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Docket Number:	14-AAER-02
Project Title:	Computer, Computer Monitors, and Electronic Displays
TN #:	204156
Document Title:	ITI/Technet Computer Presentations
Description:	PCs - Methodology/Framework, Staff Workshop: Computers, Computer Monitors and Signage Displays - Shahid Sheikh Intel Corporation, April 15, 2015
Filer:	System
Organization:	CEC/Harinder Singh
Submitter Role:	Commission Staff
Submission Date:	4/13/2015 4:07:06 PM
Docketed Date:	4/13/2015

Comment Received From: Harinder Singh
Submitted On: 4/13/2015
Docket Number: 14-AAER-02

ITI/Technet Computer presentations

Additional submitted attachment is included below.

California Energy Commission

Staff Workshop: Computers, Computer Monitors, and Signage Displays

PCs – Methodology/Framework

Shahid Sheikh

Intel Corporation

April 15, 2015

PCs - Methodology/Framework

- Overview – Global Landscape
- Computers (Desktop, AIO, Notebook PCs)
  - Categorization
  - Target Setting
- Summary

ENERGY STAR v6.1 vs. CEC proposal (PCs)

Key Focus	Energy Star v6.1 (Voluntary)	CEC Staff Report (MEPs)
Duty cycles – Mode weighting	**Aligned with Ecma 383/IEC new duty cycle (NB & DT/AIO)**	✓
TEC Equation	**Aligned with IEC 62623 standard**	✓
Definitions	**Aligned with IEC 62623 standard**	✓
Prod. Categories	**New performance score based category system ; 6 DT/AIO & 6 NB categories**	**One category for all DT/AIO and one category for all NB PCs**
TEC Targets	**Based on top 25% in each category (shipping products)**	**Based on cost effectiveness; More stringent than ENERGY STAR v6.1**
TEC adders	**Based on measured and analytical approach**	Based on ENERGY STAR v6.1 (Except no adder for dGfx)
Spec Revision	Based on E* penetration/product shifts	TBD – Need more information
Test procedure	Aligned with IEC with plus enhancements for new products	TBD - Need more information
Conformity assessment	Accredited labs/CB scheme	TBD – Need more information
Product labeling	E* label (physical or electronic)	TBD – Need more information

Key concerns: No PC product categories and more stringent TEC targets

Why Categorize?

