Climate Savers Computing Initiative (CSCI)
2010 Progress Report

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June 28 2010
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This white paper was produced by Natural Logic, Inc., under contract to the Climate Savers Computing Initiative, based on both data provided by CSCI and data gathered by NLI.
The opinions expressed in this white paper are solely those of Natural Logic, Inc.

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Climate Savers Computing Initiative (CSCI): 2009 Report on Progress Toward Goals

Natural Logic, Inc., June 2010

Overview

Climate Savers Computing Initiative (CSCI) began in mid-2007 with a mission to reduce global CO_2 emissions from the operation of computers by 54 million metric tons annually by 2010. This was to be accomplished by a 50 percent reduction in power consumption by computers by 2010, and was projected to save $5.5 billion in energy costs.

CSCI engaged Natural Logic, Inc., in 2009 to act as an independent third party to determine its progress toward its stated CO_2 reduction goals.

Natural Logic conducted research and developed a methodology for assessing both CSCI membership and worldwide progress, helped create a membership survey to gather necessary data, helped administer that survey, and performed analyses to determine membership and worldwide results. Only Natural Logic has access to individual member survey responses and, as designed, shares the results only in aggregate with CSCI.

This report explains the methodology that Natural Logic used in its assessment, and the results of CSCI membership and worldwide progress toward reducing CO_2 emissions from the operation of computers. Accompanying this report is an Excel workbook with more details about how the calculations were carried out, what data sources were used, and more results.

CSCI Strategy for Reducing CO_2 Emissions

CSCI's strategy for achieving its goals is to focus on increasing the manufacturing and purchasing of computers with more efficient power supply units (PSUs), and increasing the usage of power management features on computer systems. Organizations join CSCI and, as members, pledge to increase use of power management features across their existing and new computer systems, and to make new computer purchases that adhere to a schedule that increases the minimally acceptable PSU efficiency each year as they refresh their infrastructure.

It focuses on three main computer types: desktops, notebooks, and volume servers. (Note: the increasing usage of power management features was not applicable to volume servers at the time this assessment was conducted).

CSCI created a rating system for desktop and server systems that have associated minimum PSU efficiencies. For notebooks, CSCI has merely required that they be ENERGY STAR qualified; there is no CSCI rating system for notebooks.

Segments for Progress Assessment

There were two segments to the progress assessment conducted by Natural Logic: worldwide, and CSCI Membership.

It should be noted that CSCI's original goal of reducing CO_2 emissions from the operation of computers by 54 million metric tons annually by 2010 was in terms of worldwide changes, as

opposed to what was to be achieved by members of CSCI.

While CSCI can clearly claim to have impacted progress made by its membership that has pledged to make such changes, how much credit CSCI can take for impacting worldwide progress is not something Natural Logic can determine. The feedback that CSCI has gotten from PSU and computer manufacturers has been along the lines of, "If CSCI weren't putting such an emphasis on improving PSU efficiency, we wouldn't be making such changes." Based on such comments, changes made in the manufacturing and purchasing of more efficient computers worldwide is undoubtedly impacted by CSCI's activities, but it is impossible to ascertain to what extent. Rather than trying to quantify exactly how much credit CSCI can claim for worldwide progress, CSCI asked that the emphasis of our assessment for this overarching segment be on quantifying actual worldwide progress toward reducing CO_2 emissions since that is what ultimately matters to CSCI and its stakeholders.

CSCI Membership Progress

Here are the overview stats from the 2009 CSCI Membership Impact Tracking Survey:

Table 1 – Survey Stats

	Count	% of Members	% of Responses
Count of members that survey was sent to	477	100%	--
Count of survey responses	63	13%	100%
Subset of responses that included Desktop data	44	9%	70%
Subset of responses that included Laptop data	38	8%	60%
Subset of responses that included Server data	29	6%	46%

Table 1 shows that the survey was sent to 477 CSCI members, and the response rate was 13 percent. Furthermore, almost three quarters of respondents included data about their desktops, almost two-thirds included data about their notebooks, and less than half provided data about their servers. While not material to the overall results, membership results do not account for approximately 40 additional member company surveys obtained after the cut off date.

It should be noted that many of the members with the largest server fleets did not provide any detail about their servers, most likely due to the perceived proprietary and competitive nature of such information. This greatly limited our ability to reasonably assess membership progress for servers as well as overall.

