80 PLUS PERSONAL COMPUTER POWER SUPPLIES

Market Progress Evaluation Report

PREPARED BY

Quantec

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Final Report

Market Progress and Evaluation Report One: 80 PLUS Personal Computer Power Supplies

Prepared for:
The Northwest Energy Efficiency Alliance

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Executive Summary

The 80 PLUS program has created a unique forum that is uniting electric utilities, the computer industry, and consumers in an effort to bring energy efficient power supplies to desktop computers and servers. The 80 PLUS performance specification requires power supplies in computers and servers to be 80% or greater energy efficient at 20%, 50% and 100% of rated load with a true power factor of 0.9 or greater. Power supply manufacturers of certified units may receive a $5 buy-down for desktop units and a $10 buy-down for servers. The buy-down is processed through the 80 PLUS program, and may be applied for once a unit's purchase has been confirmed. Certification of power supplies is conducted by the Electric Power Research Institute (EPRI). Manufacturers pay a $400 fee for each model that is tested, refunded by 80 PLUS upon certification.

The Northwest Energy Efficiency Alliance (NEEA) has contracted with Quantec, LLC (Quantec) to evaluate the 80 PLUS program. This is the first of two Market Progress Evaluation Reports (MPERs), and relies on 30 interviews with key market actors, including NEEA, Ecos 80 PLUS implementation staff, participating and non-participating power supply manufacturers, participating and non-participating system integrators, Environmental Protection Agency (EPA) staff, and additional program sponsors.

The program currently (through July 2006) has 12 sponsors, including utilities, non-profit utility consortiums, and government agencies. A total of 19 power supply manufacturers have submitted 80 PLUS qualified power supply units, with a total of 35 units now certified. The 19 participating power supply manufacturers include the top four (ranked by number of units sold). In addition, ten system integrators have committed to promoting 80 PLUS PCs.

Sales have been well below forecasted goals. The original goals for 2006 projected the number of shipments to be greater than 200,000 units (approximately 17% of market share). The forecast was revised downward in the spring of 2006, but actual shipments through June 2006 still remained far short of the projections: total revised estimated sales were 6,671, but actual 2006 sales were only 1,331 (approximately 1% of market share).

A combination of factors have contributed to the gap between this goal and actual shipments, including underestimation of the effort required to increase market demand, the initial price difference, the time required to integrate 80 PLUS power supplies into new systems, and the time required to develop and test a new power supply. In addition the program was relying on the announcement of a new ENERGY STAR computer specification in September of 2006 to help drive demand. It is now expected to be announced by November 2006, with an effective date of July 2007. The original forecasts were clearly overly ambitious and underestimated the amount of time it would take to transform the market.

One large OEM has expressed its interest in offering 80 PLUS systems in 2007. 80 PLUS and NEEA staff believe that other larger market actors will likely follow suit. Such an announcement by one or two large market share actors could dramatically increase the number of orders for compliant units.

Shipments in the Northwest far exceeded other areas of the country: through June 2006 a total of 1,731 80 PLUS units were shipped (400 units sold in 2005), 1,580 (91%) to the Northwest and only 151 (9%) to other areas of the country. The area with the second highest number of shipments was Illinois (65 units).

The 80 PLUS program was instrumental in getting active power supplies into the proposed revision for the ENERGY STAR computer specifications. Without the establishment of third-party testing procedures (by 80 PLUS) and a demonstration that existing technologies were capable of the desired efficiency levels, discussions among industry members regarding efficient power supplies would not have even taken place.

The evaluation examined progress on a number of other indicators as well. For example, the cost differential for 80 PLUS qualified power supplies versus standard power supplies was perceived to have decreased by a number of power supply manufacturers and system integrators, but was still perceived as an important market barrier. Although respondents provided a wide variety of responses, most respondents, including system integrators and power supply manufacturers, estimated the incremental cost to be between $10 and $20.

Several respondents reported that consumer awareness was minimal and that the 80 PLUS Program needs to increase consumer awareness of efficient power supplies. Awareness is also likely to increase through participant marketing. For example, some of the power supply manufacturers and system integrators promoting 80 PLUS systems are taking advantage of the energy savings to market their systems as more “environmentally friendly” than comparable systems.

Interviewees also uniformly acknowledged that there are non-energy benefits associated with 80 PLUS power supplies. Non-energy benefits include: power factor correction, reduced heat, lower maintenance costs, increased system longevity, smaller design size. To some customers the non-energy benefits will actually outweigh, in terms of importance, the energy savings. However, the value of non-energy benefits really will vary by customer.

Conclusions

Sales are significantly behind goals, but could grow substantially depending on circumstances. Although sales are behind original estimates, the progress indicators clearly indicate an increasing supply of participating SIs and power supply manufacturers, additional qualified products, decreasing incremental cost, and an increase in sales. In addition, the release of the new computer ENERGY STAR specification in July 2007 and the anticipated participation of at least one major OEM is expected to substantially increase sales of 80 PLUS computers.

The participation of NEEA has been instrumental in the success of the 80 PLUS initiative. NEEA was the first program sponsor for the 80 PLUS initiative, an important milestone in demonstrating to other potential sponsors that the initiative should earn the backing of recognized energy efficiency efforts. NEEA also assisted ECOS with the start up costs to get the project off the ground. The early participation of NEEA is also one of the reasons sales in the Northwest far surpass those of other regions in the U.S.

80 PLUS has had a clear influence on the proposed ENERGY STAR specifications. The EPA was able to demonstrate, because of the 80 PLUS initiative, that qualifying power supplies were becoming increasingly available and decreasing in price.

The estimated incremental cost of 80 PLUS power supplies varies substantially, but on average is probably about $15, higher than the estimated cost of $5. The incremental cost is likely to drop sharply over the next few years as 80 PLUS power supplies become more mainstream, but for now the estimated incremental cost of $5 is most likely below the actual incremental cost.

Non-energy benefits vary in importance depending on the market actor. Some benefits, like improved power factor correction, reduced heat, reduced noise levels, and smaller size are clearly documented, while others, like potential reduced system maintenance and increased longevity of the system are less predictable.

Recommendations

The Program implementer and sponsors should focus on driving end-user demand. The 80 PLUS program, therefore, needs to adopt a more formal "push" and "pull" strategy to not only increase supply, but also drive demand.

Consider cooperative advertising, especially if reimbursement tracking becomes burdensome. Cooperative advertising (matching manufacturer advertising) can be done initially in conjunction with the current manufacturer incentive per unit mechanism, and could potentially replace the current structure, particularly if the reimbursement tracking becomes difficult.

Closely track market share and, if necessary, consider a 90 PLUS certification. Program implementers and sponsors need to closely track market share to determine when the market has exceeded the "tipping point" and saturation levels are high enough to raise the efficiency standard once again.

Acknowledge that the estimated incremental cost is over $5, and increase the cost differential in the cost-effectiveness models. Adjusting the incremental cost estimate – in both program communications and the program cost-effectiveness model – to a current range of $10 to $20 would more fairly reflect current market conditions.

Work with system integrators and power supply manufacturers to establish methods for lowering the incremental cost. Power supply manufacturers can be assisted with strategies for either licensing or developing, "bottom up," more efficient power supplies that cost less than simply retrofitting existing units.

Consider developing efficiency standards for other consumer electronics equipment. The 80 PLUS program has the infrastructure in place to expand outside of computer power supplies and include other applications that use power supplies.

1. Introduction

ECOS consulting designed the 80 PLUS initiative to drive commercial market adoption of energy efficient power supplies for desktop computers and servers. The 80 PLUS performance specification requires power supplies in computers and servers to be 80% or greater energy efficient at 20%, 50% and 100% of rated load with a true power factor of 0.9 or greater. This makes an 80 PLUS-certified power supply substantially more efficient than current power supplies and creates a unique market differentiation opportunity for power supply and computer manufacturers.

The Northwest Energy Efficiency Alliance (NEEA) has contracted with Quantec, LLC (Quantec) to evaluate the 80 PLUS program. This is the first of two Market Progress Evaluation Reports (MPERs), and relies on interviews with a number of key market actors, including NEEA, Ecos 80 PLUS implementation staff, participating and non-participating power supply manufacturers, participating and non-participating system integrators, Environmental Protection Agency (EPA) staff, and additional program sponsors. This evaluation includes the following major components:

Chapter 2 - Methodology: Provides details regarding the methodology for this report.

Chapter 3 - Market Characterization: Characterizes the PC power supply market.

Chapter 4 – Market Progress Assessment: Documents project accomplishments in relation to progress indicators, barriers, and drivers.

Chapter 5 - Cost effectiveness model review: Assesses the working assumptions/inputs for the Alliance Cost Effectiveness (ACE) model.

Chapter 6 - Conclusions and Recommendations

The second MPER will be completed in early 2007 and will include an update to this report, as well as interviews with end-users and computer original equipment manufacturers (OEMs).

Program History

The concept of promoting a more energy efficient power supply for personal computers started before 2002. Chris Calwell of Ecos Consulting began making inquiries within the industry to the manufacturers of power supply and computer systems, and among energy efficiency advocates. The power supply was identified as an opportunity as new technological adaptations to power supplies had not changed as rapidly as other computer components. Power systems could also be more readily isolated from other computer components “within the box.”

Calwell recalled that international stakeholders came together in January 2002 to explore the possibility of promoting better standards for power supplies. The California Energy Commission, PG&E, and ENERGY STAR® all contributed to a study to develop a standard methodology to test power supplies. The state of California hired Ecos and the Electric Power Research Institute to jointly perform the study. Intel also played a role in performing some of the initial tests. The need for third-party objectivity and the development of such a test was important. Members of

the industry were skeptical that such a level of efficiency could be achieved at each of the desired power levels.

80 PLUS was officially launched in the spring of 2004. At that time, only one prototype power supply was available. Early program goals included starting a dialog with larger, or "Tier One," power supply manufacturers who could potentially be engaged. Initial program goals also included increasing the number of participating power supply manufacturers to increase the number of certified units available. Recruiting program sponsors became the next big step.

As of June 2006, Ecos Consulting reported that there were 35 certified power supplies on the market. Approximately 20 more were waiting for Electric Power Research Institute (EPRI) certification. Manufacturers pay a $400 fee for each model that is tested. 80 PLUS refunds the fee for each unit that is certified.

The 80 PLUS program has conducted outreach to both system integrators and OEMs. As referenced elsewhere in this report, the system integrators were among the first groups to respond. In some cases, system integrators may have smaller existing standing orders and shorter lead times necessary to adopt new products than market actors that operate in larger volumes (such as the OEMs).

The program is funded through sponsoring organizations, including utilities, non-profit utility consortiums, and government agencies. The sponsors pay an initial fee of $5,000 plus one cent per electric meter, then pay $8.35 ($5 incentive plus a $3.35 administration fee) for each 80 PLUS qualified PC shipped in their service territories.[1] NEEA was the first sponsor, and as of July 2006 there were a total of 12 program sponsors.

