

# 80 PLUS Personal Computer Power Supplies

## *Market Progress Evaluation Report #2*

PREPARED BY

**Quantec**

REPORT #08-194  
JULY 2008



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Final Report

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

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Prepared for:  
The Northwest Energy Efficiency Alliance

July 2008



*Raising the bar in analytics™*

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# 1. Executive Summary

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This is the second and final Market Progress Evaluation Report (MPER) on the Northwest Energy Efficiency Alliance's (NEEA's) 80 PLUS initiative. It reports the initiative's activities and progress from November 2006 through January 2008. The findings and conclusions of this MPER are based on research of secondary sources and interviews with the initiative's management and implementation staff, power supply manufacturers, system integrators (SIs), the original computer equipment manufacturers (OEMs), and large end-use consumers.

## Market Progress

A review of the progress indicators shows that, by and large, the 80 PLUS initiative succeeded in meeting the majority of its goals. In addition, the market for power supplies is undergoing transformation. The initiative achieved success by involving the right market actors and creating product supply, and its three main accomplishments are as follows:

1. The initiative was instrumental in the adoption by the Environmental Protection Agency (EPA) of the Energy Star 4.0 computer specification. Energy Star rated computers must now include the 80 PLUS power supply (or equivalent).
2. The initiative succeeded in recruiting two of the largest original equipment manufacturers (OEM) of computer equipment, Dell and HP. These companies comprise about 50 percent of the computer market nationwide. This partnership promises to increase sales 80 PLUS sales radically. For example, Dell and HP claimed rebates for 10,276 units shipped in December of 2007 alone. This represents 80 percent of the 12,924 rebates claimed by all participants in December. In contrast, the total units shipped in all prior years was only 10,747.
3. The supply infrastructure of 80 PLUS power supplies is now mature. One sign of this robust infrastructure is the number of available 80 PLUS power supplies. MPER #1 reported that in June 2006, only 35 power supplies on the market were certified as 80 PLUS, whereas in December of 2007, participating manufacturers offered 403 power supply units.

## Remaining Barriers and Challenges

Despite the marked success of the initiative, several challenges remain. These include:

1. The incremental cost of 80 PLUS power supplies did not go down in response to increased production, as NEEA and implementers anticipated. In addition, the incremental cost varies by market actor; manufacturers and system integrators (SI) experience different costs.

2. The rebate amounts (\$5 for desktop and \$10 for server power supplies) are relatively small. Some OEMs and SIs therefore do not consider it worthwhile to apply for rebates. Still, actual sales of 80 PLUS units have been higher than the number of rebates requested.
3. The development of the supply side of the market transformation effort has not been adequately complemented by stimulating demand. Market transformation will be complete when demand from end users is more pronounced. Educating potential consumers about the benefits and availability of 80 PLUS power supplies will increase demand and seems to be the key piece that needs program focus.
4. Initially, the initiative underestimated the difficulties balancing the funders' need for geographic information on sales for processing rebates with the OEMs' interest in protecting proprietary sales information. The process of negotiating a nondisclosure agreement delayed OEM's shipment of incented 80 PLUS units. While this issue has been resolved for current participants, the underlying dynamic remains and could affect new participants.
5. The market for desktops is decreasing in relation to laptops, shrinking the potential market for 80 PLUS power supplies.

Because of these challenges, the target for shipments of incented 80 PLUS power supplies has not been met. The results of the evaluation indicate addressing these challenges would improve market penetration of 80 PLUS units.

## 2. Introduction

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### Update on the 80 PLUS initiative

The concept for promoting a more energy efficient personal computer power supply was developed prior to 2002. The potential for energy efficiency in power systems was latent—not only had the technology for power supplies changed at a much slower pace than other components, but additionally power systems could be readily isolated from the rest of the computer system. Ecos Consulting and others determined it was possible to upgrade the power supply's energy efficiency at a variety of rated loads. They pursued this opportunity to set a performance standard that targeted 80 percent efficiency at 20 percent, 50 percent, and 100 percent of rated load with a true power factor of 0.9 or greater. Power supplies with this capability would be substantially more efficient than standard power supplies, and could create a unique market differentiation opportunity for power supply and computer manufacturers. In 2002, the California Energy Commission, PG&E, and EPA contributed to a study to develop a standard methodology to test the energy efficiency of power supplies. The State of California hired Ecos and the Electric Power Research Institute (EPRI) to jointly conduct the study, maintaining third-party objectivity.

Ecos Consulting designed the 80 PLUS initiative to drive market adoption of energy-efficient power supplies for desktop computers and servers. Only one certified prototype power supply was available when the 80 PLUS initiative was officially launched in the spring of 2004. As the first organization to provide financial support in 2004, NEEA demonstrated to other potential sponsors that the initiative had earned the backing of a recognized energy efficiency organization. NEEA then extended initiative funding through December 2007.

The logic model developed by NEEA for MPER #1 (Appendix B) shows most outcomes should occur in the short term, that is, during the first three years of the initiative. Recent initiative activities resulted in the expected short term outcomes, but those outcomes occurred roughly one year later than expected. Implementers focused considerable and continued attention on gaining support and participation from manufacturers, system integrators, and the EPA, adapting to the slower-than-expected adoption by these market actors. Significant achievements since MPER #1 include entry of two major OEMs, which comprise 50 percent of the market, and implementation of the new Energy Star 4.0 specification effective July 2007. These achievements were clearly facilitated by Ecos Consulting and the 80 PLUS initiative. Since MPER #1, completed in September 2006, an additional 21,298 units were shipped.

### Goals of the study

The Northwest Energy Efficiency Alliance (NEEA) contracted with Quantec, LLC (Quantec) to evaluate the 80 PLUS initiative. This is the second and final Market Progress Evaluation Report (MPER). The report updates activities and findings reported in MPER #1, published in



September 2006, and discusses market changes. In addition to providing an update of total sales of 80 PLUS units, the report provides updates on key indicators, such as:

- Number of participating SIs, OEMs, and power supply manufacturers
- Number of certified power supplies
- Incremental cost of 80 PLUS power supplies
- Experiences of participants
- Barriers to participation

## Methodology

Evaluators conducted interviews and secondary research for this MPER from November 2007 to January 2008. Quantec designed interviews to provide an update on the progress of the program and perceptions of market barriers. Quantec interviewed NEEA staff and 80 PLUS team members at Ecos Consulting, Environmental Protection Agency (EPA) staff, as well as participating and nonparticipating power supply manufacturers, system integrators, original equipment manufacturers (OEMs), and large end users.

Evaluators developed, and NEEA reviewed, interview guides for each market actor group. The final survey instruments are included in Appendix D through Appendix O. Table 1 lists the targeted interview groups, number of contacts, and completed interviews.

**Table 1. Summary of Completed Interviews**

Organization	Target	Contacts	Completes
Northwest Energy Efficiency Alliance	2	2	2
80 PLUS Implementation Team (Ecos Consulting)	2	3	3
EPA Staff	2	2	2
Participant OEM	2	5	2
Nonparticipant OEM	2-3	7	1
Participant power supply manufacturers	3	9	4
Nonparticipant power supply manufacturers	2-3	10	5
Participant system integrators	3	21	4
Participant system integrators who have not received rebates	0	12	3
Nonparticipant system integrators	3	9	4
Participant large end users	2-3	2	2
Total	25-29	93	35

## 3. Market Characterization

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

### Market Actors

The four primary market actors in the computer power supply demand and supply chain are:

**System Integrators (SIs):** These companies purchase components from other manufacturers and assemble computers, typically for commercial applications. System integrators are also known as computer manufacturers, although they normally do not manufacture their own component parts.

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

**Computer Original Equipment Manufacturers (OEMs):** These companies manufacture computers and/or servers in high volume, and include popular brands such as Dell, Hewlett Packard (HP), and Gateway.

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

### Market Progress

Perhaps the greatest success for the 80 PLUS program is the Energy Star 4.0 computer specification, effective July 2007. Energy Star certified computers must now include the 80 PLUS power supply (or equivalent). While sales of 80 PLUS power supplies have consistently fallen short of the targeted goals, the introduction of the new Energy Star 4.0 standards should increase sales. Already computer manufacturers have incorporated 80 PLUS power supplies into several of their computer models.<sup>1</sup>

Additionally, since MPER #1, the two largest OEMs, Dell and Hewlett Packard (HP), committed to participate in the 80 PLUS program. HP joined in November 2006 and released its first product incorporating 80 PLUS four months before Energy Star 4.0 came into effect. Dell joined

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<sup>1</sup> The Energy Star website list dated Oct. 29, 2007 includes 564 models with the caveat that some are not available in the U.S. market or are no longer available altogether.

the program shortly after HP. Dell currently offers 19 computers with power supplies that meet the 80 PLUS requirements, four of which are in “typical, everyday” computer models.<sup>2</sup> Both began to claim initiative rebates in December 2007.

**Table 2. Top 5 U.S. Vendors: PC Shipments 2005-2007**

Vendor	2005		2006		2007	
	PC Shipments (Thousands)	Shipments (Thousands)	Shipments (Thousands)	Market Share	Shipments (Thousands)	Market Share
Dell	21,466	35%	20,472	28%	19,645	25%
Hewlett Packard	12,452	20%	14,104	19%	16,759	22%
Gateway	3,924	6%	4,411	6%		
Acer	Not Available		1,421	2%	3,860	5%
Acer/Gateway Merged	Not Available		5,826	8%	6,831	9%
Apple	2,554	4%	3,109	4%	4,081	5%
Toshiba	2,260	4%	2,846	4%	3,509	5%
Others	19,357	31%	20,589	28%	22,235	29%
<b>All Vendors</b>	<b>64,089</b>	<b>100%</b>	<b>65,531</b>	<b>100.00%</b>	<b>70,088</b>	<b>100.0%</b>

Source: MPER #1, Table 2; IDC, January 17, 2006 <<http://www.idc.com/getdoc.jsp?containerId=prUS20525907>> accessed 1/8/08 and IDC Worldwide Quarterly PC Tracker, January 16, 2008 <<http://www.idc.com/getdoc.jsp?containerId=prUS21041708>>. IDC estimates for Gateway & Toshiba are prior to financial earnings reports. PCs include Desktop, Notebook, Ultra Portable, and x86 Servers and do not include handhelds. Shipments include shipments to distribution channels or end users. OEM sales are counted under the vendor/brand under which they are sold. Market share percentages are rounded and might not add up to 100 percent.

Table 2 reports sales and market share of the top six vendors in the U.S. for 2005, 2006, and 2007. Dell and HP continue to lead the market and together account for slightly more than half of all shipments. OEMs dominate a significant portion of the market. However, system integrators (represented in the sales by “others” in Table 2), though individually smaller, still comprise more than a quarter of the market. Gateway’s incorporation of Acer in 2007 established itself as the third largest PC vendor worldwide, overtaking Lenovo.<sup>3</sup> Based on market size, Quantec considers that HP and Dell will be responsible for introducing a large number of 80 PLUS computers into the market.

## Size of the Pacific Northwest Market

The global personal computer and PC power supply markets have continued to grow over the last several years. As shown in Table 2, vendors shipped approximately 65 million personal computers in the U.S. in 2006, up 2.6 percent from the previous year. In 2007, over 70,000 units were shipped. One industry expert estimated that the Pacific Northwest market for personal computer power supplies (both laptops and desktops) is roughly five percent of the U.S. market.<sup>4</sup>

<sup>2</sup> Participant OEM survey.

<sup>3</sup> InfoWorld, August 27, 2007. <[http://www.infoworld.com/article/07/08/27/Acer-buys-Gateway\\_1.html](http://www.infoworld.com/article/07/08/27/Acer-buys-Gateway_1.html)>.

<sup>4</sup> Mohan Mankikar, President, Micro-Tech Consultants, July 2006. Mr. Mankikar speculated that this percentage could be as high as 7 percent.

The NEEA 80 PLUS team uses a lower estimate of 4.1 percent, based on the relative proportion of the Northwest population to the overall U.S. population.<sup>5</sup>

Because most laptops use external power supplies, the market for 80 PLUS is limited to the internal power supplies found in desktop PCs and servers. MPER #1 reported that an earlier Quantec study estimated that in 2003, 72.5 percent of all computers sold were desktops.<sup>6</sup> NEEA used this value in its estimate for 2004 through 2008 sales. An increasing tendency towards laptops, however, has contributed to a gradual decrease in desktop computer market share. A recent study cited in the Wall Street Journal indicates that desktops make up roughly 63 percent of the PC market, a 10 percent decrease in only four years.<sup>7</sup> This development limits the number of computers that can include 80 PLUS power supplies.

Analysts for IDC report that "The market is going through a phase of tremendous growth as PCs shift from productivity tools to lifestyle device. Most noticeable is the emergence of notebooks as the dominant PC form factor over desktops."<sup>8</sup> In another report, IDC states that in the second quarter of 2007, notebook shipments remained strong, even in budget and price-sensitive geographies. In contrast, desktop sales growth in mature regions is under pressure, and essentially continues to contract.<sup>9</sup> Industry sources note mobility is a key feature for consumers, explaining why notebook sales are growing faster than desktops. If this trend holds, the commercial desktop's market share as a percentage will slowly decline.

The strategy of the 80 PLUS initiative has focused on demand in the commercial sector, particularly commercial users that purchase a high volume of PCs. Similar to the decrease in demand for desktop PCs, the commercial sector also faces a relatively weaker presence in the market. According to IDC, consumer PC sales grew 19 percent while commercial PC sales grew by only 11.7 percent for 2006.<sup>10</sup> One expert from *BusinessWeek* stated that the commercial sector constituted 59 percent of the PC market in 2007.<sup>11</sup>

Assuming 65,531,000 PCs were shipped in the U.S. in 2006, and 4.1 percent were sold in the Northwest, 63 percent were desktop PCs, and 59 percent were commercial applications, the power supply market for desktop PCs in commercial applications in 2006 was approximately 998,673 units.