Table 2 – Membership Progress Total Results (for 13% of membership respondents)

CSCI Program Year Membership Total kWh & CO2 Savings (CSCI program years run mid-year to mid-year, so different than calendar year)			
CSCI Program Year	Total kWh Saved per Program Yr	Total CO2 Saved per Program Yr (metric tons)	Annual CO2 Reduction Compared to Business as Usual (metric tons)
1st CSCI Program Year (7/1/07-6/30/08)	9,122,524	6,550	6,550
2nd CSCI Program Year (7/1/08-6/30/09)	16,119,960	11,574	18,124

Table 2 above shows the estimated total results that the survey respondents (13 percent of total CSCI membership) have achieved in their work to reduce electricity use and CO_2 emissions.

Table 3 – Membership Progress Total Results (scaled to 100% of membership)

CSCI Program Year Membership Total kWh & CO2 Savings (CSCI program years run mid-year to mid-year, so different than calendar year)			
CSCI Program Year	**Total kWh Saved per Program Yr**	**Total CO2 Saved per Program Yr (metric tons)**	**Annual CO2 Reduction Compared to Business as Usual (metric tons)**
1st CSCI Program Year (7/1/07-6/30/08)	69,070,539	49,593	49,593
2nd CSCI Program Year (7/1/08-6/30/09)	122,051,123	87,633	137,225

Table 3 above shows what the CSCI membership progress would be if we extrapolated the reports from the 13 percent that responded to the entire CSCI membership. Given that the total for the second program year is 87 thousand metric tons of CO_2, and CSCI's original goal was stated as 54 million metric tons by 2010, this would appear to be far from the goal at initial glance. But, again, CSCI's original goal was calculated in terms of worldwide progress, not just membership progress, so it is not a proper comparison.

Next, we look at membership progress by computer type, breaking it down into desktop, notebook, and server contributions.

Table 4 – Membership Progress By Computer Type (for 13% of membership respondents)

	CSCI 1st Program Year		CSCI 2nd Program Year		Total for Both Years	
	Electricity Saved	CO2 Saved	Electricity Saved	CO2 Saved	Total Electr Saved	Total CO2 Saved
Computer Type	**(kWh)**	**(Metric Tons)**	**(kWh)**	**(Metric Tons)**	**(kWh)**	**(Metric Tons)**
Desktops	3,047,567	2,188	9,668,451	6,942	12,716,018	9,130
Notebooks	6,073,185	4,361	5,388,073	3,869	11,461,258	8,229
Servers	1,772	1	1,063,435	764	1,065,208	765
Totals	9,122,524	6,550	16,119,960	11,574	25,242,484	18,124

Table 4 above contains the results for the 13 percent of members that responded to the survey. The most startling results are those for the servers. In the first CSCI program year, only one metric ton of CO_2 was saved. This, again, is due to the fact that so few members reported their server data on the survey, and also due to the fact that those who did report only added 30 servers during the first CSCI program year. Survey data for the second CSCI program year shows members having added over 6,000 servers, so this is the reason for the total jumping up significantly during the second year.

Table 5 – Membership Progress by Computer Type (scaled to 100% of membership)

	CSCI 1st Program Year		CSCI 2nd Program Year		Total for Both Years	
	Electricity Saved	CO2 Saved	Electricity Saved	CO2 Saved	Total Electr Saved	Total CO2 Saved
Computer Type	(kWh)	(Metric Tons)	(kWh)	(Metric Tons)	(kWh)	(Metric Tons)
Desktops	23,074,435	16,567	73,203,988	52,560	96,278,423	69,128
Notebooks	45,982,685	33,016	40,795,410	29,291	86,778,095	62,307
Servers	13,418	10	8,051,725	5,781	8,065,143	5,791
Totals	69,070,539	49,593	122,051,123	87,633	191,121,661	137,225

Table 5 above shows what the results would be if the results of the 13 percent of members who participated in the survey were scaled to 100 percent of the 477 CSCI members the survey was sent to. The total result is a projected savings of 137,225 metric tons of CO_2 for the two CSCI program years.

Worldwide Progress Results

Total results for worldwide progress can be seen in Table 6 below.