Today, 80 PLUS is managed by a six person team at Ecos Consulting in Portland, OR. The team's senior manager began working at Ecos in mid-2005. Most of his colleagues have similarly been working with the program for less than a year. Ecos expanded this staff in order to more regularly communicate with program sponsors, and to recruit and manage additional sponsors.

The Sponsor Manager is in charge of regular communications with sponsor organizations. Two recent changes have been introduced to facilitate communication with sponsors. The program launched a new monthly electronic newsletter called "Plugged In" in July 2006. Sponsors are also able to sign in to the Web site for more automated updates and current information.

Program Logic and Progress Indicators

The 80 PLUS Program seeks to develop strategies and activities to mitigate key market barriers to the adoption of efficient computer power supplies. A summary of these barriers, strategies and activities, and short term and long term outcomes (progress indicators), by market actor, is

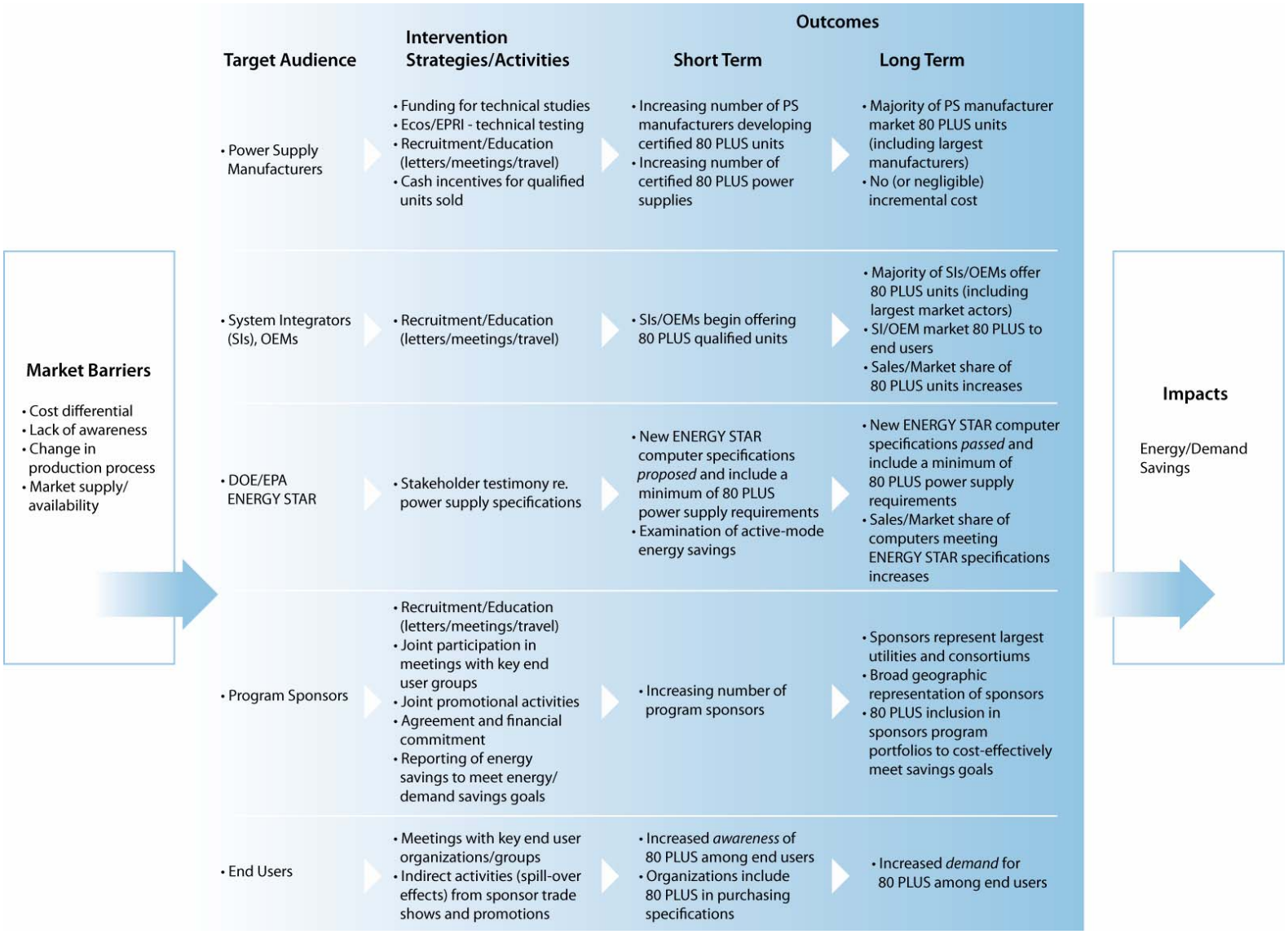
[1] Incentives for servers are $10.

presented in Figure 1.[2] As demonstrated in the diagram, the program has adopted a multifaceted approach to promoting efficient power supplies by targeting all the primary market actor groups. Key strategies have included:

- Reducing the incremental cost and increasing supply of efficient power supplies by offering buy-downs to power supply manufacturers;
- Aggressively recruiting, though ongoing meetings and communications, SIs and OEMs to carry and promote 80 PLUS computers;
- Providing supporting evidence and testimony so that the revised ENERGY STAR computer specifications will include a minimum of 80 PLUS requirements;
- Increasing the number of program sponsor to help promote 80 PLUS to customers within their service territories; and
- Meeting with key commercial sector end user organizations to educate them about the energy and non-energy benefits of 80 PLUS.

[2] This logic model was developed by Quantec as part of the current evaluation. It is meant to provide a brief overview of program strategies/activities and outcomes.

Figure 1. Program Logic Model and Progress Indicators



2. Evaluation Methodology

Data and assessments included in this report were collected through first-person interviews and were supplemented by secondary research methods. Interviews with the Northwest Energy Efficiency Alliance (NEEA) and the 80 PLUS team at Ecos Consulting were primarily conducted in person. Other interviews were completed via telephone.

Interviews were conducted between June 14 and July 24, 2006. In total, 30 respondents participated in interviews, including staff from NEEA, Ecos Consulting, participating and non-participating power supply manufacturers, participating and non-participating system integrators, EPA staff, and additional program sponsors (Table 1).[3] A complete list of interviews by organization name and date is included in Appendix A.[4]

Table 1. Summary of Completed Interviews[5]

Organization	# Respondents
Northwest Energy Efficiency Alliance	2
80 PLUS Implementation Team (Ecos Consulting)	7
Participant power supply manufacturers	5
Non-participant power supply manufacturers	4
Participant system integrators	5
Non-participant system integrators	3
EPA Staff	2
Program Sponsors	2
Total Respondents	*30*

Customized interview guides were developed for each market actor group and reviewed by NEEA. The final survey instruments are included in Appendix B.

Contact information for the program participants was provided by the 80 PLUS implementation team. To locate non-participant subjects, Quantec relied upon suggestions from the 80 PLUS implementation team, other interviewees, and web-based research. Market information was also provided by Mohan Mankikar of Micro-Tech Consultants, publisher of Power Electronics Industry News.

[3] Note that a number of the Ecos respondents participated in a single interview.

[4] Due to the regional focus of system integrators, an effort was made to speak to Northwest-based system integrators. However, due to small sample sizes, two of the five participating SI respondents and one of the non-participating SI respondents were based outside the Northwest.

[5] A "participant" is a company with an 80 PLUS certified product currently on the market and/or a company that has submitted a unit for certification.

3. Market Characterization

This section reports findings regarding the size and dynamics of the power supply market, plus market barriers and market drivers for efficient power supplies.[6]

Market Characteristics

Power supplies for personal computers are available in a wide range of options, and vary in price from less than $30 to $150 or more, depending on the amount of power to be generated and the level of associated features. Power supplies are located in a large variety of electronic equipment beyond personal computers, from televisions to cellular phones to cash registers. This section examines the primary market actors, distribution channels, and size of the market for computer power supplies.

Market Actors

There are a number of critical market actors on the supply and demand chain for computer power supplies. To clarify the nomenclature used in this report, the primary market actors include:

System Integrators (SIs): These companies purchase parts from other manufacturers to assemble computers, typically for commercial applications. System integrators are also referred to as computer manufacturers (as on the 80 PLUS Web page), although they normally do not manufacture their own parts.[7]

Power Supply Manufacturers: These companies manufacture the power supplies for personal computers (PCs), servers, and other electronic equipment. The manufacturing facilities are typically based in Asia with U.S. sales/distribution offices.

Computer Original Equipment Manufacturers (OEMs): Companies that manufacture computers or servers in high volume are referred to as OEMs. These companies include popular brands such as Dell, Hewlett Packard (HP), and Gateway.[8]

End-Use Customers: Commercial, industrial, or residential customers that purchase computer products.

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6 Note the second MPER will include further investigation on the characteristics of the power supply market..

7 Some larger SIs, however, do have their own manufacturing plants.

8 Note that the second MPER will include data collection from OEMs and end-use customers.

Distribution Channels

The OEMs dominate the computer market, with shipments representing 69.8% of 2005 units and 64.6% of 2004 units (Table 2). In fact two OEMs, Dell and HP, represented over half of all shipments in both 2005 and 2004. The SIs represent a smaller, yet significant portion of the market (30.2% in 2005).

Table 2. Annual U.S. PC Shipments by Vendor, 2004-2005

Vendor	2005 Shipments (Thousands)	Market Share	2004 Shipments (Thousands)	Market Share	Growth 2005/2004
Dell	21,466	33.5%	19,296	33.1%	11.2%
Hewlett Packard	12,452	19.4%	11,602	19.9%	7.3%
Gateway	3,924	6.1%	2,950	5.1%	33.0%
Apple	2,554	4.0%	1,935	3.3%	32.0%
Toshiba	2,260	3.5%	1,862	3.2%	21.4%
Lenovo	2,075	3.2%	0	0.0%	N/A
Others	19,357	30.2%	20,640	35.4%	-6.2%
All Vendors	64,089	100.0%	58,285	100.0%	10.0%

Source: IDC, January 18, 2006 http://www.idc.com/getdoc.jsp?containerId=prUS20051406. Unit shipments in thousands. Includes both commercial and residential use.

Size of Pacific Northwest Market

The global personal computer and PC power supply markets have continued to grow over the last several years. As shown above, approximately 64 million personal computers were shipped in the U.S. in 2005, up 10% from the previous year.

One industry expert estimated that the Pacific Northwest market for personal computer power supplies (both laptops and desktops) is roughly five percent (5%) of the U.S. market.[9] The 80 PLUS team uses a lower estimate of 4.1%, which is based on the relative proportion of the Northwest population to the overall U.S. population. For example, the 2006 U.S. population is approximately 298,217,000 people (based on a projection derived from the 2000 Census), while the population of the states of Oregon, Washington, Idaho, and Montana is approximately 12,269,000. The resulting proportion is 4.1%.