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<sup>5</sup> The Census Bureau estimates that the population of the states of Oregon, Washington, Idaho, and Montana is approximately 4.1 percent of the total U.S. population.

<sup>6</sup> Quantec, LLC, "Surveyor Network Energy Manager: Market Progress Evaluation Report #2," January 2005, Prepared for the Northwest Energy Efficiency Alliance.

<sup>7</sup> Christopher Lawton. The Laptop as Desktop; More People Ditch Bulky PCs As Notebooks Add Power; Battery Life Is a Weak Spot Wall Street Journal. (Eastern edition). New York, N.Y.: May 23, 2007. pg. D.1.

<sup>8</sup> Richard Shim, research manager with IDC's Personal Computing team. IDC. "Worldwide and U.S. PC Client Form Factor 2007–2011 Forecast. Dec 2007" <<http://www.idc.com/getdoc.jsp?containerId=209622>>

<sup>9</sup> Doug Bell, PC Tracker analyst. "Worldwide PC Market: 2Q07 Review" Sept. 2007. <<http://www.idc.com/getdoc.jsp?containerId=208755>>

<sup>10</sup> Steve Hamm and Jay Greene, That Computer Is So You. 1/2/2008. <[http://www.businessweek.com/magazine/content/08\\_02/b4066000313325.htm](http://www.businessweek.com/magazine/content/08_02/b4066000313325.htm)>

<sup>11</sup> Ibid.

**Table 3. Potential Northwest Market**

Category	Share of Market (2005)	Share of Market (2006)	Number of Units (2006)
Units Sold in US	64,089,000	65,531,000	65,531,000
Size of NW Market	4.1%	4.1%	2,686,771
Size of Desktop Market	72.5%	63%	1,692,666
Size of Commercial PC Market	61.8%	59%	998,673

## 4. Market Progress Assessment

### Market Progress Indicators

At the outset of the initiative, NEEA formulated a logic model for the first MPER. Five key market progress indicators were included in the 80 PLUS initiative logic model, which are discussed in more detail in Appendix B. Table 4 reports the change in these market progress indicators from MPER #1 through December 2007.

A review of the progress indicators shows that, on balance, the 80 PLUS initiative succeeded in meeting the majority of its goals, and the market for power supplies is undergoing transformation. This transformation is occurring more slowly than anticipated, and there continue to be problems quantifying sales through the submission of rebate applications. However, the number of market actors is increasing, and power suppliers are offering and selling a considerable number of 80 PLUS power supplies.

**Table 4. Market Progress Indicators**

Category	Indicator	Market Progress - MPER #1 through July 2006	Market Progress - MPER #1 through December 2007
Availability	Certified power supply units (SKUs)	35	403
Availability	Power supply units being tested for certification	20	50+
Availability/Participation	PS manufacturing firms with certified units	19	65
Availability/Participation	Participating System Integrators	10	51
Availability/Participation	Computer OEMs with certified units	0	2 OEM with 28 PS SKUs
Participation	Number of 80 PLUS Program Sponsors	12	13
Sales & Market Share	Sales of 80 PLUS PCs	Increasing but below goals	Increasing but below goals
Energy Star Specification	80 PLUS specifications included in revised ES 4.0 computer specifications	Pending	Effective July 2007
Incremental Cost	Decreasing incremental cost	Decreasing from initial estimates	Slowly decreasing from initial estimates
Awareness	Promotion of 80 PLUS by PS Manufacturers, System Integrators	Increasing	Increasing
Awareness	End users aware of 80 PLUS	Just developing	Increasing
Perceived Value	End users value and request 80 PLUS (e.g., in purchasing specs)	Just developing	Increasing, due to OEM marketing push

Source: MPER #1, Table 3; MPER #2 interviews; secondary internet research. <<http://www.80PLUS.org>>; personal correspondence with Ecos Consulting 1/18/08.

### Product Availability and Participation in 80 PLUS

When 80 PLUS launched in the spring of 2004, only one prototype power supply was available. Early program goals included: (1) starting a dialogue with large Tier 1 power supply manufacturers; (2) recruiting Tier 2 power supply manufacturers; (3) increasing the number of

certified units available; and, (4) recruiting program sponsors who could provide incentives to system integrators for each 80 PLUS power supply shipped.

The program has experienced substantial growth since its launch. As shown in Table 4 in the section above, the number of participating power supply manufacturers grew from 19 to 65.<sup>12</sup> These include half of the top ten power supply manufacturers, ranked by number of units sold worldwide.<sup>13</sup> Manufacturers certified 403 units of varying wattage compared to 35 in MPER #1.<sup>14</sup> In addition, two large OEMs (Dell and HP) have joined the program, as have a considerable number of system integrators. The initiative has also successfully increased the number of sponsoring utilities, non-profit utility consortiums, and government agencies.

The 80 PLUS initiative focused considerable effort on the market actors who could ultimately supply the market. The evaluation team finds that the 80 PLUS program achieved success by involving the right market actors and creating product supply. This was necessary to ensure product was available to meet demand.

Although the 80 PLUS program had a slower than anticipated start and continues to fall short of its sales goals, it has met great success engaging key market players, particularly power supply manufacturers and OEMs. Without the power supply manufacturers, a respondent from NEEA noted that inclusion of 80 PLUS in the new Energy Star 4.0 standard would not have happened.

Additionally, availability of 80 PLUS power supplies influenced HP and Dell to participate by giving them a variety of power supply options. According to another NEEA respondent, Ecos played a significant role in getting the right people on board, including the EPA. Ecos had already completed the necessary measurements and research to demonstrate the achievability of 80 percent efficiency. Furthermore, NEEA's willingness to back the project helped substantiate the effort by letting the industry know that an entire region supported 80 PLUS.

## Sales and Market Share

To date, the number of incentives claimed for 80 PLUS units is below target, as the initiative only achieved 34 percent of the 2007 forecasted sales. However, this number does not tell the entire story in two important ways. First, 2007 incentives were mostly clustered in December, when rebates from HP and Dell began to be processed. This suggests that 2008 sales will be

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<sup>12</sup> <<http://www.80PLUS.org>> accessed on January 12, 2008. Correspondence from Ecos dated 1/18/08 with final 2007 data. Fifty-five power supply manufacturers currently have certified 80 PLUS power supplies in production; an additional ten have power supplies either in pre-production or in the reference design phase, bringing the total number of participating power supply manufacturers to 65. More than 50 power supply units are currently undergoing tests for certification.

<sup>12</sup> What do you think contributed to the inclusion of the 80 PLUS power supply in the EnergyStar standards?

<sup>13</sup> Power Supply Manufacturers Association Industry Market Update July 2006  
<[http://www.psma.com/ul\\_files/info/ind\\_info/Intro\\_MM-PSMA\\_PSMA\\_July2006.pdf](http://www.psma.com/ul_files/info/ind_info/Intro_MM-PSMA_PSMA_July2006.pdf)>

<sup>14</sup> <<http://www.80PLUS.org>> This number only includes models currently in production; other models are in pre-production or in reference design.

much stronger with HP and Dell on board. Second, system integrators are selling 80 PLUS units without submitting rebates. These units are not considered in the total incentives paid, creating a false illusion of fewer sales of 80 PLUS equipped computers than is the case.

**Table 5. Sales Forecast and Incentives Paid, 2006-2007<sup>15</sup>**

	January to June 2006	July to August 2006	2007
Sales Forecast	6,671	80,000	60,000
Number of Incentives Paid in NW	1,185	1,762	20,326
Percent of forecast achieved	18%	2%	34%

Source: MPER #1 Table 5; NEEA Incentive Tracker, Nov. 2007; NEEA correspondence, Jan. 2008.

MPER #1 identified several reasons sales fell short of goals that continue to hold true:

- The effort required to transform the market to both ensure supply and increase market demand was greater and more time consuming than originally anticipated. Multiple players are involved with interdependent needs. With the available financial program resources, it was necessary to concentrate on creating supply before creating demand. With the close of MPER #2, it appears the initiative has addressed issues regarding supply.
- Short-term incremental cost dropped more slowly than anticipated and remains high. It also varies across market actors.

Respondents were asked if they thought sales would increase, decrease, or stay the same in the next year. Nearly all respondents stated sales would increase over time (see Appendix A, Table 15). Table 5, which shows increasing sales over time, supports this prediction.

The target market includes the top three PC vendors in the U.S. The top two vendors, HP and Dell, became participants in December 2007, and hold over 50 percent of PC market share. The December 2007 80 PLUS rebates by Dell and HP alone represented one percent of the estimated Northwest desktop computer market share.<sup>16</sup>

## Energy Star 4.0 Specification

The new Energy Star 4.0 specification for computers came into effect in July 2007, incorporating the 80 PLUS power supply. Table 6 summarizes respondents' perceptions about the effect of the Energy Star specification on 80 PLUS sales. Since the specification came into effect, both large OEMs interviewed noticed an increase not only in sales, but also in customer demand. One OEM respondent attributes the rise in customer demand to a heightened awareness of energy efficiency

<sup>15</sup> Projections and forecasts were revised downward several times. Original forecasts called for 70,000 sales in 2005, and 224,910 in 2006. 2006 forecasts were subsequently revised downward to 6,671 for the first half 2006 and 105,700 for second half of 2006. Forecasts were again revised to 80,000 in 2006.

<sup>16</sup> Estimated 2006 Northwest desktop computer market share is 998,672 computers of all computers shipped.



in general.<sup>17</sup> However, when asked if 80 PLUS will become the new standard for power supplies because of Energy Star, one OEM respondent said the new specifications require a change in architecture and manufacturing,<sup>18</sup> making them harder to meet. For this reason, that OEM will not necessarily adopt Energy Star 4.0 as its new standard.<sup>19</sup>

**Table 6. Perceptions of Sales**

Do you see your sales of 80 PLUS units increasing, decreasing, or staying the same during next 12 months?	Participant		
	Power supply manufacturers (n=3)	OEMs (n=2)	System integrators (n=4)
Sales of 80 PLUS will increase	3	2	2
Sales are increasing, but not sure that is due to specific demand for 80 PLUS or other factors			1

Participating system integrators and power supply manufacturers also acknowledged Energy Star’s effect within the market for 80 PLUS power supplies. One power supply manufacturer and one power supply designer said they noticed an increase in 80 PLUS sales because of the Energy Star label. Additionally, two power supply manufacturers will likely adopt 80 PLUS as the standard for all power supplies.<sup>20</sup> In contrast, the system integrators did not feel Energy Star was a big driver in terms of increased sales. One system integrator said he did not need the Energy Star specification to influence his decision to make 80 PLUS the standard for power supplies he purchased. This respondent did say, however, that even if Energy Star may not increase sales, manufacturers who choose not to produce compliant products miss other opportunities.<sup>21</sup>

When asked who the important players were in adopting 80 PLUS for the 4.0 specification, both respondents from the EPA attributed much of the background work to Ecos. Ecos performed the necessary research proving achievability of 80 percent efficiency in power supplies, presenting it to the EPA. In addition to providing the information, Ecos also understood the EPA’s process for

<sup>17</sup> Do you see your sales of 80 PLUS increasing, decreasing, or staying the same during next 12 months? Why? Do you think that the EnergyStar specifications have already influenced or will influence sales of 80 PLUS power supplies? How so?

<sup>18</sup> Architecture refers to the power supply’s physical structure, including for example, the control module and intake and exhaust air ports. Changes in this structure will require manufacturing changes.

<sup>19</sup> Now that EnergyStar 4.0 specifications have been established, is your company likely to make the 80 PLUS power supplies the standard? Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?

<sup>20</sup> The two manufacturers report 80 PLUS is standard practice because it benefits the customer and company. One noted they try to stay ahead of others and are working on 85+ and 90+ units. Neither respondent was in the top ten most active manufacturers. Survey questions for various market actors included: Do you think that the EnergyStar specifications have already influenced or will influence sales of 80 PLUS power supplies? How so? Does an EnergyStar label bring in more sales? Are customers demanding it? Now that EnergyStar 4.0 specifications have been established, is your company likely to make the 80 PLUS power supplies the standard?

<sup>21</sup> See 20.

adopting new specifications.<sup>22</sup> EPA respondents believe the EPA has had a positive effect on the 80 PLUS initiative due to the increase in certified power supply models and manufacturers.

Intuitively, the Energy Star specification should affect the 80 PLUS market positively, whether through increasing awareness of energy efficiency in desktops or in pushing the standard for efficiency upward, thus causing power supply manufacturers to adopt 80 PLUS as the standard. Respondents from NEEA believe Energy Star's adoption of 80 PLUS is one of the program's biggest successes.<sup>23</sup> How long it will take the industry to embrace the new standard remains unknown. One OEM reports it might be 2009 before it can feasibly ramp up to full production of 80 PLUS power supplies, given the change in architecture that needs to occur.<sup>24</sup> This report is written only six months since the release of the Energy Star 4.0 specification, and Energy Star 3.0 inventory is still on shelves. Quantec expects to see an increasing presence of 4.0 compliant computers in the marketplace within the next year.

## Non-Energy Benefits

Participants including end users, power supply manufacturers, OEMs, and system integrators were asked if they experienced benefits from the 80 PLUS power supply beyond the energy savings. Participants listed and appreciated additional benefits, as illustrated in Table 7.

The non-energy benefits named were similar to those mentioned in MPER #1. The two most popular non-energy benefits were cooling savings and product differentiation. Four mentioned reduced heat production and greater cooling savings, which is particularly important in buildings with many computers in one location. Four respondents appreciated that 80 PLUS is a green product and offered an opportunity for market differentiation. Another explained that 80 PLUS is a higher quality product and less prone to failure. Two stated the product increased reliability overall, and one reported it is more quiet.

