Appendix 5:
Method of Calculating Results for the Save Energy Now Initiative

Method of Calculating Results for the Save Energy Now Initiative

In support of the Industrial Technologies Program's (ITP's) mission to improve the energy intensity of the U.S. industrial sector, the Save Energy Now Initiative (formerly the BestPractices Program) is designed to provide industrial plant managers with information to evaluate opportunities and implement projects that improve the efficiency of energy systems within their production facilities. These process-supporting energy systems include those with motors and drives, fans, pumps, air compressors, steam, and process heat. Save Energy Now relies on four main activities to deliver technical information to a target audience of larger, more energy-intensive manufacturing establishments: (1) large energy-intensive plant assessments, (2) training, (3) software tools, and (4) qualification of specialists by ITP to address improving energy efficiency from the system-based perspective.

Estimates of energy savings presented in this report are based on a methodology originally developed by Oak Ridge National Laboratory in 2002 and refined as the result of a peer review conducted in 2004. The impacts presented for 2009 Save Energy Now activities reflect the on-going efforts to implement recommendations from the peer review and improve the accuracy of savings estimates. Improvements include (1) integration of results from a participant survey, (2) better understanding of energy characteristics of participating plants, (3) consistent registration information for software users, and (4) follow-up implementation information from assessments. Savings estimates for years prior to 2004 have not been adjusted to reflect these most recent improvements.

The ITP data system provides information on participants in all activity areas and uses the data to estimate output and savings outcome performance of Save Energy Now. Participants include representatives from domestic or international manufacturing plants, corporations, research or educational institutions, state and local governments, and engineering or consulting organizations. Using information on participant affiliation, the data system provides the number of unique, domestic plants participating in each activity. The number of unique plants is then scaled back to estimate the number of unique U.S. plants that are believed to take action to implement energy savings projects as a result of the dissemination of this information.

Estimates of energy savings from Save Energy Now's activities focus on the four core activities of assessments, training, software, and qualified specialists. As a result of the peer review, estimates were constrained to these activities because of their significant savings potential and the higher quality of available data. The basic methodology for estimating the energy outcome is a combination of implemented energy savings reported for assessments and calculated savings for training, software use, and qualified specialists. Energy benefits generated by assessments are based on implementation results from follow-up with participating manufacturing plants. Savings associated with unique U.S-based plants that implement projects following interaction with qualified specialists or by participating in training or use of software are estimated using recent participant survey feedback and historical assessment data from Save Energy Now and the Industrial Assessment Centers (IACs). Savings and descriptions for each of the four main delivery activities are summarized below.

Large Plant Assessments

In 2006, under the Save Energy Now campaign, ITP shifted resources to conduct system-focused assessments at 200 energy-intensive manufacturing plants across the country. Prior to this, ITP offered annual plant-wide assessments (PWAs) to a limited number of large plants. The two assessment approaches are vastly different. The Save Energy Now assessments are provided to a larger number of plants; however, they are limited to analysis of a single energy system and demonstration of and training for using the relevant ITP software tool. Conversely, PWAs were delivered to a smaller group of plants to identify overall energy use in manufacturing processes and develop a more comprehensive set of opportunities for savings. Both approaches highlight opportunities for best energy management practices for industry, including the adoption of new, efficient technologies.

In 2009, 159 Save Energy Now assessments (SENA) were completed; replication activities were limited and are not included in the impacts estimate. Implemented savings reported from SENAs totaled 6.64 TBtu. Savings from the PWAs in previous years are assumed to persist for seven years, and this effect adds 103.09 TBtu in savings for 2009. The total energy savings generated in 2009 from the old assessments in large, energy-intensive plants was 109.73 TBtu, and the cumulative savings generated from 2000 through 2009 was 490.8 TBtu.

