industrial	Automated Temperature Control	Per kWh	100%	5	0.01201923	\$2.7	1.9	Yes	Yes	100%	80%	28%
887	Industrial	De-stratification Fans	Per kWh	100%	10	0.08585165	\$200.6	0.3	No	No	15%	40%	92%
888	Industrial	Warehouse Loading Dock Seals	Per kWh	100%	10	0.0103022	\$8.6	1.0	No	No	100%	30%	54%
889	Industrial	Preventative Packaged HVAC Maintenance	Per kWh	100%	3	0.00858516	\$5.2	0.4	No	No	100%	100%	15%
890	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Per kWh	100%	15	0.02575549	\$151.4	0.2	No	No	5%	60%	59%
891	Industrial	High efficiency ballasts for lighting	Per kWh	100%	11	0.0462963	\$11.1	3.6	Yes	Yes	100%	100%	81%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Measure Unit	Measure Savings (% of Baseline)	Measure Life (Years)	Baseline Technology Size (kW)	Total Measure Incremental Cost (\$)	Measure TRC	Measure Included in Economic Potential Analysis	Measure Included in Achievable Potential Analysis	Applicability to Industrial Subsector	Technical Feasibility	Not-Yet Adopted Rate
892	Industrial	High Efficiency Light fixtures	Per kWh	100%	7	0.08518519	\$125.5	0.4	No	No	100%	100%	74%
893	Industrial	Efficient Lighting Design	Per kWh	100%	11	0.02777778	\$8.8	2.7	Yes	Yes	100%	100%	95%
894	Industrial	Lighting controls	Per kWh	100%	8	0.02777778	\$34.9	0.5	No	No	100%	80%	99%
895	Industrial	Premium efficiency ventilation control with VSD	Per kWh	100%	15	0.05217391	\$41.5	1.4	Yes	Yes	100%	80%	85%
896	Industrial	Demand-Controlled Ventilation	Per kWh	100%	10	0.0173913	\$239.4	0.1	No	No	20%	80%	98%

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
1	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMMeans Electrical Cost Data 2009, pp200
2	Industrial	Process Heat Recovery to Preheat Makeup Water	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
3	Industrial	Air Curtains (Oven)	Vendor website - date accessed: March 2010	NA
4	Industrial	Insulation (Oven)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
5	Industrial	Preventative Oven Maintenance	ICF	NA
6	Industrial	Air Curtains (Dryer)	Vendor website - date accessed: May, 2010	NA
7	Industrial	Insulation (Dryer)	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
8	Industrial	Preventative Dryer Maintenance	ICF	NA
9	Industrial	Preventative Furnace Maintenance	ICF	NA
10	Industrial	Insulation (Furnace)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
11	Industrial	Preventative Kiln Maintenance	ICF	NA
12	Industrial	Insulation (Kiln)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
13	Industrial	High Efficiency Chiller	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
14	Industrial	Optimized Distribution System	ICF	NA
15	Industrial	Premium efficiency refrigeration control system	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
16	Industrial	Smart Defrost Controls	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
17	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
18	Industrial	Preventative refrigeration/cooling system maintenance	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
19	Industrial	Optimized condenser pressure	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA
20	Industrial	VSD on chiller compressor	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
21	Industrial	Cooling Tower Optimization	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
22	Industrial	Improve insulation of refrigeration system	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
23	Industrial	High/Premium Efficiency Motors (Pumps)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
24	Industrial	Impeller Trimming (Pump)	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
25	Industrial	Optimization of pumping system	Vendor website - Date accessed: May 2010	NA
26	Industrial	Premium Efficiency Control with ASDs (Pumps)	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
27	Industrial	Preventative Pump Maintenance	ICF	NA
28	Industrial	High/Premium Efficiency Motors (Fans)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
29	Industrial	Premium efficiency control, with ASD (Fans)	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
30	Industrial	Synchronous Belts (Fans)	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
31	Industrial	Preventative Fan Maintenance	ICF	NA
32	Industrial	High/Premium Efficiency Motors	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
33	Industrial	Correctly sized motors	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
34	Industrial	Optimized motor control	Marbek in-house info	RS Means Mechanical Cost Data
35	Industrial	Preventative Motor Maintenance	ICF	NA
36	Industrial	Premium efficiency ASD compressor	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
37	Industrial	Optimized Distribution System	ICF	NA
38	Industrial	Minimize operating air pressure	ICF	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
39	Industrial	Optimized sizing of compressor system	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
40	Industrial	Optimized sizes of air receiver tanks	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
41	Industrial	Premium Efficiency Air Dryer (compressors)	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
42	Industrial	Sequencing Control	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
43	Industrial	Eliminate air leaks	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
44	Industrial	Synchronous Belts for Air Compressors	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
45	Industrial	Replace compressed air use with mechanical or electrical	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
46	Industrial	Premium efficiency ASD compressor	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
47	Industrial	Retrofit internal parts of existing centrifugal compressors	Personnal communication with IFA (International Fertilizer Association) experts.	NA
48	Industrial	High efficiency battery charger (for forklifts)	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
49	Industrial	Economizers for Packaged Air-Conditioning Units	NRCAN Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
50	Industrial	High efficiency non-packaged HVAC equipment	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCAN Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
51	Industrial	High Efficiency Unitary AC	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
52	Industrial	Ground Source Heat Pump	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
53	Industrial	Ventilation Heat Recovery	Information for Evaluating Geexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
54	Industrial	Automated Temperature Control	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
55	Industrial	Destratification Fans	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
56	Industrial	Warehouse Loading Dock Seals	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
57	Industrial	Preventative Packaged HVAC Maintenance	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
58	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
59	Industrial	High efficiency ballasts for lighting	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
60	Industrial	High Efficiency Light fixtures	CADDET Energy Efficiency. 1995. Efficient lighting in commercial buildings. (Report No.ISSN 1382-4929 ; brochure 01). Date accessed: April, 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: April, 2010
61	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	U.S. Department of Energy, Common Industrial Lighting Upgrade Technologies, 2014. http://energy.gov/sites/prod/files/2014/05/f16/lighting_factsheet.pdf
62	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	BC Hydro, Plan for Good Lighting Design, Accessed October 29, 2015: https://www.bchydro.com/powersmart/business/technologies-equipment/lighting-systems.html#1
63	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
64	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
65	Industrial	HE Dry-Type Transformers	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
66	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
67	Industrial	Air Curtains (Oven)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
68	Industrial	Insulation (Oven)	Vendor website - date accessed: March 2010	NA
69	Industrial	Preventative Oven Maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
70	Industrial	Air Curtains (Dryer)	ICF	NA
71	Industrial	Insulation (Dryer)	Vendor website - date accessed: May, 2010	NA
72	Industrial	Preventative Dryer Maintenance	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
73	Industrial	Preventative Furnace Maintenance	ICF	NA
74	Industrial	Insulation (Furnace)	ICF	NA
75	Industrial	Preventative Kiln Maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
76	Industrial	Insulation (Kiln)	ICF	NA
77	Industrial	High Efficiency Chiller	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
78	Industrial	Optimized Distribution System	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
79	Industrial	Premium efficiency refrigeration control system	ICF	NA
80	Industrial	Smart Defrost Controls	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
81	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
82	Industrial	Preventative refrigeration/cooling system maintenance	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
83	Industrial	Optimized condenser pressure	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
84	Industrial	VSD on chiller compressor	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA
85	Industrial	Cooling Tower Optimization	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
86	Industrial	Improve insulation of refrigeration system	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
87	Industrial	High/Premium Efficiency Motors (Pumps)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
88	Industrial	Impeller Trimming (Pump)	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
89	Industrial	Optimization of pumping system	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
90	Industrial	Premium Efficiency Control with ASDs (Pumps)	Vendor website - Date accessed: May 2010	NA
91	Industrial	Preventative Pump Maintenance	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
92	Industrial	High/Premium Efficiency Motors (Fans)	ICF	NA
93	Industrial	Premium efficiency control, with ASD (Fans)	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
94	Industrial	Synchronous Belts (Fans)	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
95	Industrial	Preventative Fan Maintenance	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
96	Industrial	High/Premium Efficiency Motors	ICF	NA
97	Industrial	Correctly sized motors	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
98	Industrial	Optimized motor control	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
99	Industrial	Preventative Motor Maintenance	Marbek in-house info	RS Means Mechanical Cost Data
100	Industrial	Premium efficiency ASD compressor	ICF	NA
101	Industrial	Optimized Distribution System	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
102	Industrial	Minimize operating air pressure	ICF	NA
103	Industrial	Optimized sizing of compressor system	ICF	NA
