

U.S. Set-Top Box Energy Conservation Initiatives

IEA Networked Standby Policy Workshop

Toronto Canada March 7-8, 2013







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CableLabs®
...Revolutionizing Cable Technology®

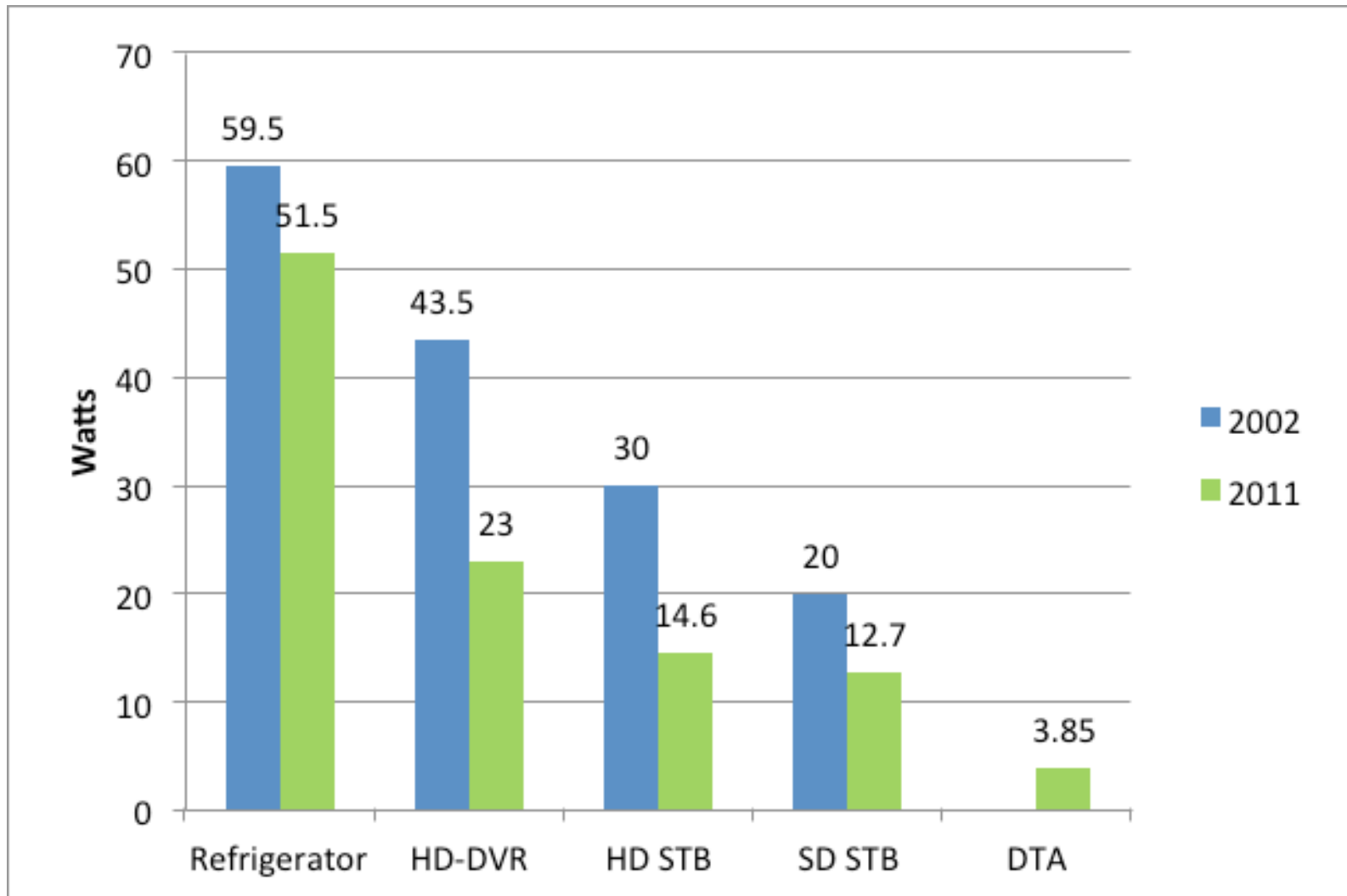
About CableLabs

- Founded in 1988
- Non-profit R&D consortium dedicated to pursuing innovative cable telecommunications technologies
- Headquartered in Louisville CO
- New innovation lab in Silicon Valley
- ~ 175 employees (+ ~ 100 contributing engineers)
- Nearly 40 cable operator members worldwide
 - U.S., Canada, Mexico, Europe, Asia
 - Represents nearly 85 M subscribers

