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ENERGY STAR® Televisions Version 8.0 Launch Webinar

October 3, 2016

ENERGY STAR Products Labeling Program





Webinar Details

- Webinar slides and related materials will be available on the Televisions Product Development Web page:
 - www.energystar.gov/RevisedSpecs
 - Follow link to “Version 8.0 is in Development” under “Televisions”
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** 773-366 #
 - Phone lines will remain open during discussion
 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



Webinar Agenda

- ENERGY STAR Specification Development Process
- TV Innovation and ENERGY STAR
- Goals for Revision
- Data Analysis and Conclusions
- Version 8.0 Initial Proposals
- Timeline



ENERGY STAR Specification Development

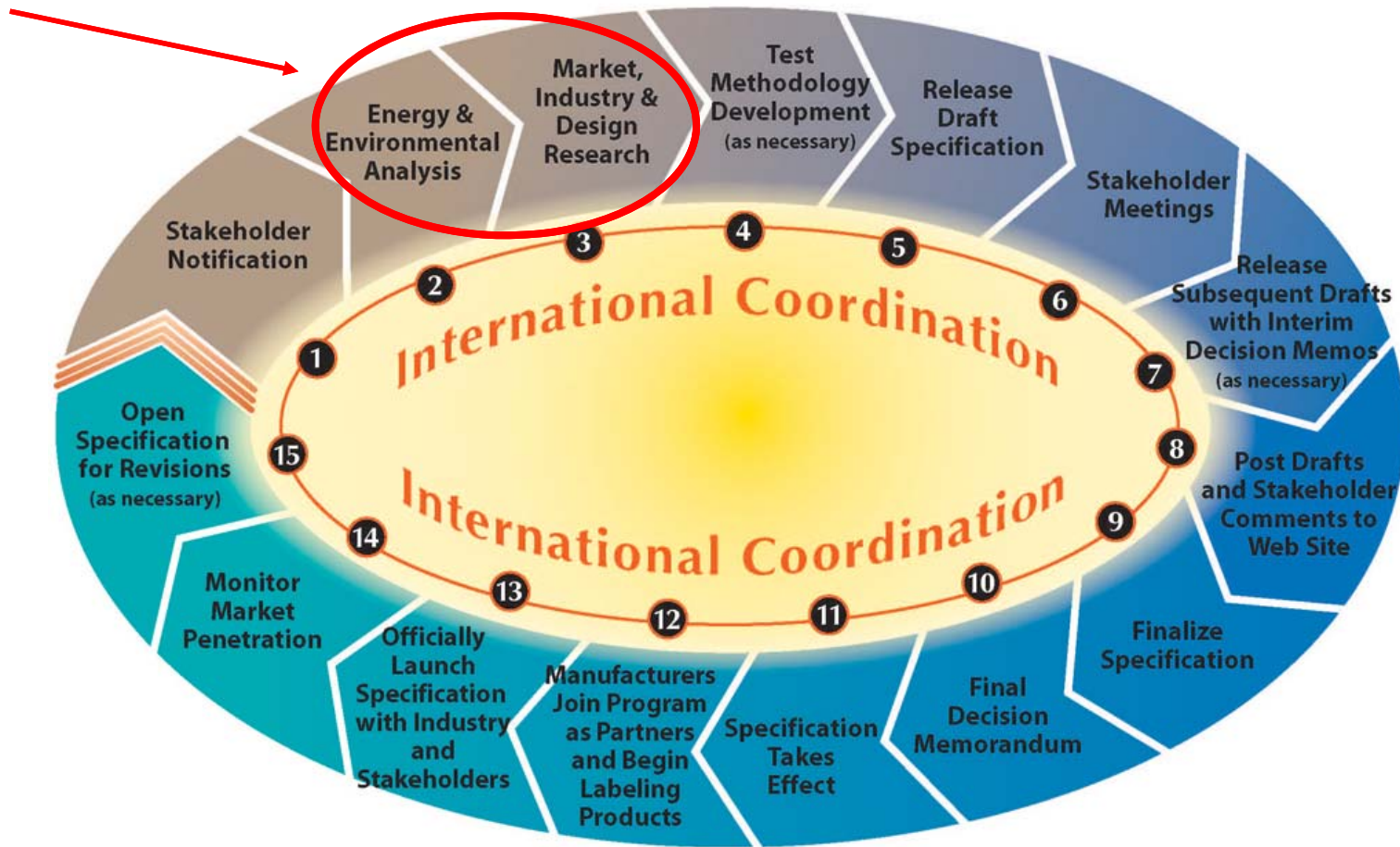
Time	Topic
1:00–1:10	ENERGY STAR Specification Development
1:10–1:30	Testing Indicative of Full Range of Energy Use
1:30–2:15	Persistence of Energy Saving Features
2:15–2:30	Specification Concept
2:30–2:45	Discussion Questions
2:45–3:00	Timeline



Recap of certification program

Specification Development Cycle

We are here





Technological Shifts in Televisions

- EPA and TV manufacturers partnered on TVs since 1998. Much has changed since then!
- TV's 50" and larger now outsell, on a units basis, each of the following individual categories of screen sizes: TVs smaller than 32", 32-35", 40-46", and 47-49".
- Most manufacturer and retailer marketing supports models 50" and larger and they become the most watched models in a household, so their energy use will be a disproportionately large share of total TV energy use.
- Ultra High Definition (UHD) penetration is greater than 50% now in the 50"+ screen sizes, and rising steadily.
- High Dynamic Range (HDR) is now in more than half of all new TVs of 50"+ and more than 60% of all new UHD TVs of 50"+.



Goals for Version 8.0

- Ensure the delivery of savings that purchasers expect and maintain these savings along with a high-quality viewing experience.
- Take interim steps to ensure ENERGY STAR is recognizing efficient TVs based on real-world energy use.
- Support DOE's update of the test method. Multiple stakeholders recognize the test loop needs to be updated and DOE has issued a Request for Information (RFI).



