



From Components to Systems Optimization for Efficiency

System Optimization for Efficiency



- ④ Pre Silicon & Post Silicon design and development phases
- ④ In lay terms, at a product level, this could be seen as long lead time versus short lead time efficiency optimization opportunities
- ④ The challenge today:
 - Increased proliferation of consumer electronics is driving a net increase in residential and commercial energy consumption
- ④ Market awareness of device efficiency opportunities are key to ensuring appropriate minimum standards are specified by regulators before mass deployment of emerging products
- ④ One emerging product market, Tier 2 APS, can be viewed as an opportunity for immediate short term efficiency optimization

Tier 2 APS Overview



• Tier 2 Advanced Power Strips (T2 APS) are products designed to save energy in Audio Visual (AV) and Information Technology (IT) environments

• Why the importance in T2 APS?

– Seen as the next big energy efficiency deployment opportunity for energy utilities

- It is a natural replacement for maturing CFL programs
- Millions will be deployed very quickly once programs commence
- Embertec utility/implementer partner programs in one State of 2.3M households, deployed over 3 Million units across 750k homes in 30 months

• What are the risks / opportunities of T2 APS?



Risks / Opportunities of T2 APS



- ④ Typically the core focus on T2 APS device performance is centered on:
 - Deemed energy savings (in kWh) in either AV or IT environments
 - Landed cost of the device

- ④ There is an additional and very critical (but less understood) T2 APS performance driver:
 - Consumer Acceptance of T2 APS

Consumer Acceptance



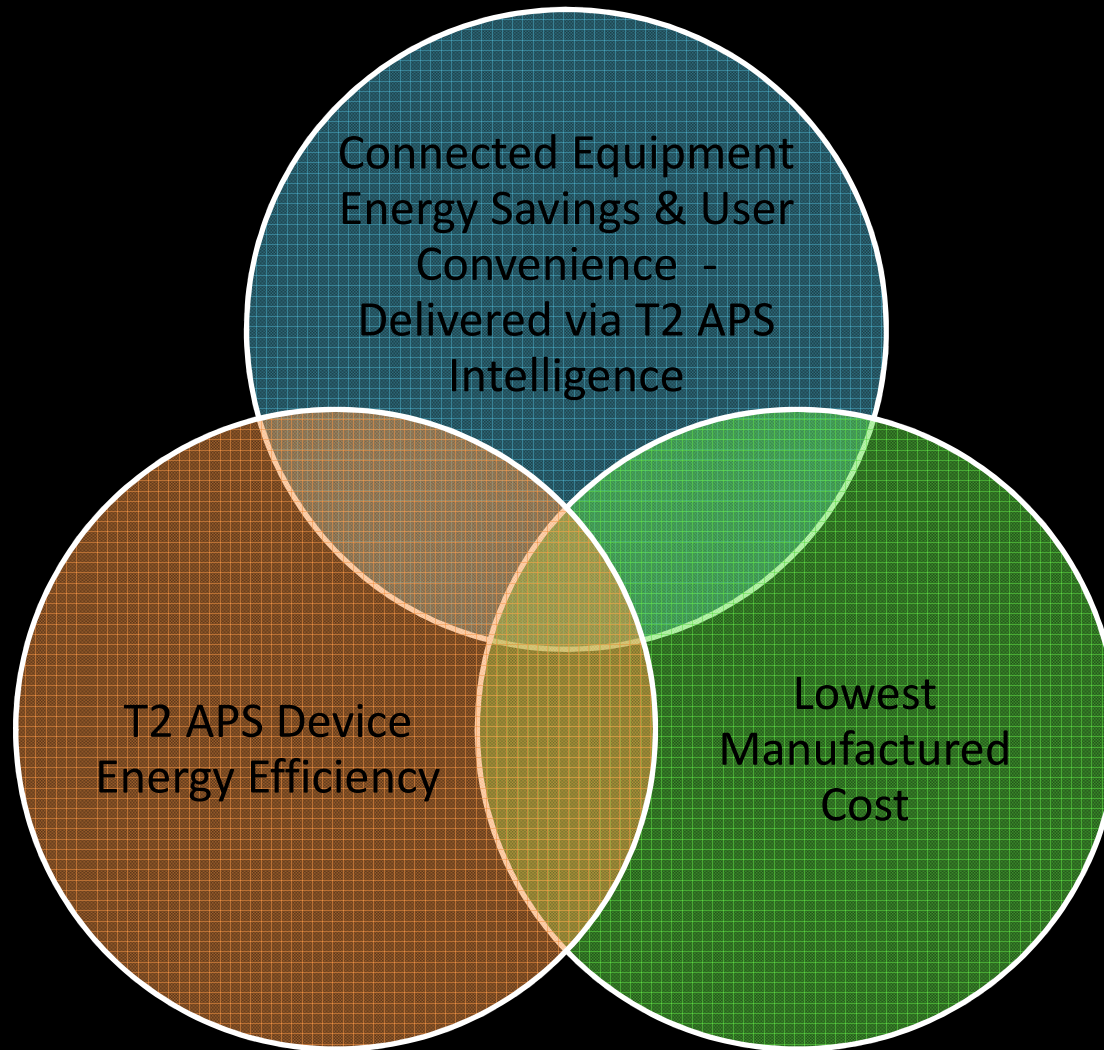
- ④ Centered on the user experience with the product
 - The ability of the T2 APS to deliver a seamless integration into the targeted AV or IT environment
- ④ Consumer acceptance is achieved by addressing the entire lifecycle of the product:
 - Ease of setup
 - Ease of use
 - Automation of savings
 - Ease of adjustability
- ④ All these elements require additional system intelligence over a basic APS platform.