104	Industrial	Optimized sizes of air receiver tanks	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
105	Industrial	Premium Efficiency Air Dryer (compressors)	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
106	Industrial	Sequencing Control	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
107	Industrial	Eliminate air leaks	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
108	Industrial	Synchronous Belts for Air Compressors	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
109	Industrial	Replace compressed air use with mechanical or electrical	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
110	Industrial	Premium efficiency ASD compressor	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
111	Industrial	Retrofit internal parts of existing centrifugal compressors	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
112	Industrial	High efficiency battery charger (for forklifts)	Personnal communication with IFA (International Fertilizer Association) experts.	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
113	Industrial	Economizers for Packaged Air-Conditioning Units	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
114	Industrial	High efficiency non-packaged HVAC equipment	NRCAN Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
115	Industrial	High Efficiency Unitary AC	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCAN Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
116	Industrial	Ground Source Heat Pump	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
117	Industrial	Ventilation Heat Recovery	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
118	Industrial	Automated Temperature Control	Information for Evaluating Geexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
119	Industrial	Destratification Fans	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
120	Industrial	Warehouse Loading Dock Seals	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
121	Industrial	Preventative Packaged HVAC Maintenance	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
122	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF
123	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
124	Industrial	High Efficiency Light fixtures	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
125	Industrial	Efficient Lighting Design	CADDET Energy Efficiency. 1995. Efficient lighting in commercial buildings. (Report No.ISSN 1382-4929 ; brochure 01). Date accessed: April, 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: April, 2010
126	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	U.S. Department of Energy, Common Industrial Lighting Upgrade Technologies, 2014. http://energy.gov/sites/prod/files/2014/05/f16/lighting_factsheet.pdf
127	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	BC Hydro, Plan for Good Lighting Design, Accessed October 29, 2015: https://www.bchydro.com/powersmart/business/technologies-equipment/lighting-systems.html#1
128	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
129	Industrial	HE Dry-Type Transformers	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
130	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
131	Industrial	Air Curtains (Oven)	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
132	Industrial	Insulation (Oven)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
133	Industrial	Preventative Oven Maintenance	Vendor website - date accessed: March 2010	NA
134	Industrial	Air Curtains (Dryer)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
135	Industrial	Insulation (Dryer)	ICF	NA
136	Industrial	Preventative Dryer Maintenance	Vendor website - date accessed: May, 2010	NA
137	Industrial	Preventative Furnace Maintenance	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
138	Industrial	Insulation (Furnace)	ICF	NA
139	Industrial	Preventative Kiln Maintenance	ICF	NA
140	Industrial	Insulation (Kiln)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
141	Industrial	High Efficiency Chiller	ICF	NA
142	Industrial	Optimized Distribution System	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
143	Industrial	Premium efficiency refrigeration control system	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
144	Industrial	Smart Defrost Controls	ICF	NA
145	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
146	Industrial	Preventative refrigeration/cooling system maintenance	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
147	Industrial	Optimized condenser pressure	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
148	Industrial	VSD on chiller compressor	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
149	Industrial	Cooling Tower Optimization	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
150	Industrial	Improve insulation of refrigeration system	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
151	Industrial	High/Premium Efficiency Motors (Pumps)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
152	Industrial	Impeller Trimming (Pump)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
153	Industrial	Optimization of pumping system	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
154	Industrial	Premium Efficiency Control with ASDs (Pumps)	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
155	Industrial	Preventative Pump Maintenance	Vendor website - Date accessed: May 2010	NA
156	Industrial	High/Premium Efficiency Motors (Fans)	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
157	Industrial	Premium efficiency control, with ASD (Fans)	ICF	NA
158	Industrial	Synchronous Belts (Fans)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
159	Industrial	Preventative Fan Maintenance	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
160	Industrial	High/Premium Efficiency Motors	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
161	Industrial	Correctly sized motors	ICF	NA
162	Industrial	Optimized motor control	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
163	Industrial	Preventative Motor Maintenance	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
164	Industrial	Premium efficiency ASD compressor	Marbek in-house info	RS Means Mechanical Cost Data
165	Industrial	Optimized Distribution System	ICF	NA
166	Industrial	Minimize operating air pressure	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
167	Industrial	Optimized sizing of compressor system	ICF	NA
168	Industrial	Optimized sizes of air receiver tanks	ICF	NA
169	Industrial	Premium Efficiency Air Dryer (compressors)	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
170	Industrial	Sequencing Control	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
171	Industrial	Eliminate air leaks	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
172	Industrial	Synchronous Belts for Air Compressors	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
173	Industrial	Replace compressed air use with mechanical or electrical	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
174	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
175	Industrial	Retrofit internal parts of existing centrifugal compressors	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
176	Industrial	High efficiency battery charger (for forklifts)	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
177	Industrial	Economizers for Packaged Air-Conditioning Units	Personnal communication with IFA (International Fertilizer Association) experts.	NA
178	Industrial	High efficiency non-packaged HVAC equipment	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
179	Industrial	High Efficiency Unitary AC	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
180	Industrial	Ground Source Heat Pump	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
181	Industrial	Ventilation Heat Recovery	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
182	Industrial	Automated Temperature Control	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
183	Industrial	Destratification Fans	Information for Evaluating Georexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
184	Industrial	Warehouse Loading Dock Seals	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
185	Industrial	Preventative Packaged HVAC Maintenance	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
186	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
187	Industrial	High efficiency ballasts for lighting	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
188	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
189	Industrial	Efficient Lighting Design	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
190	Industrial	Lighting controls	CADDET Energy Efficiency. 1995. Efficient lighting in commercial buildings. (Report No.ISSN 1382-4929 ; brochure 01). Date accessed: April, 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: April, 2010
191	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	U.S. Department of Energy, Common Industrial Lighting Upgrade Technologies, 2014. http://energy.gov/sites/prod/files/2014/05/f16/lighting_factsheet.pdf
192	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	BC Hydro, Plan for Good Lighting Design, Accessed October 29, 2015: https://www.bchydro.com/powersmart/business/technologies-equipment/lighting-systems.html#1
193	Industrial	HE Dry-Type Transformers	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMMeans Electrical Cost Data 2009, pp200
194	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMMeans Electrical Cost Data 2009, pp200
195	Industrial	Air Curtains (Oven)	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMMeans Electrical Cost Data 2009, pp200
196	Industrial	Insulation (Oven)	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMMeans Electrical Cost Data 2009, pp200
197	Industrial	Preventative Oven Maintenance	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
198	Industrial	Air Curtains (Dryer)	Vendor website - date accessed: March 2010	NA
199	Industrial	Insulation (Dryer)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
200	Industrial	Preventative Dryer Maintenance	ICF	NA
201	Industrial	Preventative Furnace Maintenance	Vendor website - date accessed: May, 2010	NA
202	Industrial	Insulation (Furnace)	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
203	Industrial	Preventative Kiln Maintenance	ICF	NA
204	Industrial	Insulation (Kiln)	ICF	NA
205	Industrial	High Efficiency Chiller	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
206	Industrial	Optimized Distribution System	ICF	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
207	Industrial	Premium efficiency refrigeration control system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
208	Industrial	Smart Defrost Controls	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
209	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	NA
210	Industrial	Preventative refrigeration/cooling system maintenance	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
211	Industrial	Optimized condenser pressure	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
212	Industrial	VSD on chiller compressor	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
