CSCI PSU Proposal for ENERGY STAR Tier 2 Server Specification

EPA Energy Star for Server Tier 2 Development Workshop

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Tier 1 ENERGY STAR Server Spec

- **Power Supply Requirements:** EPA intends to explore a *Net Power Loss* approach for Computer Server power supplies under Tier 2 of this specification. This approach would aim to specify a maximum allowed power loss through the power supply at actual operating conditions of the Computer Server (e.g., Idle and full load power).

- If a Net Power Loss approach is not developed, EPA plans to reevaluate both Multi-Output and Single-Output power supply efficiency and power factor levels.

ENERGY STAR Motivation for NPL Approach

- ENERGY STAR Goals for Tier 2 PSU requirements
  - Maximize and promote *operational* efficiency
  - Encourage right sizing and address impact of redundancy
  - Continue to recognize PSU as possible energy bottleneck AND ALSO opportunity for savings regardless of hardware configuration, work load, or application
  - Maintain momentum toward more efficient supplies as mainstream

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ENERGY STAR NPL Method

- ENERGY STAR has indicated that NPL is a possible approach for measuring system efficiency rather than current PSU efficiency and PF approach
  - Measures AC $Power_{in}$ – DC $Power_{out}$ at Idle and Max vs current method DC $Power_{out}$ / AC $Power_{in}$ at designated rated loads
- Address actual wattage losses at real operating conditions instead of efficiency at arbitrary load conditions
  - Directly correlates to wasted wattage / real-world conditions
  - Eliminate current arbitrary load points of 10%, 20%, 50% and 100% loading