Intelligence Requires Computing Power



- ④ Increased intelligence requires increased computational capacity
 - This leads to the requirement of advanced microprocessors of the same caliber of those used in smart meters.
 - More processing power means better functionality but could lead to higher energy use of the device itself
 - Thus component selection and solution integration is key to an APS device attaining the required level of system intelligence to ensure user convenience whilst maintaining energy consumption standards.

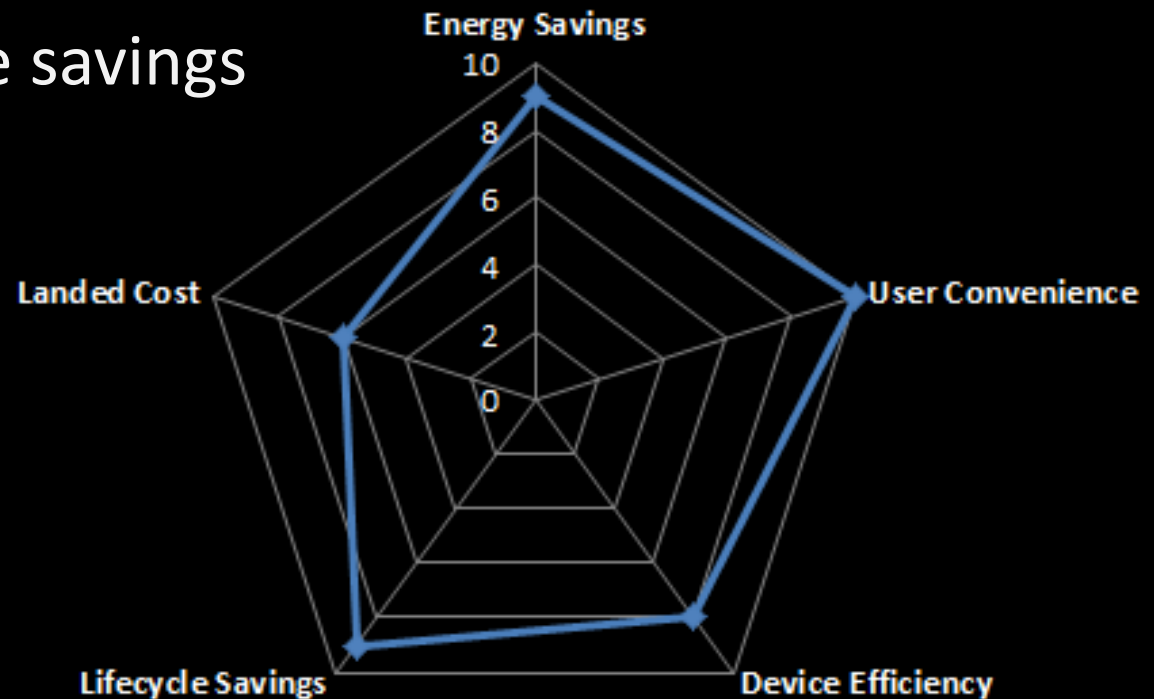
The T2 APS Challenge



T2 APS – Ideal Design Criteria



- ④ Outcome achieved via robust minimum specifications to ensure user convenience
 - Nominal cost increase/unit
 - Greater lifecycle savings

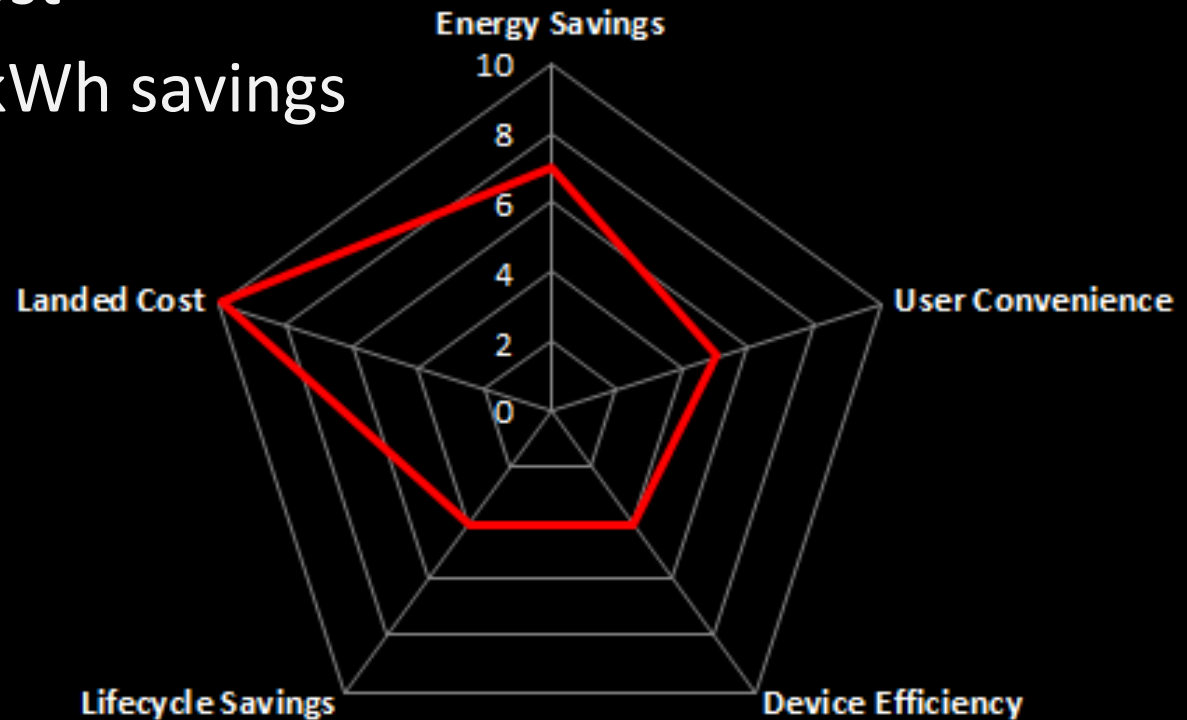


T2 APS – Landed cost as a focus



④ Outcome via low level minimum specifications

- Low landed cost
- Low lifecycle kWh savings



Challenges with AV & PC Environments ember tec[®]