One system integrator noted:

*We use 80 PLUS to differentiate ourselves, it is a green world, it is a great feature. We explain the reliability to our customers; the high quality of the power supplies because of less heat in the chassis. My customers love them, now ask for them by name, but we educated the customers about them. The power supply is one of the more common parts of the computer system to fail, and 80 PLUS is more reliable, that is a big point, the quality.*

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<sup>22</sup> What influenced EPA's decision to include the 80 Plus standard in the 4.0 specification? Who do you think were some of the most important players to contribute to the development of the EnergyStar specifications?

<sup>23</sup> Northwest Energy Efficiency Alliance survey.

<sup>24</sup> Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit? If so, what is the incremental cost?

Two end users purchased 80 PLUS because of their focus on green products. One of these end users stated they purchased the computers for their new LEED Gold Certified building, and, while the 80 PLUS computers in this building represented only one percent of all computers, they were on a four to five year replacement schedule. Next year 20 percent to 25 percent of their 15,000 computers will be replaced with 80 PLUS. The second end user interviewed stated their purchase represented about one-fifth of the total computers, and all 500 will be 80 PLUS because it is now a permanent requirement.

**Table 7. Other Benefits of 80 PLUS Power Supplies**

Are there non-energy benefits associated with 80 PLUS PCs that played a role or had importance?*	Participants				Total
	Power supply manufacturers (n=3)	OEMs (n=2)	System integrators (n=4)	End-use customers (n=2)	
Cooling savings; less heat produced	1	1	1	1	4
Market differentiation; "green" product	1		1	2	4
Higher quality product; less prone to failure	1		2		3
Increased reliability for the whole system	2				2
Reduced costs over the long term	1				1
Quieter				1	1

\*More than one response allowed.

Future marketing and educational efforts, particularly those targeting end users, could capitalize on the “green product” aspect of the 80 PLUS power supply. This message will dovetail with the market differentiation efforts of participating system integrators.

## Market Barriers

Two key market barriers remain: (1) incremental cost; and, (2) lack of customer awareness. Both barriers were identified in discussions about product availability and participation in the initiative. Table 8 summarizes themes related to 80 PLUS availability and participation that emerged in interviews with participants and nonparticipants. Respondents reported more demand-side emphasis is needed, particularly consumer education. Respondents also reported that cost remains a market barrier, given the 80 PLUS power supply’s incremental cost.

**Table 8. Availability and Participation Key Discussion Themes**

Response Theme	Participant			Nonparticipant		EPA Staff (n=2)	NEEA Staff (n=2)	80 PLUS team (n=3)
	Power supply manufacturers (n=3)	OEMs (n=2)	System integrators (n=4)	System integrators (n=4)	End-use customers (n=2)			
More emphasis needed on demand side (education is a big component)	1	2	2	1			2	3
There is an incremental cost with 80 PLUS power supplies. Cost is still a market barrier	2	2	1	1	2	1	2	3

Source: Drawn from survey responses to questions regarding program goals, activities, incentives and incremental cost, product fit with current product offerings, product availability, and barriers to adoption

## Incremental Cost

Incremental cost remains high, despite the expectation that increased supply would drive down the cost for an 80 PLUS system. In MPER #1, Quantec reported average incremental costs to manufacture 80 PLUS power supplies were \$10 to \$20. In this round of interviews, we discovered that the incremental cost ranged between \$5 to \$45, with most respondents replying that the incremental cost was \$15 or more.

Table 9 illustrates that 80 percent of respondents across all groups interviewed for this MPER continue to experience an incremental cost with manufacture or system integrator’s purchase of 80 PLUS power supplies. Only one nonparticipant system integrator and one participant end user stated there is no incremental cost.

Persistently high incremental costs fall into two categories. The first includes system integrators and OEMs that buy the power supply and chassis separately. This group experiences the lowest incremental cost, starting at \$5 and increasing dependent on the features of the power supply. The second group contains system integrators that purchase a computer chassis that is bundled with a low efficiency power supply, which is how some chassis are sold. This group must remove the inefficient supply and replace it with an efficient power supply, making the total incremental cost effectively \$25 to \$45 dollars.

**Table 9. 80 PLUS Power Supply Incremental Costs**

Is there an incremental cost to produce or purchase an 80 PLUS power supply vs. a non-80 PLUS unit?	Participant power supply manufacturers (n=3)	Participant OEMs (n=2)	Participant End user customers (n=2)	Participant system integrators (n=4)	Nonparticipant system integrators (n=4)	Total	Percent
No idea about costs	1					1	7%
No incremental cost			1		1	2	13%
Yes, there are incremental costs	2	2	1	4	3	12	80%
Total	3	2	2	4	4	15	100%

However, power supply manufacturers, OEM, and system integrators stated they did expect the incremental cost to decrease with increased demand, standardization, and economies of scale.<sup>25</sup> One power supply manufacturer and one system integrator noted the incremental cost had fallen \$5 in the last 18 months since MPER #1, and three did not experience a reduction in the incremental cost.

Evaluators asked respondents if they pass on incremental costs to purchasers.<sup>26</sup> Of the seven able to answer, all reported that they pass along costs. Two system integrators explained that part of the incremental cost was passed on to the consumer, part was covered by the rebates and the rest was absorbed by the company itself. These respondents applied for the rebates, using it to cover administrative costs and to incent salespeople to sell the benefits of a more expensive system.

In summary, the evaluation team finds incremental costs reported by 80 percent of respondents, with estimates ranging from \$5 to \$45, and 33 percent to 50 percent over standard cost.

<sup>25</sup> Have you seen a change in incremental cost during the last 18 months? How so? Is it likely to come down now with EnergyStar 4.0?

<sup>26</sup> Is the incremental cost being passed onto the buyer? From your experience with the computers you purchased, do you know if there is an incremental cost of computers with 80 PLUS power supplies?

Incremental costs have decreased for some over the last 18 months and respondents expect costs to decrease with additional demand, economies of scale, and standardization.

## Market Partner Awareness

The first MPER in July of 2006 found a general lack of awareness of the 80 PLUS product among market actors. At that time, respondents' reported lack of awareness was a significant issue. About one-third of nonparticipant market actors interviewed for this MPER reported they were not familiar with 80 PLUS power supplies, indicating a continued lack of awareness in the market (33 percent; two large end users and two power supply manufacturers). Of the eight nonparticipants (66 percent) aware of 80 PLUS power supplies, six learned about them through their vendor and two through Ecos. It should be noted that none of the nonparticipating manufacturers knew specifically about the 80 PLUS initiative.

Two nonparticipant system integrators stated they are selling 80 PLUS without the program. One is not participating until their legal department completes a resale agreement. The second said they do not plan to join until they can produce the PC. One OEM is not participating because sales data are proprietary. Sales data, i.e., confirmation of shipments within participating service territories are required for rebates. Because the sales data are proprietary, this means that OEM cannot comply with requirements necessary to receive the rebate.

Participants report a mixed picture of demand for 80 PLUS over the last 18 months (since MPER #1). Three participant respondents stated demand for 80 PLUS has been slow to build, but has grown over the last 18 months,. Two other respondents reported customers do not request the product; they must market 80 PLUS. Two stated they had not seen an increase in awareness or demand over the last 18 months. None of these responses suggest strong demand, but seem to portray a market demand that is very slowly increasing.

Educating potential purchasers, (the end users), about the benefits and availability of 80 PLUS power supplies, seems to be a key piece that needs program focus. As mentioned above, the program successfully created the necessary product, and must now shift its focus to creating a substantial demand. Both large OEM respondents agreed educating consumers about the availability of the product as well as its benefits will help push the program in the right direction.<sup>27</sup> Respondents from Ecos also confirmed this.<sup>28</sup>

End users who know about 80 PLUS do perceive value in this product. Market actors, including system integrators, power supply manufacturers, and large OEMs can (and already do) increase

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<sup>27</sup> From your perspective, Do you think there are barriers to widespread adoption of 80 PLUS power supplies? What are they? How have the market barriers changed in the last 18 months – have they increased, decreased, or stayed the same?

<sup>28</sup> Please describe the program's supply side and demand side activities. Where is the emphasis? Do you feel the balance is appropriate? Why do you say that? Are the various market actors as involved as you think they should or could be? If not, why not? If some actors are more involved than others, what contributes to that involvement?

demand through education, sales, and marketing. Increased demand will help to drive down costs.

However, as noted elsewhere, rebates assist these marketing efforts. For example, two power supply manufacturers stated the rebates are important to keep costs down. Both explained they would like to see more utilities involved in the initiative. One noticed that more coordination is needed between stakeholders (e.g., utilities and media) to get the word out, given a market climate receptive to energy efficiency.

The evaluation team concludes that overall, market actors recognize the energy and non-energy benefits of 80 PLUS power supplies. Customer awareness is growing, but continued effort is needed to educate end users and create market demand for the product. This remains a key component of successful market transformation.

## 5. Review of the ACE Model

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NEEA developed many of the assumptions included in their Cost Effectiveness (ACE) model in 2004 and 2005. In MPER #1, Quantec reviewed the ACE model and reported the incremental cost was higher than assumed and sales fell short of goals. This market progress evaluation revisits the model's assumptions and recommends course corrections.

### Energy Savings

Tests performed by Intel and EPRI's Power Electronics Applications Center showed 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 ACE model uses a conservative approach and estimates average 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 the incremental cost of an 80 PLUS power supply over a standard power supply was \$5. This parameter is the basis for the 80 PLUS buy-down system. The model further anticipated the initial costs would decrease over time and stabilize at an incremental cost of \$2.50 in seven years (2010).

Manufacturers and system integrators who were interviewed (both participant and non-participants able to answer the question) reported the incremental cost of manufacturing qualified 80 PLUS power supply and incorporating the power supply in their units was greater than \$5. MPER #1 interview respondents reported the incremental cost was \$10-\$20. MPER #2 interviews find the incremental cost varies by market actor, is higher than anticipated for some actors, and is dropping more slowly than anticipated, as discussed in Chapter 4. Based on these findings, we recommend the cost-effectiveness model use a higher initial cost for the first five years of the program (through 2008).

Table 10 provides suggested revisions for the program model, noting the average incremental cost experienced by different market actors. We suggest it may take another four years for the incremental cost to drop to levels initially expected in 2010, assuming the incremental cost drops another \$5 in 2008 and 2009.<sup>29</sup>

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<sup>29</sup> Two respondents reported a \$5 reduction in incremental cost in the last 18 months, and a third reported a \$9 reduction.



**Table 10. Incremental Cost Assumptions**

Year	ACE Model	MPER #1 Estimated Average Incremental Cost	MPER #2 Estimated Average Incremental Cost
2004	\$5.00	\$30.00	\$30.00
2005	\$5.00	\$20.00	\$20.00
2006	\$5.00	\$15.00	\$17.00
2007	\$4.38	\$7.50	\$11 PS manufacturers \$38 system integrators \$10 large end user \$32 average all actors
2008	\$3.75	\$3.75	\$10.00 PS manufacturers
2009	\$3.13	\$3.13	\$5.00
2010	\$2.50	\$2.50	\$3.75
2011	\$2.50	\$2.50	\$2.50
2012	\$2.50	\$2.50	\$2.50
2013	\$2.50	\$2.50	\$2.50
2014	\$2.50	\$2.50	\$2.50
2015	\$2.50	\$2.50	\$2.50

Source: MPER #1, Table 6; Survey questions regarding incremental cost: From your experience with the computers you purchased, do you know if there is an incremental cost of computers with 80 PLUS power supplies?

## Units Shipped

The March 29, 2005 NEEA 80 PLUS ACE model key assumptions show estimated sales of 50,000 80 PLUS units in 2005 and 238,000 units in 2006.<sup>30</sup> Goals were revised in 2006 to 105,700 units. That sales goal was revised further to 80,000. Final sales goals for 2007 were 60,000 units.

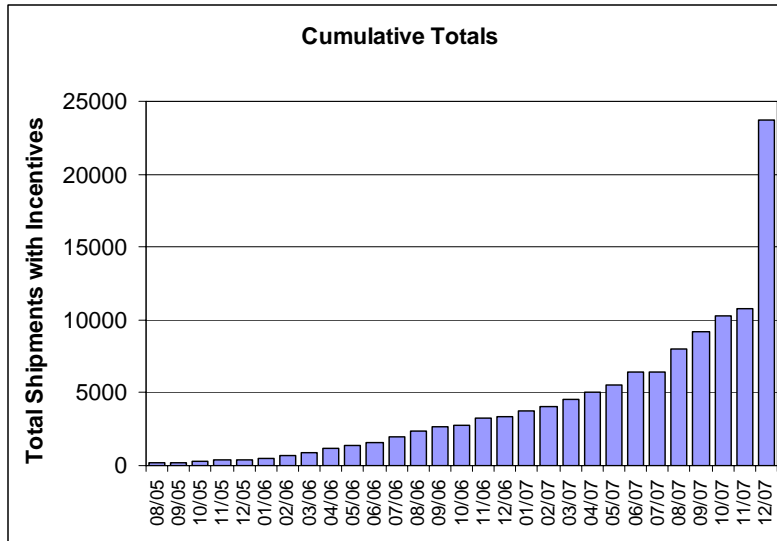
As discussed in Chapter 4 and shown in Table 5, current sales have been well below these goals. From August 2005 through November 2007, 7,402 units shipped with incentive applications submitted. In December 2007, an additional 12,924 incentives were paid. Total program sales from August 2005 through December 2007 were 23,671 80 PLUS units. Sales varied significantly by month (Table 12). Figure 1 shows cumulative sales of 80 PLUS units from 2005 through 2007. Appendix A provides additional monthly sales data.

The total program sales of 23,671 units are significantly below the 224,910 units originally forecast for 2006. In 2007 alone, sales of 20,326 units met 33.9 percent of the 60,000 unit target for 2007, with December shipments responsible for meeting 21.5 percent of goal. Dell and HP December rebates represent 3 percent of their projected 2006 NW sales shown in Table 11.<sup>31</sup>

<sup>30</sup> The forecasted 2006 units included some residential sales.