  - Includes effects of redundancy and PSU sizing
- Industry opposes
  - No accepted protocol
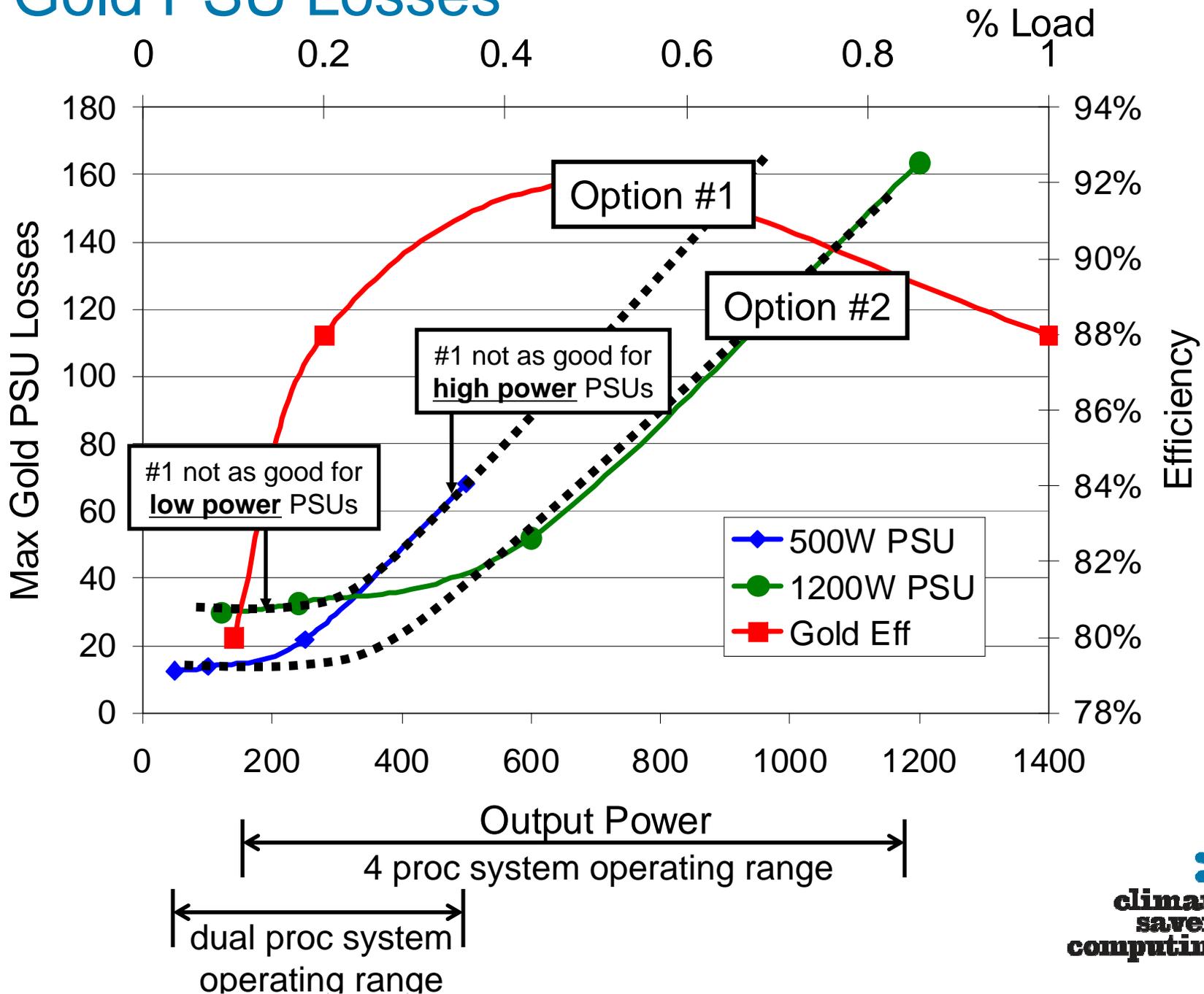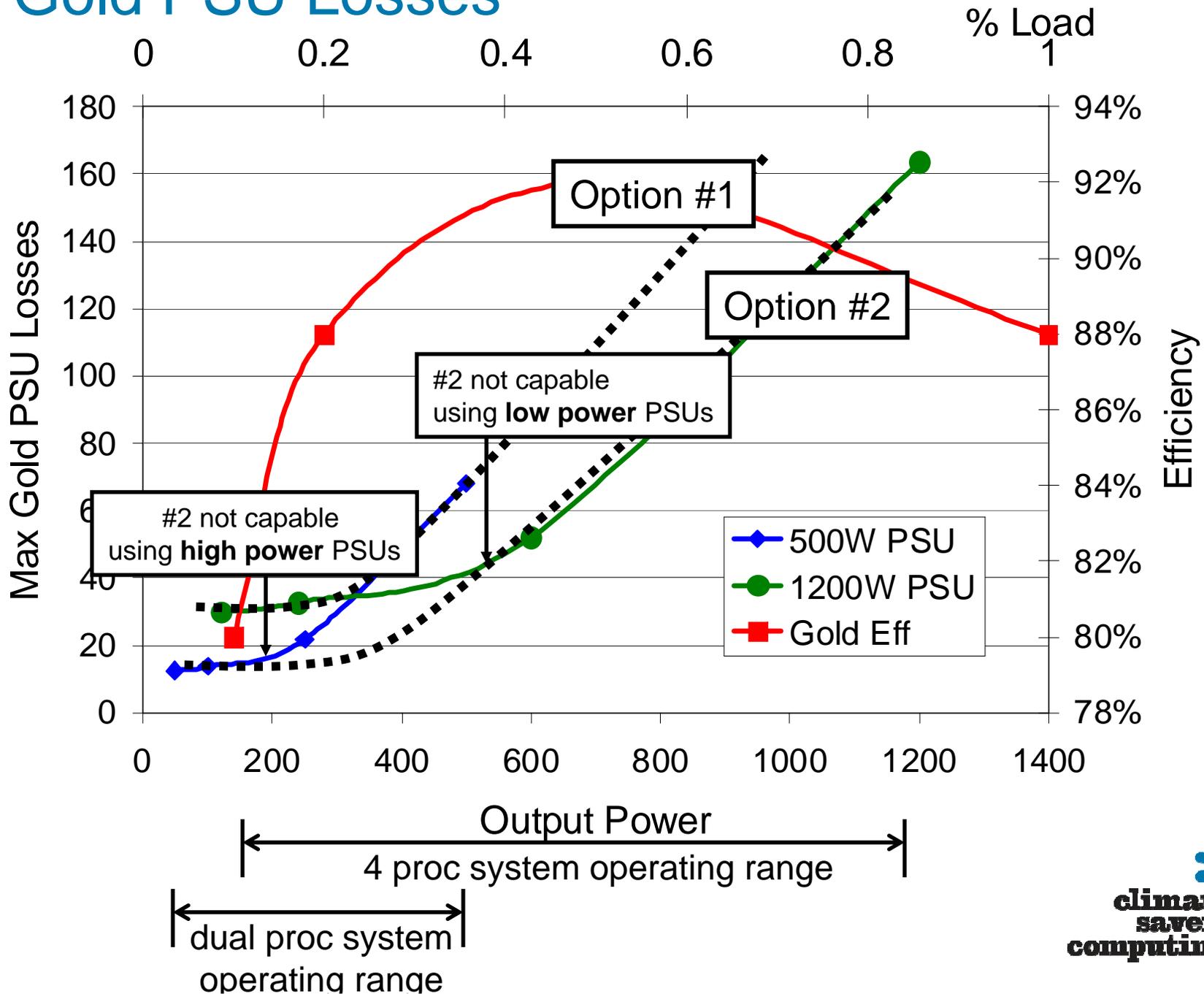 - Industry aligned behind current methods
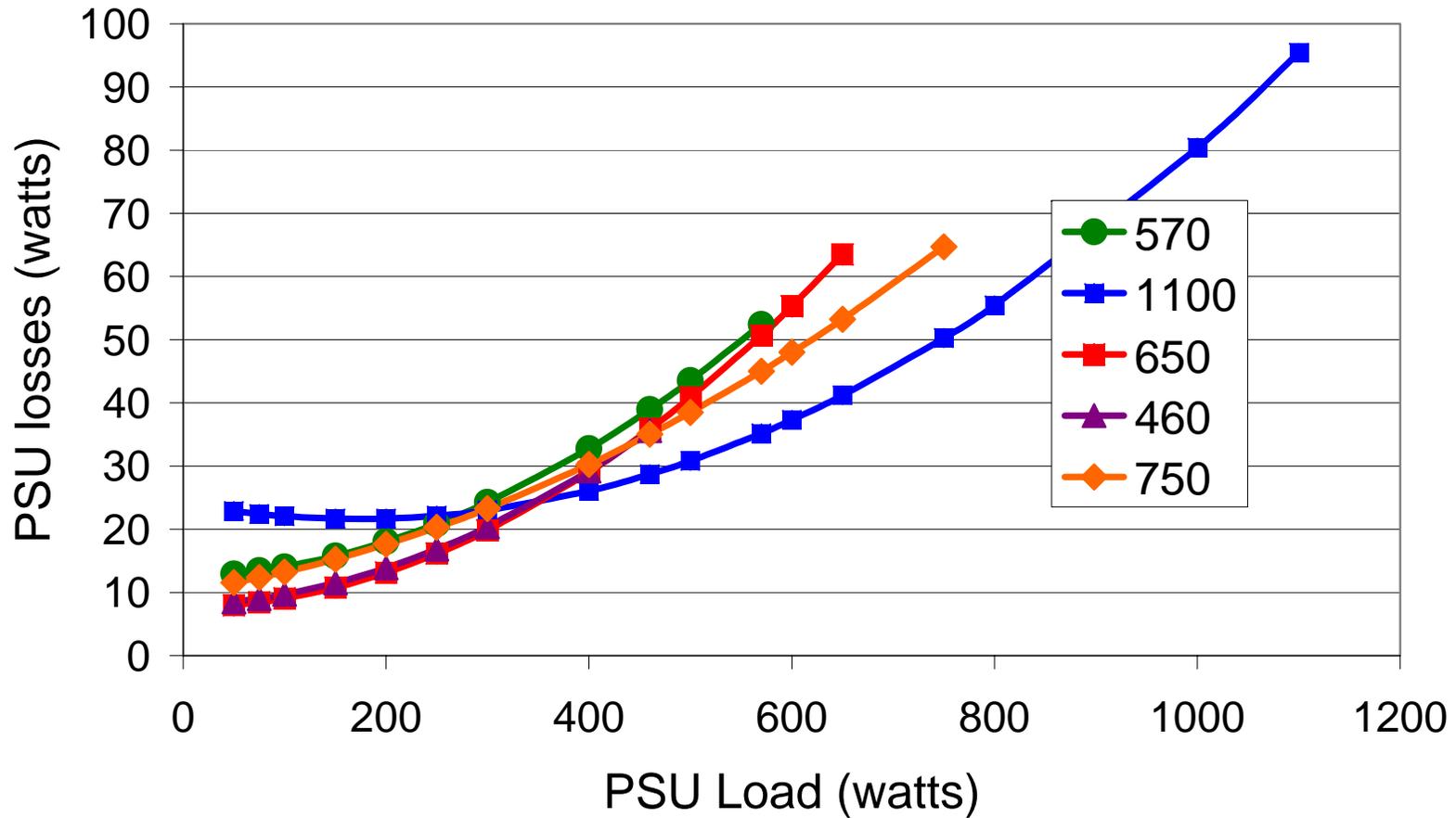
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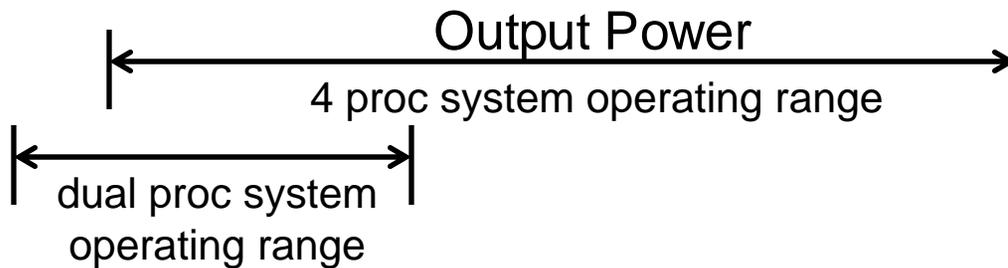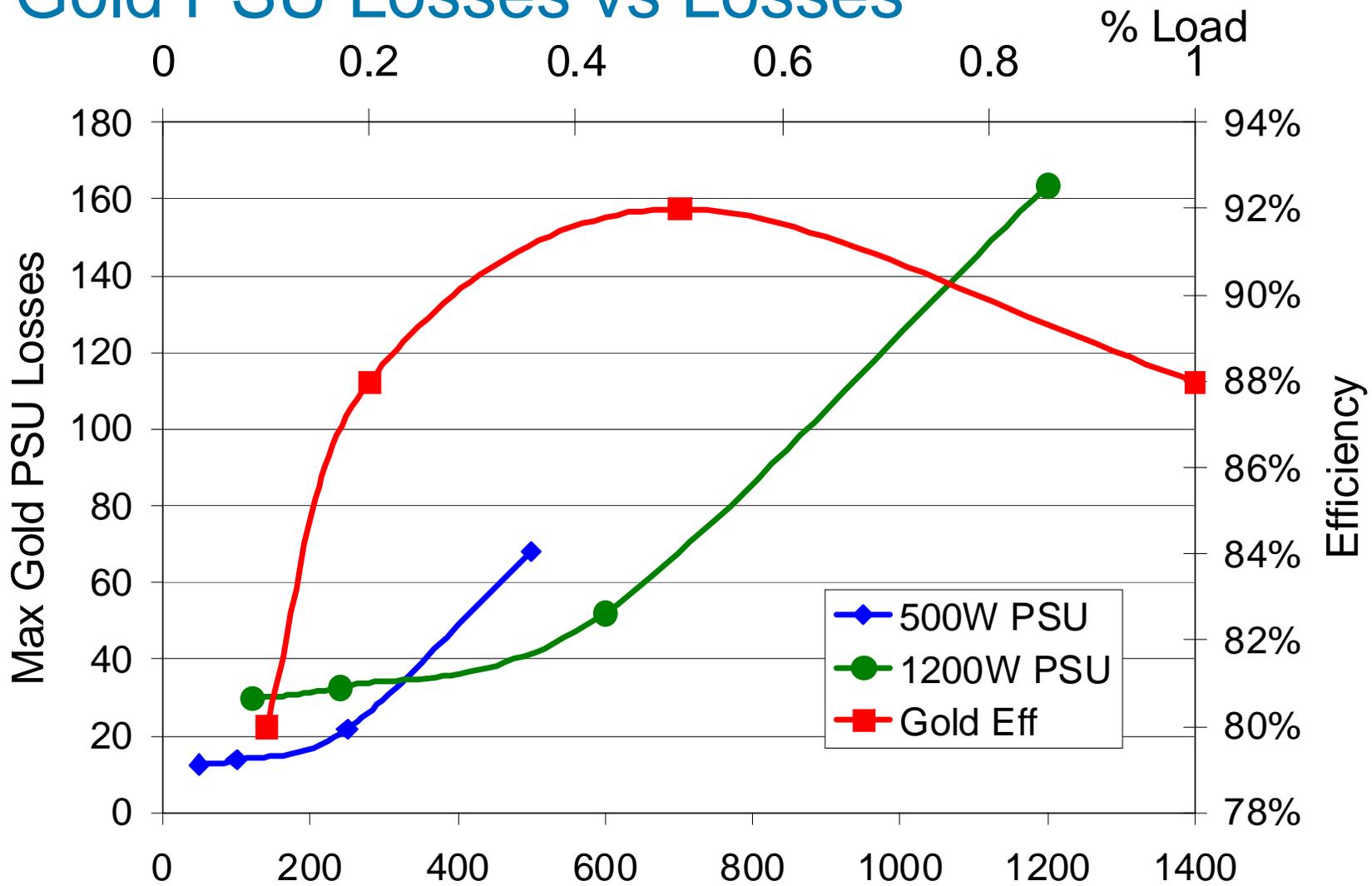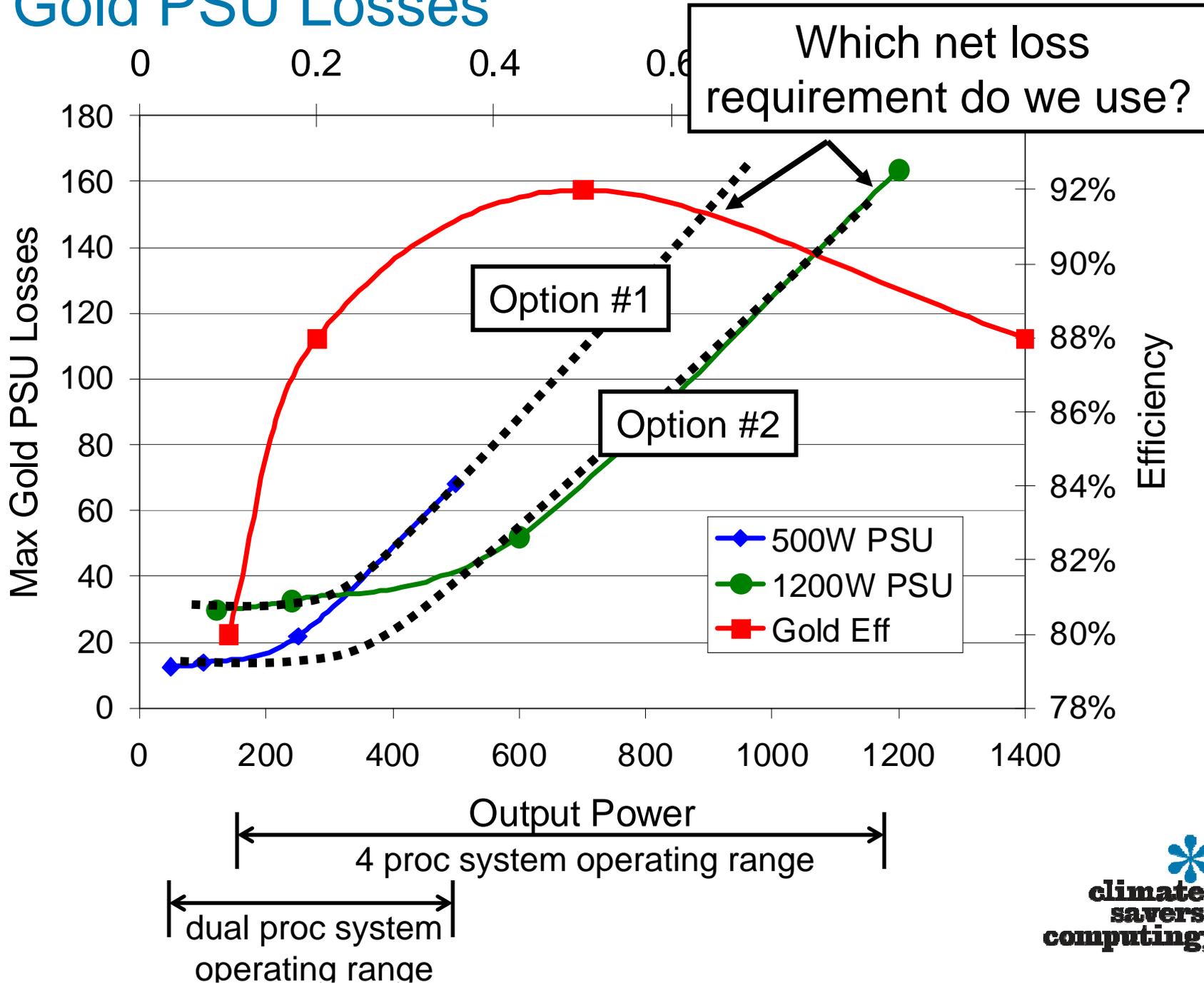
Gold PSU Losses