Method of Calculating Results for the Save Energy Now Initiative

IMPACTS

Training

Training activities continue to play a key role in the Save Energy Now strategy. Participants who attend end-user training learn how to apply the software in their own plants to identify and implement savings in energy-intensive systems. The number of unique plants participating in a training activity is recorded in the ITP data system. From 1998 through 2009, representatives from almost 6,900 unique plants attended training sessions. In 2009, of 652 plants attending training sessions, about 198 were estimated to actually take action to implement projects in their own energy-intensive systems, resulting in an estimated savings of 1.08 TBtu. Additionally, savings that persist from measures implemented as a result of training conducted in previous years contributed 31.61 TBtu in 2009. BestPractices' training saved 32.70 TBtu in 2009 and cumulatively saved 386.7 TBtu from 1998 through 2009.

Software Tools Distribution

Save Energy Now has a variety of resources to help address a company's energy management needs and facilitate energy-efficiency decision-making. A range of software tools is available to help a plant manager perform a self-assessment of a plant's fan, motor, pumping, compressed air, steam, and process heating systems. Software tools available in 2009 included Fan System Assessment Tool (FSAT), AirMaster+, MotorMaster, Pumping System Assessment Tool (PSAT), Steam System Scoping Tool, Steam System Assessment Tool, Process Heating Assessment Tool (PHAST), and 3E Plus. Users may download the software from the BestPractices website or use the Save Energy Now CD-ROM, which contains the entire suite of software tools.

Software is proving to be a powerful means of disseminating technical information for Save Energy Now. According to the ITP data system, over 3,600 unique plants obtained software in 2009. Over 495 plants are estimated to have taken action to implement projects, saving an estimated 4.97 TBtu. Savings from measures implemented in previous years that persist in 2009 contributed 36.43 TBtu. Save Energy Now software saved 41.40 TBtu in 2009 and cumulatively saved 334 TBtu from 1998 through 2009.

Qualified Specialists

Qualified specialists are industry professionals who have completed additional training and demonstrated proficiency in using Save Energy Now software tools. Specialists apply these tools to help industrial customers identify ways to improve system efficiency. In 2009, Save Energy Now offered specialist qualifications in the following software tools: Steam Systems, PSAT, AirMaster+, FSAT, and PHAST.

By the end of 2009, 415 software specialists were qualified by Save Energy Now. That same year, an estimated 1,064 plants interacted with qualified specialists, resulting in implemented projects at 543 plants. Estimated savings from qualified specialists' activities in 2009 are 5.97 TBtu. Savings that persist in 2009 from measures implemented in 2001 through 2008 contributed 33.87 TBtu. Qualified specialists saved 39.83 TBtu in 2009 and cumulatively saved 152.95 TBtu from 2001 through 2009.

Conclusion

The table below shows the total annual energy savings from ITP's Save Energy Now activities from 1998 through 2009. The subtotals from the four delivery activities are added together to calculate the total annual energy savings for 2009 of 224 TBtu and a cumulative energy savings of 1,365 TBtu. Fuel prices and emission coefficients for various fuels from Energy Information Administration publications were used to determine cumulative energy cost savings and carbon reduction.

