

# Power Supplies

**February 15, 2005**

# Agenda

- EPA Guiding Principles
- Industry Principles
- Industry Development timeline
- EPA vs. Industry Development Timeline
- EPA Notification Timeline
- Industry Proposal
- Summary
- EPA Efficiency Assumptions vs. Industry
- “80 Plus” Costs vs. Industry
- Detailed PS Qualification Requirements

# EPA Energy Star Guiding Principles

1. Significant Energy Savings Can be Realized on a National Basis
2. Product Performance Can be Maintained or Enhanced with Increased Energy Efficiency
- 3. *Purchasers Will Recover Their Investment in Increased Energy Efficiency Within a Reasonable Period of Time***
4. Energy-efficiency Can be Achieved With Several Technology Options, At Least One of Which is Non-proprietary
5. Product Energy Consumption and Performance Can be Measured and Verified With Testing
6. Labeling Would Effectively Differentiate Products and be Visible for Purchasers

# Effective industry standards have several common elements, summarized below:

- **Harmonization:** With an increasingly global supply network and customer distribution it is critically important to synch international requirements. Mandatory product labeling should be avoided or at least harmonized to existing standards.
- **Flexibility:** Requirements should not hinder innovation nor impede customer demanded performance features, consumer use or behavior. Requirements should be performance-based, holistic and flexible rather than prescriptive. Product safety and other factors should be taken into account.
- **Cost effectiveness:** The cost to implement efficiency benefits should be recoverable within the life span of the product. The interval between requirements definition and promulgation must take into account product development cycles and supply chain capability.
- **Measurable:** Requirements should be quantifiable and verification should be based on clear and reasonable testing procedures.
- **Product differentiation:** Consideration should be made for market segmentation and performance variations. Requirements must not favor proprietary technologies. Legal requirements should be set to dissuade poor performers and should not reflect aspirational targets.
- **Process transparency:** All effected stakeholders should have a meaningful opportunity to engage in the development of the requirements.
- **Compliance:** Compliance verification should be handled via self certification, 1-1-SDoC, etc. Pre-market testing or other requirements that hinder free trade should be avoided. Administrative burdens should be kept to a minimum.

## EPA vs. Industry PS Development Timeline

80 Plus claims Power Supply certification takes only 6 months or	183.d
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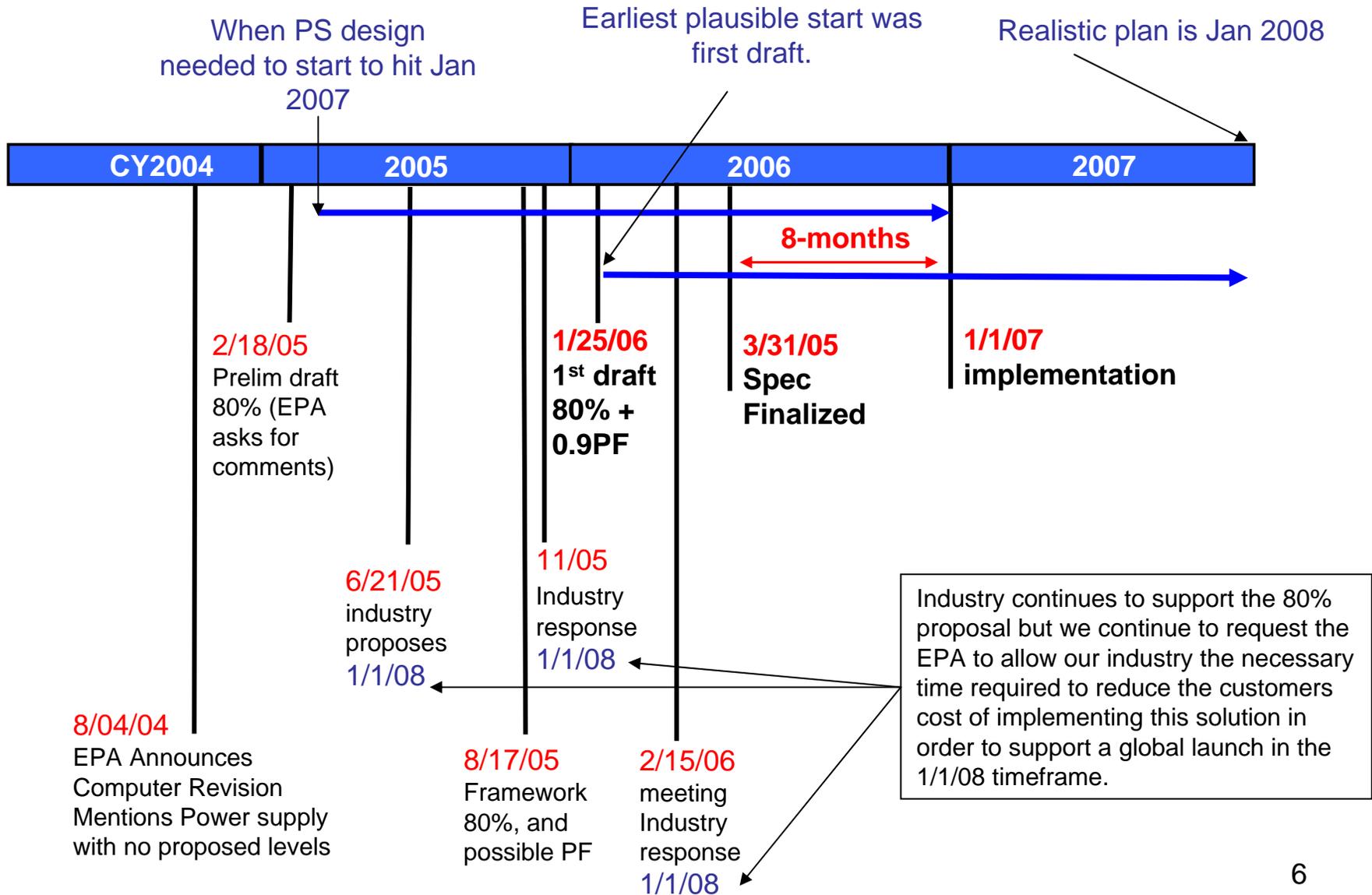
Industry Certification includes PS certification along with system integration