<sup>31</sup> Table 11 shows 2006 Dell and HP Northwest sales estimates are 527,000. Dell and HP applied for 10,276 rebates in 2007, representing 3% of 2006 projections.

**Figure 1. Cumulative Northwest 80 PLUS Shipments with Incentives, 2005-2007**



Source: ECOS and NEEA monthly reports.

Overall, while shipments verified with incentive applications fell short of 2005 through 2007 goals, it appears possible, with the participation of two large OEMs and all other vendors, that a goal of 100,000 shipped units can be met if 10 percent of target market sales are 80 PLUS units. This estimate includes shipments with and without incentive applications (Table 11). These estimates are projections based on 2006 sales and represent one scenario. Manufacturers shown in the table, including Dell and HP, did not indicate specific 80 PLUS sales goals.

**Table 11. Examples of Northwest 80 PLUS Sales Scenarios for OEMs**

Manufacturer	2006 PC Sales* (Thousands)	2006 Market Share*	Total Projected 2006 NW Sales	80 PLUS Sales Scenarios		
				80 PLUS 5% of Sales	80 PLUS 10% of Sales	80 PLUS 25% of Sales
Dell	20,472	31.20%	311,987	15,599	31,199	46,798
Hewlett Packard	14,104	21.50%	214,941	10,747	21,494	32,241
Gateway	4,411	6.70%	67,222	3,361	6,722	10,083
Apple	3,109	4.70%	47,380	2,369	4,738	7,107
Toshiba	2,846	4.30%	43,372	2,169	4,337	6,506
Others	20,589	31.40%	313,770	15,689	31,377	47,066
All Vendors	65,531	100.00%	998,673	49,934	99,867**	149,801

\*Source: <IDC, January 17, 2006 <http://www.idc.com/getdoc.jsp?containerId=prUS20525907>> accessed 1/8/08.

IDC estimates for Gateway & Toshiba are prior to financial earnings reports. See Table 4.

\*\*If 10% of all sales include 80 PLUS units, nearly 100,000 units will be shipped.



## 6. Conclusions and Recommendations

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The 80 PLUS initiative created a unique forum that united NEEA with electric utilities and the computer industry to bring energy efficient power supplies to desktop computers and servers. To transform the computer power supply market, the initiative was required to stimulate both market supply and demand. The program's first years necessarily focused on pushing the market by engaging large-volume actors who could supply the product. Product supply is no longer a potential barrier, and implementers are moving forward to develop the next level of energy efficient 80 PLUS products.

Market transformation is not complete; however, the market appears to be at a tipping point. Now seems to be the right time to increase the market buzz and work with sponsoring utilities and their key account managers to identify large-end users and key purchasing decision makers to increase awareness and demand for the product. Marketing can build on the Energy Star 4.0 standards and participation of HP, Dell, and other participating manufacturers and system integrators to increase public awareness and demand.

### Conclusions

The market for 80 PLUS power supplies has begun to transform. In the spring of 2004, only one prototype power supply existed. By June 2006, 35 certified power supplies were on the market. At the end of December 2007, Electric Power Research Institute (EPRI) had certified 403 power supplies of various wattages.

Early program goals included engaging the power supply manufacturers to build the power supplies and starting a dialogue to recruit large (tier one) power supply manufacturers. The 80 PLUS initiative reached out to both system integrators and OEMs. While members of the computer industry were initially skeptical that power supplies could meet the 80 PLUS standard, there are now sixty-five (65) power supply manufacturers participating, including five of the top ten worldwide.<sup>32</sup> The 51 participating system integrators include nearly all of the large volume players that ship nationally and regionally. The two largest OEMs (Dell and HP) are now initiative participants.

### Key Goals Met

The evaluation team concludes that the 80 PLUS initiative met the majority of its goals to transform the market for computer power supplies. These goals include:

1. **Recruiting Program Sponsors:** Ecos Consulting recruited program sponsors that provide additional financial support to fund incentives paid to manufacturers for each 80

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<sup>32</sup> Three of the remaining five are involved with the Ecos server power supply research project.

PLUS shipped. In December 2007, there were 13 sponsors offering financial support for incentives.

2. **Influencing the new Energy Star protocol:** Ecos worked with the EPA to include upgrades to the Energy Star computer specifications. Energy Star 4.0 is the first Energy Star specification not dependent on the operational mode of the personal computer to be effective. Ecos' efforts were instrumental in moving the EPA to include the 80 PLUS power supply in the 2007 Energy Star 4.0 standards. Without this effort, it is unlikely the standards would include 80 PLUS.
3. **Recruiting the two largest OEMs:** A significant achievement of the initiative is that the two largest OEMs, HP and Dell, signed on to participate and began to receive rebates in December 2007. Together, HP and Dell hold more than 50 percent of the computer market. Their participation holds great promise for future 80 PLUS sales.
4. **Increasing the number of 80 PLUS power supplies:** Beginning with one prototype power supply, Ecos increased the available models to 403 power supplies by the end of 2007.

## Trends and Issues

**Shipments of incented units are still below the targeted numbers**, despite these considerable successes. While shipments are below target, the December 2007 shipments more than doubled all previous numbers,<sup>33</sup> ending the year with 20,326 units shipped with incentive applications submitted. While only roughly a third of the year's goal was met, the addition of HP and Dell should substantially improve sales numbers going forward.

**Implementers did not anticipate that releasing sales data associated with rebates would be a barrier** nor did they anticipate the amount of time and effort needed to overcome that barrier. For some OEMs and manufacturers, sales data that include the final shipping destination is proprietary, so providing the data to sponsors to process incentives presents a participation barrier. (At least one OEM chose not to participate for this reason, but will market 80 PLUS computers outside of the initiative.) Ultimately, market transformation will be realized when sales do not require rebates. In the meantime, rebates require sales data to verify shipping to participating utility territories. However, implementers successfully completed nondisclosure and participation agreements with the two participating OEMs. Using this experience as a model, Ecos may be able to keep the number of nonparticipants to a minimum as it continues to target program marketing to nonparticipating OEMs and other large-volume market actors. Quantec supports these activities.

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<sup>33</sup> It should be noted that December figures likely include backlogged numbers. That is, Dell and HP shipments could not be rebated until sales and nondisclosure agreements were finalized in December 2007.

**The implementation team has not focused sufficiently on the demand side of the equation.** Interviews with system integrators revealed that they themselves are educating many of their consumers about 80 PLUS power supplies in order to sell the product. However, system integrators report that once consumers learn about the benefits of the 80 PLUS power supply they are highly receptive.

## Recommendations

Given the remaining challenges, Quantec offers the following recommendations:

1. **Build awareness and demand through educational marketing** to large end-user purchasing departments, IT consultants, those responsible for government and education institution specifications, and vendors. Educating end users, including purchasers and involved decision makers, about the availability and benefits of 80 PLUS power supplies will increase demand and should drive down incremental cost. Respondents reported that IT consultants, vendors, and government contract specifications directed their purchases. End users also relied on their vendor to provide Energy Star and energy efficient computers.
2. **NEEA and initiative sponsors should continue to offer incentives to reduce incremental cost** as the market builds. The entry of the two largest OEMs in 80 PLUS (HP and Dell) in December 2007 is beginning to add 80 PLUS units to the market, and their presence should encourage additional companies to participate. Market actors expect significant increases in power supply shipments will reduce incremental cost.
3. **Ecos should identify the companies selling cases with the power supply installed and then encourage these companies to use the 80 PLUS power supply.** Incentives could be offered to install the 80 PLUS power supply in cases shipped with the power supply installed. Some system integrators purchase computer cases or chassis with the power supply installed, as discussed in the incremental cost section above. In that case, converting to 80 PLUS requires purchase of the 80 PLUS power supply, removal of the standard supply, and installation of the 80 PLUS unit. Incorporating 80 PLUS as the standard power supply into computer cases and chassis sold to system integrators will significantly reduce the incremental cost experienced by system integrators.
4. **Retain the 2007 goal of 60,000 units for 2008.** Given the anticipated sales of two large participating OEMs and other vendors, it is possible that the early goal of 100,000 shipped units may be met in 2008.
5. **Adjust the incremental cost model.** A conservative approach to estimating savings leaves the estimated non-energy benefits savings and O&M cost savings assumptions at zero. The interview responses and a review of the NEEA ACE model suggest the original incremental cost estimates were low. It may take another four years for the incremental cost to drop to the levels initially expected in 2010, assuming the incremental cost drops another \$5 in 2008 and 2009.



## Appendix A: 80 PLUS Shipments

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Incentive tracking data provided by NEEA document the number of shipments with incentive applications, August 2005 through December 2007.

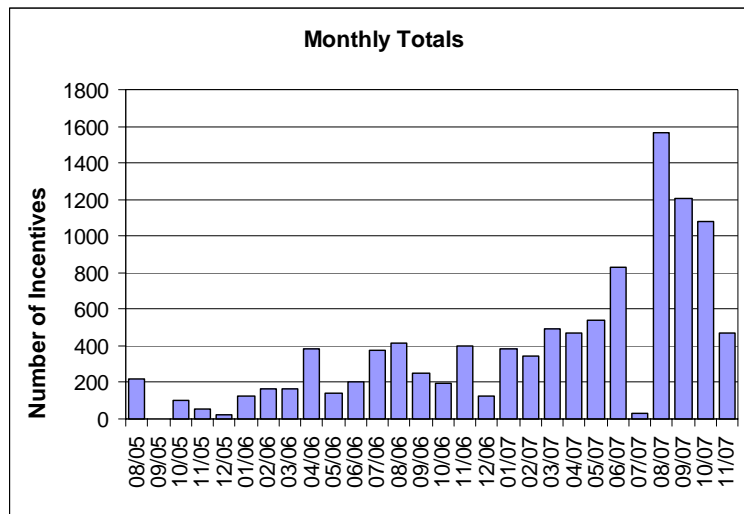
**Table 12. Monthly Incentives 2005-2007**

Month/Year	Total Units	Annual Total	Grand Total
08/05	216	216	216
09/05	2	218	218
10/05	102	320	320
11/05	55	375	375
12/05	23	398	398
<b>Total 2005</b>		<b>398</b>	
01/06	128	128	526
02/06	163	291	689
03/06	163	454	852
04/06	382	836	1234
05/06	142	978	1376
06/06	207	1185	1583
07/06	373	1558	1956
08/06	417	1975	2373
09/06	251	2226	2624
10/06	192	2418	2816
11/06	403	2821	3219
12/06	126	2947	3345
<b>Total 2006</b>		<b>2947</b>	
01/07	382	382	3727
02/07	343	725	4070
03/07	492	1217	4562
04/07	472	1689	5034
05/07	537	2226	5571
06/07	828	3054	6399
07/07	33	3087	6432
08/07	1564	4651	7996
09/07	1208	5859	9204
10/07	1077	6936	10281
11/07	466	7402	10747
12/07	12924	20326	23671
<b>Subtotal 2007</b>		<b>20326</b>	
<b>Grand total shipments</b>			<b>23671</b>



Figure 2 and Figure 3 graph data reported in incentive tracking data provided by NEEA, August 2005 through September 2007. Sales have increased slowly and steadily over time. Figure 2 graphs monthly shipments. Data shows that sales increased dramatically in August and September 2007, with over 1,200 shipments each month. Sales dropped in October and November. However, sales jumped in December, with Antec and HP each contributing over 1,000 units to sales and Dell contributing over 8,900 to Northwest sales (Figure 3). With the new OEM completed agreements, implementers expect this number to rise again in 2008. Figure 1 graphs cumulative shipments from August 2005 through December 2007.

**Figure 2. 80 PLUS Northwest Shipments with Incentive Rebates, by Month**



**Figure 3. December 2007 Incentives**

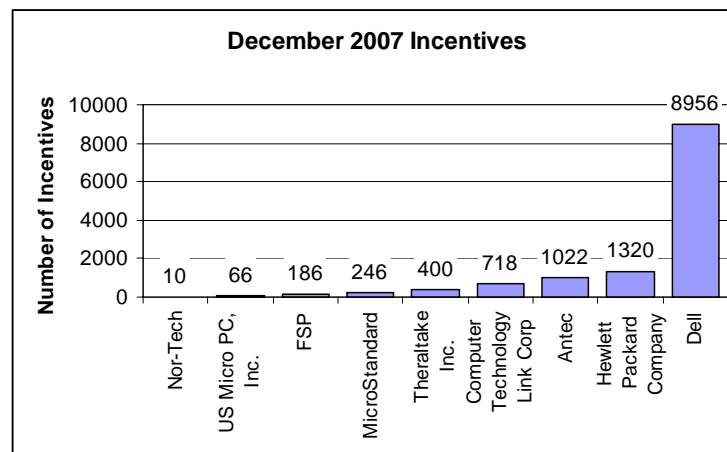


Table 13 shows December activity. December alone represents nearly 54 percent of all 23,671 shipments since August 2005.

**Table 13. December 2007 Incentives**

Company	Shipments
MicroStandard	246
Computer Technology Link Corp	718
Nor-Tech	10
HP	1,320
Antec	1,022
Theraltake Inc.	400
US Micro PC, Inc.	66
Dell	8,956
FSP	186
Total	12,924

As noted in MPER #1 and acknowledged by Ecos and NEEA, the original forecasts of 100,000 units were overly ambitious and underestimated the amount of time it would take to transform the market. It also underestimated the OEM's need to keep market data secure and the time it would take to meet that need and develop participation and nondisclosure agreements. The OEMs completed the agreements in late December 2007 and began to submit applications for shipment incentives. Once this process to track shipments and apply for incentives is fully underway, we can expect the number of shipments to increase. One OEM estimates 10 percent of their sales are 80 PLUS, and it is within the realm of possibility the OEM could continue to meet 10 percent of the overall unit shipment goals. Clearly, the participation of the two OEMs holding 50 percent of market share along with other large manufacturers could catapult 80 PLUS sales. Table 11 in Chapter 4 presents various scenarios based on assumptions discussed earlier.<sup>34</sup> Sales scenarios show goals can be met if 10 percent of Northwest desktop commercial sales include the 80 PLUS power supply.