Table 6 – Total Worldwide Progress Results

CSCI Program Year	Total kWh Saved per Program Yr	Total CO2 Saved per Program Yr (metric tons)	Annual CO2 Reduction compared to business as usual (metric tons)
1st CSCI Program Year (7/1/07-6/30/08)	7,220,571,089	5,184,370	5,184,370
2nd CSCI Program Year (7/1/08-6/30/09)	17,747,773,305	12,742,901	17,927,271
3rd CSCI Program Year (7/1/09-6/30/10) - Projected	26,394,631,608	18,951,345	36,878,617

As shown in this table, we have estimated savings for the first two program years, and have also calculated a projection of savings for the current year underway. Comparing the projected savings of roughly 36.8 million metric tons of CO_2 for the current year to the original goal of 54 million metric tons, it can be seen that approximately 60-70% of the target will be achieved by the end of the year.

Desktops

Progress for desktop computers worldwide can be seen in the following two tables, which are based on new worldwide desktop system shipments:

Table 7 – Desktop Worldwide Progress by Calendar Year

Year	Annual kWh Saved CSCI Base PSU 80%	Annual kWh CSCI Bronze PSU 85%	Annual kWh CSCI Silver PSU 88%	Annual kWh CSCI Gold PSU 90%	Total kWh Saved	Total CO2 Saved (metric tons)
2007	2,081,654,905				2,081,654,905	1,494,628
2008	6,933,362,066	326,916,467			7,260,278,533	5,212,880
2009	11,242,311,689	1,857,834,227	673,495,179	363,923,752	14,137,564,848	10,150,772
2010		6,281,920,234	2,411,918,023	1,360,582,521	10,054,420,778	7,219,074
kWh Totals	20,257,328,660	8,466,670,927	3,085,413,202	1,724,506,274	33,533,919,063	
CO2 (m tons)	14,544,762	6,079,070	2,215,327	1,238,196		24,077,354

Table 8 – Desktop Worldwide Progress by CSCI Program Year

CSCI Program Year	Total kWh Saved per Program Yr	Total CO2 Saved per Program Yr (metric tons)	Annual CO2 Reduction compared to business as usual (metric tons)
1st CSCI Program Year (7/1/07-6/30/08)	4,670,966,719	3,353,754	3,353,754
2nd CSCI Program Year (7/1/08-6/30/09)	10,698,921,690	7,681,826	11,035,580
3rd CSCI Program Year (7/1/09-6/30/10) - Projected	12,095,992,813	8,684,923	19,720,503

Table 7 above shows a breakdown of kWh and metric tons of CO_2 saved by calendar year worldwide by customers buying desktop systems that meet CSCI rating categories. Since CSCI's program years run mid-year to mid-year, Table 8 contains a summary based on CSCI's program years (which uses averages of the calendar years).

While the annual total kWh saved by calendar year increases between 2007 and 2009, it can be seen that they are projected to decrease in 2010, due in part to desktop sales being projected to decrease.

It can be seen in Table 8 above that by the end of the most recent program year ended June 30, 2009, that annual desktop CO_2 savings are roughly 11 million metric tons, compared to CSCI's total goal of 54 million metric tons per year (for desktops, notebooks, and servers combined). The end of the third program year is estimated to reach about 19.7 million metric tons.

Given that CSCI's original goal was to decrease global CO_2 emissions by 54 million metric tons per year by the end of the 2010 CSCI program year, and that the desktop PCs make up a good portion of the market, this result equates to roughly 37% of the original goal. One reason is that there has been no significant change in the adoption of power management features on desktops worldwide. Our analysis initially used the conservative estimate made several years ago from the US EPA of power management being used on 10 percent[1] of all systems but this figure was scaled to 18% to reflect updated intelligence gathered through the assessment period-

The modest change in adoption of power management (which can result in kWh and CO_2 savings of around 55 percent of normal consumption), has limited the expected results. Also, if there had been a significant change in the use of power management, then it would make sense to try to quantify and include the savings that are achieved across the existing worldwide fleet of desktop systems (instead of just new shipments as we are currently doing), which would have a dramatic impact on the total.