- Business/Marketing Plan: 30.d
- Electrical /Mechanical/Thermal Spec: 10.d
- Design Approach Phase: 120.d
- Detailed PSU Design/Evaluation: 180.d
- System Integration: 40.d
- System Test: 60.d
- Factory Readiness: 30.d
- Power Supply Pilot: 10.d
- PS Mass Production (supplier factory): 5.d
- Shipping 14.d
- Chassis Integration (production & shipping): 42.d
- Factory Pilots (Multiple systems/chassis) 90.d
- Factory RTS (Mass Production): 3.d

Total time for the entire product development cycle is	634.d
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(or approximately 22 months)

# EPA Notification Timeline is too short.



# Industry Proposal

		<b>Load:</b>		
<b>EPA Assumptions</b>	<b>20%</b>	<b>50%</b>	<b>100%</b>	
Standard Computer	55%	62%	68%	
High End Computer	67%	80%	75%	
<b>Industry Proposal 1/07</b>				
Standard Computer	70%	75%	75%	
Workstation Computer	70%	75%	75%	
<b>Industry Proposal 1/08</b>				
Standard Computer	80%	80%	80% + .9PF	
Workstation Computer	80%	80%	80% + .9PF	

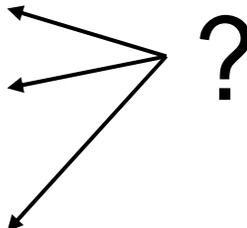
## Summary

- Industry is listening to the EPA and our customers and designing more efficient Internal Power Supplies (IPS)
- Although we may not be able to achieve the proposed 80% efficient IPS with 0.9PF by 1/1/07, we are taking interim steps to improve overall efficiency
- An example of our willingness to design more efficient power supplies, we would like to propose the following interim step to support the 1/1/07 date as we continue to work toward 80% and .9PF for January 2008
  - **70% efficient @ the 20% load**
  - **75% efficient @ the 50% load**
  - **75% efficient @ the 100% load**