Because most laptops use external power supplies, the market for 80 PLUS is limited to the internal power supplies found in desktop PCs. An earlier Quantec study estimated that in 2003,

[9] Mohan Mankikar, President, Micro-Tech Consultants, July 2006. Mr. Mankikar speculated that this percentage could be as high as 7%.

27.5% of all computers sold were laptops.[10] NEEA used this value in its estimate for 2004 through 2008 sales. The trend from 2001 through 2003, however, found an increasing number of laptops sold (and thus a decreasing number of desktops); the NEEA estimate may therefore overestimate the number of desktop PCs sold.[11] In addition, NEEA has estimated that approximately 61.8% of all PCs shipped are for commercial applications.

Assuming that 64,089,000 PCs were shipped in the U.S. in 2005, and that 4.1% of them were sold in the Northwest, 27.5% were desktop PCs, and 61.8% were for commercial applications, the power supply market for desktop PCs in commercial applications in 2005 was approximately 1.2 million units.

[10] Quantec, LLC, "Surveyor Network Energy Manager: Market Progress Evaluation Report #2," January 2005, Prepared for the Northwest Energy Efficiency Alliance.

[11] Potential revisions to these figures are presented in the review of the Alliance Cost Effectiveness Model (Section 5)

4. Market Progress Assessment

This section assesses the progress of the 80 PLUS initiative as measured by progress indicators (short-term and long-term outcomes) presented in the logic model. The indicators, introduced above in the logic model, are summarized below in Table 3.

Table 3. Summary of Market Progress Indicators

Category	Indicator	Market Progress
Availability	Certified power supply units	35
Availability	Power supply units being tested for certification	20
Availability/Participation	PS manufacturing firms with certified units	19
Availability/Participation	Participating System Integrators	10
Availability/Participation	Computer OEMs with certified units	0
Participation	Number of 80 PLUS Program Sponsors	12
Sales/Market share	Sales of 80 PLUS PCs	Increasing but below goals
ENERGY STAR Specification	80 PLUS specifications included in revised ES computer specifications	Pending
Incremental Cost	Decreasing incremental cost	Decreasing from initial estimates
Awareness	Promotion of 80 PLUS by PS Manufacturers and SIs	Increasing
Awareness	End-users aware of 80 PLUS	Just developing
Perceived Value	End-users value and request 80 PLUS (e.g., in purchasing specs)	Just developing

Availability/Participation

Table 3 provides a summary of some important market progress indicators related to availability and program participation. These indicators generally measure the number of certified units on the market, and include items such as the number of different certified models, the number of manufacturers producing certified units, and the number of units that are currently being tested. This table will be updated for the second Market Progress and Evaluation Report due in February 2007.

Another important indicator is the market share represented by participating power supply manufacturers and system integrators. The 19 participating power supply manufacturers include the top four (ranked by number of units sold). One Program implementer estimated that these power supply manufacturers represent “at least 50%” of the PC desktop power supply market. It is also interesting to note the apparent acceleration in the number of participants – in January 2006, there were 12 participating power supply manufacturers, and by July 2006 there were 19. In terms of the system integrators, Ecos staff also estimated that the participating Northwest SIs represent up to10% of all Northwest computer sales. In addition, the 12 program sponsors now represent utilities and non-profits from a wide geographic representation throughout the United States.

Market Supply

Initially, supply of 80 PLUS qualified power supplies was a true concern. For example, in early 2005 Dell evaluated two 80 PLUS suppliers.[12] One of the suppliers' units was in the prototype phase, and was not yet ready for mass-production. The other vendor did have a complete unit, ready for mass-production, although critical differences between the electrical specification and Dell's requirements made it a technically unviable option.

Similarly, one responding system integrator reported waiting several months before they were able to obtain the 80 PLUS power supplies and build units. The manufacturer that supplied this system integrator acknowledged that the company had difficulty meeting their total customer orders in 2005. One factor that contributed to their delay, they reported, was the wait for final EPRI approval on some of their supplies. However, according to the same system integrator, supply no longer appears to be a significant issue. He added that they were shipping about 1,500 80 PLUS units a month as of June 2006 with approximately 120 units (or 8%) going to Northwest customers.

Now that there are 55 power supply units currently certified or being tested for certification, and 19 manufacturers of 80 Plus units, computer manufacturers and system integrators should no longer face a general supply issue. However, for system integrators or OEMs that are still purchasing from a power supply manufacturer that does not offer 80 PLUS units, product supply may still be a perceived barrier, and switching to a new power supply vendor that offers 80 PLUS could be a time consuming process. Should demand for 80 PLUS increase sharply, supply could become a temporary barrier, but with the largest power supply manufacturers participating in the Program any shortage presumably would be temporary.

Importance of the 80 PLUS Buy-down

In an effort to drive availability and participation, the program offers power supply manufacturers of certified units a $5 buy-down for desktop units and a $10 buy-down for servers. The buy-down is processed through the 80 PLUS program, and may be applied for once a unit's purchase has been confirmed. The general impression derived from asking respondents about the buy-down was that, while positive, it was a limited market driver. "Money is always good, of course if it were more that would be better," stated one respondent.

A number of respondents stated that $5 isn't enough of an incentive. As stated above, their cost difference is closer to $10 to $20. The $5 incentive may not even by enough of a motivator for some power supply manufacturers to complete the paperwork, as one program sponsor stated that he occasionally makes phone calls to power supply manufacturers to remind them to send in their paper work so he can process their buy-down checks.

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[12] http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/computer/Industry_Power_Supply_Slides.pdf

One system integrator also stated that he believed the buy-down was "difficult to validate." The validation process requires reporting the zip code where the purchase took place and confirming that this is in an area where the buy-down is available.[13]

Sales/Market Share

According to one member of the 80 PLUS team, 1,580 80 PLUS units had been shipped in the Pacific Northwest through June 30, 2006. Computer Technology Link (CTL) in Portland, OR and Alden Associates in Redmond, WA shipped almost all of these units, as shown in Table 4. Premio Computers is located in California.

Table 4. 80 PLUS Power Supply Shipments by System Integrator

System Integrator	NW 80 PLUS Units Shipped To Date*
Computer Technology Link	976
Alden Associates	601
Premio Computers	3
Total	*1,580*

* Through June 30, 2006
Source: Ecos Consulting

The Northwest stands out as a region in terms of the number of units shipped. Compared to the 1,580 units that have been shipped in the NW through June 30, 2006, only 151 qualified units were shipped in the rest of the country during the same time period (Table 5). This may be attributed in part to the fact that the first program sponsor – NEEA – is located in the Northwest, and NEEA has been one of the most active sponsors in terms of promoting 80 PLUS. NEEA was able to assist ECOS with the start up costs to get the project off the ground. NEEA assistance provided important development funds for Ecos to more aggressively market 80 PLUS, another contributing factor to higher sales in the Northwest.

To date, the 80 PLUS initiative has fallen short of its 2006 unit shipment goals The original goals for 2006 projected the number of shipments to be greater than 200,000 units. The forecast was revised downward in the spring of 2006, but actual shipments through June still remained far short of the projections: the revised sales forecast for January through June was 6,671 units, but actual sales were only 1,331 (Table 5). Sales for the second half of 2006 are forecasted at 105,700 units; in July and August 2006, however, only 682 units had been sold.

[13] Note that due to confidentiality concerns 80 PLUS does not request information, other than the zip code, on who purchased the units. Thus the number and type of customers purchasing 80 PLUS PCs was unavailable.

Table 5. Projected and Actual Sales

Sales (# units)	2005	2006	
		Jan-June	July-Dec
Original Forecast	70,000	12,462	212,448
Revised projection/forecast	N/A	6,671	105,700
Actual Total Sales (Total)	400	1,331	N/A
Northwest	395	1,185	N/A
Illinois	0	65	N/A
Nebraska	0	30	N/A
California	2	28	N/A
Other States	3	23	N/A

Source: Ecos Consulting

A combination of factors have contributed to the gap between this goal and actual shipments, including underestimation of:

- The effort required to increase market demand
- Short-term incremental cost
- Time required to integrate 80 PLUS power supplies into new systems. (One observer stated that there is a popular misconception regarding high tech companies; while they are generally perceived to be a "nimble" industry, high tech companies may require significant lead times of 12 months or more to test and introduce new products).
- Time required to develop and test a new power supply. (Two manufacturers reported that the time between the corporate decision to pursue 80 PLUS and obtaining successful testing results at EPRI was longer than one year. This timeframe includes initial failing of the test and retesting).

The implementation team is optimistic about the Program's accomplishments, particularly in light of possible partnerships to be announced in 2007. According to program staff, one large OEM has expressed its interest in offering 80 PLUS systems in 2007 and other larger market actors will likely follow suit. Such an announcement by one or two large market share actors could dramatically increase the number of orders for compliant units.

ENERGY STAR Computer Specification

One of the goals of the 80 PLUS program has been to influence the EPA to adopt – at a minimum – the 80 PLUS requirements into the revised ENERGY STAR specifications for PCs. The EPA has hosted a series of meetings with computer industry stakeholders in order to solicit feedback on proposed changes, with attendees including industry leaders such as Apple, Dell, Hewlett Packard, Intel, and Sun Microsystems. The EPA has signaled to the industry that the 80 PLUS specifications will be adopted as part of the ENERGY STAR program, with final

specifications to be released by November 2006 and to take effect by July 2007.[14] When implemented, this update will effectively adopt the 80 PLUS standards.

This will be the first ENERGY STAR specification that is not dependent upon the operational mode of the personal computer to be effective. ENERGY STAR specifications currently refer to the prescribed actions while a computer is in "sleep mode." One EPA staff person pointed out the significance of this change. End-user behavior does not impact the end result.

Interview participants were asked their opinion about the likely impact of the new specifications. They all generally agreed that the new specifications will have a positive impact on power supply efficiencies. A few respondents further elaborated that the changes will "open the door" to future specifications related to operational mode in other consumer electronics.

The speed with which the future ENERGY STAR specifications will be adopted remains open to question. A small number of participants stated that the new ENERGY STAR specifications by themselves won't change the availability of compliant power supplies. "There will still be plenty of power supplies out there that aren't 80 PLUS compliant," stated one non-participant. "The [ENERGY STAR] program makes it recommended, not mandatory."

One manufacturer has indicated its intention to have all of their power supplies be 80 PLUS compliant. An industry observer reported that the anticipation of the new ENERGY STAR specification alone is driving the market to more efficient power supplies, noting that "By the time the new spec becomes effective, >80% efficient Power Supply Unit (PSUs) should be much more common than they are now. With enough demand, high efficiency PSU components will also become less expensive as economies of scale slide up."[15]

One Program sponsor was critical of the slow pace with which power supply manufacturers and computer OEMs have adopted 80 PLUS machines. However, she felt this will change following the new specifications. She further commented that the standard for power supplies would have eventually changed "if not for 80 PLUS" but that it would have taken a lot longer.