DOE RFI Report Found Significantly Higher Energy Use in Some TVs when Playing Realistic Content

Table 2: 620-second Average On Mode Power Draw for Each Tested TV

Video Clip	Brand X #1 (W)	Brand X #2 (W)	Brand X #3 (W)	BRAND Y #4 (W)	Brand Z #5 (W)
IEC	52.7	29.7	91.1	42.6	69.4
Recut IEC	52.4	29.7	93.6	41.4	69.1
Movie 1	64.0	29.9	113.2	58.1	69.0
Movie 2	54.8	29.6	103.7	48.3	69.8
News	55.1	29.9	89.7	58.7	70.6
Sports 1	51.7	29.7	95.2	52.8	69.7
Sports 2	52.4	29.7	87.3	58.5	70.6



Testing in Europe and the US Also Showed Differences in Power Use Depending on the Test Clip

TV Model	Model A	Model B	Model C	Model D	Model E	Model F	Model G	Model H	Model I
Screen Size (inches)	50	55	55	55	65	65	65	55	55
IEC (Watts)	77	131	70	132	194	102	160	106	103
CLASP UHD (Watts)	79	132	102	130	206	114	157	101	112
CLASP UHD-HDR (Watts)	103	163	163	138	448	175	168	104	109
CLASP UHD Increase over IEC	3%	1%	46%	-2%	6%	12%	-2%	-4%	9%
CLASP UHD-HDR Increase over CLASP UHD	30%	24%	60%	6%	118%	54%	7%	3%	-3%



Proposed Priority Areas for Version 8.0

- Address energy consumption and persistence of energy saving features in various picture settings.
- Effectiveness of Automatic Brightness Control (ABC).
- Treatment of HDR.
- UHD: Resetting adder based on current performance?



Version 8.0 Launch: Data Assembly

- EPA launched Version 8 with data assembly effort:
 - In order to allow for the evaluation of the proposed approaches, EPA sent out a data assembly template and asked stakeholders to share data by September 19, 2016.
 - In addition, EPA performed its own testing in a contractor laboratory and retail stores.



Data Assembly Template

ENERGY STAR® Specification for Televisions Version 8.0 Data Collection Form

Version 1.0, 8/5/16

Instructions

Fill-in yellow cells where possible and follow instructive comments embedded in column headers and cells.

TV Test Method may be found here: http://www.ecfr.gov/cgi-bin/text-idx?node=ap10.3.430_127.h

General Information About TV Model, Settings, and Notifications

Manufacturer	
Model Number	
Date of Manufacture of Sample Tested	
Software Version # or Update Date	
Date Test Was Conducted	
List all available automatic brightness control settings (e.g. N/A, Low, Medium, High, On, Off, etc.)	
List all available motion detection dimming settings (e.g. N/A, Low, Medium, High, On, Off, etc.)	
Note minimum possible setting value for Backlight	
Note maximum possible setting value for Backlight	
Note minimum possible setting value for Contrast	
Note maximum possible setting value for Contrast	
Note minimum possible setting value for Brightness	
Note maximum possible setting value for Brightness	
Describe any other automatic energy saving features beyond ABC and MDD and their possible settings	
Note any changes to ABC enabling from backlight/contrast/brightness adjustment	
Note any changes to MDD enabling from backlight/contrast/brightness adjustment	
Note any changes to other automatic energy saving feature enabling from backlight/contrast/brightness adjustment	
Record any on-screen notifications given to the user that changing preset picture settings may cause ABC, MDD, or other automatic energy saving features to switch off, may change the unit's power consumption, or may cause it to no longer qualify for ENERGY STAR in	
Note any on-screen notifications that encourage users to change picture settings	



Data Assembly – Preset Picture Setting Defaults

Preset Picture Setting Information												
Forced Menu Mode	Video Format	Preset Picture Setting	Characterization of Setting	Preset Picture Setting Defaults								
				ABC	Able to be Switched On by User?	MDD	Able to be Switched On by User?	Other automatic energy saving features	Able to be Switched On by User?	Backlight	Contrast	Brightness
Home	Standard Dynamic Range		Brightest, most power consumptive picture setting									
			Default picture setting									
			available, or the preset picture setting that yields the next highest power consumption after the factory default preset picture setting if HDR upscaling is not available									
Retail	HDR 10											
	Dolby Vision											
	SDR											



Data Assembly – ABC Measurements

ABC Off		ABC Measurements (if ABC can be enabled in a given preset picture setting)										Black Test
		3 Lux		12 Lux		35 Lux		100 Lux		300 Lux		
Power (watts)	Luminance (cd/m ²)	Power (watts)	Luminance (cd/m ²)	Power (watts)	Luminance (cd/m ²)	Power (watts)	Luminance (cd/m ²)	Power (watts)	Luminance (cd/m ²)	Power (watts)	Luminance (cd/m ²)	Power (watts)