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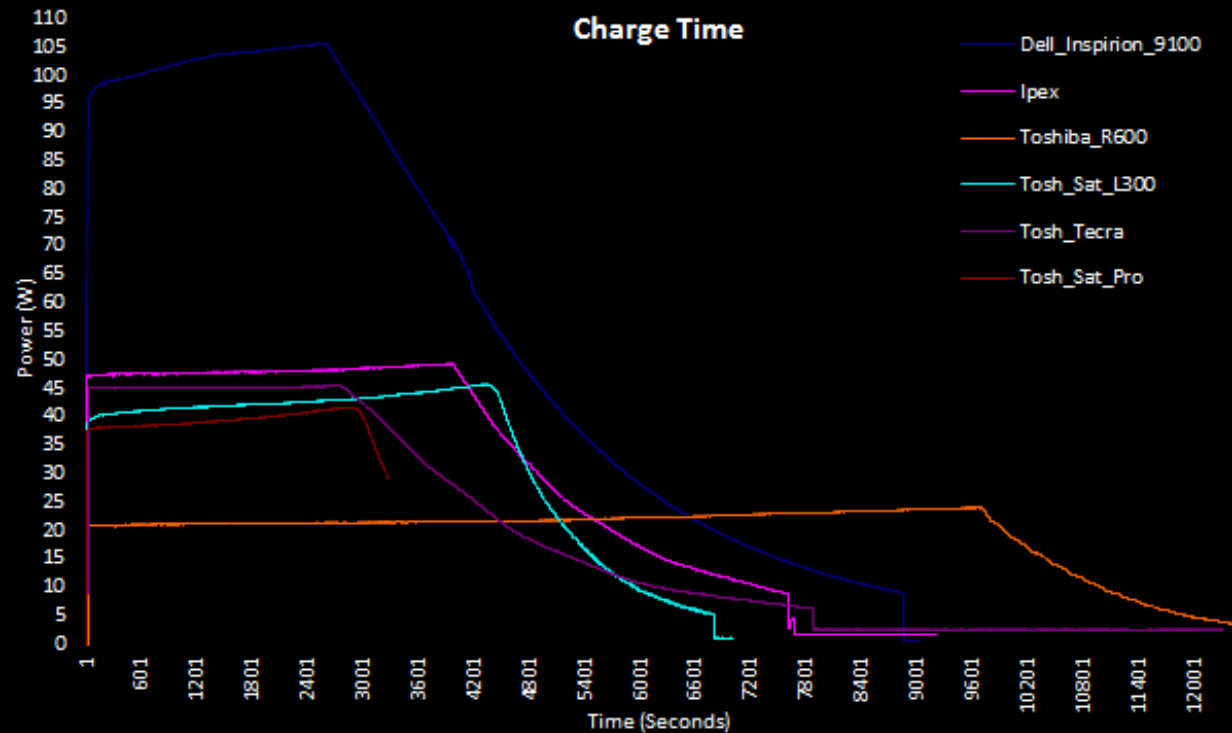
- ④ Stable power level of PC and AV connected equipment can vary between 8W and 35W+



- ④ Where do you set your switching threshold?

Challenges with PC's

- ④ Laptop battery charging cycles vary PC to PC...



- ④ T2 APS which get fooled by battery charging will lead to consumer confusion, frustration & de-installation.
- ④ They will also be susceptible to AV environment issues

Challenges with AV Environments



- ④ Significant power fluctuations of connected equipment
- ④ Spurious IR from sunlight / CFL's
- ④ Mains voltage fluctuations
- ④ APS device adjustability is key to consumer satisfaction
- ④ To cope with all these challenges requires a significant level of computational capacity from a T2 APS

T2 APS Challenge



- ④ Finding the right performance mix
 - Balance between energy savings, ease of use and device energy consumption
- ④ Must remove design short cuts by T2 APS manufacturers
- ④ This is achieved through setting robust minimum performance standards

- ④ CalPlug has focused on Tier 2 APS to provide market awareness on:
 - The best process to evaluate energy savings of Tier 2 APS products
 - Highlighting key functional elements of Tier 2 APS which will enhance user experience
 - The importance of Tier 2 APS to meet consumer requirements for maximum retention, delivering long term energy efficiency and program performance

CalPlug Key Findings – Testing



- ④ Bench testing not ideal for determining savings and retention but used to prove basic functionality – real world field trial is required (in real households)
- ④ Detailed proper testing method for T2 APS – What data is required and why?
- ④ Importance of testing each product separately – due to functionality and feature set differences
- ④ Feature sets drive retention and therefore long term energy savings

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