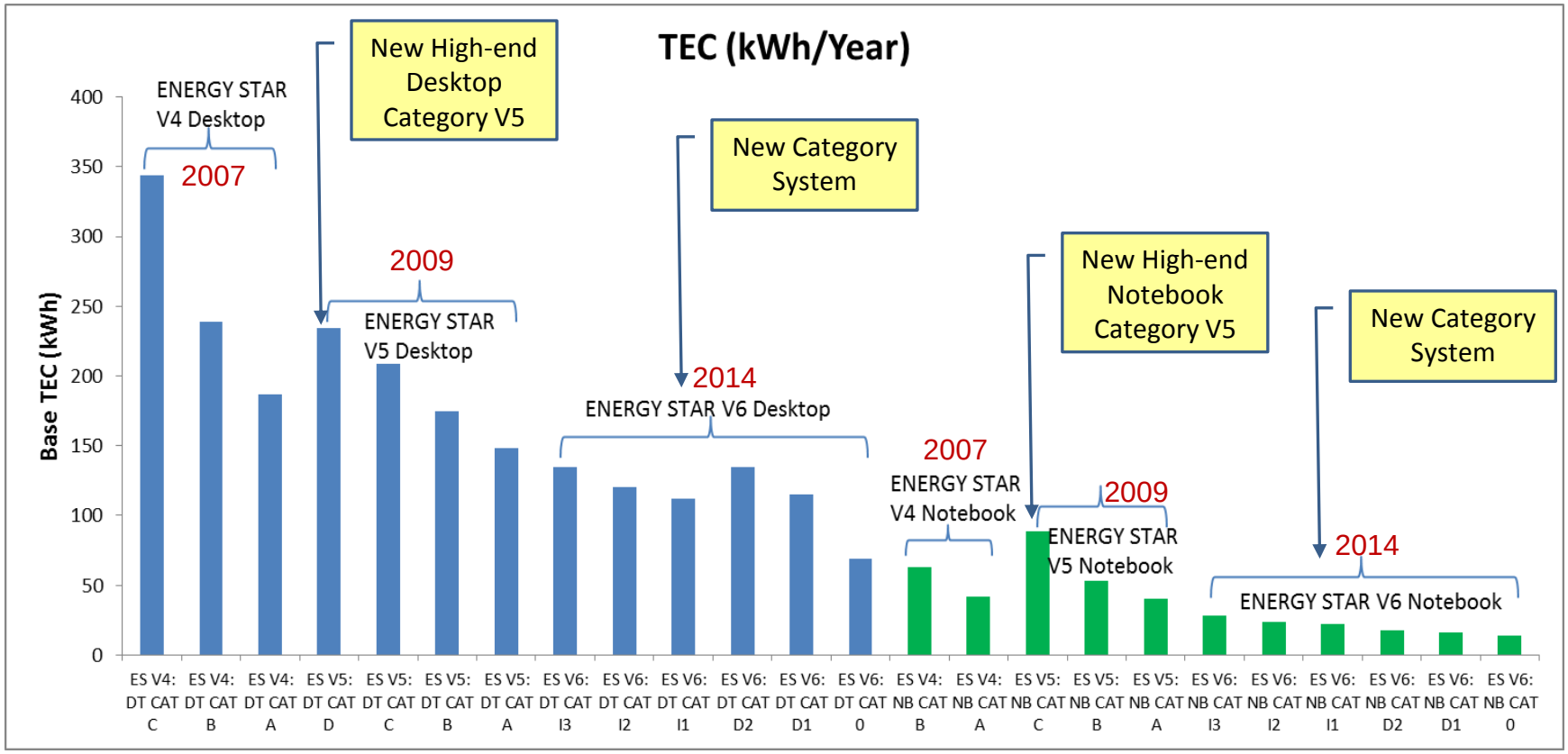
- Categories are used to group systems with similar capability together
  - Allows a consumption (TEC) comparison based on their capabilities

Motor vehicle analogy

	Consumption	Transportation Uses	Computer Uses
 Tablet/ Slate	Motorbike: 120 mpg Tablet: 5W	Transport a person A→B	Web Browsing, consumption
 Notebook	Car: 45 mpg Notebook: 9W	Transport people A→B	Content creation
 High-end Notebook	Pickup: 18 mpg HE Notebook: 25W	Transport people and things A→B	Games, Media creation, computational analysis

ENERGY STAR PC generational improvements (V4 through V6)

(Lower Energy Consumption and Additional categories)



PC Product category evolution key to ENERGY STAR program success

Source: Intel/US EPA

Global PC Energy Programs – global alignment