Two other Program sponsors were much more direct in attributing the anticipated change in EPA specifications to 80 PLUS. Senior staff at EPA likewise acknowledged the important role that 80 PLUS played, particularly with respect to the initial systems testing that was conducted in conjunction with EPRI. Without the establishment of third-party testing procedures (by 80 PLUS) and a demonstration that existing technologies were capable of the desired efficiency levels, discussions among industry members regarding efficient power supplies would not have even taken place. According to this EPA staff member, "the 80 PLUS program was highly influential in setting the new specifications, offering a turnkey solution, a coherent message with the needed backup data." EPA also acknowledges the important promotional role that the 80 PLUS team has played.

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[14] Further details about the upcoming changes may be found on the ENERGY STAR webpage - http://www.energystar.gov/index.cfm?c=revisions.computer_spec.

[15] Mike Chin, The Silent Front. March 21, 2005. http://www.silentpcreview.com/article227-page1.html.

Incremental Cost

The single most important market barrier mentioned by respondents was the cost differential for 80 PLUS qualified power supplies versus standard power supplies. “Cost is the big one,” reported a participating power supply manufacturer. “The technology is there, everybody has the ‘know-how,’ but it is cost that is the barrier.”

In terms of estimating the incremental cost, the Quantec team heard a wide variety of responses, and observed a greater disparity of opinion on this topic than on any other. All of the participant power supply manufacturers interviewed reported that there was a price difference. Most respondents, including system integrators and power supply manufacturers, estimated the incremental cost to be between $10 and $20. One participating system integrator stated that there should be little cost difference, while another participating system integrator estimated the cost as high as $60. Non-participants were less able to provide a specific dollar amount than participant companies.

One participant system integrator (with current shipments) charges $20 more for their 80 PLUS machines, a price difference that was echoed by other respondents. This integrator feels that the market demand is there to support the price differential. The integrator’s business model has the company selling nothing but 80 PLUS compliant systems in the near future.

A number of non-participant system integrators, however, felt that the incremental cost was a significant barrier to sales. One stated that 80 PLUS will become mainstream when it is economically feasible to produce compliant units. However, he did not anticipate that cost changes would take place soon. He noted that when they were first approached by Ecos, there were only a handful of power supplies that were certificated and they were all “far too expensive” to be of interest to their main customers, “the incremental cost may not be very significant to the buyer of one computer, but the incremental cost of the upgraded 80 PLUS power supplies is quite significant when your main client base purchases 100 or more computers at a time.”

The system integrator that reported a cost difference of $60 explained his company’s production process. They currently purchase the complete “box” – the Central Processing Unit (CPU), power supply, and so on. They then disassemble the “box,” remove the original power supply, and install an 80 PLUS power supply. This process likely increases the cost difference that they face when compared to other integrators who do not need to follow this additional step (i.e., purchasing two power supplies).

The substantial incremental cost barrier reported by respondents is consistent with a February 2005 presentation prepared by manufacturers in response to the ENERGY STAR specifications. At that time, manufacturers estimated that the incremental cost for a 300 Watt power supply

ranged between $25 and $35, while the incremental cost for a 400 Watt power supply ranged between $40 and $45.[16]

One system integrator, based on their own successes, speculated that the cost difference is less of a barrier for public agencies whose purchasing requirements sometimes include more efficient equipment, as these organizations already are prepared to pay for the incremental cost.

A number of respondents also observed that over the long-term, system savings that result from lowered operation and maintenance costs are significant. Which customers are able to make a higher initial investment to capture those savings, however, may vary. Some integrators perceived that governments and schools are willing to pay higher up-front costs but small business customers are less able to pay the initial costs. It was noted that there are some customers who recognize the long term benefits of an 80 PLUS system and are willing to pay the difference.

Many participants commented that the anticipated announcement of new Energy Star specifications in 2007 will cause more units to become available and will therefore drive the market price down. Naturally, the arrival of new ENERGY STAR specifications won't have an immediate or complete impact on the market. "As long as there is a demand for cheaper, non-80 PLUS units, then those units will be available," observed a non-participant system integrator. Manufacturers who are large enough to produce a wide range of products will serve both the "high-end" and "low-end" users.

One non-participant indicated that there will increasingly be a low-end and high-end power supply market. His customers are reportedly more responsive to price. "We do offer 80 PLUS in our high-end machines. Every time, however, we have given the price differential information for a computer with and without 80 PLUS, they have always gone without. Nobody has purchased one through us."

The long term result in the market will be a stratified system similar to what consumers find for other personal computer components and computers themselves. A wider variety of 80 PLUS compliant systems will be available, and the cost differential will be less as participating power supply manufacturers like Seasonic and Rainier Technologies move to have all of their products be 80 PLUS compliant. In another five or more years, compliant systems that provide greater than 500 Watts will likely also be available, as the EPA explores adoption of specifications for more powerful units.

Production Retooling

Power supply manufacturers were asked about changes in the production process to manufacture an 80 PLUS system. The production process, is closely related to the incremental cost barrier. The power supply manufacturers that chose to simply retrofit their existing design and production are typically the ones with the highest incremental cost. Those that chose to be more

[16] http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/computer/Industry_Power_Supply_Slides.pdf. Note this estimate could not be corroborated by respondents to this study, who generally were only aware of 80 PLUS for a year or less.

innovative and design a new power supply from the "bottom up" are reportedly shipping products with lower incremental costs. For example, On Semiconductor, Celetronix, and Commergy are three examples of manufacturers that chose to "think outside the box" and redesign the power supply manufacturing process/inputs with the goal of energy efficiency in mind. Two of these companies have since sought to license their design to other power supply manufacturers.

Although most respondents indicated that retooling was more of an initial concern, and less of an on-going issue, some respondents even indicated that few, if any, changes were required. One respondent dismissed the notion and stated that "the manufacturing process is exactly the same." Another respondent indicated that the process is not much different: "the parts are the same, the circuit is the same, what may be needed is new testing equipment."

For one firm, detailed process changes were needed to obtain a low impedance level. The temperature and weight of materials being used had to be changed but once the company implemented these changes, no further alterations were required.

Awareness

The 80 PLUS model – with a manufacturer buy-down - was designed to provide an impetus for manufacturers to get more product on the market. Although an increased number of power supply units are receiving certification, several respondents reported that the 80 PLUS Program now needs to increase consumer awareness of efficient power supplies. One integrator stated that 80 PLUS should "focus more on the end-user" in its promotional efforts.

One non-participant power supply manufacturer stated that very few of its customers - less than 1% - request 80 PLUS systems. Its customer base is comprised of approximately 50% large retailers and 50% distributors. The manufacturer states that lack of consumer awareness is a significant issue. He recognized that this could be a result of the customers with whom he works, noting that they would probably see some demand if they supplied school districts or customers who place larger orders. This manufacturer stated that increased awareness and increased availability of these products needs to take place.

Another non-participant system integrator was very direct in his comments that consumer education is an important activity. He stated that the average consumer does not equate typical computer use with energy loss. In marketing his product, he stated that he tries to describe the energy saved in easy, clear terms. For example, he refers to "the number of cars that are off the road.". He suggested that the EPA also increase its efforts to raise consumer awareness.

Despite the perceived general lack of awareness, implementation staff did report that a number of customers with potentially large purchasing capacities are beginning to take interest in 80 PLUS. For example, although both Boeing and the New York City Council, have not as yet placed orders for 80 PLUS PC's, both, have indicated that they will be making purchases in the future. The New York City council, in fact, has included 80 PLUS in the city's procurement specifications.

Product Differentiation

Some of the power supply manufacturers and system integrators promoting 80 PLUS systems are taking advantage of the energy savings to market their systems as more "environmentally friendly" than comparable systems. These companies include their power supplies with other computer system features that promote energy savings or other "green" aspects of their products and business practices (e.g., more efficient monitors, environmentally friendly packaging, recycling options, etc.). This is true for Seasonic, Computer Technology Link, Rainier Technologies, and Tech Networks of Boston. CTL's "Green Machine" and the "New Earth PC" offered by Tech Networks are two primary examples.

Others are using the 80 PLUS label as a way to differentiate their systems, without explicitly linking the energy savings to larger environmental issues. Enhance Electronics, for example, promotes 80 PLUS on its Web site and product literature but does not make this larger connection. Some of the participating power supply manufacturers are thus using 80 PLUS as a means of moving out of the "commodity trap" of offering the lowest cost per Watt and getting customers to focus on other product attributes such as energy efficiency. One power supply manufacturer, in fact, approached one of the implementation staff and asked if Ecos was going to offer a "90 PLUS" tier for energy efficiency.

The interest in product differentiation was also one of the reasons that the 80 PLUS program established an early target of working with system integrators. Generally, the early adaptor system integrators took advantage of the opportunity to distinguish themselves from their competitors. One NEEA staff person commented that the regional system integrators of the Northwest could move relatively quickly and had a greater level of interaction with their customers – and therefore the ability to "spread the word" more quickly.

Program participants were asked if they felt that the market advantage would diminish after 80 PLUS standards became more widely adhered to. They responded that they would continue to serve the same customers and that their general customer base could grow from a strong group currently being recruited.

Product differentiation may not be a strong driver for most market actors. But for those who have decided to build their business model on leadership within this market niche, it is clearly a prime motivator.

Perceived Value

Perceived value is the interest among consumers in purchasing 80 PLUS computers. Indications of perceived value include consumers requesting information about 80 PLUS, including 80 PLUS in purchasing specifications, and fully understanding the benefits of 80 PLUS, including non-energy benefits.

With the perception among "upstream" market actors that consumer awareness is limited, perceived value was also considered limited: few organizations were specifically requesting 80 PLUS or including 80 PLUS in their purchasing specifications.

Non-Energy Benefits

Interviewees uniformly acknowledged that there are non-energy benefits associated with 80 PLUS power supplies. Non-energy benefits include:

- The power factor correction inherent in the system
- Reduced heat in the computer
- Resulting savings in maintenance costs
- Increased longevity of the system
- Smaller size, which may increase design options

Interestingly, a number of interviewees replied that these benefits should be a market driver but that for many customers it simply was not. In most cases, customers are not aware of energy inefficiencies related to their personal computers. These comments appear to indicate a need for increased outreach and consumer awareness.

To some customers the non-energy benefits will actually outweigh, in terms of importance, the energy savings. For example, Wall Street firms were interested in 80 PLUS because the improved power supplies would more than pay for the incremental cost by allowing them to properly size their building conductors. However, the value of non-energy benefits really will vary by customer. For example, for customers with computers in a data center, reduced noise levels may have very little value, but the potential of reduced heat generation may be extremely valuable.

The difficulty with many of the non-energy benefits is that they are difficult to prove or quantify. Some, like improved power factor correction, reduced heat, reduced noise levels, and smaller size are clearly documented, while others, like potential reduced system maintenance and increased longevity of the system are less predictable.