213	Industrial	Cooling Tower Optimization	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
214	Industrial	Improve insulation of refrigeration system	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	NA
215	Industrial	High/Premium Efficiency Motors (Pumps)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
216	Industrial	Impeller Trimming (Pump)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
217	Industrial	Optimization of pumping system	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
218	Industrial	Premium Efficiency Control with ASDs (Pumps)	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
219	Industrial	Preventative Pump Maintenance	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
220	Industrial	High/Premium Efficiency Motors (Fans)	Vendor website - Date accessed: May 2010	NA
221	Industrial	Premium efficiency control, with ASD (Fans)	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
222	Industrial	Synchronous Belts (Fans)	ICF	NA
223	Industrial	Preventative Fan Maintenance	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
224	Industrial	High/Premium Efficiency Motors	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
225	Industrial	Correctly sized motors	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
226	Industrial	Optimized motor control	ICF	NA
227	Industrial	Preventative Motor Maintenance	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
228	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
229	Industrial	Optimized Distribution System	Marbek in-house info	RS Means Mechanical Cost Data
230	Industrial	Minimize operating air pressure	ICF	NA
231	Industrial	Optimized sizing of compressor system	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
232	Industrial	Optimized sizes of air receiver tanks	ICF	NA
233	Industrial	Premium Efficiency Air Dryer (compressors)	ICF	NA
234	Industrial	Sequencing Control	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
235	Industrial	Eliminate air leaks	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
236	Industrial	Synchronous Belts for Air Compressors	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
237	Industrial	Replace compressed air use with mechanical or electrical	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
238	Industrial	Premium efficiency ASD compressor	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
239	Industrial	Retrofit internal parts of existing centrifugal compressors	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
240	Industrial	High efficiency battery charger (for forklifts)	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
241	Industrial	Economizers for Packaged Air-Conditioning Units	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
242	Industrial	High efficiency non-packaged HVAC equipment	Personnal communication with IFA (International Fertilizer Association) experts.	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
243	Industrial	High Efficiency Unitary AC	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
244	Industrial	Ground Source Heat Pump	NRCAN Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
245	Industrial	Ventilation Heat Recovery	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCAN Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
246	Industrial	Automated Temperature Control	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
247	Industrial	Destratification Fans	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
248	Industrial	Warehouse Loading Dock Seals	Information for Evaluating Geexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
249	Industrial	Preventative Packaged HVAC Maintenance	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
250	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
251	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
252	Industrial	High Efficiency Light fixtures	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF
253	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
254	Industrial	Lighting controls	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
255	Industrial	Premium efficiency ventilation control with VSD	CADDET Energy Efficiency. 1995. Efficient lighting in commercial buildings. (Report No.ISSN 1382-4929 ; brochure 01). Date accessed: April, 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: April, 2010
256	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	U.S. Department of Energy, Common Industrial Lighting Upgrade Technologies, 2014. http://energy.gov/sites/prod/files/2014/05/f16/lighting_factsheet.pdf
257	Industrial	HE Dry-Type Transformers	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
258	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
259	Industrial	Air Curtains (Oven)	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
260	Industrial	Insulation (Oven)	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
261	Industrial	Preventative Oven Maintenance	NRCAN Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
262	Industrial	Air Curtains (Dryer)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
263	Industrial	Insulation (Dryer)	Vendor website - date accessed: March 2010	NA
264	Industrial	Preventative Dryer Maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
265	Industrial	Preventative Furnace Maintenance	ICF	NA
266	Industrial	Insulation (Furnace)	Vendor website - date accessed: May, 2010	NA
267	Industrial	Preventative Kiln Maintenance	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
268	Industrial	Insulation (Kiln)	ICF	NA
269	Industrial	High Efficiency Chiller	ICF	NA
270	Industrial	Optimized Distribution System	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
271	Industrial	Premium efficiency refrigeration control system	ICF	NA
272	Industrial	Smart Defrost Controls	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
273	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
274	Industrial	Preventative refrigeration/cooling system maintenance	ICF	NA
275	Industrial	Optimized condenser pressure	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
276	Industrial	VSD on chiller compressor	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
277	Industrial	Cooling Tower Optimization	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
278	Industrial	Improve insulation of refrigeration system	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
279	Industrial	High/Premium Efficiency Motors (Pumps)	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
280	Industrial	Impeller Trimming (Pump)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
281	Industrial	Optimization of pumping system	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
282	Industrial	Premium Efficiency Control with ASDs (Pumps)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
283	Industrial	Preventative Pump Maintenance	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
284	Industrial	High/Premium Efficiency Motors (Fans)	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
285	Industrial	Premium efficiency control, with ASD (Fans)	Vendor website - Date accessed: May 2010	NA
286	Industrial	Synchronous Belts (Fans)	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
287	Industrial	Preventative Fan Maintenance	ICF	NA
288	Industrial	High/Premium Efficiency Motors	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
289	Industrial	Correctly sized motors	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
290	Industrial	Optimized motor control	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
291	Industrial	Preventative Motor Maintenance	ICF	NA
292	Industrial	Premium efficiency ASD compressor	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
293	Industrial	Optimized Distribution System	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
294	Industrial	Minimize operating air pressure	Marbek in-house info	RS Means Mechanical Cost Data
295	Industrial	Optimized sizing of compressor system	ICF	NA
296	Industrial	Optimized sizes of air receiver tanks	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
297	Industrial	Premium Efficiency Air Dryer (compressors)	ICF	NA
298	Industrial	Sequencing Control	ICF	NA
299	Industrial	Eliminate air leaks	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
300	Industrial	Synchronous Belts for Air Compressors	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
301	Industrial	Replace compressed air use with mechanical or electrical	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
302	Industrial	Premium efficiency ASD compressor	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
303	Industrial	Retrofit internal parts of existing centrifugal compressors	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
304	Industrial	High efficiency battery charger (for forklifts)	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
305	Industrial	Economizers for Packaged Air-Conditioning Units	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
306	Industrial	High efficiency non-packaged HVAC equipment	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
307	Industrial	High Efficiency Unitary AC	Personnal communication with IFA (International Fertilizer Association) experts.	NA
308	Industrial	Ground Source Heat Pump	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
309	Industrial	Ventilation Heat Recovery	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
310	Industrial	Automated Temperature Control	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
311	Industrial	Destratification Fans	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
312	Industrial	Warehouse Loading Dock Seals	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
313	Industrial	Preventative Packaged HVAC Maintenance	Information for Evaluating Georexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
314	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
315	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
316	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
317	Industrial	Efficient Lighting Design	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
318	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
319	Industrial	Premium efficiency ventilation control with VSD	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
320	Industrial	Demand-Controlled Ventilation	CADDET Energy Efficiency. 1995. Efficient lighting in commercial buildings. (Report No.ISSN 1382-4929 ; brochure 01). Date accessed: April, 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: April, 2010
321	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
322	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
323	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
324	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
325	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
326	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
327	Industrial	Insulation (Dryer)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
328	Industrial	Preventative Dryer Maintenance	Vendor website - date accessed: March 2010	NA
329	Industrial	Preventative Furnace Maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