Testing Indicative of Full Range of Energy Use

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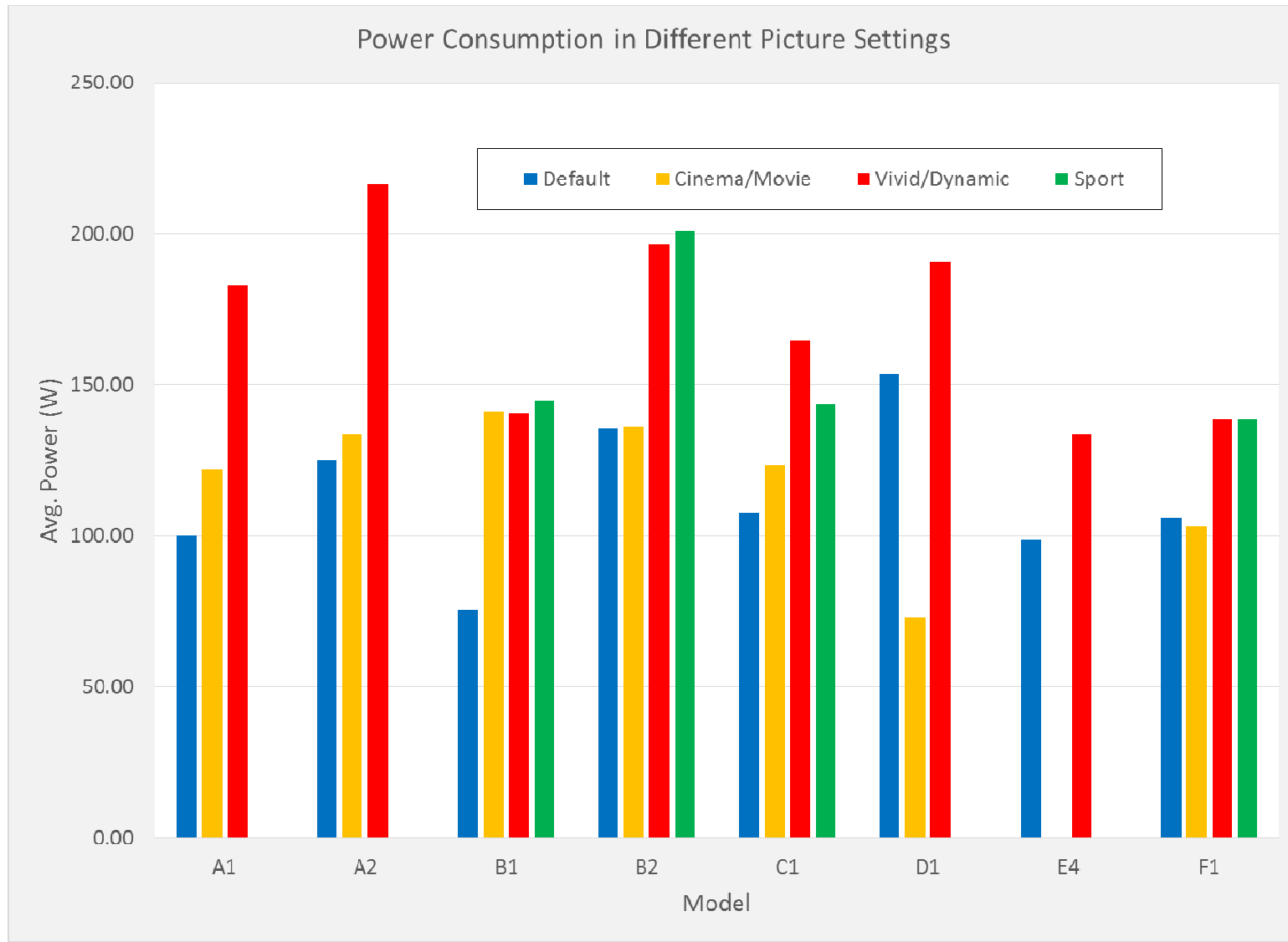


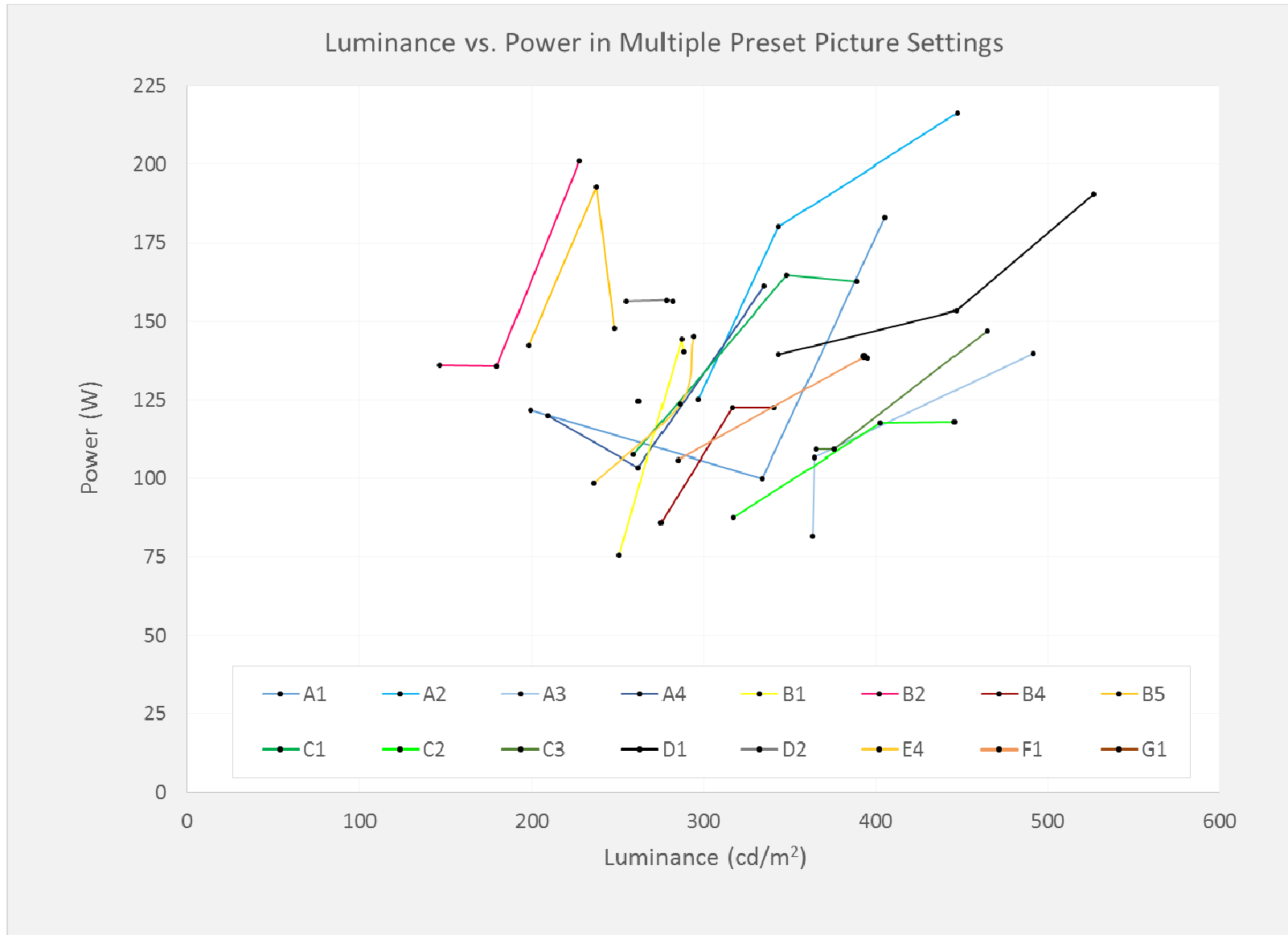
Findings Based on EPA Testing of Products and Manufacturer Submitted Data