Program Marketing

The 80 PLUS program is marketed in a variety of ways. Implementation staff and one of the utility respondents believed that some of the most effective marketing approaches have included participation at industry conferences and vendor meetings. Recent conferences include the World Energy and Engineering Conference in Washington DC, the Corporate and Channel Computing Expo in New York, the West Coast Energy Management conference in Seattle and a forum for leading Wall Street firms held in Spring 2006. Firms with increased concerns about system reliability may be attracted to the improved power performance of 80 PLUS over conventional power supplies. An article featuring 80 PLUS ran in the Wall Street Journal on June 13, 2006.

Ecos staff uniformly agreed that the sponsors play a critical role in not just funding the program, but promoting and marketing it as well. According to one of the implementation staff, “we would have no program without [the sponsors].” For example, at ECOS request, NEEA and other

sponsors sent letters of support for 80 + to one of the interested OEMs specifically and to the community of PC manufacturers (including SI) in general. NYSERDA has also highlighted 80 PLUS at some of their vendor events. Sponsors will also promote 80 PLUS on their websites, or in written materials to their residential and business customers, such as the “bill stuffer” recently mailed out by SMUD. PG&E has similarly invited vendors to some of their events to learn about 80 PLUS.

Another program sponsor, New England utility NSTAR, arranged a meeting between Ecos staff and a potential large institutional customer. While the customer has not yet placed an order for 80 PLUS units, this initial meeting laid important groundwork that could result in the purchase of hundreds of units in the future.

Interviewees were asked if they had any recommendations for the 80 PLUS program in terms of increasing the number of certified units available and/or operating more effectively. Program participants and sponsors agreed that 80 PLUS had been instrumental in creating an established standard. Their recommendations involved increasing marketing efforts and extending the availability of buy-downs to the end user.

One system integrator stated that “the retail products do not get the buy-down and buy-downs are not available everywhere. This is wrong.” Another stated that there should be more of an effort to promote the product to the end user. He felt that the majority of consumers have no idea about the role of the power supply. One stated that “over 90% of the end users” do not know that there even is the potential for energy savings in how their computer is operating. The program needs to “focus more on the end-user.”

5. Review of Program Cost Effectiveness Model

Many of the assumptions that formed the basis of the Alliance Cost Effectiveness (ACE) model were developed for NEEA in 2004 and 2005. This market progress evaluation provides an ideal opportunity to revisit these underlying assumptions and recommend any course corrections.

Energy Savings

Tests performed by Intel and EPRI's Power Electronics Applications Center showed that an 80 PLUS power supply installed in a commercial PC will typically result in an energy savings of 88 kWh/year (a reduction from 149 to 61 kWh/year). The Alliance Cost Effectiveness model, however, has chosen a conservative approach and estimated savings of 82 kWh/year to allow for some sales to residential applications and the use of Verdiem Surveyor power management software. The evaluation team does not recommend any changes to these savings values.

First Cost Assumptions

One key program assumption estimated that the additional cost for an 80 PLUS power supply, versus a standard power supply, was $5. This same parameter was adopted as the basis for the 80 PLUS buy-down system. The model further anticipated that the initial costs would decrease over time, and stabilize at an incremental cost of $2.50.

Manufacturers and system integrators who were interviewed (both participant and non-participants able to answer the question) reported that the incremental cost of manufacturing qualified 80 PLUS power supply was greater than $5. As described in Section 3, cost differentials were typically reported as $10 to $20. Based on these findings, we recommend that a higher initial cost be incorporated into the cost effectiveness model for the first five years of the program (through 2008). The initial cost, however, is assumed to drop steeply as 80 PLUS power supplies become more common and economies of scale are reached. Table 6 provides initial suggested revisions for the program model.

Table 6. First Cost Assumptions

Year	ACE Model	Suggested Revised First Cost
2004	$5.00	$30.00
2005	$5.00	$20.00
2006	$5.00	$15.00
2007	$4.38	$7.50
2008	$3.75	$3.75
2009	$3.13	$3.13
2010	$2.50	$2.50
2011	$2.50	$2.50
2012	$2.50	$2.50
2013	$2.50	$2.50
2014	$2.50	$2.50
2015	$2.50	$2.50

Units Shipped

The March 29, 2005 NEEA key assumptions for the 80 PLUS ACE model show sales of an estimated 50,000 80 PLUS units in 2005 and 238,000 units in 2006.[17] As noted above, however, current sales have been well below these forecasts, as well as recently revised forecasts by Ecos. With the revised ENERGY STAR specifications not expected to take effect in 2006, and the participation of any OEMs expected until 2007, it is unlikely that there will be any substantial increase in sales through the rest of this year. Through the end of August 2006 there were a total of 1,820 80 PLUS shipments in the Northwest, with sales varying significantly by month (Figure 1). Assuming the same average sales per month for the remaining four months of the year would lead to a total of 2,730 units sold at the end of the year. Even with aggressive growth rates in average sales per month for the next four months, such as 50% or 100%, would only provide 3,185 and 3,640 units at the end of 2006. This is significantly below the 224,910 units (17% market share) originally forecast for 2006 and even the revised 2006 Ecos goal of 105,700 units (8% market share) for 2006. These original forecasts were clearly overly ambitious and underestimated the amount of time it would take to transform the market.

Ecos recently (October 2007) estimated that Northwest sales would be 100,000 units (approximately 7% market share) for 2007. The ability to achieve this goal depends on the participation of at least one major OEM and the computer OEMs developing new products that qualify for the new ENERGY STAR specification. However, even with these developments it will take some time for the market to shift: manufacturers may not immediately respond to the new ENERGY STAR specifications, and the large OEM that is planning on participating may need additional time to prepare and launch a product line and associated marketing efforts. In addition, should both the ENERGY STAR specification and OEM participation be delayed sales will likely remain far below the current goal.

[17] Note the forecasted 2006 units included some residential sales.

In a worst case scenario, if sales in 2007 remain the same per month as 80 PLUS averaged for January through August of 2006 (227.5 units/month), total 80 PLUS sales would only be 2,730 units. This is of course the most conservative scenario, and seems unlikely based on the scheduled revision of the ENERGY STAR specification, as well as the reports of interest by at least one OEM. However, as shown in Table 7, even modest 80 PLUS market share for the major computer OEMs can lead to significantly higher sales. Interviews with OEMs will be included in the second MPER in early 2007, and at that time the evaluation can more precisely gauge their intent regarding participation and positioning of 80 PLUS (or ENERGY STAR units) within their product lines.

Figure 1. 80 PLUS Northwest Shipments in 2006, by Month

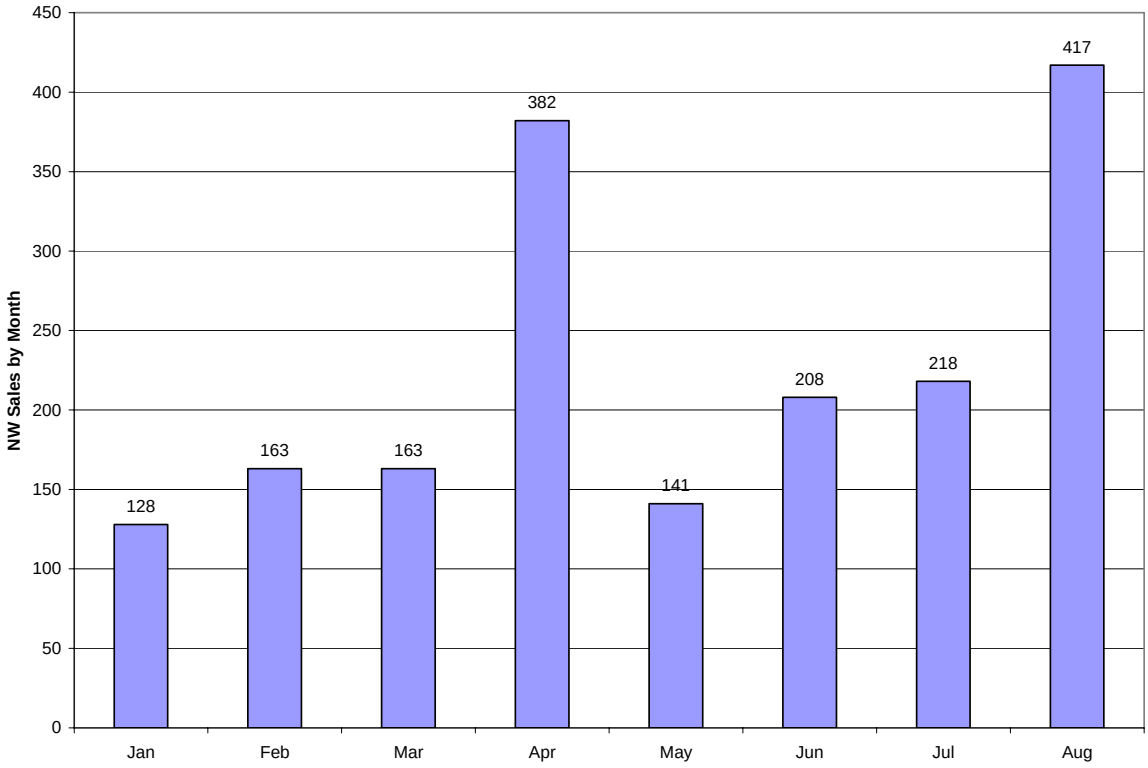

Table 7. Examples of Northwest 80 PLUS Sales Scenarios for OEMs for 2007

Manufacturer	Market Share*	Total Projected 2007 NW Sales**	80 PLUS Sales in the Northwest		
			80 PLUS 5% of Sales	80 PLUS 10% of Sales	80 PLUS 25% of Sales
Dell	33.5%	492,950	24,648	49,295	123,238
Hewlett Packard	19.4%	285,470	14,273	28,547	71,367
Gateway	6.1%	89,761	4,488	8,976	22,440
Apple	4.0%	58,860	2,943	5,886	14,715
Toshiba	3.5%	51,502	2,575	5,150	12,876
Lenovo	3.2%	47,088	2,354	4,709	11,772
Others	30.2%	444,391	22,220	44,439	111,098
All Vendors	100.0%	1,471,493	73,575	147,149	367,873

* Based off of 2005 U.S. shipments (See Table 2)

**Based off of current NEEA total projected sales of commercial PCs in the Northwest for 2007

Operation and Maintenance Costs

The reported increased reliability of 80 PLUS compared to non- 80 PLUS machines typically translates into cost savings for the end user. Savings are generated by increased longevity of a given machine; by fewer repair costs; and by reduced temperature controls required for their place of operation.

In the initial model, no dollar amount was assigned to these costs. The variety of factors involved and the large differences in the number of units operated by any given user make it difficult to assign a dollar amount to these savings. A worthy follow-up study would be to try to calculate these benefits. An initial approach could focus on one element, such as replacement cost. Estimating average acquisition price and computer life span could be initial steps in determining costs associated with operation of power supplies.

Leaving the dollar amount at zero is a conservative approach; respondents generally agreed that there are cost savings in the use of these systems, but acknowledged that they are difficult to quantify.