Curve Fitting with NPL

Single O/P Gold PSUs (best in rating)

Proposed PSU Requirements for Tier 2 Server Spec

- **Follow same PSU efficiency and PF approach as adopted in Tier 1 Server spec**
  - Maintains alignment with CSCI and 80$^+$ requirements
  - Establishes consistent roadmap for PSU suppliers
  - Eliminate unique Tier 1 single O/P PSU requirements for PSU <500W
- Maintain PSU consistency for all specifications
  - Follow similar approach for Tier 1 Storage PSU spec requirements
  - Maintain alignment with ENERGY STAR Client Spec
    - Both specs contain requirement for multi O/P PSUs
    - Creates confusion as there is overlap in low end/pedestal servers and desktop PSUs

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Proposed PSU Requirements (cont)

- Withdraw consideration of system level PSU requirement
  - Idle power specification encourage right sizing
  - Use adders to address redundant power supplies
- Focus on system level requirements rather than additional PSU requirements
  - CSCI supports industry efforts to develop server performance/efficiency metric
    - Metric should be applied to blade servers as system PSU requirements for blades becomes quite complicated

Proposed Accuracy Requirements for Tier 2

- In general, CSCI does not understand motivation of including a power monitoring feature in an energy efficiency specification.
  - Market feature, not energy feature
- Accuracy requirement of ±5% accuracy with a maximum error of ±10W per PSU
  - Tier 1 → ±5% with a maximum error of ±5W per PSU
  - As the load decreases the ability to accurately measure the power becomes increasingly difficult → maintain max error of ±10W
- Requirement should be per PSU
  - Fixed maximum system error becomes increasingly difficult for systems with redundant and additional PSUs
- Eliminate specialized power metering solutions
  - Sacrifices additional power losses to accurately measure input power
  - Unnecessarily drive up PSU costs
- Power reporting requirements should be applicable to rack mounted server products only
  - Power reporting requirements should not be required for pedestal servers

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Other questions:

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