Notebooks

Progress for notebook computers worldwide can be seen in the following two tables, which are based on new worldwide notebook system shipments:

[1] *Forrester: PC power management still not widespread in IT, despite recession*. Patrick Thibodeau, April 29, 2009. www.computerworld.com/s/article/9132338/Forrester_PC_power_management_still_not_widespread_in_IT_despite_recession

Table 9 – Notebook Worldwide Progress by Calendar Year

Year	Annual Total kWh Saved	Total CO2 Saved (metric tons)
2007	540,885,940	388,356
2008	2,662,319,592	1,911,545
2009	6,650,917,205	4,775,359
2010	13,007,767,375	9,339,577
kWh Totals	22,861,890,112	
CO2 (m tons)		16,414,837

Table 10 – Notebook Worldwide Progress by Program Year

CSCI Program Year	Total kWh Saved per Program Yr	Total CO2 Saved per Program Yr (metric tons)	Annual CO2 Reduction compared to business as usual (metric tons)
1st CSCI Program Year (7/1/07-6/30/08)	1,601,602,766	1,149,951	1,149,951
2nd CSCI Program Year (7/1/08-6/30/09)	4,656,618,399	3,343,452	4,493,403
3rd CSCI Program Year (7/1/09-6/30/10) - Projected	9,829,342,290	7,057,468	11,550,871

Table 10 above shows that by the end of the most recent program year (June 30, 2009), annual notebook CO_2 savings are roughly 4.5 million metric tons, compared to desktop savings of roughly 11 million, and CSCI's total goal of 54 million metric tons per year (for desktops, notebooks, and servers combined). The end of this program year is estimated to reach about 11.5 million metric tons.

The total number of systems shipped worldwide of desktop systems and notebook systems is comparable, so the difference in the CO_2 savings (4.5 million metric tons for notebooks versus 11 million metric tons for desktops) for the most recent program year is due to the fact that laptops have tended to have more efficient PSUs to begin with than desktop systems, and use far less electricity, so the savings are less for combination of both of these reasons.

The notebook worldwide contribution of saving 4.5 million metric tons CO_2 in contrast to CSCI's original goal of 54 million metric tons per year by 2010/2011 seems low. This is partly due to the more efficient PSUs and lower electricity consumption referenced above, and to the fact that notebooks are subject to the same slow market adoption of power management features as desktop systems. US EPA estimates that use of power management in laptops is comparable to its use in desktops, so our analysis uses the same estimate of 18% noted in the desktop section above.

The modest change in adoption of power management (which can result in kWh and CO_2 savings of around 55 percent of normal consumption), has significantly depressed the expected results. Also, if there had been a significant change in power management, then it would make sense to try to quantify and include the savings that are achieved across the existing worldwide fleet of notebook systems (instead of just new shipments as we are currently doing), which would have a dramatic impact on the total.

Servers

CSCI has decided to focus on *volume* servers, since these make up the vast majority of the server market and are the main contributors to CO_2 generated by servers. Progress for volume servers worldwide can be seen in the following two tables, which are based on new worldwide volume server system shipments:

Table 11 – Volume Server Worldwide Progress by Calendar Year

Year	Annual Total kWh Saved	Total CO2 Saved (metric tons)
2007	339,038,287	243,429
2008	1,556,964,921	1,117,901
2009	3,227,501,511	2,317,346
2010	5,711,091,500	4,100,564
kWh Totals	10,834,596,219	
CO2 (m tons)		7,779,240

Table 12 – Volume Server Worldwide Progress by Program Year

CSCI Program Year	Total kWh Saved per Program Yr	Total CO2 Saved per Program Yr (metric tons)	Annual CO2 Reduction compared to business as usual (metric tons)
1st CSCI Program Year (7/1/07-6/30/08)	948,001,604	680,665	680,665
2nd CSCI Program Year (7/1/08-6/30/09)	2,392,233,216	1,717,623	2,398,289
3rd CSCI Program Year (7/1/09-6/30/10) - Projected	4,469,296,506	3,208,955	5,607,243

It can be seen in Table 12 above that by the end of the most recent program year ended June 30, 2009, that annual volume server CO_2 savings are roughly 2.4 million metric tons, compared to desktop savings of roughly 11 million, notebook savings of around 4.5 million, and CSCI's total goal of 54 million metric tons per year by 2010 (for desktops, notebooks, and servers combined). The end of the next program year is estimated to reach about 5.6 million metric tons.

Perhaps it is surprising that volume servers would have the lowest savings when compared to desktops and notebooks worldwide. Given that these worldwide estimates are based on worldwide shipments, and volume server shipments worldwide are on the order of only 5 percent of worldwide desktop shipments, then this smaller contribution begins to make sense. Servers have also tended to have a baseline with a higher PSU efficiency than desktop systems since datacenter managers have been more likely to care about power consumption costs and there has been more market pressure for more efficient servers.