EPA dataset

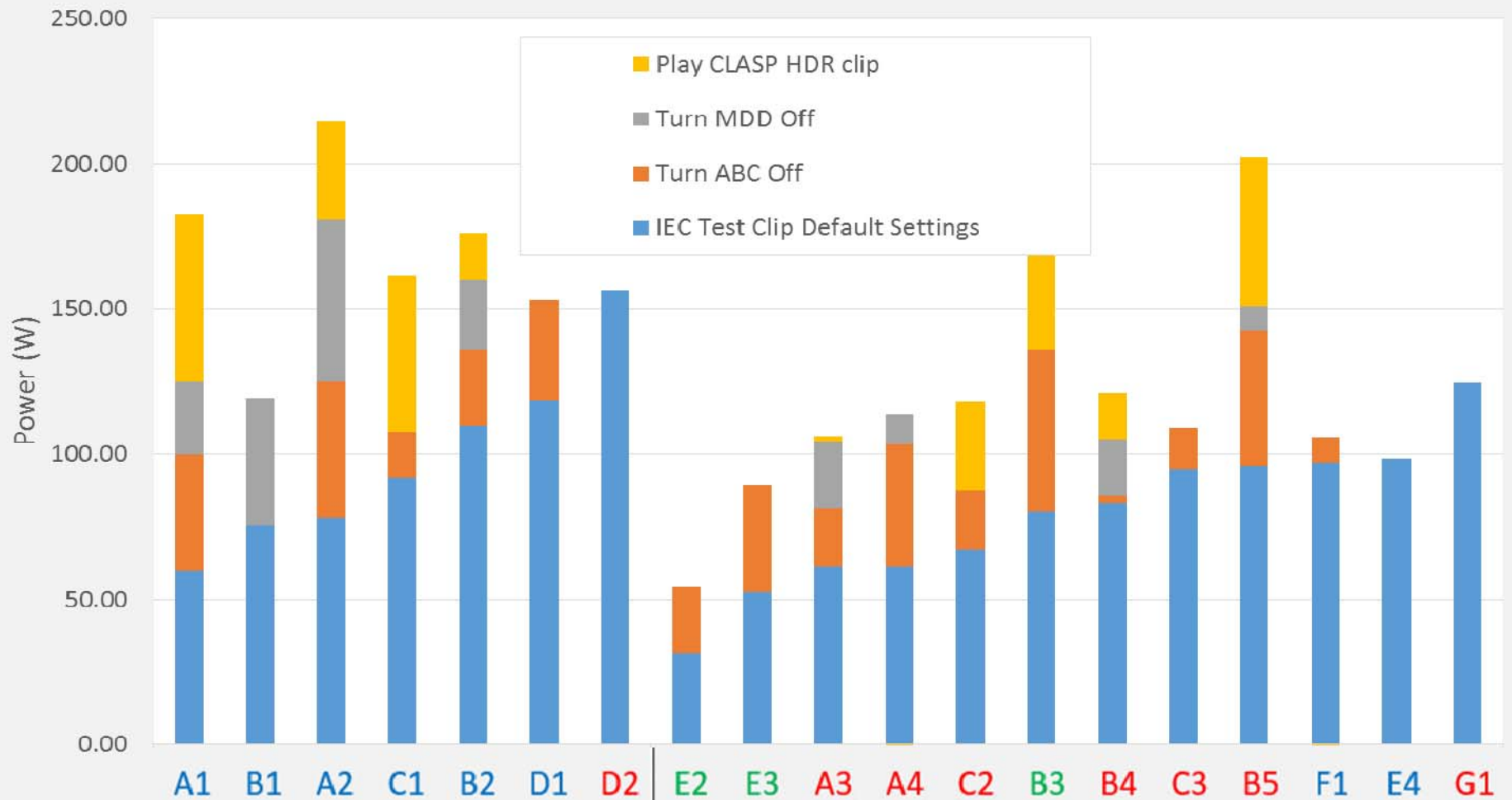
Year	Brand and Model	Size (inches)	Data Source	ENERGY STAR	Default Settings		
					ABC	MDD*	HDR 10
2015	A1	55	Lab	Yes	Yes	Yes	Yes
	A2	55	Lab	Yes	Yes	Yes	Yes
	B1	58	Lab	Yes	No	Yes	No
	B2	55	Lab	No	Yes	Yes	Yes
	C1	55	Lab	No	Yes	No	Yes
	D1	55	Lab	No	Yes	No	No
	D2	55	Retail	No	No	No	No
	E1	65	Lab	No	No	No	No
2016	A3	55	Retail	Yes	Yes	Yes	Yes
	A4	55	Retail	Yes	Yes	Yes	Yes
	B3	55	Industry	No	Yes	Yes	Yes
	B4	55	Retail	Yes	Yes	Yes	Yes
	B5	55	Retail	No	Yes	Yes	Yes
	C2	55	Retail	No	Yes	No	Yes
	C3	55	Retail	No	Yes	No	No
	E2	43	Industry	Yes	Yes	No	No
	E3	50	Industry		Yes	No	No
	E4	55	Lab	Yes	No	No	No
	F1	55	Lab	No	Yes	No	Yes
	G1	55	Retail	Yes	No	No	No