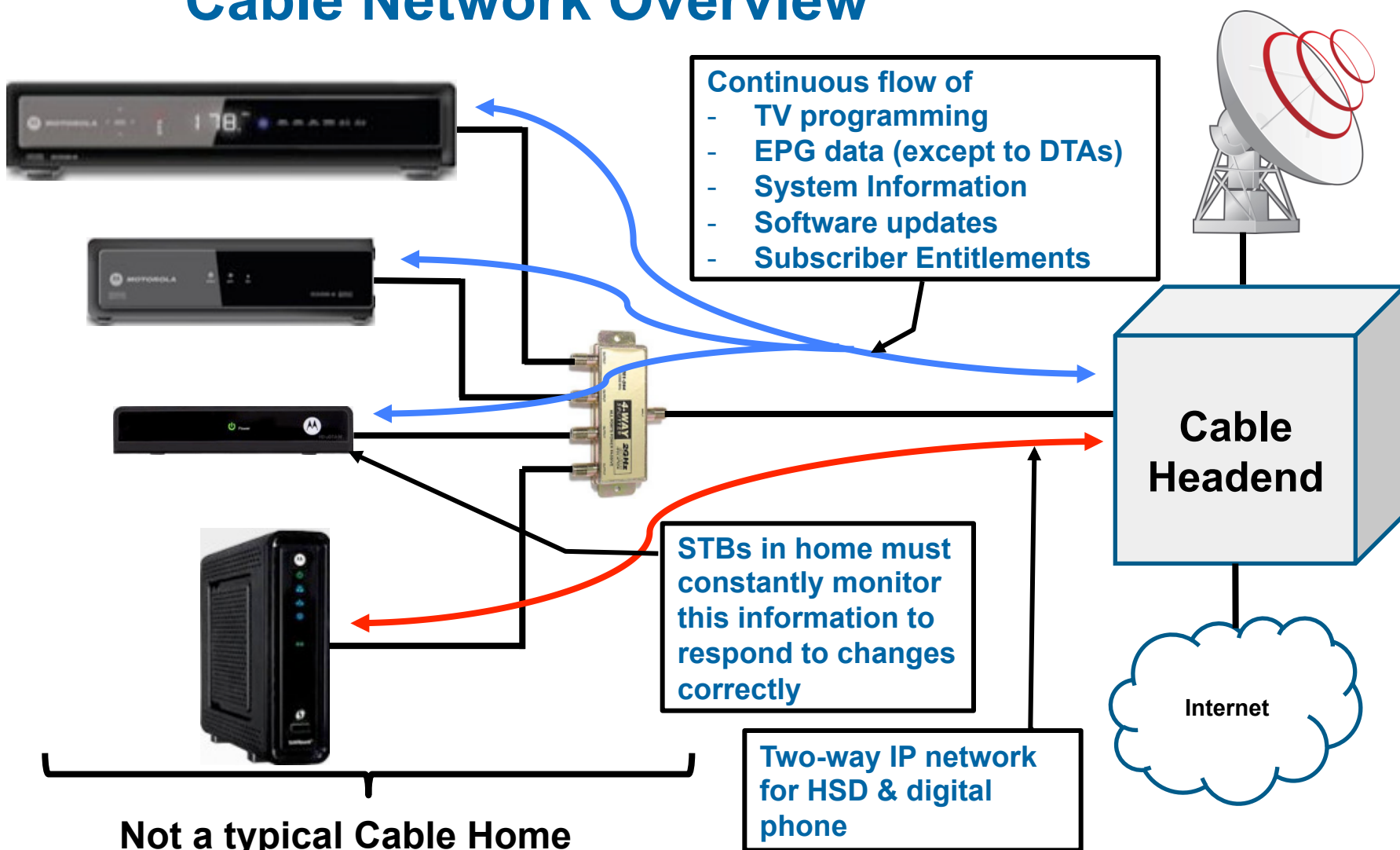
Diversity of Cable Devices & Functionality