Conclusion

It appears that CSCI is on track to achieve roughly 60 to 70 percent of its original estimate of saving 54 million metric tons of CO_2 per program year by the end of its 2009 program year (July 2009 – June 2010). Since comprehensive data on the use of power management is not yet available, the power management deployment figures we used range from 10 percent (low estimate from EPA) to 18 percent (higher estimate from market analysis) for a combined average of consumer and commercial deployments, which accounts for the range of values.

Since CSCI's original estimate was based on an assumption that the use of power management features on desktops and notebooks would be in the range of 90 percent by the end of the 2010 program year, but the latest research shows it is only around 10 percent (22 percent at the most), this seems like the biggest cause of additional results being achieved – and may represent the biggest opportunity for CSCI in the future. To meet the 54 million metric ton reduction compared to business as usual, CSCI will need to increase adoption of higher efficiency equipment and further encourage broad scale usage of power management.

There is also a large measure of uncertainty in our estimates due to the challenges in finding solid data sources for PSU efficiencies, market mix, and electricity consumption. It may be the case that with more accurate data, the estimates contained in this report could change significantly.

In terms of gauging the progress of CSCI membership, future efforts would benefit from more engagement with members to encourage better participation in these surveys, including informing members well in advance (e.g. now) about what data they will be asked for, a longer lead time on the survey, and working to get the membership to share more detail about their server fleets since few have done so in this and the previous survey.

Appendix A: Progress Assessment Methodologies

This appendix contains further detail about the methodology that was used for assessing CSCI membership progress and worldwide progress towards CSCI's CO_2 emissions reduction goals.

Progress Assessment Methodology for Membership

Natural Logic helped create and administer the 2009 CSCI Membership Impact Tracking Survey that was conducted via the online survey tool, SurveyMonkey, during the month of August 2009. This was the mechanism used to obtain data from membership to gauge its progress. In response to feedback from the previous year's survey that it was challenging for members to collect data in preparation to fill out the online survey, Natural Logic also created an Excel workbook that was supplied to members that contained survey questions and data tables to help them collect and validate their data.

The progress that CSCI members have made toward reducing CO_2 emissions is judged in terms of changes they have made since joining CSCI. This was done by looking at a few "snapshots" at various times of each member's computer fleet (both total number and efficiency mix) and operations (use of power management).

The first snapshot was of the computer fleet and operations that were in place when the member first joined CSCI (which could be any time within CSCI's past two program years). The other snapshots are June 30, 2009, the end of CSCI's second program year, and June 30, 2008, the end of CSCI's first program year. If a member joined after June 30, 2008, then there is no end-of-first-year snapshot.

For each snapshot in time, the member provided detail about:

- Total number of each type of computer system in use
- The breakdown of their PSU efficiencies according to CSCI rating criteria (or purchase years for systems with other/unknown efficiencies in order to estimate efficiencies)
- The percentage of their fleet (desktops and notebooks) using power management features

This equated to members providing the following details in each snapshot for each type of computer system:

Desktops

- Total number of desktop systems in use at time of snapshot
- How many of the total number of desktop systems fell into each of these CSCI categories:
  - CSCI Gold (PSU 90%)
  - CSCI Silver (PSU 88%)
  - CSCI Bronze (PSU 85%)
  - CSCI Base (PSU 80%)
- For those desktop systems not accounted for in the CSCI ratings above (because the member was unable to identify their PSU efficiency or the efficiency fell below CSCI ratings), how many of the total number of desktop systems were purchased in the following years (because their efficiencies can be estimated based on this):

        - 2009
        - 2008
        - 2007
        - 2006
        - In or before 2005
    - What percentage of the total number of desktop systems had power management features enabled

Notebooks

- Total number of notebook systems in use at time of snapshot
- How many of the total number were ENERGY STAR qualified
- What percentage of the total number of notebook systems had power management features enabled

Servers

- Total number of server systems in use at time of snapshot
- How many of the total number of server systems fell into each of these CSCI categories (note that these differ from laptop ratings):
    - CSCI Gold (PSU 92%)
    - CSCI Silver (PSU 89%)
    - CSCI Bronze (PSU 85%)
- For those server systems not accounted for in the CSCI ratings above (because the member was unable to identify their PSU efficiency or the efficiency fell below CSCI ratings), how many of the total number of server systems were purchased in the following years (because their efficiencies can be estimated based on this):
    - 2009
    - 2008
    - 2007
    - 2006
    - In or before 2005