Method of Calculating Results for the Save Energy Now Initiative

	1998	1999	2000	2001	2002	2003	2004
Large Plant Assessments							
Unique Plants Implementing Improvements Each Year	–	–	2	14	17	8	9
New Plant Replications	–	–	–	1	10	22	5
Annual Energy Savings from Large Plant Assessments (*TBtu*)	–	–	0.61	1.28	9.45	20.5	27.4
Cumulative Energy Savings from Large Plant Assessments (*TBtu*)	–	–	0.61	1.28	11.3	31.9	59.3
Training							
Unique Plants Reached Each Year	75	150	300	330	791	652	693
Unique Plants Implementing Improvements Each Year	38	75	150	165	396	326	347
Annual Energy Savings from Training (*TBtu*)	0.84	2.51	5.86	10.2	28.5	44.0	49.8
Cumulative Energy Savings from Training (*TBtu*)	0.84	3.35	9.21	19.4	47.9	91.9	142
Software Tools Distribution							
Unique Plants Reached Each Year	479	959	4,793	10,718	9,608	5,847	1,842
Unique Plants Implementing Improvements Each Year	96	192	959	2,143	1,922	1,169	368
Annual Energy Savings from Software (*TBtu*)	0.24	1.04	4.63	13.3	21.1	32.4	36.0
Cumulative Energy Savings from Software (*TBtu*)	0.24	1.28	5.91	19.2	40.3	72.7	109
Qualified Specialists							
Number of Qualified Specialists	–	–	–	27	89	177	300
Unique Plants Interacting Each Year with Qualified Specialists	–	–	–	13	43	85	667
Unique Plants Implementing Improvements Each Year	–	–	–	7	22	43	352
Annual Energy Savings from Qualified Specialists (*TBtu*)	–	–	–	0.17	0.77	3.30	8.42
Cumulative Energy Savings from Qualified Specialists (*TBtu*)	–	–	–	0.17	0.94	4.24	12.7
Sum of All Save Energy Now Areas							
Unique Plants Reached Each Year	554	1,109	5,095	11,076	10,469	6,614	3,216
Unique Plants Implementing Improvements Each Year	134	267	1,111	2,330	2,367	1,568	1,081
Annual Energy Savings (*TBtu*)	1.08	3.55	11.1	25.0	59.8	100	122
Cumulative Energy Savings (*TBtu*)	1.08	4.63	15.7	40.7	101	201	322
Energy Cost Savings (*B$*)	0.005	0.021	0.084	0.233	0.555	1.19	2.09
Carbon Reduction (*MMTCE*)	0.019	0.083	0.282	0.732	1.81	3.61	5.81

Method of Calculating Results for the Save Energy Now Initiative

IMPACTS

	2005	2006	2007	2008	2009	2010	2011
Large Plant Assessments							
Unique Plants Implementing Improvements Each Year	8	200	258	260	159	–	–
New Plant Replications	1	0	0	0	0	–	–
Annual Energy Savings from Large Plant Assessments (*TBtu*)	40.8	75.9	93.8	111	110	–	–
Cumulative Energy Savings from Large Plant Assessments (*TBtu*)	100	176	270	381	491	–	–
Training							
Unique Plants Reached Each Year	1,197	929	562	566	652	–	–
Unique Plants Implementing Improvements Each Year	599	282	171	172	198	–	–
Annual Energy Savings from Training (*TBtu*)	54.1	55.3	53.1	49.9	32.7	–	–
Cumulative Energy Savings from Training (*TBtu*)	196	251	304	354	387	–	–
Software Tools Distribution							
Unique Plants Reached Each Year	3,088	3,536	2,547	2,740	3,663	–	–
Unique Plants Implementing Improvements Each Year	618	477	344	370	495	–	–
Annual Energy Savings from Software (*TBtu*)	41.7	49.2	49.1	44.3	41.4	–	–
Cumulative Energy Savings from Software (*TBtu*)	150	200	249	293	334	–	–
Qualified Specialists							
Number of Qualified Specialists	351	443	613	431	415	–	–
Unique Plants Interacting Each Year with Qualified Specialists	844	1,084	1,150	913	1,064	–	–
Unique Plants Implementing Improvements Each Year	434	553	587	466	543	–	–
Annual Energy Savings from Qualified Specialists (*TBtu*)	14.9	22.3	28.8	34.5	39.8	–	–
Cumulative Energy Savings from Qualified Specialists (*TBtu*)	27.6	49.9	78.7	113	153	–	–
Sum of All Save Energy Now Areas							
Unique Plants Reached Each Year	5,138	5,749	4,517	4,479	5,538	–	–
Unique Plants Implementing Improvements Each Year	1,660	1,512	1,352	1,268	1,365	–	–
Annual Energy Savings (*TBtu*)	151	203	225	240	224	–	–
Cumulative Energy Savings (*TBtu*)	474	676	901	1,141	1,365	–	–
Energy Cost Savings (*B$*)	3.42	5.32	7.51	10.03	12.3	–	–
Carbon Reduction (*MMTCE*)	8.55	12.2	16.3	20.6	24.6	–	–