Impact of Settings and Content on UHD TV Energy Use



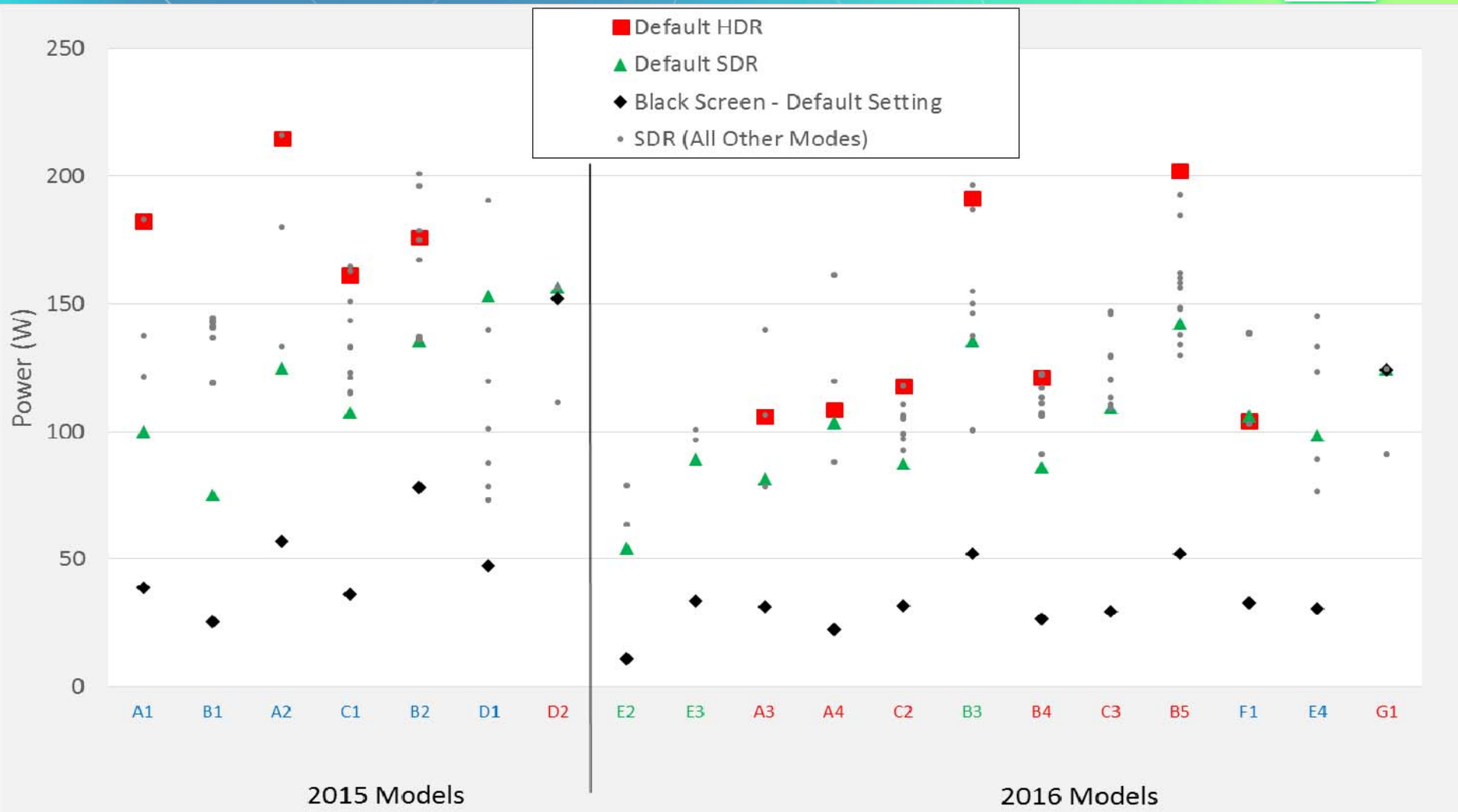
2015 Models

2016 Models

Blue = Lab Tested

Red = Retail Tested

Green = Industry Tested

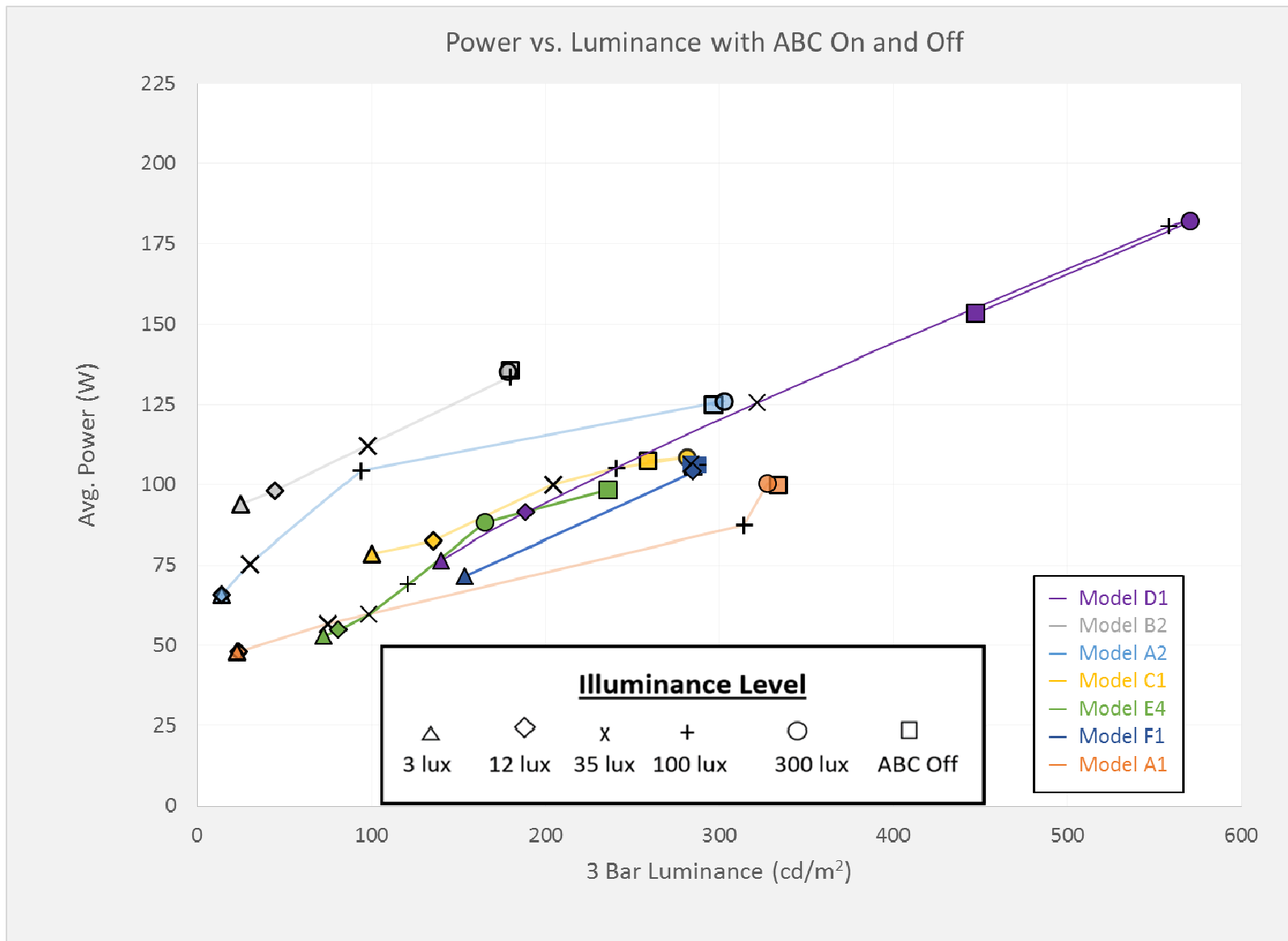


All Measurements with ABC Off

Blue = Lab Tested

Red = Retail Tested

Green = Industry Tested





Persistence of Energy Saving Features

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High potential for TVs not being watched in the mode in which they were certified as ENERGY STAR.

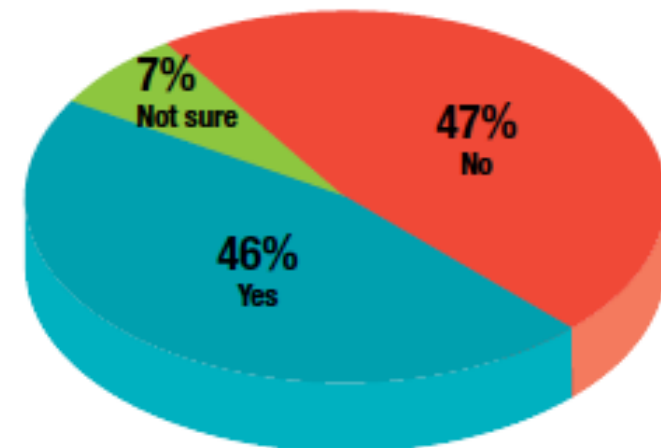


Do Users Commonly Change Picture Settings?

- 3M data from a 2011 survey of nearly 600 consumers (chart).
- LG comment on DOE RFI: “[O]ur understanding of our customers’ behavior points in the same direction – the majority of TV owners do not change their picture mode default settings.”