In an ideal world, each member would have been able to identify the PSU efficiency of every computer in their fleet and report those to CSCI. However, most members and their asset tracking systems do not track details such as the PSU efficiency of their computers. Therefore, since members agree to purchase new systems that meet the CSCI ratings, the survey was structured to ask members about their computer fleets in terms of the CSCI ratings since each rating has an associated PSU efficiency with it. But, realizing that members may have older systems purchased before joining CSCI (or even newer systems purchased after joining) that have lower or unknown efficiencies, and members may not have an easy way to determine their efficiencies, a compromise was used to get some idea of their efficiencies. Members were asked to provide the purchase years of these systems with other/unknown efficiencies so that we could then use estimates of their efficiency based on the purchase year. This was done to remove the burden from members of trying to identify the efficiency of every computer in their fleet and, hopefully increase survey participation. Even providing this level of detail (purchase year) proved challenging for some members, but is a level of detail that most asset tracking systems do track.

With the snapshot of the member's computer fleet when they joined, additions and subtractions from that original snapshot were calculated based on the snapshots at the end of the first and second CSCI program years.

For new additions to the fleet that met CSCI ratings, members were given credit for the amount of energy savings that resulted from the more efficient PSU as compared to a typical system available in 2007. The amount of credit is also based on the number of months the system has been in place (with the assumption that the system was in place half of the remaining time in the program year they joined, in addition to the full program year if they joined before the beginning of the second program year). For systems that fell into the other/unknown category for which purchase year data was provided, members were given credit for the difference between the average efficiency for the year of purchase and the efficiency of a typical system available in 2007. Again, this latter calculation is an estimate in the absence of the ability to reasonably collect more precise efficiency information from members.

For desktop and laptop systems that can use power management (as opposed to servers that cannot), members were given credit for increases made to the percentage of their fleet using power management compared to their baseline for their entire existing computer fleet. And, they were given full credit (not just the increase compared to baseline) of power management deployed on newly added systems.

Progress Assessment Methodology for Worldwide

Worldwide progress is judged in terms of the increasing PSU efficiency of the computer systems that have been shipping since 2007 when CSCI began, as compared to the efficiency of a typical system available in 2007 (the assumption is that CSCI has had a role in increasing the efficiency of PSUs since its beginning, even though the exact extent of this cannot be determined). This depends on knowing the actual or estimated number of units shipped worldwide for each year, knowing the market mix of PSU efficiencies for each of those years (e.g. what percentage of total shipments fell within each CSCI rating category; Gold, Silver, Bronze, etc.), and knowing the associated average electricity use of each system. The computer system shipment data was easily obtained from an IDC tracking and forecast report dated April 2009 and from IDC Quarterly Shipment Tracker dated December 2009. The market mix of PSU efficiencies for each year has been far more difficult to obtain.

Obtaining the market mix PSU efficiency data was difficult because few industry analysts research or track this information, and the PSU and computer manufacturers regard this as very sensitive and competitive information that they do not want to release publicly. It took a lot of work on the part of the CSCI Executive Director to convince a few manufacturers to provide even basic information so that reasonable estimates of the market mix could be assembled.

Natural Logic also reviewed public and private research to assess incremental adoption rates of power management. There simply was no broad scale publicly available research available, nor any private samples that could be obtained, so a Delphi method was established in order to estimate adoption rates. Analysis included review of recent public research (e.g., limited sample size research), interviews of industry expert analysts and power management companies, and CSCI member company deployment rates. Third party analysts covering power management reviewed the estimated adoption rates to gauge its appropriateness. The resultant adoption rates used in the final model are stated below based on a combined segmentation of commercial and consumer users.

Power Management

- Commercial adoption
  - 2007 - 10%
  - 2008 - 15%
  - 2009 - 20%
  - 2010 - 25%
- Consumer adoption
  - 2007 - 10%
  - 2008 - 12.5%
  - 2009 - 15%
  - 2010 - 17.5%
- Average Commercial/Consumer adoption based on shipment mix
  - 2007 - 10%
  - 2008 - 14%
  - 2009 - 18%
  - 2010 - 22%

We took what data we were able to collect and made reasonable assumptions and extrapolations to fill in the holes. The Excel workbook that accompanies this report contains more detail about data sources, assumptions, extrapolations, and calculations. Please refer to it for more detail.