Other Non-Energy Benefits

As with operating and maintenance costs, other non-energy benefits are difficult to quantify. The benefits that will be generated will vary from one environment to the next. For example, even the value of power factor correction will vary for different end-users. A case study approach to illustrate the cost savings realized by some users could be one approach to illustrate these savings, but the cost effectiveness of the model should continue to adopt a conservative approach and leave the estimated savings as zero.

Market Description/Size

As noted earlier in this report, 80 PLUS has gone through detailed calculations to estimate the market size/potential for 80 PLUS qualified PCs. There are a few discrepancies and potential modifications to the assumptions:

- ***The total number of assumed PC units sold differs slightly from a recent IDC study***. The assumptions show estimated sales of 58,400,000 PCs in 2004 and 64,900,000 PCs in 2005. As shown in Table 2 of this report, however, PC shipments (a proxy for sales) were 58,285,000 in 2004 and 64,089,000 in 2005. Note these differences are minor (-0.2% in 2004 and -1.2% in 2004) but can be incorporated into updated projections. In the future, IDC updates should be used to assess market potential.

- ***The assumed number of laptops is most likely low***. As noted earlier, the market size estimates assume that 27.5% of all commercial PCs sold were laptops. However, trends from 2001 through 2003 showed an increasing percentage of PCs that were sold were laptops, and thus this estimate might be low (i.e., a lower percentage of computers sold are desktops, and thus the market size for 80 PLUS is potentially smaller than estimated).

6. Conclusions and Recommendations

The interviews conducted for this evaluation with staff of NEAA, Ecos, participating and non-participating SIs, participating and non-participating power supply manufacturers, the EPA, and additional program sponsors have led to a number of important conclusions and recommendations. In general, although the initiative is well behind forecasted sales goals, significant successes have been achieved.

Conclusions

Sales are significantly behind goals, but could grow substantially depending on circumstances. There are a number of reasons that sales are behind original estimates, including overly optimistic goals, delays in the production of 80 PLUS qualified power supply products, higher than anticipated incremental cost, longer lead times than estimated for changes in computer part specifications, and lack of consumer awareness. However, the progress indicators clearly point to an increasing supply of participating SIs and power supply manufacturers, additional qualified products, and an increase in sales. In addition, the release of the new computer ENERGY STAR specification for July l2007 and the anticipated participation of at least one major OEM is expected to substantially increase sales of 80 PLUS computers.

The participation of NEEA has been instrumental in the success of the 80 PLUS initiative. NEEA was the first program sponsor for the 80 PLUS initiative, an important milestone in demonstrating to other potential sponsors that the initiative should earn the backing of recognized energy efficiency efforts. The early participation of NEEA is also leading to earlier program success in the Northwest: as of June 2006, there were 1,580 80 PLUS shipments in the Northwest, compared to only 151 in the rest of the U.S. NEEA was in unique position to assist ECOS with the start up costs to get the project off the ground, thus providing important development funds for Ecos to more aggressively market 80 PLUS. According to one of the program founders, “The 80 PLUS initiative would not be here today if it were not for the Northwest Energy Efficiency Alliance.”

80 PLUS has had a clear influence on the ENERGY STAR draft specifications. The current draft specifications for ENERGY STAR computers include the 80 PLUS standards for power supplies. During the review period, industry representatives contested the 80 PLUS specifications, claiming that limited qualifying power supplies were available and that the incremental cost was prohibitive. The EPA was able to demonstrate, because of the 80 PLUS initiative, that qualifying power supplies were becoming increasingly available and decreasing in price. According to a senior EPA staff member, “the 80 PLUS program was highly influential in setting the new specifications, offering a turnkey solution, a coherent message with the needed backup data.”

The estimated incremental cost of 80 PLUS power supplies varies substantially, but on average is probably about $15, higher than the estimated cost of $5. There was a wide range of estimates for the incremental cost of 80 PLUS power supplies, but most respondents estimated the cost between $10 and $20. Different approaches for manufacturing and integrating the

efficient power supplies is one reason for the wide variation: some manufacturers attempted to retrofit existing models, while others either developed or licensed newly developed power supplies. The incremental cost is likely to drop sharply over the next few years as 80 PLUS power supplies become more mainstream, but for now the estimated incremental cost of $5 is most likely below the actual incremental cost.

Non-energy benefits vary in importance depending on the market actor. There are a number of potential non-energy benefits for efficient power supplies. Some, like improved power factor correction, reduced heat, reduced noise levels, and smaller size are clearly documented, while others, like potential reduced system maintenance and increased longevity of the system are less predictable. A number of interviewees replied that these benefits should be a market driver but that for many customers it simply was not, primarily due do to lack of awareness.

Recommendations

The Program implementer and sponsors should focus on driving end-user demand. Currently the sponsors are conducting a number of activities to promote consumer awareness and demand of 80 PLUS, including direct mailings, vendor fairs, and personal meetings. A large number of respondents, however, still believed that consumer demand was lagging. The 80 PLUS program, therefore, needs to adopt a more formal "push" and "pull" strategy to not only increase supply, but also drive demand. The development and dissemination of additional marketing materials is one way to do this.

Consider cooperative advertising, especially if reimbursement tracking becomes burdensome. Following from the previous recommendation, one method to drive consumer demand is cooperative advertising and marketing. This is a popular tool for many energy efficiency programs throughout the country, plus it serves as an effective method for leveraging program funds and further engaging participants. This can be done initially in conjunction with the current manufacturer incentive per unit mechanism, and could potentially replace the current structure, particularly if the reimbursement tracking becomes difficult. For example, one sponsor already mentioned that they needed to call the manufacturer to get them to fill out the paperwork for the incentives. Should the current incentive level go away, however, marketing incentives still need to be tied to the delivery of shipment data so that program impacts can be estimated by service territory. Marketing incentives can also be offered to system integrators and OEMs.

Closely track market share and, if necessary, consider a 90 PLUS certification. With the upcoming change in the ENERGY STAR specifications for computers and the anticipated participation of a major OEM, sales of 80 PLUS PCs are expected to increase substantially. Although there is no exact point at which a market has been decisively transformed, a popular "rule of thumb" is that when market share reaches 50%, further efficiency standards should be considered. The program implementers and sponsors need to closely track market share to determine when the market has exceeded the "tipping point" and saturation levels are high enough to raise the efficiency standard once again. One power supply manufacturer already requested a 90 PLUS certification, and others will likely follow as the sales of 80 PLUS qualified PCs increase.

Acknowledge that the estimated incremental cost is over $5, and increase the cost differential in the cost-effectiveness models. Based on the results of this study, NEEA and the 80 PLUS program should acknowledge that the incremental cost is currently greater than $5. In fact, there was frustration among a number of respondents with the $5 incremental cost estimate. Adjusting the incremental cost estimate – in both program communications and the program cost-effectiveness model – to a current range of $10 to $20 would more fairly reflect current market conditions.

Work with system integrators and power supply manufacturers to establish methods for lowering the incremental cost. Although current incremental cost may be higher than perceived, there are clearly demonstrable ways to reduce the incremental cost. The 80 PLUS program and the sponsors can work with both system integrators and power supply manufacturers to devise ways to reduce incremental cost. For example, system integrators can be assisted with identifying new power supply manufacturers that offer compatible, competitively priced 80 PLUS units. Power supply manufacturers, on the other hand, can be assisted with strategies for either licensing or developing, "bottom up," more efficient power supplies that cost less than simply retrofitting existing units.

Consider developing efficiency standards for other consumer electronics equipment. The 80 PLUS program has the infrastructure in place to expand outside of computer power supplies and include other applications that use power supplies. For example, the EPA is currently developing specifications for external power supplies. The 80 PLUS program could leverage its relationships with the power supply manufacturers (many of whom produce power supplies for other applications) and the sponsors to expand the scope of efficient power supplies beyond computers.

Appendix A: Interview Respondent List

Organization Type/Company Name
NW Energy Efficiency Alliance
80 PLUS Implementation Team
PS manufacturers
Energy Recovery Systems
Seasonic
Enhance Electronics
Channel Wall Technologies
ON Semiconductor
Non-part manufacturers
Antec
Zippy USA
Enermax Technology
PC Power & Cooling, Inc.
System Integrators
Alden Associates Inc
Computer Technology Link
Rainier Technologies
Premio Computers
Tech Networks of Boston
Non-part system integrators
Tangent Computers
Equus Computer Systems
EPA ENERGY STAR Staff
Other Project Sponsors
SMUD
PG&E
Other Respondents
Micro-Tech Consultants

Appendix B: Interview Guides

- Program Staff – Northwest Energy Efficiency Alliance
- Program Sponsors
- Participating System Integrators
- Participating Power Supply Manufacturers
- Non-Participating System Integrators
- Non-Participating Power Supply Manufacturers
- EPA Staff
- Ecos Consulting Implementation Staff

Evaluation of 80 PLUS Efficient Power Supplies
Interview Guide
Program Staff – Northwest Energy Efficiency Alliance

Staff Name: _____ Title: _____

Interview Conducted by: _____ Date: _____

NOTE to interviewer – Please remember that this list of questions is just a guide. Feel free to explore topics of interest to the participant, and record his/her strongest impressions.

Alliance 80 PLUS Background

1. What is your role at the Alliance?

2. How, if at all, does the 80 PLUS project differ from other Alliance projects?

Goals and Success Indicators

3. What were the primary goals and indicators of success of the 80 PLUS project?

4. How successful has the project been to date in reaching the goals? Why? Should the goals of the project be adjusted?

5. Given the experience in the market now, are there other indicators of success that should be included? Should the goals have been readjusted since the project began? Why or why not? What might some additional indicators be?

Marketing & Market Actors

6. What influence, if any, do you think the Alliance had on the participation of various market actors? How so?

7. The 80 PLUS power supply project was created by ECOS who were working to change the standards. Is this a typical approach or a unique approach to changing standards?

8. What have been the most/least successful marketing/promotion activities for 80 PLUS? (e.g., the sponsor group support letter to the OEMs, industry trade shows, meeting with Wall Street firms, etc.).

9. Please describe the supply side and demand side activities. Where is the emphasis? Do you feel the balance is appropriate? Why do you say that? What in your opinion could be done differently?

10. Who/which do you think was the primary market actor to move the EPA to change Energy Star specifications? What part did the other market actors play?

11. Does it take more effort to influence some of the market players than others? What differences have you observed?

12. What needs to happen for 80 PLUS power systems to become the standard, or the market is considered "mainstream"?

13. What do future program opportunities look like around power supplies?

(Interviewer: Listen for and probe accordingly: blade servers, System Integrators buying chassis with the power supply installed)

Non-Energy Benefits (NEB)

14. What do you consider to be non-energy benefits of 80 PLUS? What role do you think non-energy benefits have played in promoting 80 PLUS to date? Which NEBs do you believe are the most compelling to end users? Manufacturers? What future NEBs do you think might occur in the next 2-3 years?