330	Industrial	Insulation (Furnace)	ICF	NA
331	Industrial	Preventative Kiln Maintenance	Vendor website - date accessed: May, 2010	NA
332	Industrial	Insulation (Kiln)	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
333	Industrial	High Efficiency Chiller	ICF	NA
334	Industrial	Optimized Distribution System	ICF	NA
335	Industrial	Premium efficiency refrigeration control system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
336	Industrial	Smart Defrost Controls	ICF	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
337	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
338	Industrial	Preventative refrigeration/cooling system maintenance	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
339	Industrial	Optimized condenser pressure	ICF	NA
340	Industrial	VSD on chiller compressor	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
341	Industrial	Cooling Tower Optimization	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
342	Industrial	Improve insulation of refrigeration system	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
343	Industrial	High/Premium Efficiency Motors (Pumps)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
344	Industrial	Impeller Trimming (Pump)	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: July, 2010	NA
345	Industrial	Optimization of pumping system	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
346	Industrial	Premium Efficiency Control with ASDs (Pumps)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
347	Industrial	Preventative Pump Maintenance	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
348	Industrial	High/Premium Efficiency Motors (Fans)	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
349	Industrial	Premium efficiency control, with ASD (Fans)	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
350	Industrial	Synchronous Belts (Fans)	Vendor website - Date accessed: May 2010	NA
351	Industrial	Preventative Fan Maintenance	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
352	Industrial	High/Premium Efficiency Motors	ICF	NA
353	Industrial	Correctly sized motors	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
354	Industrial	Optimized motor control	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
355	Industrial	Preventative Motor Maintenance	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
356	Industrial	Premium efficiency ASD compressor	ICF	NA
357	Industrial	Optimized Distribution System	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
358	Industrial	Minimize operating air pressure	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
359	Industrial	Optimized sizing of compressor system	Marbek in-house info	RS Means Mechanical Cost Data
360	Industrial	Optimized sizes of air receiver tanks	ICF	NA
361	Industrial	Premium Efficiency Air Dryer (compressors)	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
362	Industrial	Sequencing Control	ICF	NA
363	Industrial	Eliminate air leaks	ICF	NA
364	Industrial	Synchronous Belts for Air Compressors	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
365	Industrial	Replace compressed air use with mechanical or electrical	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
366	Industrial	Premium efficiency ASD compressor	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
367	Industrial	Retrofit internal parts of existing centrifugal compressors	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
368	Industrial	High efficiency battery charger (for forklifts)	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
369	Industrial	Economizers for Packaged Air-Conditioning Units	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
370	Industrial	High efficiency non-packaged HVAC equipment	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
371	Industrial	High Efficiency Unitary AC	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
372	Industrial	Ground Source Heat Pump	Personnal communication with IFA (International Fertilizer Association) experts.	NA
373	Industrial	Ventilation Heat Recovery	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
374	Industrial	Automated Temperature Control	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
375	Industrial	Destratification Fans	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
376	Industrial	Warehouse Loading Dock Seals	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
377	Industrial	Preventative Packaged HVAC Maintenance	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
378	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Information for Evaluating Geexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
379	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
380	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
381	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
382	Industrial	Lighting controls	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF
383	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.
384	Industrial	Demand-Controlled Ventilation	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: September 2010	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0
385	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
386	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
387	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
388	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
389	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
390	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
391	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
392	Industrial	Preventative Dryer Maintenance	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
393	Industrial	Preventative Furnace Maintenance	Vendor website - date accessed: March 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
394	Industrial	Insulation (Furnace)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
395	Industrial	Preventative Kiln Maintenance	ICF	NA
396	Industrial	Insulation (Kiln)	Vendor website - date accessed: May, 2010	NA
397	Industrial	High Efficiency Chiller	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
398	Industrial	Optimized Distribution System	ICF	NA
399	Industrial	Premium efficiency refrigeration control system	ICF	NA
400	Industrial	Smart Defrost Controls	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
401	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	NA
402	Industrial	Preventative refrigeration/cooling system maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
403	Industrial	Optimized condenser pressure	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
404	Industrial	VSD on chiller compressor	ICF	NA
405	Industrial	Cooling Tower Optimization	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
406	Industrial	Improve insulation of refrigeration system	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
407	Industrial	High/Premium Efficiency Motors (Pumps)	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
408	Industrial	Impeller Trimming (Pump)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
409	Industrial	Optimization of pumping system	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	NA
410	Industrial	Premium Efficiency Control with ASDs (Pumps)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
411	Industrial	Preventative Pump Maintenance	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
412	Industrial	High/Premium Efficiency Motors (Fans)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
413	Industrial	Premium efficiency control, with ASD (Fans)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
414	Industrial	Synchronous Belts (Fans)	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
415	Industrial	Preventative Fan Maintenance	Vendor website - Date accessed: May 2010	NA
416	Industrial	High/Premium Efficiency Motors	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
417	Industrial	Correctly sized motors	ICF	NA
418	Industrial	Optimized motor control	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
419	Industrial	Preventative Motor Maintenance	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
420	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
421	Industrial	Optimized Distribution System	ICF	NA
422	Industrial	Minimize operating air pressure	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
423	Industrial	Optimized sizing of compressor system	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
424	Industrial	Optimized sizes of air receiver tanks	Marbek in-house info	RS Means Mechanical Cost Data
425	Industrial	Premium Efficiency Air Dryer (compressors)	ICF	NA
426	Industrial	Sequencing Control	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
427	Industrial	Eliminate air leaks	ICF	NA
428	Industrial	Synchronous Belts for Air Compressors	ICF	NA
429	Industrial	Replace compressed air use with mechanical or electrical	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
430	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
431	Industrial	Retrofit internal parts of existing centrifugal compressors	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
432	Industrial	High efficiency battery charger (for forklifts)	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
433	Industrial	Economizers for Packaged Air-Conditioning Units	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
434	Industrial	High efficiency non-packaged HVAC equipment	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
435	Industrial	High Efficiency Unitary AC	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
436	Industrial	Ground Source Heat Pump	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
437	Industrial	Ventilation Heat Recovery	Personnal communication with IFA (International Fertilizer Association) experts.	NA
438	Industrial	Automated Temperature Control	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
439	Industrial	Destratification Fans	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
440	Industrial	Warehouse Loading Dock Seals	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
441	Industrial	Preventative Packaged HVAC Maintenance	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
442	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
443	Industrial	High efficiency ballasts for lighting	Information for Evaluating Geoexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
444	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
445	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
446	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
447	Industrial	Premium efficiency ventilation control with VSD	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF
448	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	National Center for Energy Management and Building Technologies, Energy Reduction Through Practical Scheduled Maintenance, 2006.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
449	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
450	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
451	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
452	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