# Back-Up

## 80 Plus Certified Cost vs. Quoted

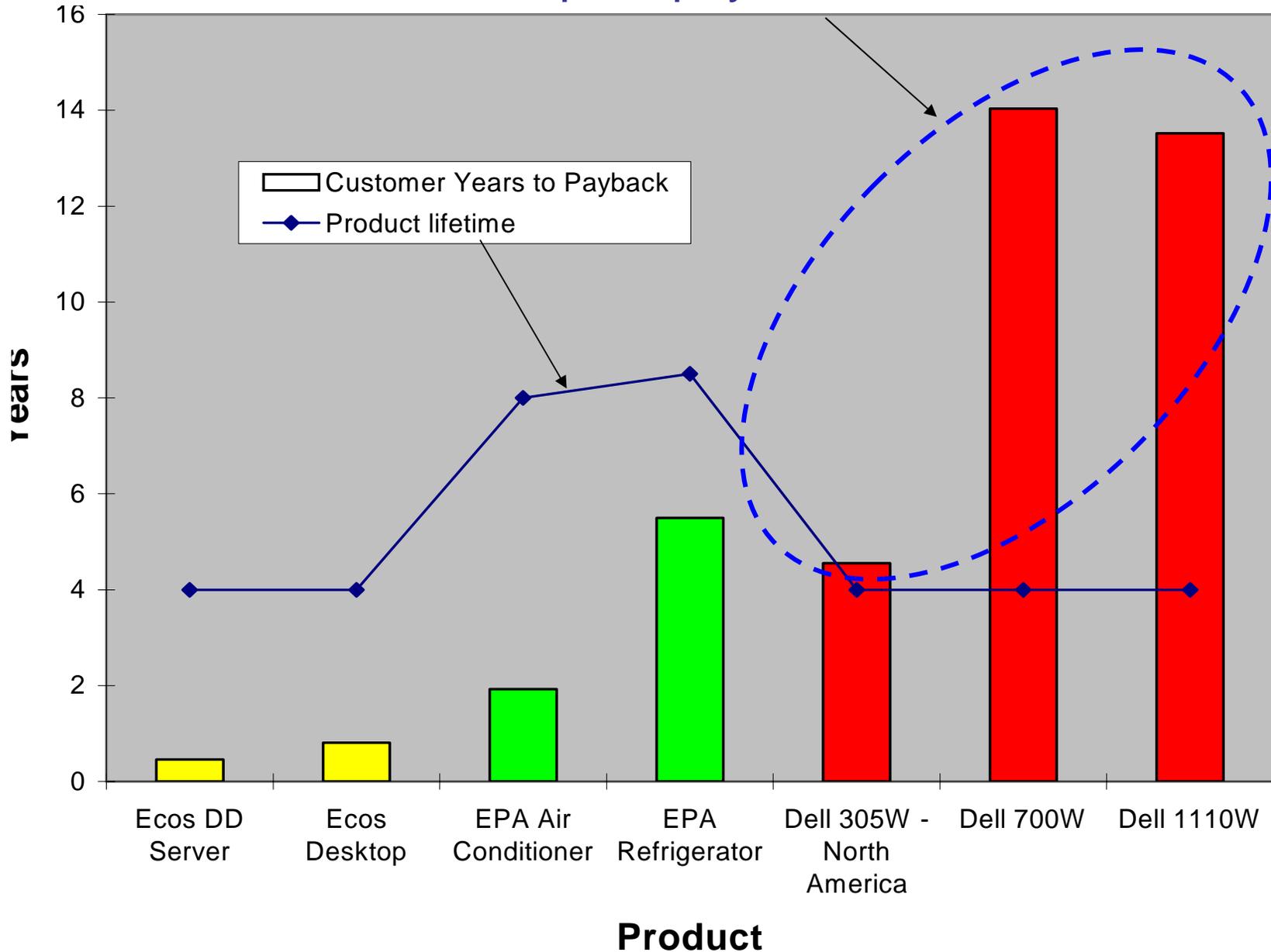
- 80 Plus claims a **\$6** incremental cost increase per computer
- Quotes from 80 plus certified manufacturers exceed industry costs