Logistics

15. How often does the Alliance meet with Ecos staff? (Probe for all sponsor meetings vs. Alliance only?)

16. How would you describe the current level of communications between Ecos, the Alliance, and the other sponsors? What processes work well? What processes appear challenging? What, if anything, would you change about current communications practices?

(INTERVIEWER: Probe to see if any adaptive management changes have been made, or if there are changes that need to be made. Probe for specific answers re. communications practices - number/type of meetings, reports received, etc.)

Other

17. Is there anything else that you would like to add, or any other topics you would like us to consider for this evaluation?

Thank you for your time.

Evaluation of 80 PLUS Efficient Power Supplies
Interview Guide

PROGRAM SPONSOR

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

My name is _____. We are conducting an evaluation of the 80 PLUS program for the Northwest Energy Efficiency Alliance, and have a few questions regarding the new ENERGY STAR specification for computers. Is this a good time to speak?

(Proceed or arrange call time)

1. What is your role at _____?

Interaction with 80 Plus

2. Please describe your interaction with the 80 Plus program team. How often do you correspond?

3. How many new clients/end users do you think has learned about 80 Plus as a result of utility incentives? Can you think of an example?

ENERGY STAR Specifications

4. From you perspective, how was the upcoming ENERGY STAR computer specification developed?

5. What were the primary reasons for the changes?

6. Who have been some of the most important market actors to contribute to the development and/or changes of Energy Star specifications?

7. Do you believe the 80 PLUS initiative had any influence on the upcoming specifications? How so?

Marketing & Market Actors

8. How do you believe the change in the ENERGY STAR specifications will impact the computer power supply market? How so?

9. How will it impact the PC market in general?

Non-Energy Benefits

10. What is the role/importance of other non-energy benefits vs. the energy savings for efficiency power supplies? Which ones are the most important? (If necessary probe: decreased parts count, reduced footprint, quieter operation, etc.)

Other

11. Is there anything else that you would like to add, or any other topics you would like us to consider for this evaluation?

Thank you for your time.

Evaluation of 80 Plus Efficient Power Supplies
Interview Guide

PARTICIPATING SYSTEM INTEGRATORS

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

Hello, my name is _____. I am calling on behalf of Quantec, LLC. We are conducting an evaluation of the 80 PLUS Personal Computer power supplies. Do you have a few minutes to speak with me, or may I arrange a time to call you back?

Background

1. Are you familiar with 80 Plus standard for power supplies? [IF NOT, PROBE FOR ANOTHER RESPONDENT AT COMPANY] How did you first learn about 80 PLUS?

2. How long have you worked at _____? What is your role there?

3. What types of computer systems does your company produce? Approximately how many systems a year?

4. Why did your company decide to participate in the 80 PLUS initiative? *(listen for but do not prompt: enhanced reliability, improved performance and efficiency, environmental performance)*

5. Do you recall hearing about "group support" letters in favor of 80 PLUS? [IF YES, PROBE - WHAT THEY HEARD AND IF IT INFLUENCED THEM]. Do you recall hearing about sponsorship by other agencies [SAME PROBE]; newspaper articles; trade shows etc. Anything else?

Sales

6. Could you tell me approximately how many PCs your company sold last year? Do you know approximately how many – or what percentage of these – were Energy Star certified?

7. [ASK OF THOSE THAT HAVE SOLD 80 PLUS PCs] Was this what you expected to sell? Why/Why not?

8. IF APPLICABLE: Why do you think you have not sold [MORE/ANY] 80 PLUS PCs?

9. What are the projected sales for 80 PLUS through this year? Next year? [DESCRIBE YEAR THEY USE, I.E., CALENDAR YEAR OR FISCAL YEAR-DATES, USE CALENDAR YEAR FOR PROJECTION]

Production

10. Let's talk about some of the challenges you may have encountered in order to offer 80 PLUS PCs? [LISTEN FOR: ISSUES WITH THE UNITS, DELIVERY CONCERNS, ETC.) What did you do in order to get past these challenges?

11. What specific ordering or production changes, if any, has your company had to make in order to produce 80 PLUS qualified PCs? [IF RESPONDENT HAS NOT PRODUCED ANY, WHAT CHANGES DO THEY ANTICIPATE MAKING IN THE FUTURE]

12. What is (or was) the lead time needed to bring 80 PLUS to full production?

ENERGY STAR

13. Do you think that the 80 PLUS program impacted ENERGY STAR standards?

14. Is your company changing product offerings in response to the new expected ENERGY STAR specifications? How?

Incremental Cost

15. What is the incremental cost of manufacturing 80 PLUS PCs? Has the incremental cost changed since you started offering these systems? How will it change as production increases?

16. What financial incentives (if any) do you receive to produce this product?

17. Do incentives cover the incremental cost?

Non-Energy Benefits

18. Are there any benefits for you to producing 80 PLUS power supplies other than saving energy? And for your customers?

19. IF OTHER BENEFITS ARE MENTIONED: What is the role/importance of these benefits vs. the energy savings for efficiency power supplies? Which ones are most important? [IF NECESSARY PROBE: DECREASED PARTS COUNT, REDUCED FOOTPRINT, QUIETER OPERATION, ETC.]

20. Of these other benefits, which specific ones do you think are most compelling to end users, or your potential customers? Do you mention these benefits when you are marketing 80 PLUS Power supplies to your customers.

Marketing & Market Actors

21. What percentage of your customers are aware of 80 PLUS?

22. What percentage request it?

23. What types of customers are aware of or request 80 PLUS?

24. What are you doing to market 80 PLUS to your customers? What is your company doing to getting customers more interested or willing to commit to 80 Plus power supplies?

25. What do you think are the barriers to widespread adoption of 80 PLUS Power supplies?

26. How will the 80 PLUS power supply influence changes in the industry?

27. What other changes are happening in the PC industry? Do you see them as being synergistic or at odds with 80 PLUS?

Goals and Success Indicators

28. What are your goals with to respect 80 PLUS in the near future? How would you measure its success?

29. What do future program opportunities look like with respect to increased power supply efficiency components? (Listen for and probe: blade servers, System Integrators buying chassis with the power supply installed)

Additional Information

30. Would you like to add anything else about your experience with 80 PLUS, or add anything that we should consider in this evaluation?

Thank you for your time.

Evaluation of 80 Plus Efficient Power Supplies
Interview Guide

PARTICIPATING POWER SUPPLY MANUFACTURERS

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

Hello, my name is _____. I am calling on behalf of Quantec, LLC. We are conducting an evaluation of the 80 PLUS Personal Computer power supplies. Do you have a few minutes to talk with me, or may I arrange a time to call you back?

Background

1. How long have you worked at _____? What is your role there?

2. Are you familiar with 80 Plus standard for power supplies? How did you first learn about 80 PLUS? Were you involved in the decision to participate?

3. Which component parts are manufactured by your company? How many power supplies are manufactured (Standard and 80 PLUS)?

4. Could you describe your customer base? How many customers do you have, generally speaking? Are they primarily system integrators, OEMs, both? Any international customers?

5. Did you know about 80 PLUS before your company was approached by ECOS? What role did 80 PLUS play in your company's development of ee power supplies?

6. How long has your company been manufacturing 80 PLUS power supplies?

7. What type of customers are currently receiving these power supplies? Did they request them or did your company approach them?

Decision to Manufacture

8. What factors influenced the decision to begin to manufacture 80 PLUS power supplies?

INTERVIEWER: (Listen for but do not prompt: enhanced reliability, improved performance and efficiency, environmental performance)

9. Were there other factors that played a part in your decision to move forward with 80 PLUS? If yes, probe what they heard and how it influenced them For instance do you recall hearing about "group support" letters in favor of 80 PLUS?) What about sponsorship by other agencies (same probe); newspaper articles; trade shows etc.

Production

10. When was the decision made to manufacture 80 PLUS power supplies? When were the first units produced (or when will they be ready)?

11. What specific changes, if any, has your company had to make moving forward? What did your company need to do to retool or adjust your manufacturing process in order to produce this power supply? (NOTE: there may be issues with accounting, personnel, staff training etc.)

12. Have there been any other challenges?

INTERVIEWER: (Listen for issues with the units, delivery concerns etc)

13. What is (or was) the lead time needed to bring 80 PLUS to full production?

EPRI Certification

14. Did your staff receive any training regarding certification? How difficult/easy was the certification process?

15. What happens if a power supply fails EPRI certification?

16. How did the 80 PLUS certification compare to the UL certification process in terms of ease, time, and overall process?

ENERGY STAR

17. Is your company changing product offerings in response to the new expected ENERGY STAR specifications? How?

18. Do you think that the 80 PLUS program impacted ENERGY STAR standards?

Incremental Cost

19. What is the incremental cost of manufacturing 80 PLUS? Has the incremental cost changed since you started manufacturing these systems? How will it change as production increases?

20. What financial incentives (if any) do you receive to produce this product?
20A IF RECEIVED INCENTIVES - How important were financial incentives in your decision to build 80 PLUS?

21. Do incentives cover the incremental cost? *(can start up costs be excluded to determine*)?

22. What will it take to bring manufacturing costs in line with current power supply manufacturing cost?

Sales

23. What percentage of your customers are aware of 80 PLUS? What percentage request it? (IS THIS SALES WEIGHTED OR JUST NUMBER OF CUSTOMERS, PLEASE TRY TO GET SALES WEIGHTED, IT'S MORE USEFUL)

24. Please describe company sales of 80 PLUS products in the past two years. (How many 80 PLUS units have been sold and shipped in the past 6 months? 12 months? 24

months? Where have they been shipped?) What percentage of your power supply units manufactured/sold are 80 Plus?

25. What are the projected sales for 80 PLUS through this year? Next year? (Describe year they use, i.e., calendar year or fiscal year-dates) Use calendar year for projection.

INTERVIEWR: *(NOTE: How many vendors (SI) currently order 80 PLUS Power Supply units? About what percentage of the vendors you work with does this represent*

Non-Energy Benefits

26. What other benefits do you associate with 80 Plus power supplies?

27. How important are these benefits vs. the energy savings? Which non-energy benefits would you say are the most important?

INTERVIEWER: (If necessary probe: decreased parts count, reduced footprint, quieter operation, etc.)

28. Which specific benefits do you think are most compelling to end users, or your potential customers?

Marketing & Market Actors

30. What do you think are the barriers to widespread adoption of 80 Plus Power supplies?

29. What needs to happen for 80 PLUS power supplies to become standard equipment? What is your company doing to getting customers more interested or willing to commit to 80 Plus power supplies?

30. What, if anything, do you think the 80 PLUS program could do differently?

Goals and Success Indicators

31. What are your goals with respect 80 PLUS in the near future. How would you measure its success? If you had to launch the product all over again, how might you do it differently?

32. What impact does the 80 PLUS power supply have on development of future system components?

33. What do future program opportunities look like?

INTERVIEWER: (Listen for and probe: blade servers, System Integrators buying chassis with the power supply installed)

Thank you for your time.