Global PC Energy Programs	Desktops/AIO Categories	Notebooks Categories	Duty Cycle (Mode weighting)	Voluntary/ MEPs	Status/Est. Effective date
ENERGY STAR* V5.2 Categories (Baseline); TEC/Adder framework	CAT A CAT B CAT C CAT D	CAT A CAT B CAT C	Energy Star V5.2 (based on MSFT study – No IEC Std.)	Voluntary	Effective July 2009
EU (ErP Lot 3) -TEC plus modal power targets	✓	✓	✓	MEPs	Phase 1: July 2013 Phase 2: Tier 1 July 2014; Tier 2 Jan, 2016
China	✓	✓	✓	Voluntary/ MEPs	Multi-grade/ 2012
South Korea	✓	✓	✓	MEPs	Effective July 2012
Australia	✓	✓	✓	MEPs	Effective Oct. 2013
India	✓	✓	✓	Voluntary	NB implemented 2012; Awaiting DT
Brazil	✓	✓	✓	Voluntary	Effective April 2012
ENERGY STAR V6.1	6 DT/AIO	6 NB	Based on Ecma 383/IEC std.	Voluntary	Effective Sep.2014
*California – CEC Appliance EE	Single category	Single category	✓	MEPs	Effective: 2017 (Est.)
*Japan – new Top Runner	In Dev	In Dev	In Dev	MEPs	Effective: 2016 (Est.)