453	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
454	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
455	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
456	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
457	Industrial	Preventative Furnace Maintenance	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
458	Industrial	Insulation (Furnace)	Vendor website - date accessed: March 2010	NA
459	Industrial	Preventative Kiln Maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
460	Industrial	Insulation (Kiln)	ICF	NA
461	Industrial	High Efficiency Chiller	Vendor website - date accessed: May, 2010	NA
462	Industrial	Optimized Distribution System	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
463	Industrial	Premium efficiency refrigeration control system	ICF	NA
464	Industrial	Smart Defrost Controls	ICF	NA
465	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
466	Industrial	Preventative refrigeration/cooling system maintenance	ICF	NA
467	Industrial	Optimized condenser pressure	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
468	Industrial	VSD on chiller compressor	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
469	Industrial	Cooling Tower Optimization	ICF	NA
470	Industrial	Improve insulation of refrigeration system	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
471	Industrial	High/Premium Efficiency Motors (Pumps)	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
472	Industrial	Impeller Trimming (Pump)	US Environmental Protection Agency. 1998. Wisersules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
473	Industrial	Optimization of pumping system	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
474	Industrial	Premium Efficiency Control with ASDs (Pumps)	US Environmental Protection Agency. 1998. Wisersules for Industrial Efficiency. Date accessed: July, 2010	NA
475	Industrial	Preventative Pump Maintenance	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
476	Industrial	High/Premium Efficiency Motors (Fans)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
477	Industrial	Premium efficiency control, with ASD (Fans)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
478	Industrial	Synchronous Belts (Fans)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
479	Industrial	Preventative Fan Maintenance	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
480	Industrial	High/Premium Efficiency Motors	Vendor website - Date accessed: May 2010	NA
481	Industrial	Correctly sized motors	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
482	Industrial	Optimized motor control	ICF	NA
483	Industrial	Preventative Motor Maintenance	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
484	Industrial	Premium efficiency ASD compressor	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
485	Industrial	Optimized Distribution System	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
486	Industrial	Minimize operating air pressure	ICF	NA
487	Industrial	Optimized sizing of compressor system	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
488	Industrial	Optimized sizes of air receiver tanks	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
489	Industrial	Premium Efficiency Air Dryer (compressors)	Marbek in-house info	RS Means Mechanical Cost Data
490	Industrial	Sequencing Control	ICF	NA
491	Industrial	Eliminate air leaks	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
492	Industrial	Synchronous Belts for Air Compressors	ICF	NA
493	Industrial	Replace compressed air use with mechanical or electrical	ICF	NA
494	Industrial	Premium efficiency ASD compressor	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
495	Industrial	Retrofit internal parts of existing centrifugal compressors	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
496	Industrial	High efficiency battery charger (for forklifts)	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
497	Industrial	Economizers for Packaged Air-Conditioning Units	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
498	Industrial	High efficiency non-packaged HVAC equipment	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
499	Industrial	High Efficiency Unitary AC	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
500	Industrial	Ground Source Heat Pump	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
501	Industrial	Ventilation Heat Recovery	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
502	Industrial	Automated Temperature Control	Personnal communication with IFA (International Fertilizer Association) experts.	NA
503	Industrial	Destratification Fans	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
504	Industrial	Warehouse Loading Dock Seals	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
505	Industrial	Preventative Packaged HVAC Maintenance	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
506	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
507	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
508	Industrial	High Efficiency Light fixtures	Information for Evaluating Geexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
509	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
510	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
511	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
512	Industrial	Demand-Controlled Ventilation	Rutgers, Industrial Assessment Centers Database, Accessed: October 26, 2015.	ICF
513	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
514	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
515	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
516	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
517	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
518	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
519	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
520	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
521	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
522	Industrial	Insulation (Furnace)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
523	Industrial	Preventative Kiln Maintenance	Vendor website - date accessed: March 2010	NA
524	Industrial	Insulation (Kiln)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
525	Industrial	High Efficiency Chiller	ICF	NA
526	Industrial	Optimized Distribution System	Vendor website - date accessed: May, 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
527	Industrial	Premium efficiency refrigeration control system	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
528	Industrial	Smart Defrost Controls	ICF	NA
529	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	NA
530	Industrial	Preventative refrigeration/cooling system maintenance	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
531	Industrial	Optimized condenser pressure	ICF	NA
532	Industrial	VSD on chiller compressor	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
533	Industrial	Cooling Tower Optimization	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
534	Industrial	Improve insulation of refrigeration system	ICF	NA
535	Industrial	High/Premium Efficiency Motors (Pumps)	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
536	Industrial	Impeller Trimming (Pump)	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
537	Industrial	Optimization of pumping system	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
538	Industrial	Premium Efficiency Control with ASDs (Pumps)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
539	Industrial	Preventative Pump Maintenance	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA
540	Industrial	High/Premium Efficiency Motors (Fans)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
541	Industrial	Premium efficiency control, with ASD (Fans)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
542	Industrial	Synchronous Belts (Fans)	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
543	Industrial	Preventative Fan Maintenance	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
544	Industrial	High/Premium Efficiency Motors	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
545	Industrial	Correctly sized motors	Vendor website - Date accessed: May 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
546	Industrial	Optimized motor control	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
547	Industrial	Preventative Motor Maintenance	ICF	NA
548	Industrial	Premium efficiency ASD compressor	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
549	Industrial	Optimized Distribution System	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
550	Industrial	Minimize operating air pressure	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
551	Industrial	Optimized sizing of compressor system	ICF	NA
552	Industrial	Optimized sizes of air receiver tanks	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
553	Industrial	Premium Efficiency Air Dryer (compressors)	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
554	Industrial	Sequencing Control	Marbek in-house info	RS Means Mechanical Cost Data
555	Industrial	Eliminate air leaks	ICF	NA
556	Industrial	Synchronous Belts for Air Compressors	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
557	Industrial	Replace compressed air use with mechanical or electrical	ICF	NA
558	Industrial	Premium efficiency ASD compressor	ICF	NA
559	Industrial	Retrofit internal parts of existing centrifugal compressors	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
560	Industrial	High efficiency battery charger (for forklifts)	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
561	Industrial	Economizers for Packaged Air-Conditioning Units	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
562	Industrial	High efficiency non-packaged HVAC equipment	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
563	Industrial	High Efficiency Unitary AC	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
564	Industrial	Ground Source Heat Pump	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
565	Industrial	Ventilation Heat Recovery	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
566	Industrial	Automated Temperature Control	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
567	Industrial	Destratification Fans	Personnal communication with IFA (International Fertilizer Association) experts.	NA
568	Industrial	Warehouse Loading Dock Seals	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
569	Industrial	Preventative Packaged HVAC Maintenance	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
570	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
571	Industrial	High efficiency ballasts for lighting	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
572	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
573	Industrial	Efficient Lighting Design	Information for Evaluating Georexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
574	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
575	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
576	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Ontario Independent Electricity System Operator, Prescriptive Measures and Assumptions List, 2015.