- Samsung comment on DOE RFI: “According to Samsung’s internal study, approximately 60% of consumers stay within the default viewing settings through the lifetime of their televisions.”
- California utilities comment on DOE RFI: “the evidence points to the fact that TVs are not being viewed in the as-shipped settings.”
- Consumer Reports [urges all TV buyers](#) to change their TV from default settings.

Changing Picture Settings

To the best of your knowledge, have you or anyone else changed the picture settings on your newest TV since it was purchased?

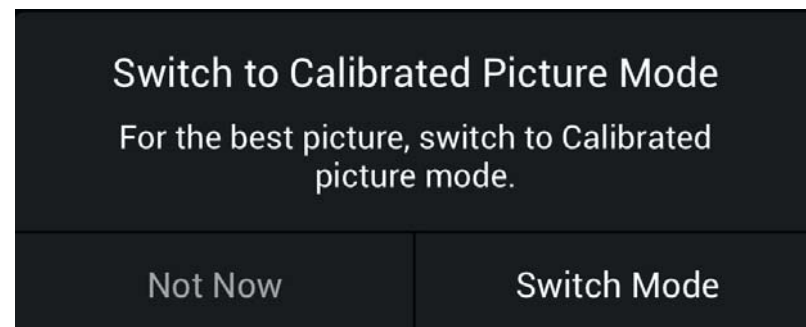


Source: Dave Lamb (3M), *3M-Commissioned Research Shows Consumers Value Wide Angle Viewing on their LCD TVs*, 5/30/12.



How Can TVs Switch from Default Settings without Deliberate Action by the User?