Categorization reflects PC market segmentation and is critical to global harmonization

* In Development

PC segmentation – Desktop example

- Key applications by segment
- Typical power profile

Desktop Form Factors
Different Types for Different Applications

	Enthusiast Tower	Mainstream Tower	All-in-One	Portable All-in-One	Mini PC	Compute Stick
						
	• Gaming • Content Creation • Max Performance • DIY/Configurable	• Price Performance • Flexible • Reliable/Secure	• Stylish • Huge HD Screen • High Performance	• Full PC + Giant Tablet + Portable TV • Multi-user	• Small & Powerful • Fits Anywhere	• Pocketable • Entry Compute • Any Screen • Smart
OS	Windows Linux Mac iOS	Windows Linux Mac iOS	Windows Linux Mac iOS	Windows Mac iOS	Windows Linux Mac iOS Chrome	Windows Linux Chrome

Source: Intel Corp.

Desktop Form Factor – Power Profile




	Enthusiast Tower	Mainstream Tower		AIO	Mini PC
	dGfx (G5-G7)	dGfx (G1-G5)	iGfx	very screen size dependent	<3 Liter chassis
TEC (kWh)	290	197	140	137	38.5
Short Idle (W)	66	46.5	31.5	35	8.3
Long Idle(W)	61	41.5	30.0	20	7.3
Sleep (W)	3.4	1.5	1.5	2.5	1.5
Off (W)	1.3	0.6	0.6	0.7	0.7
Sample Size	16	69	265	55	23

All data is Average of measured power based on shipping configurations

Notes: 1) Most dGfx based data based on 2013-2014 shipping systems 2) This is not a TEC proposal for California

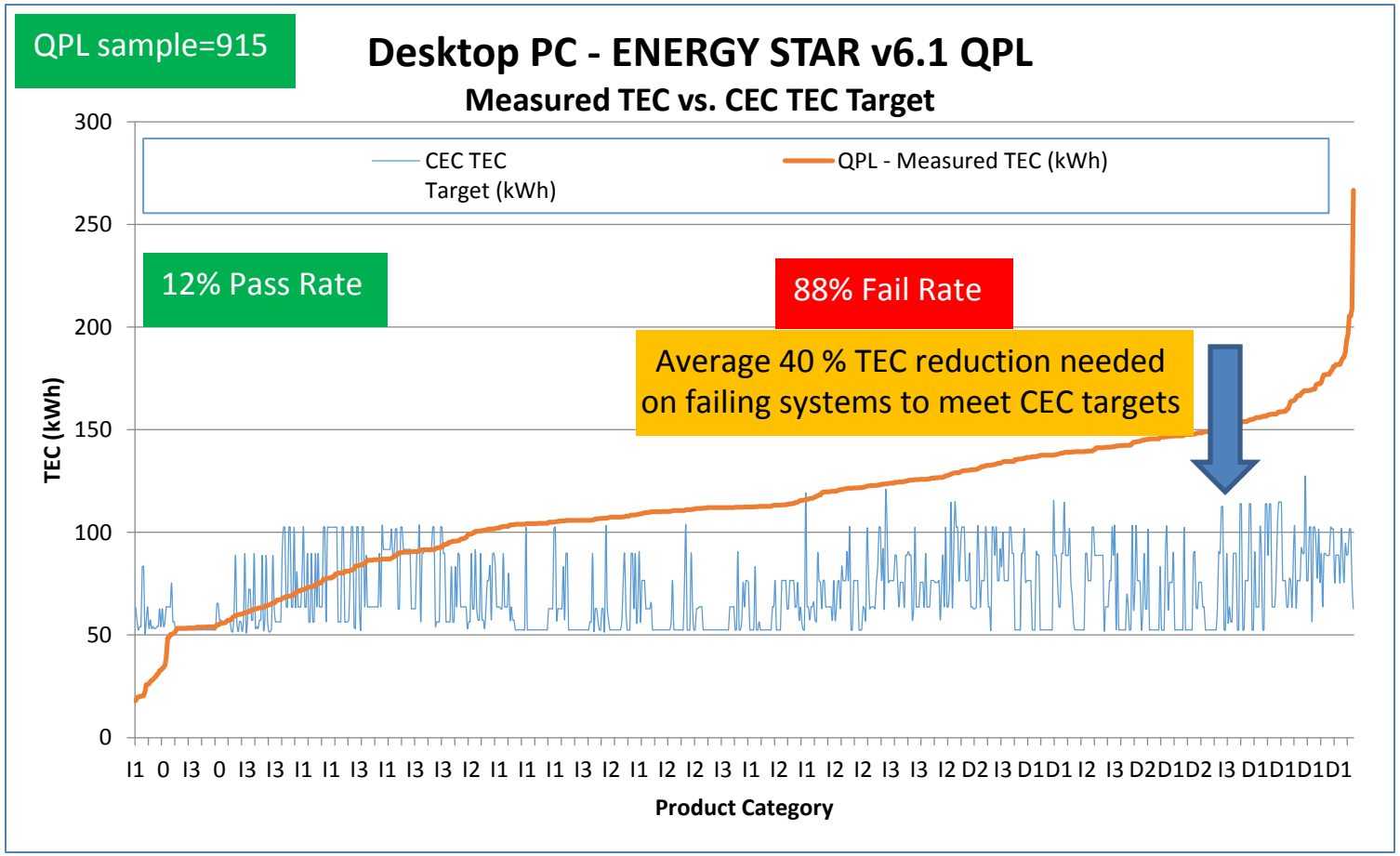
Source: Intel Corp.