Evaluation of 80 Plus Efficient Power Supplies
Interview Guide

NON-PARTICIPATING SYSTEM INTEGRATORS

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

Hello, my name is _____. I am calling on behalf of Quantec, LLC. We are conducting an evaluation of 80 PLUS Personal Computer power supplies. As part of this, we would like to speak with system integrators that are not currently participating in the 80 PLUS program. Do you have a few minutes to talk with me, or may I arrange a time to call you back? The interview will take about 20 minutes.

Background

1. Are you familiar with 80 PLUS standards for power supplies? [IF NOT, PROBE AWARE, ASK FOR ANOTHER RESPONDENT AT COMPANYTHAT MIGHT BE AWARE; IF NO RESPONDENT IS AWARE THEN TERMINATE]

2. [IF YES] How would you describe the 80 PLUS Program?

[IF RESPONDENT DEMONSTRATES UNDERSTANDING OF THE PROGRAM CONTINUE; IF NOT EXPLAIN THAT WE ARE LOOKING FOR SOMEONE WITH MORE DETAILED KNOWLEDGE OF THE PROGRAM THAT MAY HAVE CONSIDERED PARTICIPATING; PROVIDE PROGRAM WEB SITE AND CONTACT INFO IF THEY ARE INTERESTED]

3. How did you first learn about 80 PLUS?

4. Why did your company decide to NOT to participate in the 80 PLUS initiative? *(listen for but do not prompt: enhanced reliability, improved performance and efficiency, environmental performance)*

5. On a scale of 1 to 5, where 1 is “very unlikely’ and 5 is “very likely,” how likely are to you manufacture computers with the 80 PLUS power supply in the next year? Why is that?

ENERGY STAR

6. Do you think that the 80 PLUS program impacted ENERGY STAR standards?

7. Is your company changing product offerings in response to the new expected ENERGY STAR specifications? How?

Incremental Cost

8. What is the incremental cost of manufacturing 80 PLUS PCs? Has the incremental cost changed since you started offering these systems? How will it change as production increases?

9. What financial incentives (if any) do you receive to produce this product?

10. Do incentives cover the incremental cost? (can start up costs be excluded to determine)?

Non-Energy Benefits

11. What Non-Energy Benefits do you associate with 80 Plus power supplies?

12. What is the role/importance of other non-energy benefits vs. the energy savings for efficiency power supplies? Which ones are most important? [IF NECESSARY PROBE: DECREASED PARTS COUNT, REDUCED FOOTPRINT, QUIETER OPERATION, ETC.]

13. Which specific benefits do you think are the most compelling to end users, or your potential customers?

Marketing & Market Actors

14. What percentage of your customers aware of 80 PLUS?

15. What percentage request it?

16. What types of customers are aware of or request 80 PLUS?

17. What do you think are the barriers to widespread adoption of 80 Plus Power supplies? [PROBE FOR BARRIERS AMONG ALL MARKET ACTORS, INCLUDING CUSTOMERS, SI'S, POWER SUPPLY MANUFACTURERS, ETC.]

18. What needs to happen for 80 PLUS power supplies to become mainstreamed?

19. How will the 80 PLUS power supply influence changes in the industry?

20. What other changes are happening in the PC industry? Do you see them as being synergistic or at odds with 80 PLUS?

Additional Information

21. How long have you worked at _____? What is your role there?

22. What types of computer systems does your company produce? Approximately how many systems a year?

23. Would you like to add anything else about 80 PLUS, or add anything that we should consider in this evaluation?

Thank you for your time.

Evaluation of 80 Plus Efficient Power Supplies
Interview Guide

NON-PARTICIPATING POWER SUPPLY MANUFACTURERS

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

Hello, my name is _____. I am calling on behalf of Quantec. We are conducting an evaluation of 80 PLUS Personal Computer power supplies. As part of this, we would like to speak with power supply manufacturers that are not currently participating in the 80 PLUS program. Do you have a few minutes to talk with me, or may I arrange a time to call you back?

Background

1. How long have you worked at _____? What is your role there?

2. Which personal computer component parts are manufactured by your company? How many different power supplies do you manufacture?

3. Are you familiar with the 80 PLUS standards for power supplies? Am I correct that your company does not currently participate in the 80 Plus program? Has your company been approached by ECOS or another advisor regarding the 80 PLUS program?

INTERVIEWER - IF NOT AWARE: Give interviewee a brief description of what 80 PLUS is. Also, ask probing questions – Is your company considering manufacturing these? Why/Why not? What are the barriers to taking this on?

4. Do you recall which factors influenced the decision to NOT manufacture 80 PLUS power supplies? *(enhanced reliability, improved performance and efficiency, environmental performance)*

5. Could you tell me who your primary customers are?

6. Are your customers aware of 80 PLUS? What percentage requests it? What are the barriers to asking for it? Do you plan to promote 80 PLUS compatible power supplies to your customers in the future?

7. What do you feel are the barriers to adopting 80 Plus for the non-participating manufacturers? Is it just customer demand (if applicable)? What do you think needs to happen for 80 PLUS power supplies to become standard?

8. What specific changes could 80 Plus influence in the industry?

9. What other changes are happening in the PC industry? Are they synergistic with 80 PLUS?

10. Do you have any general comments that you would like to add regarding Energy Star certification?

Thank you for your time.

Evaluation of 80 PLUS Efficient Power Supplies
Interview Guide

EPA STAFF

Staff Name: _____ Title: _____

Interview Conducted by:_____ Date: _____

Introduction

My name is _____. We are conducting an evaluation of the 80 PLUS program for the Northwest Energy Efficiency Alliance, and have a few questions regarding the new ENERGY STAR specification for computers. Is this a good time to speak?

(Proceed or arrange call time)

ENERGY STAR Specifications

1. How was the upcoming ENERGY STAR computer specification developed?

2. How does it differ from the current specification?

3. What were the primary reasons for the changes?

4. (If not mentioned) Why was the decision made to include standards for power supply efficiency as part of the new specifications?

5. Who have been some of the most important market actors to contribute to the development and/or changes of Energy Star specifications?

6. Do you believe the 80 PLUS initiative had any influence on the upcoming specifications? How so?

7. On a scale of "1" to "5", where "1" is not at all influential and "5" is extremely influential, how important was the 80 PLUS initiative in influencing the specifications?

8. Did the development of the ENERGY STAR computer specification differ from the development of other specifications? (If yes) How so?

Marketing & Market Actors

9. How do you believe the change in the ENERGY STAR specifications will impact the computer power supply market? How so?

10. How will it impact the PC market in general?

Non-Energy Benefits

11. What is the role/importance of other non-energy benefits vs. the energy savings for efficiency power supplies? Which ones are most important? (If necessary probe: decreased parts count, reduced footprint, quieter operation, etc.)

Other

12. Is there anything else that you would like to add, or any other topics you would like us to consider for this evaluation?

Thank you for your time.

Evaluation of 80 PLUS Efficient Power Supplies
Interview Guide
Program Staff – Ecos Consulting

Staff Name: _____ Title: _____

Interview Conducted by: _____ Date: _____

NOTE to interviewer – Please remember that this list of questions is just a guide. Feel free to explore topics of interest to the participant, and record his/her strongest impressions.

Program Goals and Indicators of Success

1. Please provide a brief overview of the history of 80 PLUS – when/how originated.

2. What were the original goals of the project? What were the original indicators of success? Do you feel you've reached those goals? Why or why not?

3. What are the current goals for the projects? Given the experience in the market now, are there other indicators that should be included or used instead? Should the goals have changed earlier on?

4. What are the primary project goals for 2006? Do you think that you will reach it?

Marketing & Market Actors

5. Which specific market actors do you think play or have played key parts in 80 PLUS?

INTERVIEWER: DON'T READ, Check for all that are mentioned:

- ❑ sponsors
- ❑ power supply manufacturers
- ❑ system integrators
- ❑ end users

- ❑ EPA for ES
- ❑ OEMs
- ❑ Others?

6. What types of outreach activities are currently in place? What activities might you add to the list?

6B. Which outreach strategies have been the most successful? How so? And which would you consider to be the least successful? Why?

6C. How do you plan to improve on the less successful outreach activities?

7. Please describe the supply side and demand side activities. Where is the emphasis? Do you feel the balance is appropriate? Why do you say that? What could be done differently?

8. Are there other market actors that we may not have mentioned yet (e.g., utilities)?

9. What are the primary market barriers to the use of 80 PLUS adoption?

10. What do you think is needed to increase interest/participation of the various market actors?

11. How long does it typically take from 80 PLUS certification to see the product sold in the marketplace?

12. Does it take more effort to influence some of the market players than others? What differences have you observed?

13. Do you think that sponsorship has an impact or influence on decisions to manufacture/specify/integrate 80 PLUS ? Could you give me an example?

14. Did the “group support” letters impact/influence decisions to manufacture 80 PLUS ?

15. What needs to happen for 80 PLUS power systems to become “mainstream”? What percent of the market is considered ‘mainstreamed’? Or, what does it mean with this product?

16. Is there a ‘tipping point’ for this market? What is it?

16A What do future project opportunities look like around power supplies? (Listen for and probe: blade servers, systems integrators buying chassis with the power supply installed)

17. What impact will Hewlett Packard’s participation in the 80 Plus program have on 80 PLUS ?

18. How does 80 PLUS electronic product regulatory activity in the US influence Canada/Europe/Asia and vice versa? What impact does foreign activity have on US?

19. How would you describe the current level of communications between Ecos, the Alliance, and the other sponsors? What processes work well? What processes appear challenging? What, if anything, would you change about current communications practices?

Non-Energy Benefits

20. What have you identified as the non-energy benefits of 80 PLUS? What role do you think that non-energy benefits have play in promoting 80 PLUS? (Probe for additional market drivers, including heat budget - both individual system and at business level with hot computer rooms, remodeling for cooling, Wall St. example, etc.)

Incremental Cost

21. What do you believe is the current incremental cost of computers with 80 PLUS power supplies?

22. What do you perceive to be the greatest drivers of incremental cost?

23. Do you believe it will decrease over the next 3-5 years? By how much?

EPA ENERGY STAR Spec

24. What role do you think the 80 PLUS initiative had on the new EPA ENERGY STAR specifications?

25. What role did other market actors play in influencing the new ENERGY STAR specifications?

26. What are some of the concerns raised by those opposing the new ENERGY STAR specifications?

NOTE TO INTERVIEWER: Save detailed follow-up about overcoming critic concerns for MPER 2.

Market Response

27. Do you think that the personal computer market is changing in response to increased energy efficiency demands? Do you think this is part of a larger trend in the market?

28. Where is the market for 80 PLUS power supplies going from here? (Mention blade servers, System Integrators I buying chassis with the power supply installed)

Other

29. Would you like to add anything else about your experience with the 80 PLUS product, or add anything that we should consider in this evaluation?

30. Is there anything that you (ECOS) or other 80+ sponsors may need from the Alliance to ensure the desired level of market penetration?

31. Have you adopted any adaptive management changes? Anything else that should change?

Thank you for your time.