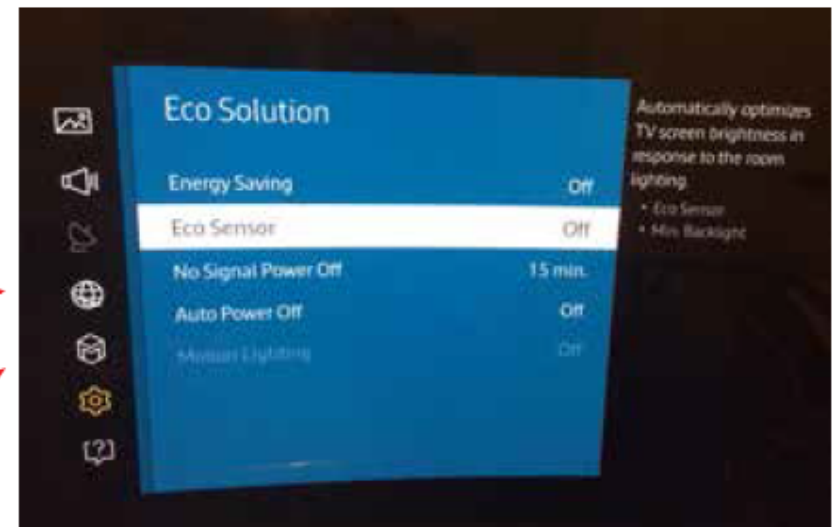
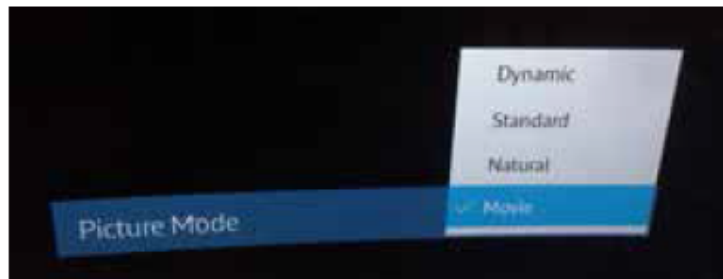
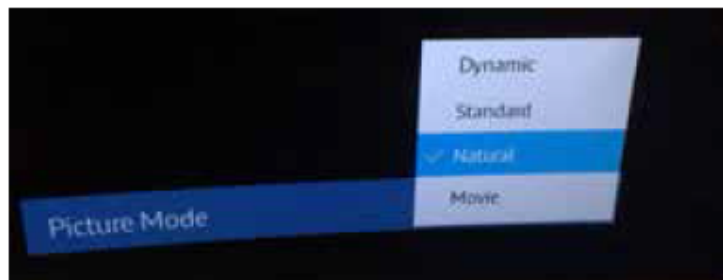
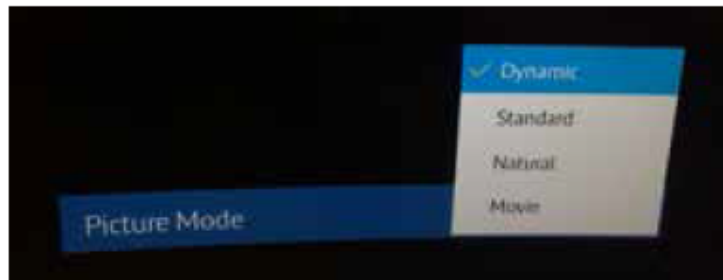
- Inadvertent button presses on remote control (some remotes have offered single button access to preset picture settings)
- Viewing HDR content (most TV models automatically but temporarily shut off ABC and/or MDD, if available, when displaying HDR content)
- Viewing content from a source other than HDMI can cause some TV models to switch to a Photo preset picture setting with higher backlight parameter values and ABC and/or MDD disabled
- Floor models of TVs sold from retail stores are typically in Retail mode or Vivid/Dynamic preset picture setting when user receives them
- Users may follow setup guidance from TV itself urging them to switch to Calibrated picture setting:





DOE and NRDC reports both noted that energy saving features are turned off in many TVs in preset picture settings other than default

These demonstrate how Eco Sensor (Samsung's term for Automatic Brightness Control [ABC]) is disabled when the main picture setting is changed from Standard.



**Eco Sensor (ABC) Off
Motion Lighting Off and Grayed Out**



Factors that reduce persistence of energy savings relative to test

Factor	Comments
User changes preset picture setting or picture parameter	These user actions can automatically disable energy saving features that may not be restored automatically if the user returns to default settings
Lack of notification	Many TVs fail to notify the user when energy saving features have been disabled automatically
Prompts	Some TVs prompt users to switch preset picture settings, automatically disabling energy saving features
Motion detection dimming	Savings do not persist relative to test results because majority of popular content does not contain enough motion or frequent enough scene cuts to activate MDD
HDR content	Causes TVs to shut off energy saving features automatically



Specification Concept

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1:00–1:10	Introductions and Specification Development Recap
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Specification Concept: Addressing Energy Consumption in Different Picture Settings

- Should ENERGY STAR certification require testing in more than the default picture setting?
- **Option:** Adding testing in additional picture settings, beyond the default.



Specification Concept: Improving Persistence of Energy Savings Features

- How could a spec be conceptually structured to encourage TVs to operate more of the time in more energy efficient settings with energy saving features enabled?
- **Options:**
 - $(\text{Power measured by DOE test}) \times (X) + (\text{Power in max picture setting}) \times (1-X) \leq \text{PON MAX} + \text{PHR},$
Where X is a persistence score based on a weighted average of persistence features
 - Require energy saving features to be on in all settings



Factors that reduce persistence of energy savings relative to test

Factor	Comments
User changes preset picture setting or picture parameter	These user actions can automatically disable energy saving features that may not be restored automatically if the user returns to default settings
Lack of notification	Many TVs fail to notify the user when energy saving features have been disabled automatically
Prompts	Some TVs prompt users to switch preset picture settings, automatically disabling energy saving features
ABC luminance levels	Very low luminance values at 3 and 12 lux may discourage dark room viewing or encourage outright disabling of ABC
Motion detection dimming	Savings do not persist relative to test results because majority of popular content does not contain enough motion or frequent enough scene cuts to activate MDD
HDR content	Causes TVs to shut off energy saving features automatically



Specification Concept: Improving ABC

- Current approach allows manufacturers to use an average of power draw at 3, 12, 35, and 100 lux
- Concern that once ABC is disabled, power will increase
- Reduce likelihood that user will disable
- Options:
 - Perform test with ABC disabled and require this power to be \leq power at 35 lux
 - Require minimum luminance at illuminance levels to ensure user satisfaction with ABC
 - Other?