CEC Target Setting

- ENERGY STAR: Targets based on top 25% of shipping systems
  - ENERGY STAR spec revision process driven by increase in penetration rate ~50%, and based of product transformations (Typical: 3-5 year after effective dates).
- CEC Process: Target setting based on cost effectiveness and technical feasibility
  - Proposed targets more stringent than voluntary ENERGY STAR V6.1 (~50% reduction in idle power for all Desktop/AIO PCs --one-size-fits-all approach)
  - Industry does not have access to CEC dataset to evaluate and provide constructive input
  - CEC staff report references ENERGY STAR V6.1 qualified product list (QPL) and % of systems that may meet CEC targets.
  - Energy Star QPL is a limited dataset of only ENERGY STAR qualified systems – not reflective of all shipping systems in the US/CA.
  - California MEPs approach should be based on all shipping systems (ENERGY STAR and Non-ENERGY STAR)
- Current Impact (based on ENERGY STAR v6.1 QPL) – see charts

CEC Targets – Desktop impact

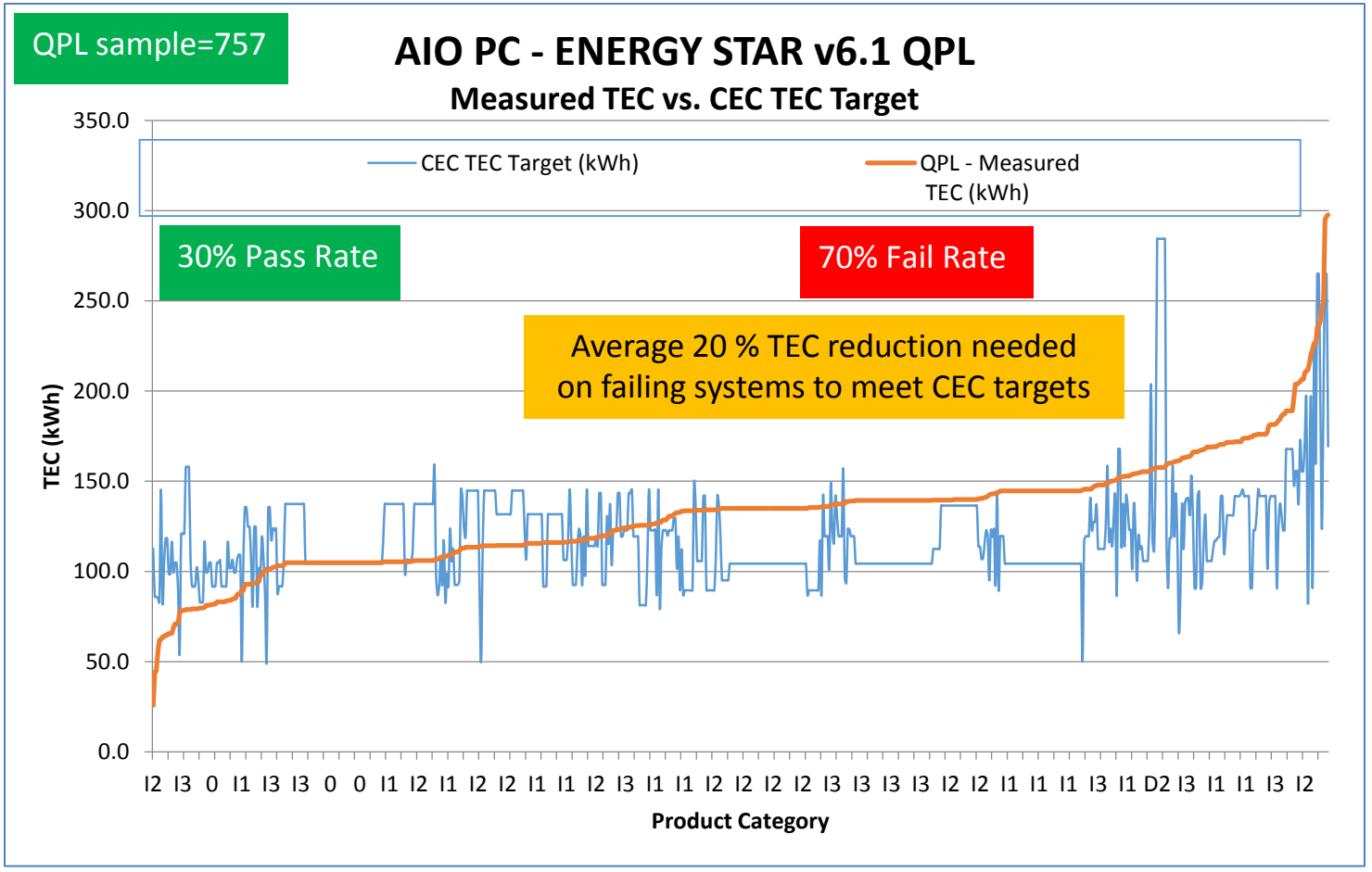
- **Desktop PC product impact:**
  - **High failure rate across all segments. Expect even higher % failure on all shipping systems.**
  - **~40% TEC reduction by 2018 on Energy Star systems, to comply with proposed targets (Need access to CEC data to validate cost effectiveness assumptions)**