577	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
578	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
579	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
580	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
581	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
582	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
583	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
584	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
585	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
586	Industrial	Insulation (Furnace)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
587	Industrial	Preventative Kiln Maintenance	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
588	Industrial	Insulation (Kiln)	Vendor website - date accessed: March 2010	NA
589	Industrial	High Efficiency Chiller	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
590	Industrial	Optimized Distribution System	ICF	NA
591	Industrial	Premium efficiency refrigeration control system	Vendor website - date accessed: May, 2010	NA
592	Industrial	Smart Defrost Controls	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
593	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	NA
594	Industrial	Preventative refrigeration/cooling system maintenance	ICF	NA
595	Industrial	Optimized condenser pressure	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
596	Industrial	VSD on chiller compressor	ICF	NA
597	Industrial	Cooling Tower Optimization	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
598	Industrial	Improve insulation of refrigeration system	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
599	Industrial	High/Premium Efficiency Motors (Pumps)	ICF	NA
600	Industrial	Impeller Trimming (Pump)	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
601	Industrial	Optimization of pumping system	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
602	Industrial	Premium Efficiency Control with ASDs (Pumps)	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
603	Industrial	Preventative Pump Maintenance	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
604	Industrial	High/Premium Efficiency Motors (Fans)	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA
605	Industrial	Premium efficiency control, with ASD (Fans)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
606	Industrial	Synchronous Belts (Fans)	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
607	Industrial	Preventative Fan Maintenance	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
608	Industrial	High/Premium Efficiency Motors	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
609	Industrial	Correctly sized motors	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
610	Industrial	Optimized motor control	Vendor website - Date accessed: May 2010	NA
611	Industrial	Preventative Motor Maintenance	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
612	Industrial	Premium efficiency ASD compressor	ICF	NA
613	Industrial	Optimized Distribution System	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
614	Industrial	Minimize operating air pressure	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
615	Industrial	Optimized sizing of compressor system	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
616	Industrial	Optimized sizes of air receiver tanks	ICF	NA
617	Industrial	Premium Efficiency Air Dryer (compressors)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
618	Industrial	Sequencing Control	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
619	Industrial	Eliminate air leaks	Marbek in-house info	RS Means Mechanical Cost Data
620	Industrial	Synchronous Belts for Air Compressors	ICF	NA
621	Industrial	Replace compressed air use with mechanical or electrical	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
622	Industrial	Premium efficiency ASD compressor	ICF	NA
623	Industrial	Retrofit internal parts of existing centrifugal compressors	ICF	NA
624	Industrial	High efficiency battery charger (for forklifts)	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
625	Industrial	Economizers for Packaged Air-Conditioning Units	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
626	Industrial	High efficiency non-packaged HVAC equipment	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
627	Industrial	High Efficiency Unitary AC	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
628	Industrial	Ground Source Heat Pump	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
629	Industrial	Ventilation Heat Recovery	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
630	Industrial	Automated Temperature Control	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
631	Industrial	Destratification Fans	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
632	Industrial	Warehouse Loading Dock Seals	Personnal communication with IFA (International Fertilizer Association) experts.	NA
633	Industrial	Preventative Packaged HVAC Maintenance	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
634	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
635	Industrial	High efficiency ballasts for lighting	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
636	Industrial	High Efficiency Light fixtures	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
637	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
638	Industrial	Lighting controls	Information for Evaluating Geoexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
639	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
640	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	Opinion Dynamics Corporation, Delaware Technical Resource Manual, 2012
641	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
642	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
643	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
644	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
645	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
646	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
647	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
648	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
649	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
650	Industrial	Insulation (Furnace)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
651	Industrial	Preventative Kiln Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
652	Industrial	Insulation (Kiln)	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
653	Industrial	High Efficiency Chiller	Vendor website - date accessed: March 2010	NA
654	Industrial	Optimized Distribution System	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
655	Industrial	Premium efficiency refrigeration control system	ICF	NA
656	Industrial	Smart Defrost Controls	Vendor website - date accessed: May, 2010	NA
657	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
658	Industrial	Preventative refrigeration/cooling system maintenance	ICF	NA
659	Industrial	Optimized condenser pressure	ICF	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
660	Industrial	VSD on chiller compressor	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
661	Industrial	Cooling Tower Optimization	ICF	NA
662	Industrial	Improve insulation of refrigeration system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: April, 2010
663	Industrial	High/Premium Efficiency Motors (Pumps)	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
664	Industrial	Impeller Trimming (Pump)	ICF	NA
665	Industrial	Optimization of pumping system	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
666	Industrial	Premium Efficiency Control with ASDs (Pumps)	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
667	Industrial	Preventative Pump Maintenance	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
668	Industrial	High/Premium Efficiency Motors (Fans)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
669	Industrial	Premium efficiency control, with ASD (Fans)	US Environmental Protection Agency. 1998. Wiserules for Industrial Efficiency. Date accessed: July, 2010	NA
670	Industrial	Synchronous Belts (Fans)	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
671	Industrial	Preventative Fan Maintenance	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
672	Industrial	High/Premium Efficiency Motors	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
673	Industrial	Correctly sized motors	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
674	Industrial	Optimized motor control	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
675	Industrial	Preventative Motor Maintenance	Vendor website - Date accessed: May 2010	NA
676	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
677	Industrial	Optimized Distribution System	ICF	NA
678	Industrial	Minimize operating air pressure	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
679	Industrial	Optimized sizing of compressor system	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
680	Industrial	Optimized sizes of air receiver tanks	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
681	Industrial	Premium Efficiency Air Dryer (compressors)	ICF	NA
682	Industrial	Sequencing Control	NRCAN Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
683	Industrial	Eliminate air leaks	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
684	Industrial	Synchronous Belts for Air Compressors	Marbek in-house info	RS Means Mechanical Cost Data
685	Industrial	Replace compressed air use with mechanical or electrical	ICF	NA
686	Industrial	Premium efficiency ASD compressor	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
687	Industrial	Retrofit internal parts of existing centrifugal compressors	ICF	NA
688	Industrial	High efficiency battery charger (for forklifts)	ICF	NA
689	Industrial	Economizers for Packaged Air-Conditioning Units	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
690	Industrial	High efficiency non-packaged HVAC equipment	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
691	Industrial	High Efficiency Unitary AC	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
692	Industrial	Ground Source Heat Pump	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
693	Industrial	Ventilation Heat Recovery	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
694	Industrial	Automated Temperature Control	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
695	Industrial	Destratification Fans	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
696	Industrial	Warehouse Loading Dock Seals	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
697	Industrial	Preventative Packaged HVAC Maintenance	Personnal communication with IFA (International Fertilizer Association) experts.	NA
698	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
699	Industrial	High efficiency ballasts for lighting	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
700	Industrial	High Efficiency Light fixtures	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
701	Industrial	Efficient Lighting Design	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
702	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
703	Industrial	Premium efficiency ventilation control with VSD	Information for Evaluating Georexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
704	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.