Device	Description
	HD DVR STB provides linear TV (both SD & HD), DVR, VoD, and optionally may be a server for multi-room DVR
	HD STB provides linear TV (both SD & HD), VoD, and optionally may be a client for multi-room DVR
	DTA STB provides linear TV (SD & HD) only
	Small network devices: <ul style="list-style-type: none">• Cable Modem provides High Speed Data (HSD) service• Media Terminal Adaptor provides digital phone service and optionally HSD• Gateway provides HSD, home networking, and digital phone service

Historic Energy Reductions In Cable STBs



Cable Network Overview



Industry Voluntary Agreement

- Signed December 6, 2012
- 15 Signatories, including
 - Cable
 - Satellite
 - Telco
 - Manufacturers
- Light sleep
- 90% of new STBs will meet or exceed ESv3 metrics
- Whole-home DVR
- Field trial deeper sleep modes, deploy if successful
- Independent Administrator
- <http://i.ncta.com/VoluntaryAgreement-EnergyEfficiencyofSetTopBoxes.pdf>

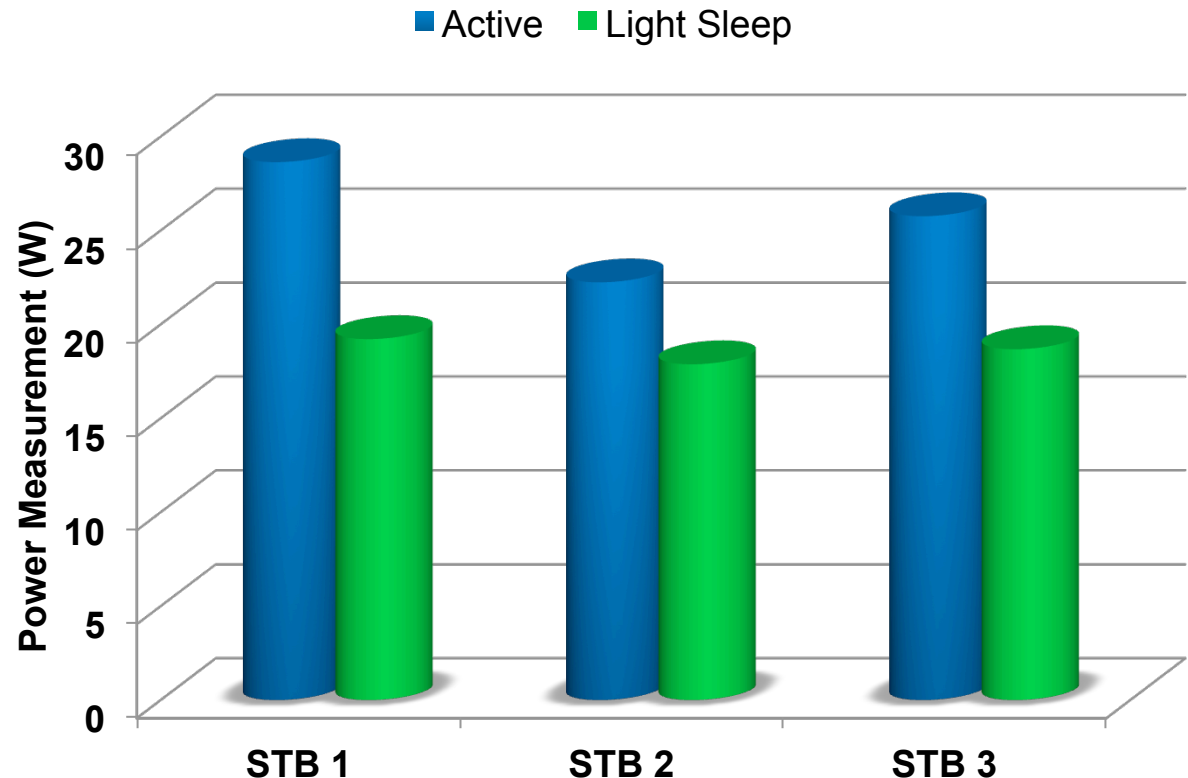


VA Signatories



Light Sleep

- Deployed on many existing STBs today
- Spin down hard disks, in-band tuners, video outputs
- Auto Power Down