Specification Concept: Addressing HDR

- EPA is interested in understanding High Dynamic Range (HDR)-capable Ultra High Definition (UHD) TV energy consumption under two circumstances:
 - When translating Standard Dynamic Range (SDR) content via “HDR Plus” preset picture settings
 - When playing native HDR10-encoded content
 - Current testing does not factor in HDR
- **Options:**
 - An additional HDR test could be added (using CLASP)
 - Reporting requirement added to provide information



Specification Concept: Evaluating UHD Adder

- EPA has provided a 50% UHD adder with Version 7.0 (finalized December 30, 2014 and effective October 30, 2015).
- NEEA incentivizing UHD TVs with no adders. 11 models meet that incentive level.
- **Option:** Drop or modify UHD adder for V8, based on data analysis.



Discussion Questions

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Discussion Questions



Timeline

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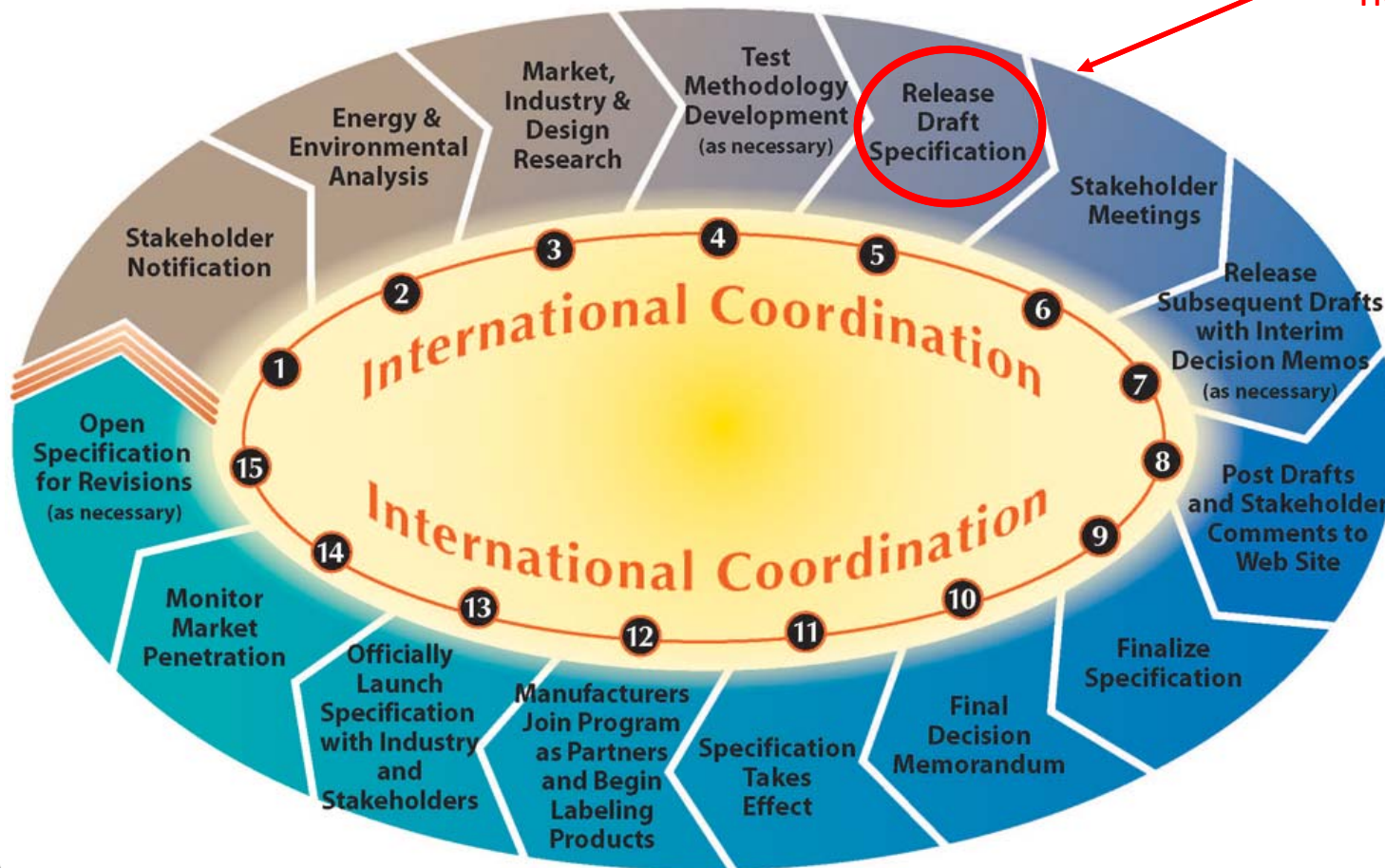
Timeline and Next Steps

- EPA invites stakeholders to provide additional data by Nov 1
- Draft 1 early December anticipated
- Draft 2 late February anticipated

Next Steps: After Data Assembly and Stakeholder Feedback

Specification Development Cycle

We are headed here





Comments and Data Assembly

- Comments and data were due on **September 19, 2016**.
- Please send all additional data and comments to:

Televisions@energystar.gov

- Unless marked as confidential, all comments will be posted to the Television product development page at https://www.energystar.gov/products/spec/televisions_specification_version_8_0.pdf
- Accessible through www.energystar.gov/RevisedSpecs and clicking on “Version 8.0 is in development” under “Televisions”



Thank you!

To be added to EPA's stakeholder listserve
to receive specification updates, please email:

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