705	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
706	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
707	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
708	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
709	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
710	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
711	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
712	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
713	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
714	Industrial	Insulation (Furnace)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
715	Industrial	Preventative Kiln Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
716	Industrial	Insulation (Kiln)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
717	Industrial	High Efficiency Chiller	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
718	Industrial	Optimized Distribution System	Vendor website - date accessed: March 2010	NA
719	Industrial	Premium efficiency refrigeration control system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
720	Industrial	Smart Defrost Controls	ICF	NA
721	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	Vendor website - date accessed: May, 2010	NA
722	Industrial	Preventative refrigeration/cooling system maintenance	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
723	Industrial	Optimized condenser pressure	ICF	NA
724	Industrial	VSD on chiller compressor	ICF	NA
725	Industrial	Cooling Tower Optimization	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
726	Industrial	Improve insulation of refrigeration system	ICF	NA
727	Industrial	High/Premium Efficiency Motors (Pumps)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
728	Industrial	Impeller Trimming (Pump)	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
729	Industrial	Optimization of pumping system	ICF	NA
730	Industrial	Premium Efficiency Control with ASDs (Pumps)	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
731	Industrial	Preventative Pump Maintenance	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
732	Industrial	High/Premium Efficiency Motors (Fans)	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
733	Industrial	Premium efficiency control, with ASD (Fans)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
734	Industrial	Synchronous Belts (Fans)	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	NA
735	Industrial	Preventative Fan Maintenance	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
736	Industrial	High/Premium Efficiency Motors	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
737	Industrial	Correctly sized motors	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
738	Industrial	Optimized motor control	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
739	Industrial	Preventative Motor Maintenance	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
740	Industrial	Premium efficiency ASD compressor	Vendor website - Date accessed: May 2010	NA
741	Industrial	Optimized Distribution System	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
742	Industrial	Minimize operating air pressure	ICF	NA
743	Industrial	Optimized sizing of compressor system	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
744	Industrial	Optimized sizes of air receiver tanks	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
745	Industrial	Premium Efficiency Air Dryer (compressors)	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
746	Industrial	Sequencing Control	ICF	NA
747	Industrial	Eliminate air leaks	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
748	Industrial	Synchronous Belts for Air Compressors	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
749	Industrial	Replace compressed air use with mechanical or electrical	Marbek in-house info	RS Means Mechanical Cost Data
750	Industrial	Premium efficiency ASD compressor	ICF	NA
751	Industrial	Retrofit internal parts of existing centrifugal compressors	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
752	Industrial	High efficiency battery charger (for forklifts)	ICF	NA
753	Industrial	Economizers for Packaged Air-Conditioning Units	ICF	NA
754	Industrial	High efficiency non-packaged HVAC equipment	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
755	Industrial	High Efficiency Unitary AC	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
756	Industrial	Ground Source Heat Pump	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
757	Industrial	Ventilation Heat Recovery	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
758	Industrial	Automated Temperature Control	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
759	Industrial	Destratification Fans	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
760	Industrial	Warehouse Loading Dock Seals	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
761	Industrial	Preventative Packaged HVAC Maintenance	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
762	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Personnal communication with IFA (International Fertilizer Association) experts.	NA
763	Industrial	High efficiency ballasts for lighting	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
764	Industrial	High Efficiency Light fixtures	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
765	Industrial	Efficient Lighting Design	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
766	Industrial	Lighting controls	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
767	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
768	Industrial	Demand-Controlled Ventilation	Information for Evaluating Georexchange Applications, New York State Energy Research and Development Authority (NYSERDA), 2007.	Ground-Source Heat Pumps: Overview of Market Status, Barriers to Adoption, and Options for Overcoming Barriers, Navigant Consulting Inc., 2009.
769	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
770	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
771	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
772	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
773	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
774	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
775	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
776	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
777	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
778	Industrial	Insulation (Furnace)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
779	Industrial	Preventative Kiln Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
780	Industrial	Insulation (Kiln)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
781	Industrial	High Efficiency Chiller	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
782	Industrial	Optimized Distribution System	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
783	Industrial	Premium efficiency refrigeration control system	Vendor website - date accessed: March 2010	NA
784	Industrial	Smart Defrost Controls	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
785	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	ICF	NA
786	Industrial	Preventative refrigeration/cooling system maintenance	Vendor website - date accessed: May, 2010	NA
787	Industrial	Optimized condenser pressure	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
788	Industrial	VSD on chiller compressor	ICF	NA
789	Industrial	Cooling Tower Optimization	ICF	NA
790	Industrial	Improve insulation of refrigeration system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010
791	Industrial	High/Premium Efficiency Motors (Pumps)	ICF	NA
792	Industrial	Impeller Trimming (Pump)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wiserule for Industrial Efficiency. Date accessed: April, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
793	Industrial	Optimization of pumping system	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
794	Industrial	Premium Efficiency Control with ASDs (Pumps)	ICF	NA
795	Industrial	Preventative Pump Maintenance	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
796	Industrial	High/Premium Efficiency Motors (Fans)	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
797	Industrial	Premium efficiency control, with ASD (Fans)	US Environmental Protection Agency. 1998. Wisersules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
798	Industrial	Synchronous Belts (Fans)	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
799	Industrial	Preventative Fan Maintenance	US Environmental Protection Agency. 1998. Wisersules for Industrial Efficiency. Date accessed: July, 2010	NA
800	Industrial	High/Premium Efficiency Motors	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
801	Industrial	Correctly sized motors	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
802	Industrial	Optimized motor control	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
803	Industrial	Preventative Motor Maintenance	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
804	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
805	Industrial	Optimized Distribution System	Vendor website - Date accessed: May 2010	NA
806	Industrial	Minimize operating air pressure	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
807	Industrial	Optimized sizing of compressor system	ICF	NA
808	Industrial	Optimized sizes of air receiver tanks	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
809	Industrial	Premium Efficiency Air Dryer (compressors)	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
810	Industrial	Sequencing Control	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
811	Industrial	Eliminate air leaks	ICF	NA
812	Industrial	Synchronous Belts for Air Compressors	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
813	Industrial	Replace compressed air use with mechanical or electrical	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
814	Industrial	Premium efficiency ASD compressor	Marbek in-house info	RS Means Mechanical Cost Data
815	Industrial	Retrofit internal parts of existing centrifugal compressors	ICF	NA
816	Industrial	High efficiency battery charger (for forklifts)	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
817	Industrial	Economizers for Packaged Air-Conditioning Units	ICF	NA
818	Industrial	High efficiency non-packaged HVAC equipment	ICF	NA
819	Industrial	High Efficiency Unitary AC	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
820	Industrial	Ground Source Heat Pump	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
821	Industrial	Ventilation Heat Recovery	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
822	Industrial	Automated Temperature Control	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
823	Industrial	Destratification Fans	NRCAN Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
824	Industrial	Warehouse Loading Dock Seals	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
825	Industrial	Preventative Packaged HVAC Maintenance	Stanley Assembly Technologies. 200Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
826	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
827	Industrial	High efficiency ballasts for lighting	Personnal communication with IFA (International Fertilizer Association) experts.	NA
828	Industrial	High Efficiency Light fixtures	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
829	Industrial	Efficient Lighting Design	NRCAN Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
830	Industrial	Lighting controls	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCAN Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
831	Industrial	Premium efficiency ventilation control with VSD	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
832	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF
833	Industrial	HE Dry-Type Transformers	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
834	Industrial	Process Heat Recovery to Preheat Makeup Water	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
835	Industrial	Air Curtains (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
836	Industrial	Insulation (Oven)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
837	Industrial	Preventative Oven Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
838	Industrial	Air Curtains (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
839	Industrial	Insulation (Dryer)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
840	Industrial	Preventative Dryer Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
841	Industrial	Preventative Furnace Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
842	Industrial	Insulation (Furnace)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
843	Industrial	Preventative Kiln Maintenance	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
844	Industrial	Insulation (Kiln)	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
845	Industrial	High Efficiency Chiller	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
846	Industrial	Optimized Distribution System	NRCan Office of Energy Efficiency. 2009. Dry-Type Transformers - date accessed: July 2010	RSMeans Electrical Cost Data 2009, pp200
847	Industrial	Premium efficiency refrigeration control system	Energy Design Resources, Industrial Process Heat Recovery Design Brief, 2009.	Global Energy Partners, Industrial Waste-Heat Recovery: Benefits and Recent Advancements in Technology and Applications, 2007.