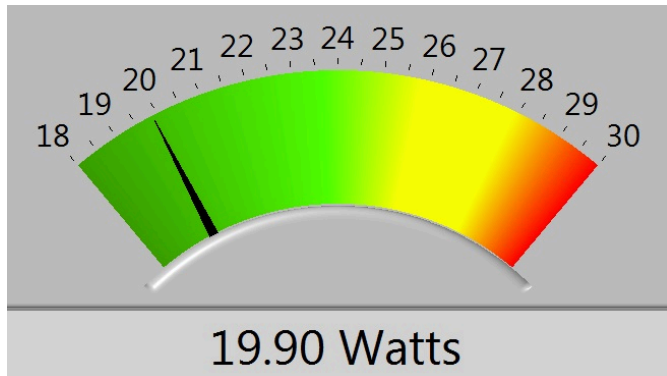


Benefits to the Voluntary Agreement

- Increased energy efficiency (and savings)
 - Retrofitting deployed STBs not just new STBs
- Doesn't stifle innovation and creativity
- Faster adoption and deployment
- Annual review for improvement
 - Consider new products
 - Consider new efficiencies
- Save US\$1.5 Billion Annually
 - (4+ Power Plants)



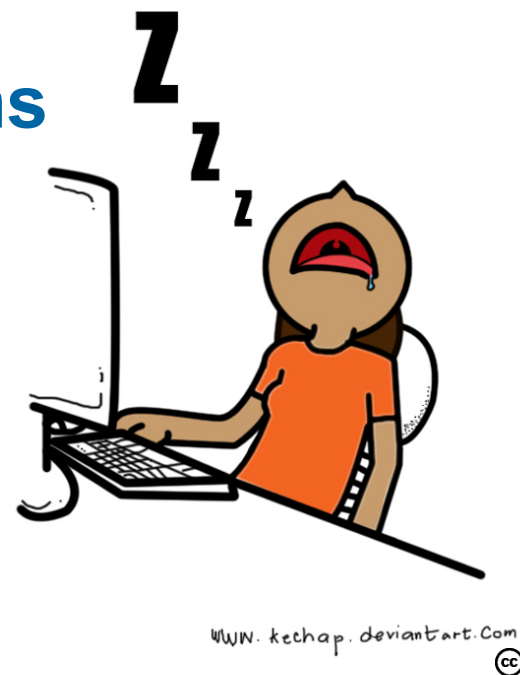
CableLabs Energy Lab



- Energy tracking program for measuring and reporting energy consumption of new set-top boxes
- Test and development facility for designers of energy efficient software and hardware
- Create energy efficiency specifications for semiconductor and hardware suppliers and the network operations systems that support cable devices

“Network Standby” for Cable Modems

- “**Active mode**” energy consumption is already proportional to throughput
- “**Sleep modes**” are not feasible or appropriate for cable modem technology due to network architecture, functional role, and service expectations
- “**Idle modes**” may be appropriate to reduce quiescent power
 - Trade-off network performance for energy savings
 - Challenges created by resume time expectations and by “chatty” end-use appliances



Cable Modem “Idle Modes”

- DOCSIS 3.0 “1x1 Mode”
 - Defines requirements for cable modems to automatically enter a lower power state that preserves network connectivity at a performance level equivalent to DOCSIS 2.0 equipment.
- DOCSIS 3.1
 - Specification development underway
 - Energy management considered a core component

CableLabs Specifications Engineering Changes

- DOCSIS 1x1 Mode
 - Protocol interface
 - Management and reporting
- CableCARD startup times
- tru2way® Host update to notify eCM when going into sleep mode



Additional Approaches

- More efficient digital tuners and use of DTAs
- Continued SoC (System on a Chip) integrations
- Improved home networking and “whole-home” technology development and deployment
- IP video delivery to devices such as tablets, smart TVs, game consoles
- Service provider applications in the cloud
- Network-based DVR



Thank You

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