Although data shows 80 PLUS computers continue to slowly increase market share, the number of computers with 80 PLUS power supplies in the market remains largely unknown. Some system integrators do not currently submit applications for rebates.<sup>35</sup> The two participating OEMs began submitting rebate applications in late December and shipped units without tracking prior to the first applications. This means the number and destination of some 80 PLUS units are not known, making an accurate assessment of 80 PLUS units in the market rather challenging. One manufacturer estimated that they shipped 20,000 80 PLUS without incentives. One OEM interviewed estimated 10 percent of their 40,000,000 worldwide shipments, per quarter, were 80 PLUS. If half the sales are shipped to U.S. locations, this estimate could represent about 2 million 80 PLUS computers sales in the U.S.<sup>36</sup>

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<sup>34</sup> The MPER #1 model input estimates 4.1% of sales are Northwest sales, 61.8% are commercial sales, and 72.5% desktop sales. The projected NW sales are based on the 2006 sales data and updated assumptions discussed in Chapter 3: 4.1% sold in the Northwest, 63% were desktop PCs, and 59% were for commercial applications.

<sup>35</sup> Participant OEM and participant system integrator surveys; interviews with Ecos Consulting.

<sup>36</sup> Ibid.

Table 14 provides self-report estimates of 80 PLUS shipments made by a subset of interview respondents, and includes units shipped in the United States, both with and without rebates. The OEM shipments were made without rebates, as well as 20,000 reported by a manufacturer. Respondents report 80 PLUS units represent between 10 percent to 60 percent of all sales. Respondents also report they anticipate sales will increase.<sup>3738</sup> Based on these very highly estimable numbers, estimates based on these respondents' reports show they shipped 46,500 80 PLUS units into the Northwest over the last 18 months.

**Table 14. Estimates of 80 PLUS Units Shipped Worldwide in Last 18 Months**

How many 80 PLUS power supplies your company has sold and shipped in the past 18 months?	Total 80 PLUS units presented as a range		
	United States		Northwest projection
	Low end	High End	Based on U.S. low end
	PS Manufacturer (n=3)	1,042,000	1,242,000
OEM (n=1)	2,000,000	2,000,000	30,479
System Integrator (n=2)	10,000	11,000	152

Respondents stated that schools, hospitals, larger corporations, and mid-to-small businesses are purchasing computers with 80 PLUS supplies.<sup>39</sup>

Respondents expect sales to increase, Table 15.

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<sup>37</sup> Do you see your sales of 80 PLUS units increasing, decreasing, or staying the same during next 12 months? Why?

<sup>38</sup> Note that these are highly estimable numbers and represent worldwide sales. Using the formula applied previously,

<sup>39</sup> Can you tell me what kind of businesses are specifying the 80 PLUS power supplies? Can you tell me what percentage of your sales that represents?

**Table 15. Perceptions of Sales**

Do you see your sales of 80 PLUS units increasing, decreasing, or staying the same during next 12 months?	Participant		
	Power supply manufacturers (n=3)	OEMs (n=2)	System integrators (n=4)
Sales of 80+ will increase	3	2	2
Sales are increasing, but not sure that is due to specific demand for 80+ or other factors			1

## **Appendix B: Market Progress: Logic Model Short and Long Term Goals**

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The NEEA MPER #1 logic model set out long-term and short-term outcomes. This logic model is presented below. Following that, the next section on Market Progress describes short- and long-term outcomes expected, and progress toward those outcomes for five key market progress indicators included in the 80 PLUS initiative logic models. These key indicators are discussed in Chapter 4 of this report.

### **NEEA Logic Model**

**Table 16. NEE Logic Model**

Situation	Inputs	Activities	Outputs (= "activity indicators")	Outcomes—Short Term (= "market progress indicators")	Outcomes—Longer Term (= "market progress indicators")	Impact
<i>The context and need that gives rise to an initiative</i>	<i>The resources, contributions, and investments made in response to the situation (allow for activities)</i>	<i>What you do with your inputs (lead to outputs)</i>	<i>The desired outputs (tools, materials, plans, etc.) from your activities (lead to outcomes)</i>	<i>The results and benefits</i>	<i>The results and benefits</i>	<i>Changes in the market resulting from the preceding outcomes</i>
<i>Barriers &amp; Opportunities must either be shown in this column or below the chart.</i>	<i>In order to accomplish our set of activities we will need the following:</i>	<i>In order to address our problem we will conduct the following activities:</i>	<i>We expect that if completed or underway these activities will produce the following evidence:</i>	<i>We expect that if completed or ongoing these activities will lead to the following changes in 1-3 years</i>	<i>We expect that if completed or ongoing these activities will lead to the following changes in 4-6 years</i>	<i>We expect that if the preceding outcomes are achieved, activities will lead to the following changes in 7-10 years</i>
Barriers: - Desktop computer power supplies are treated as a commodity, differentiated by price instead of performance. - No supply of more efficient power supplies. - No testing protocol to verify power supply efficiency. - Likely cost differential between conventional and efficient power supplies. - Existing ENERGY STAR efficiency standard for power supplies sets a very low bar for industry. - Commercial sector computer purchasers are unaware of power	Initiative Lead (Ecos Consulting) for - Project administration - Marketing - Incentive processing and tracking Budget for: - Marketing - Incentives - Incentive administration - Evaluation	Develop and implement marketing plan, including - General outreach to media outlets serving OEMs, SIs, power supply manufacturers and prospective purchasers - Providing content for manufacturers' communication channels - Developing materials for outreach by regional utilities Develop and manage national initiative beginning in August 2004, including - Meet with OEMs and SIs to explain benefits of 80 PLUS - Recruit power supply manufacturers	Marketing - Marketing plan - Website is active - Marketing collateral developed for manufacturers, purchasers and utilities Initiative - Power supply testing protocols are developed - \$5 incentive is offered to help bridge price differential between conventional and 80 PLUS power supplies - At least two OEMs and SIs contacted to participate in initiative - Power supply manufacturers submit units for testing and approval - At least one additional potential	Marketing - Marketing materials generate inquiries from: - Power supply manufacturers - OEMs and SIs - Electric utilities - Large consumers ( <b>awareness</b> ) - Website usage increases over time ( <b>awareness</b> ) Initiative Management - Contractor posts and maintains power supply testing protocol on website - Contractor reimburses OEMs and SIs \$5 for each qualifying PC sold in NW (\$10 for each desktop server) Response from computer industry: - At least one major desktop PC OEM participates ( <b>availability</b> ) - At least one more power supply	75% or higher market share of 80 PLUS equipped PCs by 2010 Industry will continue to embrace ENERGY STAR as a significant marketing advantage	All PCs meet ENERGY STAR specification NEEA and/or utility support not needed

<p>supply energy use.</p> <p>Opportunities:</p> <ul style="list-style-type: none"> <li>- Power supplies that are at least 80% efficient can provide 82 kWh/yr of cost-effective savings.</li> <li>- Participate in a national initiative that can help influence an upgrade to the ENERGY STAR specification for desktop computers.</li> </ul>		<ul style="list-style-type: none"> <li>- Develop a test protocol for power supplies</li> <li>- Test and certify power supplies</li> <li>- Receive and pay invoices of participating computer manufacturers</li> <li>- Secure participation of at least one other utility or energy organizations in the initiative</li> <li>- Update information on the initiative website</li> <li>- Share production and sales data with EPA</li> </ul> <p>Evaluate progress of initiative</p>	<p>initiative sponsor contacted</p> <ul style="list-style-type: none"> <li>- At least one power supply manufacturer contacted</li> </ul> <p>ENERGY STAR</p> <ul style="list-style-type: none"> <li>- Participate in public process for developing revised specification</li> <li>- Assess need for any additional support once specification goes into effect</li> </ul> <p>Evaluation</p> <ul style="list-style-type: none"> <li>- RFP for evaluation contractor</li> <li>- Select contractor</li> <li>- Conduct MPERS</li> </ul>	<p>manufacturer offers and supplies qualifying product (<i>availability</i>)</p> <ul style="list-style-type: none"> <li>- OEMs and SIs deliver sales of at least 70,000 qualifying units before end of 2005 (<i>market share/penetration</i>)</li> <li>- Participating OEMs and SIs receive \$5 incentive (\$10 for desktop servers) for each qualifying unit sold in NW</li> <li>- Buy-down spurs OEM and SI sales of qualifying PCs</li> </ul> <p>Support from other interested parties:</p> <ul style="list-style-type: none"> <li>- At least one other major utility or energy efficiency organization provides greater than \$1 million in support (<i>availability</i>)</li> </ul> <p>ENERGY STAR</p> <ul style="list-style-type: none"> <li>- EPA includes at least an optional power supply in its proposed revision to ENERGY STAR for computers by early 2005 (<i>awareness</i>)</li> </ul> <p>EPA finalizes the revised standard, to take effect in early 2006 (<i>market share/penetration</i>)</p>		
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## Market Progress

### Power Supply Manufacturers

1. Short Term: Increasing number of power supply manufacturers developing certified 80 PLUS units, coupled with an increasing number of certified 80 PLUS power supplies.
2. Long Term: Majority of power supply manufacturer market 80 PLUS units (including largest manufacturer). No, or negligible, incremental cost.

Since the first MPER, the number of power supply manufacturers that sell certified power supplies, and the quantity of certified power supply models have both increased. Eighteen months ago, 19 power supply manufacturers offered 80 PLUS power supplies,<sup>40</sup> this number is now 55,<sup>41</sup> including both OEMs and manufacturers with models in production. Ten additional power supply manufacturers have products in pre-production or at the reference design stage. In addition, the number of models in production has also seen a dramatic increase, from 35 to 403.<sup>42</sup>

80 PLUS has successfully engaged nearly all power supply manufacturers. The majority of the major manufacturers, including Delta Electronics, Lite-on, Hipro, Acbel Polytech Inc., FSP Group, and Sparkle Power Inc, all participate in the 80 PLUS program.<sup>43</sup> According to Ecos, Foxconn is the only large power supply manufacturer not participating in the program. Foxconn reported to evaluators that they were not familiar with Ecos or Energy Star standards, but were about to produce high efficiency power supplies in two wattages.

Ecos is working with the large volume participating power supply manufacturers that currently have product and the capability of offering more within their product line. Volume manufacturers include, for example, Tier 1 (e.g. Delta, Hipro) and Tier 2 (e.g., HP, Dell, Acer, Gateway) manufacturers. Efforts are underway to develop and offer the next generation of higher efficiency 80 PLUS Gold and Silver product lines.

While the supply of 80 PLUS power supplies has increased, the incremental cost remains higher than expected. Interview respondents quoted a range of incremental costs; power supply manufacturers experience the lowest incremental cost, and system integrators pay a premium of

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<sup>40</sup> Quantec, LLC. *Market Progress and Evaluation Report One: 80 PLUS Personal Computer Power Supplies*, October 2006.

<sup>41</sup> <<http://www.80PLUS.org>> accessed 1/12/08.

<sup>42</sup> This figure only includes models in production; other models are in the pipeline. Personal communication with Ecos Consulting, 1/18/08.

<sup>43</sup> Personal communication with Jason Boehike, Ecos Consulting, 12/16/07.



at least ten dollars for an 80 PLUS power supply.<sup>44</sup> For some system integrators, the incremental cost is much higher, roughly 30 to 45 dollars, discussed in Chapter 4.

## System Integrators and OEM

1. Short Term: System Integrators (SIs) and OEMs offer 80 PLUS qualified units.
2. Long Term: The majority of SIs and OEMs offer 80 PLUS units; SIs and OEMs market 80 PLUS to end users; sales and market share of 80 PLUS units increases.

One of the most consequential achievements of the 80 PLUS initiative occurred in the last 18 months. Two large OEMs, Dell and HP, joined the program. Dell and HP together comprise over half of the market; the IDC reports they are the two largest PC vendors.<sup>45</sup> It is difficult to quantify the number of units the OEMs are selling since neither company applied for rebates until late December 2007. However, their websites show many models containing 80 PLUS power supplies for sale, and one OEM reported 80 PLUS units represented 10 percent of sales.<sup>46</sup> Ecos continues efforts to recruit other large OEM. The largest barrier for this market actor is the data sensitivity issue; sales information identifying shipping destination is proprietary data.

In addition to the large OEMs entering the program, Ecos continued to recruit and enroll system integrators. Only ten system integrators participated 18 months ago.<sup>47</sup> Ecos' website shows 34 system integrators participating with the program, and Ecos 2007 year-end reports show 51 are now participating. The number of system integrators increased significantly.

## Energy Star Specifications

1. Short Term: New Energy Star computer specifications proposed and include a minimum of 80 PLUS power supply requirements; examination of active-mode energy savings.
2. Long Term: New Energy Star computer specifications passed and include a minimum of 80 PLUS power supply requirements; sales and market share of computers meeting Energy Star specification increases.

The 80 PLUS program worked with the EPA to incorporate 80 PLUS power supplies in the Energy Star standards. Energy Star 4.0 specifications were released in July 2007, incorporating 80 PLUS power supplies into their requirements. The previous Energy Star specifications monitored power usage in the sleep mode; the new specifications created a standard for

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<sup>44</sup> Can you tell me if there is an incremental cost to producing a computer with an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?

<sup>45</sup> IDC, January 17, 2006, <<http://www.idc.com/getdoc.jsp?containerId=prUS20525907>> accessed 1/9/08.

<sup>46</sup> Can you tell me how many 80 PLUS power supplies your company has sold and shipped in the past 18 months? Do you know what percentage of your sales that represents? Can you provide a breakdown by PNW or by region?