- 400W	-	<b>\$40.00 - \$45.00</b>	
- 300W	-	<b>\$25.00 - \$30.00</b>	

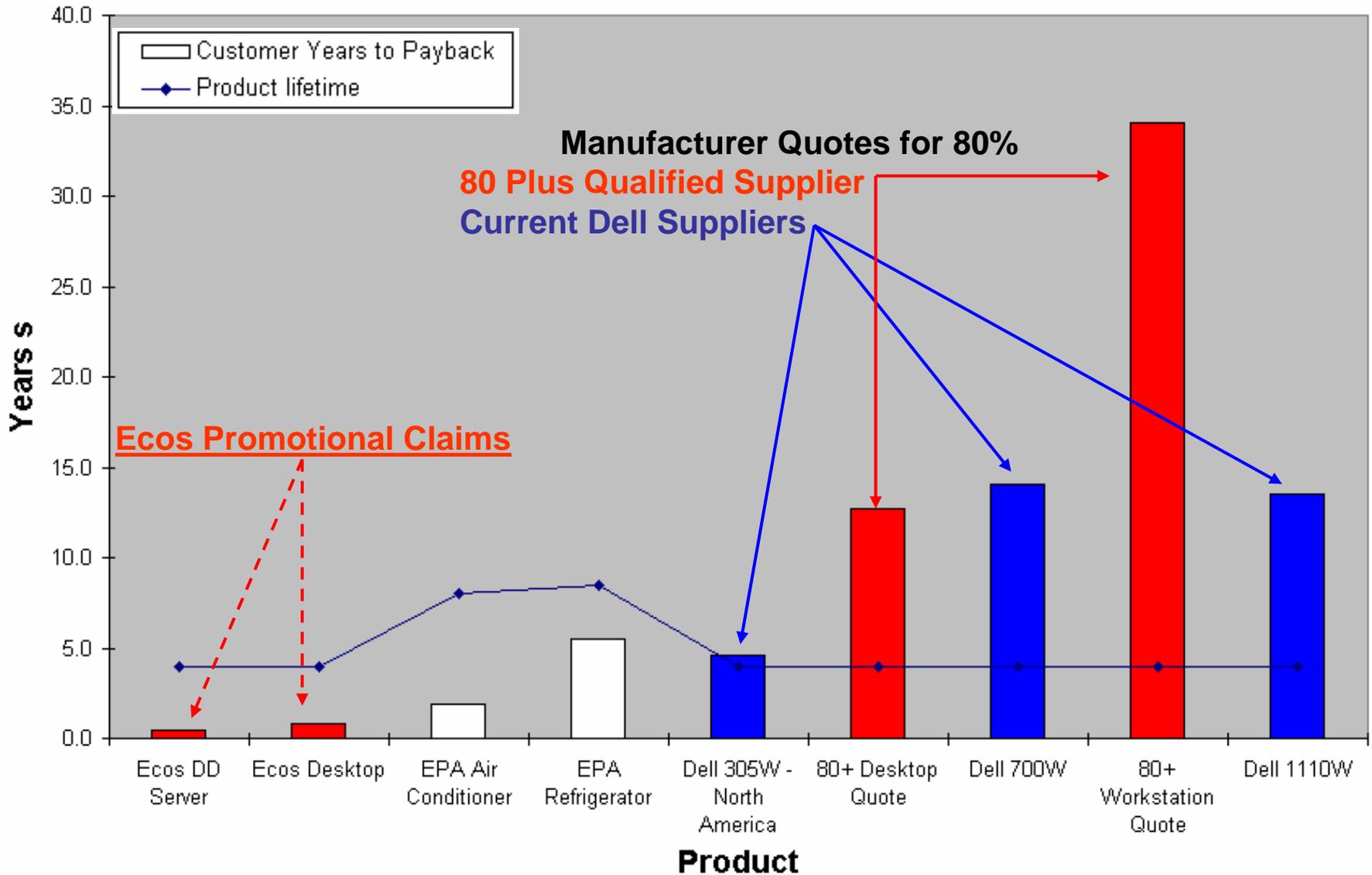
Dell evaluated two (2) 80 Plus suppliers:

- One of the suppliers' units is in the prototype phase, and not yet ready for mass-production, so they are not a viable option.
- Second vendor did have a complete unit, and it is ready for mass-production.
  - There were some critical differences between their electrical specification and our requirements that would have to be ironed out before their supply would become a technically viable option. Some examples are:
    - Static and dynamic load difference and MTBF requires the 80 Plus Power supplies redesigned to meet Dell Specs. Cost would go up.

Boosting PS efficiency on systems that already have 70+% efficient PS's, is a poor payback for a customer.



# Payback and Savings Exceed Product Lifetime



# Detailed PS Development Process



ITI Vendor  
Qualification Process