Source: ENERGY STAR Computers QPL

CEC Targets – AIO impact

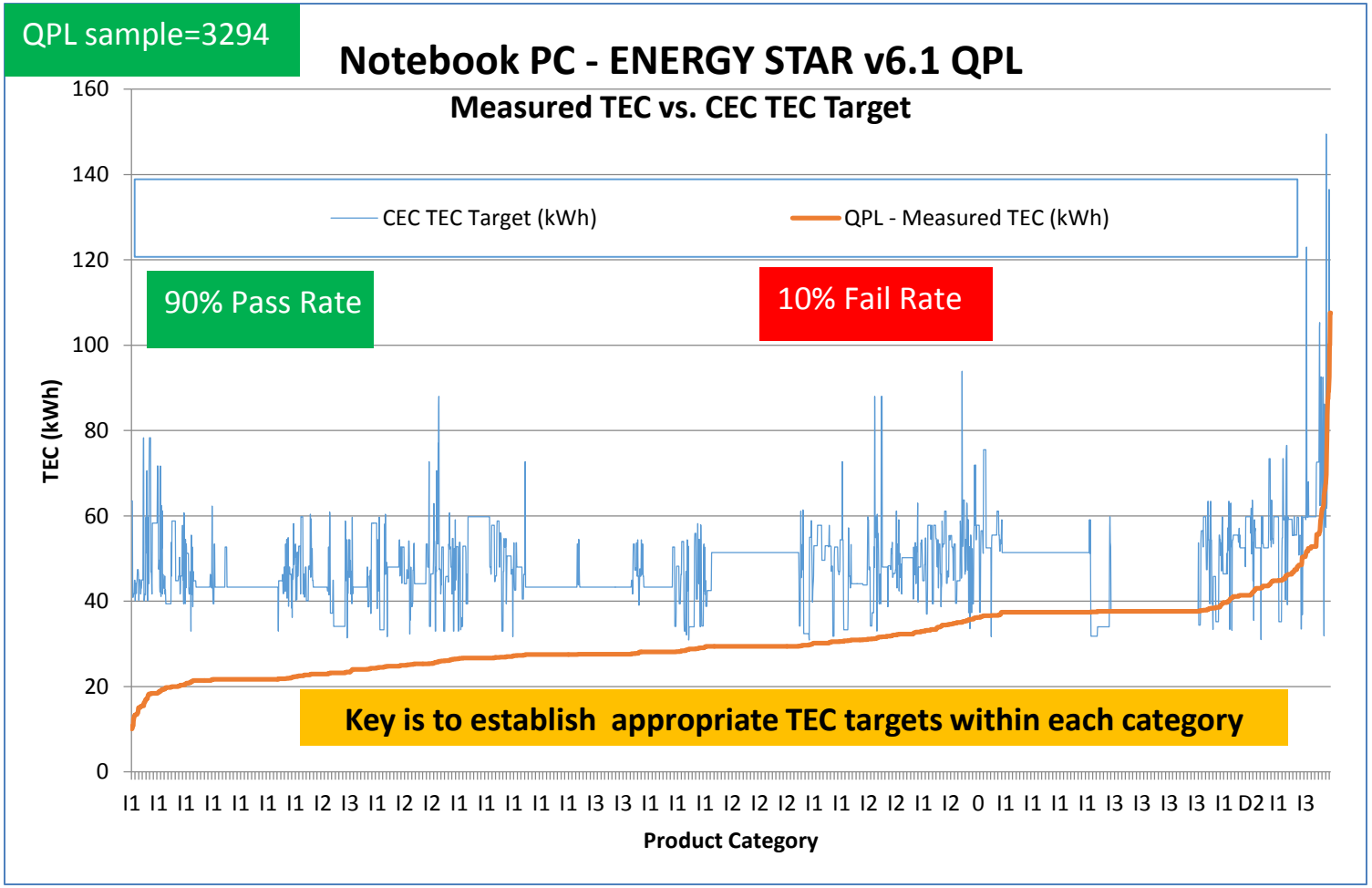
- **AIO PC product impact:**
  - **High failure rate. Expect even higher % failure on all shipping systems**
  - **~20% TEC reduction by 2018 on Energy Star systems, to comply with proposed targets (Need access to CEC data to validate cost effectiveness assumptions)**



Source: ENERGY STAR Computers QPL

CEC Targets – NB Impact

- **NB PC product impact:**
  - **Moderate failure rate (mainly High-end systems at risk). Expect higher % failure on all shipping systems. A good example of why one-size-fits-all approach is not appropriate**
  - **Need access to CEC data to validate assumption.**



Source: ENERGY STAR Computers QPL

Framework/methodology summary

- Industry does not have access to CEC dataset to evaluate and provide constructive input
- CEC assessment appears to be based on limited sample size and using best in class ENERGY STAR qualified product list.
  - CEC proposed targets are more stringent than Energy Star v6.1
- Establishing PC categories and setting appropriate targets within each category is key to success of PC energy efficiency program. One-size-fits-all approach does not reflect PC market segmentation in CA.
- CEC target setting and cost effectiveness criteria should be based on all shipping products (not just ENERGY STAR QPL)
- CEC's cost effectiveness and technical assessment does not represent ground realities (Addressed by Gary Verdun, Dell)

THANK YOU