<sup>47</sup> <<http://www.80PLUS.org>> accessed on January 12, 2008.

computers during the active mode. Ecos and the 80 PLUS initiative were critical in pushing for heightened Energy Star standards. The 80 PLUS program showed that an 80 PLUS power supply was (1) technically feasible,<sup>48</sup> and (2) available in the marketplace.<sup>49</sup>

## Program Sponsors

1. Short Term: Increasing number of program sponsors.
2. Long Term: Sponsors represent the largest utilities and consortiums; broad geographic representations of sponsors; 80 PLUS inclusion in sponsors' program portfolios to cost-effectively meet savings goals.

The 80 PLUS initiative has a wide range of program sponsors, including large and small utilities, in a wide range of locations. Pacific Gas and Electric and Southern California Edison in California are examples of larger utilities, while Salt River Project in Arizona and Western Massachusetts Electric in Massachusetts are smaller participating utilities. Eighteen months ago, 12 organizations sponsored the program.<sup>50</sup> Presently, there are 13 groups sponsoring the 80 PLUS program.<sup>51</sup> There is room for improvement by including more utilities and organizations; however, the rebate process will need streamlining, as utilities need to quantify the savings through the rebate process.

From a utility perspective, and NEEA's, one of the problems is the inability to track installations (and savings) when rebates are not submitted for processing.<sup>52</sup> Increasing incentives and streamlining the rebate process are two possible approaches to better quantify savings and increase program sponsorship and participation. Ecos and the OEMs are working to determine the best methods to track shipments within the service territories of sponsoring utilities and for OEMs to receive rebates. Lastly, one potential Northwest sponsor stated that tracking shipments and associated energy savings to the region is critical, and, if NEEA funding discontinues they will not have a platform to piggy-back their funding.<sup>53</sup>

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<sup>48</sup> What other changes has the 80 PLUS program made in the marketplace? EPA Question 2. Are there any issues with the new spec that were unanticipated? How has the specification impacted the PC market? How do you think they will impact the PC market in the future?

<sup>49</sup> *ibid.*

<sup>50</sup> Quantec, LLC. *Market Progress and Evaluation Report One: 80 PLUS Personal Computer Power Supplies*, October 2006.

<sup>51</sup> <<http://www.80PLUS.org>> accessed on January 12, 2008.

<sup>52</sup> Do you feel the level of program funding is appropriate for this program to move the market as intended? Do you feel the incentive levels offered manufacturers and system integrators are appropriate for this program to move the market as intended? Have the challenges this program faced changed over the last 18 months? If so, what has changed? Old challenges gone? New challenges?

<sup>53</sup> Nonparticipant large end user discussion.

## Awareness and Demand

1. Short Term: Increasing awareness of consumers and increasing numbers of end users specifying 80 PLUS in their purchasing specifications.
2. Long Term: Increased demand for 80 PLUS among end users.

To date, 80 PLUS initiative activities largely ensure supply is available. In part, limited resources dictate the focus of these resources. Activities that increase demand when there is no supply would not benefit the Initiative. Interview respondents from Ecos Consulting explain that “given the resources, focus on supply made sense, to not have demand for a product that doesn’t exist.”<sup>54</sup> NEEA supported this, explaining the “emphasis has, by far, been on the supply side.... It’s a chicken and egg conundrum—need the supply before you can influence demand.”<sup>55</sup>

System integrators reported they educate their customers about the benefits of 80 PLUS. Few customers initiate requests for the product. This is likely to change with the Energy Star 4.0 specifications; as one system integrator noted: “In the bid process, the RFPs are referencing Energy Star—so while Energy Star doesn’t bring in more sales, if you aren’t compliant you can’t participate in certain opportunities.”<sup>56</sup> In addition, system integrators pointed out that once they educated their customers about the benefits for an initial sale, their customers continued to buy the 80 PLUS machines.<sup>57</sup>

Interviews with nonparticipant end users indicated some are not aware of Ecos’ 80 PLUS initiative and/or the Energy Star 4.0 specifications. One reported their purchasing contracts are with major vendors like Dell and they follow the advice of their IT consultant and government contract specifications. Another noted they were aware of 80 PLUS power supplies through their vendor CTL, but did not know about NEEA’s program sponsorship. This person noted price differential and customer preference tipped their purchasing decisions. A third respondent was aware of Energy Star but not 80 PLUS; they looked to their vendor Dell for Energy Star

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<sup>54</sup> ECOS Consulting survey, Question 13.

<sup>55</sup> NEEA survey, Question 11.

<sup>56</sup> Does an EnergyStar label bring in more sales? Are customers demanding it Or is EnergyStar the standard?

<sup>57</sup> Over the last 18 months, or since you’ve been installing them, have you seen a change in consumer awareness and demand for 80 PLUS units? How so?

products. Overall, implementers and sponsors will need to pull the market and educate end users about energy efficient power supplies and the Energy Star specifications.

## Appendix C: Self-Report Estimates of Incremental Cost

Table 17 below summarizes respondents' estimates of incremental cost.

**Table 17. Estimates of Incremental Costs**

What is the incremental cost of the 80 PLUS power supply?	Participant				Nonparticipant	Total	Percent
	Power supply manufacturers (n=3)	OEMs (n=2)	End-use customers (n=2)	System integrators (n=4)	System integrators (n=2)		
\$35-\$45				1	1	2	20%
\$25-\$30				1		1	10%
\$20			1			1	10%
\$15	1					1	10%
\$5-\$10	1			1		2	20%
50% more than standard power supply		1		1		1	20%
33% more than standard power supply		1				1	10%
Total	2	2	1	4	1	10	100%

NEEA and program implementer Ecos originally estimated a \$5 incremental cost to produce the 80 PLUS power supply. MPER #1 estimated the initial incremental cost at \$30 in 2004, dropping by \$10 in 2005, another \$5 in 2006 and \$7.50 in 2007.<sup>58</sup> Interviews conducted for MPER #2 suggest the incremental cost differs by market actor, and is both higher and slower to drop than originally anticipated. Responses suggest the average incremental cost for manufacturers is about \$11 and about \$38 for system integrators. Overall, the incremental cost averages about \$32. The incentive covers some incremental cost. While not all participants utilize the incentive, it is important to the majority. Incentives should be continued; they make it possible for some system integrators to market product that includes 80 PLUS.

System integrators said that the incremental cost of incorporating an 80 PLUS power supply into its system tends to be higher than the typical extra cost of \$10-20, and it is more likely around \$35-\$40 per power supply.<sup>59</sup> Another stated it could be 40 percent-50 percent higher than the cost of standard supplies. Many of the computer cases a system integrator buys come with a

<sup>58</sup> Quantec, LLC. *Market Progress and Evaluation Report One: 80 PLUS Personal Computer Power Supplies*, October 2006.

<sup>59</sup> Can you tell me if there is an incremental cost to producing a computer with an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?

power supply already installed, which then must be removed and replaced with an 80 PLUS power supply. A non-participating system integrator confirmed this finding.

# Appendix D: Northwest Energy Efficiency Alliance Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Program Staff – Northwest Energy Efficiency Alliance

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for NEEA's second MPER. I'd like to talk with you about the program and the activities that have occurred since we conducted the first MPER about 18 months ago. This may take about 30-45 minutes Is this a good time? *Set schedule to call back if needed.*

### Goals and Success Indicators

When the 80 PLUS program was first initiated, the overriding goals were to move the EnergyStar standards to include power supply efficiencies equivalent to the 80 PLUS power supplies and to ship 200,000 units into the market place. The EnergyStar standards were realized in July 2007 but far fewer power supplies have been shipped.

1. From NEEA's point of view, what are the overall successes of the 80 PLUS program? What are the most important achievements?
2. What do you think contributed to the inclusion of the 80 PLUS power supply in the EnergyStar standards?
3. What other changes has the 80 PLUS program made in the marketplace?
4. Have the challenges this program faced changed over the last 18 months?
  - a. If so, what has changed? Old challenges gone? New challenges? (*specifics*)
5. What do you think contributed to fewer shipments of the 80 PLUS power supplies than had been anticipated?
  - a. Is this still the case?
6. What are the current goals for numbers of power supply shipments within the NW? Do you think these are reasonable goals?
7. How have the program goals changed over the last 18 months
8. What do you think are the most important program goals?

9. Are these goals being met?
  - a. If not, why not?
  - b. If so, what is the contributing factor to the successful accomplishment?
10. Have there been any other technological changes that have influenced the savings from 80 PLUS? (Windows Vista? Other?)

### **Program Focus**

11. Please describe the program's supply side and demand side activities.
  - a. Where is the emphasis?
  - b. Do you feel the balance is appropriate?
  - c. Why do you say that?
  - d. Are the various market actors as involved as you think they should or could be?
    - i. If not, why not?
    - ii. If some actors are more involved than others, what contributes to that involvement?
12. What could or should be done differently?
13. Has the program done all it can to influence the market to increase efficiencies of computer power supplies and move the market to adopt the technology?

### **Logistics**

14. How would you describe the current level of communications between Ecos, NEEA, and the other sponsors?
  - a. What processes work well?
  - b. What processes appear challenging?
  - c. What, if anything, would you change about current communications practices?
15. Do you feel the level of program funding is appropriate for this program to move the market as intended?
16. Do you feel the incentive levels offered manufacturers and system integrators are appropriate for this program to move the market as intended?

### **Other**

17. Is there anything else that you would like to add regarding what has worked well for 80 PLUS, or where the program can be improved?

*Thank you for your time.*



# Appendix E: Ecos Consulting Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Program Staff – Ecos Consulting

Staff Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### ***Introduction***

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for NEEA's second Market Progress and Evaluation Report. I'd like to talk with you about the program and the activities that have occurred since we conducted the first MPER about 18 months ago. This may take about 30 minutes. Is this a good time? *Set schedule to call back if needed.*

### ***Goals and Success Indicators***

When the 80 PLUS program was first initiated with NEEA, the overriding goals were to move the EnergyStar standards to include power supply efficiencies equivalent to the 80 PLUS power supplies and to ship 200,000 units into the market place. The EnergyStar standards were realized in July 2007 but it appears that far fewer power supplies have been shipped in the NW and in other regions of the country than expected.

1. From ECOS's point of view, what are the overall successes of the 80 PLUS program?
  - a. What are the most important achievements?
  - b. What contribution has NEEA made toward realizing those successes?
2. What do you think contributed to the inclusion of the 80 PLUS power supply in the EnergyStar standards?
3. The EnergyStar standards reference Tier 1 and Tier 2.
  - a. Could you explain the Tiers? Is Tier 1 80 percent and Tier 2 85 percent efficiency?
  - b. How did this program influence development of the 2 tiers?
4. What other changes has the 80 PLUS program made in the marketplace?
5. Have the challenges this program faced changed over the last 18 months?
  - a. If so, what has changed? Old challenges gone? New challenges? (*specifics*)
6. What do you think contributed to fewer shipments of the 80 PLUS power supplies than had been anticipated?
  - a. Is this still the case?
7. What are the current goals for numbers of power supply shipments within the PNW? Do you think these are reasonable goals?

8. How is 80 PLUS doing nationally?
  - a. Where are the sales successes occurring?
  - b. How do PNW sales compare to elsewhere, OEMS vs SI?
  - c. What sales estimates are they coming up with?
9. How have the program goals changed over the last 18 months?
10. What do you think are the most important program goals now?
11. Are these goals being met?
  - a. If not, why not?
  - b. If so, what is the contributing factor to the successful accomplishment?
12. Have there been any other technological changes that have influenced the savings from 80+? (Windows Vista? Other?)

***Program Focus***

13. Please describe the program's supply side and demand side activities.
  - a. Where is the emphasis?
  - b. Do you feel the balance is appropriate?
  - c. Why do you say that?
  - d. Are the various market actors as involved as you think they should or could be?
    - i. If not, why not?
    - ii. If some actors are more involved than others, what contributes to that involvement?
14. What could or should be done differently?
15. Has the program done all it can to influence the market to increase efficiencies of computer power supplies and move the market to adopt the technology?

***Logistics***

16. How would you describe the current level of communications between Ecos, NEEA, and the other sponsors?
  - a. What processes work well?
  - b. What processes appear challenging?
  - c. What, if anything, would you change about current communications practices?
17. Do you feel the level of program funding is appropriate for this program to move the market as intended?
18. Do you feel the incentive levels offered manufacturers and system integrators are appropriate for this program to move the market as intended?
19. Is there anything that you (ECOS) or other 80 PLUS sponsors need from NEEA to assist the program to meet the program's goals?

***Incremental Cost***

20. What do you believe is the current incremental cost of producing the 80 PLUS power supplies?

21. Have you seen a change in incremental cost during the last 18 months? How so?
22. Is the incremental cost being passed onto the cost of the computer?
23. Do you think that there are power supplies shipped without application for the rebates? That is, are there more 80 PLUS power supplies in the market place than we cannot account for with rebates?
  - a. If so, how large do you think this increment is? How can this be quantified?

***Other***

24. Is there anything else that you would like to add regarding what has worked well for 80+, or where the program can be improved?

***Thank you for your time.***

# Appendix F: Environmental Protection Agency Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) EPA

Staff Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### **Introduction**

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA). We talked with you about 18 months ago when we conducted the first evaluation and market progress report. I'd like to talk with you about the program and the EnergyStar 4.0 specifications for computers that came online last July. This may take about 10 -15 minutes. Is this a good time? *Set schedule to call back if needed.*

### **EnergyStar Specifications**

1. What influenced EPA's decision to include the 80 Plus standard in the 4.0 specification? Who do you think were some of the most important players to contribute to the development of the EnergyStar specifications? *Probe these to exhaustion and probe about specifics of these entities here, like ECOS, NEEA and others.*
2. Are there any issues with the new spec that were unanticipated (*there was some concern about it working with vista OS, find out what the problem was, how was it resolved, i.e., what did EPA and Microsoft work at it, let them tell you the story*)
  - 2a. How has the specification impacted the PC market? How do you think they will impact the PC market in the future?
3. Have you seen any changes yet? *Probe for evidence or example*
  - 3a. What response do you expect from the OEM and large manufacturers?
4. How do you think the EnergyStar specifications will impact the 80 PLUS power supply market?
5. Do you know of changes in product offerings manufacturers or system integrators might initiate in response to Energy Star 4.0?
6. Do you know of any other changes in the computer marketplace that the 80 PLUS power supply (has already / in the near future) influence?