848	Industrial	Smart Defrost Controls	Vendor website - date accessed: March 2010	NA
849	Industrial	Optimized chilled water temperature and/or optimized condenser temperature	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisersules for Industrial Efficiency. Date accessed: April, 2010
850	Industrial	Preventative refrigeration/cooling system maintenance	ICF	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
851	Industrial	Optimized condenser pressure	Vendor website - date accessed: May, 2010	NA
852	Industrial	VSD on chiller compressor	US Department of Energy, 2007. Improving Process Heating System Performance: A Sourcebook for Industry 2nd edition- Date accessed: October 2015	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
853	Industrial	Cooling Tower Optimization	ICF	NA
854	Industrial	Improve insulation of refrigeration system	ICF	NA
855	Industrial	High/Premium Efficiency Motors (Pumps)	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
856	Industrial	Impeller Trimming (Pump)	ICF	NA
857	Industrial	Optimization of pumping system	US Department of Energy, 2004. Improving Process Heating System Performance: A Sourcebook for Industry- Date accessed: April 2010	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: April, 2010
858	Industrial	Premium Efficiency Control with ASDs (Pumps)	US Office of Energy Efficiency & Renewable Energy. 2011. Covered Product Category: Water-Cooled Electric Chillers. Date accessed: October 2015	US Department of Energy. 2003. How to Buy an Energy Efficient Air-Cooled Chiller. Date accessed: May 2010
859	Industrial	Preventative Pump Maintenance	ICF	NA
860	Industrial	High/Premium Efficiency Motors (Fans)	ICF	Energy Design Resources. 2010. Energy Efficiency Practices in Industrial Refrigeration. Accessed October 2015.
861	Industrial	Premium efficiency control, with ASD (Fans)	Vendor website - date accessed: July 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: July, 2010
862	Industrial	Synchronous Belts (Fans)	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	Progress Energy. Energy Savers: Chiller Optimization and Energy-Efficient Chillers. Date accessed: October 2015
863	Industrial	Preventative Fan Maintenance	Betterbricks. Operation and Maintenance of Chillers. Date accessed: July 2010	NA
864	Industrial	High/Premium Efficiency Motors	US Environmental Protection Agency. 1998. Wisrules for Industrial Efficiency. Date accessed: July, 2010	NA
865	Industrial	Correctly sized motors	Ontario Power Authority. 2009. 2009 Commercial and Institutional Measures and Assumptions. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
866	Industrial	Optimized motor control	Energy Design Resources, Chiller Plant Efficiency Design Brief, 2010.	Frank Morrison, Saving Energy with Cooling Towers, ASHRAE Journal, February 2014.
867	Industrial	Preventative Motor Maintenance	Heschong Mahone Group. 2008. Analysis of Standards Options for Walk-in Refrigerated Storage. Date accessed: July 2010	Canada Plan Service. Walk-in Cooler. Date accessed: July 2010
868	Industrial	Premium efficiency ASD compressor	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
869	Industrial	Optimized Distribution System	US Department of Energy. 2006. Trim or Replace Impellers on Oversized Pumps. Date accessed: May 2010	Masanet, E., Worrel, E., Graus, W., Galitsky, C. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for the Fruit and Vegetable Processing Industry. Date accessed: May 2010
870	Industrial	Minimize operating air pressure	Vendor website - Date accessed: May 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
871	Industrial	Optimized sizing of compressor system	US Department of Energy. 2004. Variable Speed Pumping. Date accessed: May 2010	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010
872	Industrial	Optimized sizes of air receiver tanks	ICF	NA
873	Industrial	Premium Efficiency Air Dryer (compressors)	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
874	Industrial	Sequencing Control	Neelis, M., Worrell, E., Masanet, E. 2008. Energy Efficiency Improvement and Cost Saving Opportunities for Petrochemical Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
875	Industrial	Eliminate air leaks	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA
876	Industrial	Synchronous Belts for Air Compressors	ICF	NA
877	Industrial	Replace compressed air use with mechanical or electrical	NRCan Office of Energy Efficiency. Premium-Efficiency Motors Technical Fact sheet. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
878	Industrial	Premium efficiency ASD compressor	US Department of Energy. 2002. Industrial Electric Motor Systems Market Opportunities Assessment. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
879	Industrial	Retrofit internal parts of existing centrifugal compressors	Marbek in-house info	RS Means Mechanical Cost Data
880	Industrial	High efficiency battery charger (for forklifts)	ICF	NA
881	Industrial	Economizers for Packaged Air-Conditioning Units	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
882	Industrial	High efficiency non-packaged HVAC equipment	ICF	NA
883	Industrial	High Efficiency Unitary AC	ICF	NA
884	Industrial	Ground Source Heat Pump	1.Sustainability Victoria. 2006. Efficient Compressed Air Systems. Date accessed: March 2010	NA
885	Industrial	Ventilation Heat Recovery	US Department of Energy. 2003. Improving Compressed Air System Performance, a Sourcebook for Industry. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
886	Industrial	Automated Temperature Control	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: July 2010	NA
887	Industrial	Destratification Fans	Vendor website - date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
888	Industrial	Warehouse Loading Dock Seals	NRCan Office of Energy Efficiency. 2007. Compressed Air Energy Efficiency Reference Guide. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
889	Industrial	Preventative Packaged HVAC Maintenance	US Department of Energy. 2005. Replace V-Belts with Cogged or Synchronous Belt Drives. Date accessed: May 2010	NA

Appendix F: Industrial Measure Assumptions

Measure ID	Sub-Sector	Measure Name	Reference 1	Reference 2
890	Industrial	Heat Recovery from Processes to Heat Ventilation Make-up Air	Stanley Assembly Technologies. 2009. Energy Consumption of Pneumatic and DC Electric Assembly Tools. Date accessed: March 2010	NA
891	Industrial	High efficiency ballasts for lighting	UK Department of the Environment, Transport and the Region's Energy Efficiency Best Practice Programme. 1999. Air compressors with integral variable speed control. Date accessed: May 2010	BC Hydro. 2006. QA Standard, Technology: Effective Measure Life. Date accessed: May, 2010
892	Industrial	High Efficiency Light fixtures	Personal communication with IFA (International Fertilizer Association) experts.	NA
893	Industrial	Efficient Lighting Design	Design & Engineering Services, Air Source Heat Pump for Preheating of Emergency Diesel Backup Generators, December, 2009	NA
894	Industrial	Lighting controls	NRCan Office of Energy Efficiency. 2009. Industrial Battery Chargers. Date accessed: September 2010	Power Designers. 2012. High-efficiency Battery Chargers Save Energy, Cut Costs. Date accessed: October 2015 (http://www.mhi.org/media/members/17127/130197612878638451.pdf)
895	Industrial	Premium efficiency ventilation control with VSD	The Cadmus Group Inc, Wisconsin Focus on Energy Technical Reference Manual, 2014.	NRCan Office of Energy Efficiency, Technical Fact Sheet: Economizers for packaged air-conditioning Units, 2004.
896	Industrial	Demand-Controlled Ventilation	Illinois Statewide Technical Reference Manual for Energy Efficiency, 2015, Version 4.0	ICF