### **Market Barriers**

7. From your perspective, do you think there are barriers to widespread adoption of 80 PLUS power supplies? What are they?
8. How have those barriers changed in the last 18 months – have they increased, decreased, or stayed the same? (*Probe for each market barrier and why any changes might have occurred*)

### **80 PLUS Program**

9. In retrospect, what kind of influence did the Ecos 80 PLUS initiative have in developing the EnergyStar 4.0 computer specifications? (*might have already been answered*)
  - a. Ecos' work
  - b. NEEA involvement
  - c. Utility sponsored rebates (remember these only apply to utilities in other parts of the country, there are very few if any I think in the NW.)
10. Do you think that the 80 PLUS program has done all it can to influence the market to increase efficiencies of computer power supplies and move the market to adopt the technology? What else could the program do? Can you think of anything else?
11. Do you think that manufacturer or system integrator utility funded rebates are still needed to encourage manufacture of 80 PLUS power supplies and/or transform the market?
12. Where would you suggest that Ecos focus its efforts with the 80 PLUS program?
13. Does the EPA put out any kind of report that details how many computers have been manufactured and/or sold with 80+?
14. In an interview with one of the large OEMs it came up that the Federal Government isn't doing what it should be doing in terms of adopting EnergyStar 4.0—there are certain loopholes. Are you aware of this occurring, and do you know what these loopholes might be?

### **Other**

15. What future plans is the EPA considering with regard to EnergyStar specification. Probe for time line etc.
16. Has the EPA received any feedback from the industry, about the current specification? What data have they gathered etc.
17. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding EnergyStar 4.0 or 80 PLUS power supplies?

*Thank you for your time.*

# **Appendix G: Participating OEMs Interview Guide**

## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Participating OEMs

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### **Introduction**

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding for utilities to offer incentives to manufacturers of the power supplies. We received your name and contact information from Ecos Consulting. I'd like to talk with you about the program and the activities that have occurred since we conducted the first evaluation about 18 months ago. This may take about 20-30 minutes. Is this a good time? *Set schedule to call back if needed.*

### **Experience with 80 PLUS Power Supplies**

1. First I'd like to ask about your experience with the 80 PLUS power supplies. How long have you been manufacturing 80 PLUS power supplies?
2. How would you describe how the 80 PLUS power supplies fit into your product mix? Do you produce power supplies for desktops? Laptops? Servers?

### **Awareness and Demand**

3. Over the last 18 months, or since you've been certifying the 80 PLUS power supplies, have you seen a change in demand for 80 PLUS supplies? How so?
4. Does the demand for 80 PLUS units vary by geographic region? How (else) does it vary?
5. Do you know what kind of businesses are specifying the 80 PLUS power supplies?

### **Sales**

6. Can you tell me how many 80 PLUS power supplies your company has sold and shipped in the past 18 months?
  - a. Do you know what percentage of your sales that represents?
  - b. Can you provide a breakdown by PNW or by region?
7. Do you see your sales of 80 PLUS increasing, decreasing, or staying the same during next 12 months? Why?

### **EnergyStar Specifications**

The EnergyStar 4.0 specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

8. Do you think that the EnergyStar specifications have already influenced or will influence sales of 80 PLUS power supplies? How so?
9. Now that EnergyStar 4.0 specifications have been established, is your company likely to make the 80 PLUS power supplies the standard?
10. Does an EnergyStar label bring in more sales? Are customers demanding it?
11. What, if any, changes in product offerings has your company initiated in response to the recent EnergyStar specifications?

### **Incremental Cost**

I'd like to ask a couple of questions about incremental cost of 80 PLUS power supplies.

12. Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?
13. Have you seen a change in incremental cost during the last 18 months? How so?
14. Do you expect the incremental cost to (*continue to*) change? How so? What will trigger the change?
15. Is the incremental cost being passed onto the buyer?
16. Do you receive a rebate for each 80 PLUS power supply shipped? If so, how does it/doesn't it benefit your company? Does it cover the incremental cost?
18. (*If receiving a rebate*) Do you think that there are power supplies shipped without application for the rebates? That is, are there more 80 PLUS power supplies in the market place than we cannot account for with rebates?
  - a. If so, how large do you think this increment is? How can this be quantified?
19. Would you produce the 80 PLUS without the incentive?

### **Market Barriers**

20. From your perspective, Do you think there are barriers to widespread adoption of 80 PLUS power supplies? What are they?
21. How have the market barriers changed in the last 18 months – have they increased, decreased, or stayed the same? (*Probe for each market barrier and why any changes might have occurred*)

**Other**

22. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?



# Appendix H: Nonparticipating OEM Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Nonparticipating OEMs

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA). We received your name and contact information from Ecos Consulting. I'd like to talk with you about the program and the activities that have occurred since we conducted the first evaluation about 18 months ago. This may take about 20-30 minutes. Is this a good time?

Set schedule to call back if needed.

### Experience with 80 PLUS Power Supplies

1. First I'd like to ask if you are aware of 80 PLUS Power Supplies.
2. (If YES) We understand that your company does not include 80 PLUS power supplies in your desktops. *[If not already addressed]* From your perspective, what are barriers to including 80 PLUS power supplies in your desktops?
3. Have these barriers increased, decreased, or stayed the same? *(Probe for each market barrier and why any changes might have occurred)*

### EnergyStar Specifications

The EnergyStar 4.0 specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

4. *[If not already discussed]* Now that EnergyStar 4.0 specifications have been established, is your company likely to add 80 PLUS power supplies as a standard component in your computers? Why/Why not?
  - a. Are there (other) changes in product offerings your company has initiated in response to the recent EnergyStar specifications?
5. Do you think that the EnergyStar specifications have already influenced or will influence inclusion of 80 PLUS power supplies in desktops and servers? How so?
  - a. Does an EnergyStar label bring in more sales? Are customers demanding it?

6. Could you tell me what you think would be the price difference between a PC with 80 PLUS versus a PC without an 80 PLUS power supply?

### **EnergyStar Specifications**

The EnergyStar 4.0 specifications put into place in July 2007 included power supply efficiencies equivalent to the 80+ power supplies.

7. Do you think that the EnergyStar specifications have already influenced or will influence sales of 80+ power supplies? How so?
8. Now that ES 4.0 specifications have been established, is your company likely to make the 80+ power supplies the standard?
9. Does an ES label bring in more sales? Are customers demanding it?
10. What, if any, changes in product offerings has your company initiated in response to the recent ES specifications?

### **Incremental Cost**

I'd like to ask a couple of questions about incremental cost of 80+ power supplies.

11. Can you tell me if there is an incremental cost to producing an 80+ power supply vs. a non-80+ unit? If so, What is the incremental cost?
12. Have you seen a change in incremental cost during the last 18 months? How so?
13. Do you expect the incremental cost to (*continue to*) change? How so? What will trigger the change?
14. Is the incremental cost being passed onto the buyer?
15. Do you receive a rebate for each 80+ power supply shipped? If so, how does it/doesn't it benefit your company? Does it cover the incremental cost?
16. (*If receiving a rebate*) Do you think that there are power supplies shipped without application for the rebates? That is, are there more 80+ power supplies in the market place than we cannot account for with rebates?
  - a. If so, how large do you think this increment is? How can this be quantified?
17. Would you produce the 80+ without the incentive?

### **Market Barriers**

18. From your perspective, Do you think there are barriers to widespread adoption of 80+ power supplies? What are they?

19. How have the market barriers changed in the last 18 months – have they increased, decreased, or stayed the same? (*Probe for each market barrier and why any changes might have occurred*)

**Other**

20. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?

# Appendix I: Participating Power Supply Manufacturer Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Participating Manufacturers

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding for utilities to offer incentives to manufacturers of the power supplies. We received your name and contact information from Ecos Consulting. I'd like to talk with you about the program and the activities that have occurred since we conducted the first evaluation about 18 months ago. This may take about 20-30 minutes. Is this a good time? *Set schedule to call back if needed.*

### Experience with 80 PLUS Power Supplies

1. First I'd like to ask about your experience with the 80 PLUS power supplies. How long have you been manufacturing 80 PLUS power supplies?
2. Can you tell me how you would describe how the 80 PLUS power supplies fit into your product mix? Do you produce power supplies for desktops? Laptops? Servers?

### Awareness and Demand

3. Over the last 18 months, or since you've been certifying the 80 PLUS power supplies, have you seen a change in demand for 80 PLUS supplies? How so?
4. Does the demand for 80 PLUS units vary by geographic region? How (else) does it vary?

### Sales

5. Can you tell me how many 80 PLUS power supplies your company has sold and shipped in the past 18 months?
  - a. Can you tell me what percentage of your sales that represents?
  - b. Can you provide a breakdown by PNW or by region?
6. Do you know what kind of businesses are specifying the 80 PLUS power supplies?
7. Do you see your sales of 80 PLUS units increasing, decreasing, or staying the same during next 12 months? Why?

### **EnergyStar Specifications**

The EnergyStar 4.0 specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

8. Do you think that the EnergyStar specifications have already influenced or will influence sales of 80 PLUS power supplies? How so?
9. Does an EnergyStar label bring in more sales? Are customers demanding it?
10. Now that EnergyStar 4.0 specifications have been established, is your company likely to make the 80 PLUS power supplies the standard?
11. What, if any, changes in product offerings has your company initiated in response to the recent EnergyStar specifications?

### **Incremental Cost**

I'd like to ask a couple of questions about incremental cost of 80 PLUS power supplies.

12. Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?
13. Have you seen a change in incremental cost during the last 18 months? How so?
14. Do you expect the incremental cost to (*continue to*) change? How so? What will trigger the change?
15. Is the incremental cost being passed onto the buyer?
16. Do you receive a rebate for each 80 PLUS power supply shipped? If so, how does it/doesn't it benefit your company? Does it cover the incremental cost?
17. (*If receiving a rebate*) Do you think that there are power supplies shipped without application for the rebates? That is, are there more 80 PLUS power supplies in the market place than we cannot account for with rebates?
  - a. If so, how large do you think this increment is? How can this be quantified?
18. Would you produce the 80 PLUS without the incentive?

### **Market Barriers**

19. Do you think there are barriers to widespread adoption of 80 PLUS power supplies? What are they?
20. How have the market barriers changed in the last 18 months – have they increased, decreased, or stayed the same? (*Probe for each market barrier and why any changes might have occurred*)

### **Other**

21. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?

# Appendix J: Participants with no Rebate Application

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Evaluation of 80 PLUS Efficient Power Supplies  
Interview Guide (MPER #2)  
Participating System Integrators and Manufacturers  
Who Have Not Applied for Rebates

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

## ***Introduction***

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding to offer incentives for the power supplies. We received your name and contact information from Ecos Consulting, the program implementer. I have just a couple of questions for you about the program. This will take about 5-10 minutes. Could we talk for a few minutes?

## ***80+ Power Supplies Rebates***

1. First I'd like to ask -- about how long have you been using 80PLUS power supplies in your computers.

Participants in this 80PLUS program receive a \$5 rebate for each desktop 80+ power supply shipped and \$10 for server power supplies. Records show that [*your company*] has not submitted requests for rebates.

2. Is this correct?

### **CONTACT DOES RECEIVE REBATE**

- a. How does, or how doesn't, the rebate benefit your company?
- b. Would you install the power supply without the incentive?
- c. Do you know if your company shipped 80PLUS power supplies without applying for the rebate?
  - i. Did not ship any without rebate
  - ii. If Yes, how many power supplies do you think your company has shipped without application for the rebates?

### **CONTACT DOES NOT RECEIVE REBATE**

- d. Can you tell me why your company has chosen not to apply for the rebates?

- e. Do you think you will apply for the rebate in the future?
- f. How many power supplies do you think your company has shipped without application for the rebates?

***Incremental Cost -- Ask everyone***

I'd like to ask a couple of questions about incremental cost of 80+ power supplies.

- 7. Can you tell me if there is an incremental cost to producing a computer with an 80+ power supply vs. a non-80+ unit? If so, What is the incremental cost?
- 8. Have you seen a change in the incremental cost during the last 18 months (*or since they have been using them if less than 18 months*)? How so?
- 9. Do you expect the incremental cost to (*continue to*) change? How so? What will trigger the change?
- 10. Is the incremental cost being passed onto the buyer?

These are all of my questions. I appreciate your time. Do you have any comments you'd like to share regarding 80 PLUS power supplies or the 80 PLUS program?

# Appendix K: Nonparticipating Power Supply Manufacturers Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Nonparticipating Power Supply Manufacturers

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding for this program. We received your name and contact information from Ecos Consulting, the program implementers. I'd like to talk with you about 80 PLUS power supplies. This may take about 10 minutes. Is this a good time? *Set schedule to call back if needed.*

### Awareness and Energy Star

The last time we talked, you were not participating in the 80 PLUS power supply Program. Since then, the EnergyStar 4.0 computer specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

1. Are you familiar with the 80 PLUS power supplies and the EnergyStar specifications?
2. Can you tell me if your company has initiated any changes in product offerings in response to the recent EnergyStar specifications?
3. What are your thoughts about producing computers that meet the EnergyStar 4.0 computer specifications as an alternative to 80 plus?
4. Can you tell me if you or your company feels there are either benefits or drawbacks to offering EnergyStar 80 PLUS units? What are they?
5. Will you be manufacturing components or 80 PLUS power supplies to meet the new EnergyStar specifications?

### 80 PLUS Program

Ecos Consulting is the contractor implementing the 80 PLUS Power Supply Program with funding from NEEA and a number of utilities.



6. Do you know if Ecos Consulting has talked with your company about participating in an 80 PLUS power supply program?

If no,

- a. Do you think your company might participate in the 80 PLUS power supply Program in the future? If not, why not?

If yes,

- b. Our records show that your company is not participating in the 80 PLUS power supply program.

1. Do you think your company might participate in the 80 PLUS power supply Program in the future? If not, why not?
2. Can you tell me why you decided not to participate in the program?

### **Incremental Cost**

I'd like to ask a couple of questions about incremental cost.

7. Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit?

If so, What is the incremental cost?

Is it more than you anticipated?

8. Have you seen a change in incremental cost during the last 18 months? How so?
  - a. Is it likely to come down now with EnergyStar 4.0?

### **Market Barriers**

*(If not already addressed in previous questions)*

9. There are manufacturers that are not adopting the 80 PLUS power supply technology. What do you think the reasons or the market barriers are?

10. Is there anything the 80 PLUS program can do to mitigate these barriers?

### **Other**

11. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?

*Thank you for your time*

# Appendix L: Participating System Integrators Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Participating System Integrators

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding for utilities to offer incentives to manufacturers of the power supplies. We received your name and contact information from Ecos Consulting. I'd like to talk with you about the program and the activities that have occurred since we conducted the first evaluation about 18 months ago. This may take about 20-30 minutes. Is this a good time?

Set schedule to call back if needed.

### Experience with 80 PLUS Power Supplies

1. First I'd like to ask about your experience with the 80 PLUS power supplies. How long have you been using them in your computers?
2. Can you describe how the 80 PLUS power supplies fit into your product mix? Do you install 80 PLUS power supplies in desktops? Laptops? Servers?
3. Do you include 80 PLUS power supplies in all computers you market or only in orders specifying them?

### Awareness and Demand

4. Over the last 18 months, or since you've been installing them, have you seen a change in consumer awareness and demand for 80 PLUS units? How so?
5. Does the demand for 80 PLUS units vary by geographic region?
  - a. Customer business type?
  - b. Any other trends?
6. Can you tell me what kind of businesses are specifying the 80 PLUS power supplies?

## Sales

7. Can you tell me how many 80 PLUS units your company has sold and shipped in the past 18 months?
  - a. Do you know about what percentage of your sales that represents?
  - b. Can you provide a breakdown by PNW or by region?
8. Do you see your sales of 80 PLUS units increasing, decreasing, or staying the same during next 12 months? Why?

## EnergyStar Specifications

The EnergyStar 4.0 specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

9. Do you think that the EnergyStar specifications have already influenced or will influence sales of 80 PLUS power supplies? How so?
10. Now that EnergyStar 4.0 specifications are in place, is your company likely to include the 80 PLUS power supplies as a standard component?
11. Does an EnergyStar label bring in more sales? Are customers demanding it Or is EnergyStar the standard?
12. What, if any, changes in product offerings has your company initiated in response to the recent EnergyStar specifications?

## Incremental Cost

I'd like to ask a couple of questions about incremental cost of 80 PLUS power supplies.

13. Can you tell me if there is an incremental cost to producing a computer with an 80 PLUS power supply vs. a non-80 PLUS unit? If so, What is the incremental cost?
14. Have you seen a change in the incremental cost during the last 18 months? How so?
15. Do you expect the incremental cost to (*continue to*) change? How so? What will trigger the change?
16. Is the incremental cost being passed onto the buyer?
17. (*If receiving a rebate*) Do you think that there are power supplies shipped without application for the rebates? That is, are there more 80 PLUS power supplies in the market place than we cannot account for with rebates?
  - a. If so, how large do you think this increment is? How can this be quantified?
18. Do you receive a rebate for each 80 PLUS power supply shipped?
  - a. If so, how does it/doesn't it benefit your company?
  - b. If so, would you install the power supply without the incentive?

**Market Barriers**

19. From your perspective, do you think there are barriers to widespread adoption of 80 PLUS power supplies? What are they?
20. How have the market barriers changed in the last 18 months – have they increased, decreased, or stayed the same? (*Probe for each market barrier and why any changes might have occurred*)

**Other**

21. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?

# Appendix M: Nonparticipating System Integrators Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Nonparticipating System Integrators

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

### Introduction

Hello, my name is \_\_\_\_\_ from Quantec. We are conducting an evaluation of the 80 PLUS power supply program for the Northwest Energy Efficiency Alliance (NEEA) which has provided funding for this program. We received your name and contact information from Ecos Consulting. I'd like to talk with you about 80 PLUS power supplies. This may take about 10-15 minutes. Is this a good time? *Set schedule to call back if needed.*

### Awareness and Energy Star

The EnergyStar 4.0 computer specifications put into place in July 2007 included power supply efficiencies equivalent to the 80 PLUS power supplies.

1. Are you familiar with the 80 PLUS power supplies?
2. Can you tell me if your company has initiated any changes in product offerings in response to the recent EnergyStar specifications?
3. What are your thoughts about producing computers that meet the EnergyStar 4.0 computer specifications as an alternative to 80 plus?
4. Can you tell me if you or your company feels there are either benefits or drawbacks to offering EnergyStar 80 PLUS units? What are they?
5. Is your company selling any desktop computers with 80 PLUS power supplies?
  - a. If No, Can you tell me why your company is not using 80 PLUS power supplies?

### 80 PLUS Program

Ecos Consulting is the contractor implementing the 80 PLUS Power Supply Program with funding from NEEA and a number of utilities.

6. Do you know if Ecos Consulting has talked with your company about participating in an 80 PLUS power supply program?

- a. If yes, Our records show that your company is not participating in the 80 PLUS power supply program. Can you tell me why you decided not to participate in the program?
- b. If no, continue

### **Incremental Cost**

I'd like to ask a couple of questions about incremental cost.

7. Can you tell me if there is an incremental cost to producing an 80 PLUS power supply vs. a non-80 PLUS unit?  
If so, What is the incremental cost?  
Is it more than you anticipated?
8. Have you seen a change in incremental cost during the last 18 months? How so?
  - a. Is it likely to come down now with EnergyStar 4.0?

### **Market Barriers**

*(If not already addressed in previous questions)*

9. There are a number of system integrators that are not adopting the 80 PLUS power supply technology. What do you think the reasons or the market barriers are?
10. Is there anything the 80 PLUS program can do to mitigate these barriers?

### **Other**

11. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding 80 PLUS power supplies?

*Thank you for your time*

# Appendix N: Participating End User Interview Guide

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## Evaluation of 80 PLUS Efficient Power Supplies Interview Guide (MPER #2) Participating Large End-Use Decision-Makers

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

Hello, my name is \_\_\_\_\_ from Quantec. I am calling on behalf of the Northwest Energy Efficiency Alliance. We are conducting an evaluation of the 80 PLUS Personal Computer power supplies. We received your name and contact information from Ecos Consulting, the program implementers. I'd like to talk with you about 80 PLUS power supplies. Do you have a few minutes to talk with me, or may I arrange a time to call you back? Is this a good time? *Set schedule to call back if needed.*

*Explain if needed:* 80 PLUS is an electric utility-funded incentive program to integrate more energy-efficient power supplies into desktop computers and servers. The 80 PLUS performance specification requires power supplies in computers and servers to be 80 percent or greater energy efficient.

### Background

1. Have you heard of EnergyStar 4.0 certified PCs with 80 PLUS power supplies?
2. Are you aware of the 80 PLUS program initiative? *[IF RESPONDENT IS NOT AWARE ASK FOR OTHER POTENTIAL RESPONDENTS THAT MAY BE AWARE; IF NO ONE IS AWARE TERMINATE INTERVIEW].*
3. Just to confirm, my records show that your organization has purchased the 80 PLUS power supplies or EnergyStar 4.0 computers with 80 PLUS power supplies. Is this correct? *[INTERVIEWER: IF HAVE NOT PURCHASED, COMPLETE THE NONPARTICIPANT LARGE END-USER SURVEY.]*

### Awareness

4. Do you remember how you or *[your company]* first learned about 80+?

### Purchase Decisions

5. How many 80 PLUS Power Supply Computers have you purchased?
  - a. Did you purchase any before July of 2007, when the Energy Star specification was implemented?
  - b. What percentage of your PC purchases are 80 PLUS certified?

6. What are your organization's procurement specifications? Are the specifications the same for all PCs? (Please find out if 80 PLUS is specified) Have they changed since the new EnergyStar specifications were released?
7. Could you explain the process your organization uses when deciding on purchasing PCs? How are those decisions made?
8. What percent of all your PC purchases during the last year do the computers with the 80 PLUS power supply represent?
9. Could you give me an estimate of the number of PCs your company will be purchasing during the next 12 months?
  - a. Do you think you will be specifying EnergyStar or 80 PLUS computers in future orders?
    - i. Yes, what percent of total will be EnergyStar
    - ii. No, why not
10. What were the primary reasons for purchasing 80 PLUS power supplies and/or EnergyStar certified PCs?
11. Were there other factors that played a part in your decision to purchase 80 PLUS PCs? Which ones? [LISTEN AND PROMPT FOR] What about sponsorship by other agencies; newspaper articles; trade shows etc. Anything else?

### **Purchasing Specifications**

12. Can you tell me how your organization typically purchases PCs? Do you purchase through a System Integrator, directly from an OEM, or some other way? [*IF COMBINATION PROBE FOR PERCENTS THROUGH EACH DISTRIBUTION CHANNEL*]
13. Does your organization typically specify computer performance (e.g., ENERGY STAR qualified) or component parts?
14. How do ENERGY STAR standards impact decisions to use specific components or otherwise specify equipment?
15. How do you typically obtain information regarding the type of PC to purchase? [*PROBE FOR SPECIFIC NAMES OF TRADE SHOWS OR TRADE PUBLICATIONS, INFORMATION DIRECT FROM MANUFACTURERS, ETC.*]

### **Computer Performance**

16. Do you notice any differences in operation, performance, or any other factors between your 80 PLUS PCs and other PCs that you have purchased? How so?
17. On a scale of 1 to 5, where 1 is "extremely dissatisfied" and 5 is "extremely satisfied," how satisfied have you been with you 80 PLUS PCs? Why do you say that?



**Non-Energy Benefits**

18. *[IF NOT MENTIONED THEN ASK]* Are there other non-energy benefits associated with 80 PLUS PCs that played a role or had importance? These might include, for example, more quiet operation, less heat generated “inside the box,” and power factor harmonics, and others.

**Incremental Cost**

19. From your experience with the computers you purchased, do you know if there is an incremental cost of computers with 80 PLUS power supplies?
20. Did you receive any financial incentives to purchase 80 PLUS PCs? Which ones? How much were they for?

**Other**

21. These are all of my questions. I appreciate your time. Do you have any other comments you’d like to share regarding 80 PLUS power supplies?

*Thank you for your time.*

# Appendix O: Nonparticipating End-User Interview Guide

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## Evaluation of 80+Efficient Power Supplies Interview Guide (MPER #2) Nonparticipating Large End-Use Customers

Company Name: \_\_\_\_\_

Respondent Name: \_\_\_\_\_ Title: \_\_\_\_\_

Interview Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

Hello, my name is \_\_\_\_\_ from Quantec. I am calling on behalf of the Northwest Energy Efficiency Alliance. We are conducting an evaluation of the 80 PLUS personal Computer power supplies. We received your name and contact information from Ecos Consulting, the program implementers. I'd like to talk with you about 80 PLUS power supplies. Do you have a few minutes to talk with me, or may I arrange a time to call you back? Is this a good time? *Set schedule to call back if needed.*

*Explain if needed:* 80 PLUS is an electric utility-funded incentive program to integrate more energy-efficient power supplies into desktop computers and servers. The 80 PLUS performance specification requires power supplies in computers and servers to be 80 percent or greater energy efficient.

### Background

1. Have you heard of EnergyStar certified PCs with 80 PLUS power supplies?
2. Are you aware of the 80 PLUS program initiative? *[IF RESPONDENT IS NOT AWARE ASK FOR OTHER POTENTIAL RESPONDENTS THAT MAY BE AWARE; IF NO ONE IS AWARE TERMINATE INTERVIEW].*

### Awareness

3. *[IF AWARE OF 80+]* Do you remember how you or *[your company]* first learned about 80 PLUS?

### Purchasing Specifications

4. Can you describe how your organization typically purchases PCs?
  - a. Do you purchase through a System Integrator, directly from an OEM, or some other way? *[IF COMBINATION PROBE FOR PERCENTS THROUGH EACH DISTRIBUTION CHANNEL]*
  - b. Who is involved in the purchase process?
  - c. Do you have contractual obligations that limit your flexibility in purchasing? Do you have a preferred vendor?

5. Can you tell me what factors your organization typically considers when specifying computers or component parts?
  - a. Performance
  - b. Energy use
  - c. Benefits
  - d. Other - specifics
6. *[IF NOT MENTIONED THEN ASK]* Are there other considerations that play a role or have importance in your computer purchase decisions? *[Prompt only if absolutely necessary: These might include, for example, more quiet operation, less heat generated “inside the box,” and power factor harmonics, and others.]*
7. Does your company have specifications you require?
8. Do EnergyStar standards impact decisions to use specific components or otherwise specify equipment?
9. How do you typically obtain information regarding the type of PC or components to purchase? *[PROBE FOR SPECIFIC NAMES OF TRADE SHOWS OR TRADE PUBLICATIONS, INFORMATION DIRECT FROM MANUFACTURERS, ETC.]*

#### **Purchase Decisions**

10. Could you give me an estimate of the number of PCs your company will be purchasing during the next 12 months?
  - a. Do you think you will be specifying EnergyStar or 80 PLUS computers in future orders?
    - i. Yes, what percent of total will be ES
    - ii. No, why not
11. What do you think are the barriers to adopting 80 PLUS computers for your organization?

#### **Other**

12. These are all of my questions. I appreciate your time. Do you have any other comments you'd like to share regarding EnergyStar specifications or 80 PLUS power supplies?

*Thank you for your time.*