



# Set-top Box Workshop

## TV Network and Service Trends

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# Set-Top Box Energy Efficiency



Big Picture. Small Footprint.

DIRECTV's energy efficient receivers save customers money while protecting the environment. For the second straight year, we stand alone among TV providers recognized by ENERGY STAR®



1.800.DIRECTV | directv.com

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## ENERGY STAR

- Service Provider Partner since 2009
- Set-top Box Manufacturer Partner since 2009
- 2010 & 2011 Awards for Excellence in Energy Efficient Product Design

***DIRECTV joined the ENERGY STAR Set-Top Box program upon its inception, and by the end of 2011 will have delivered more than 30 million ENERGY STAR qualified receivers to customers.***

# Prior to ENERGY STAR STB Program



- 2005: DIRECTV H20 High Definition STBs
  - Loaded with new technology (e.g. H.264 MPEG4)
  - Enabled DIRECTV to launch 100 HD channels: an advance that reshaped the Pay-TV industry
- Average:
  - ON power = 27W
  - TEC = 230 kWhr/yr
- W x D x H (inches)  
15" x 11.5" x 3"





- 2007: DIRECTV H21 & H23 High Definition STBs
  - Higher integration of functionality
  - Reduced cost and greater reliability
- Average
  - ON power = 14.5W
  - TEC = 125 kWhr/yr
- W x D x H (inches)  
15" x 9.75" x 2.75"

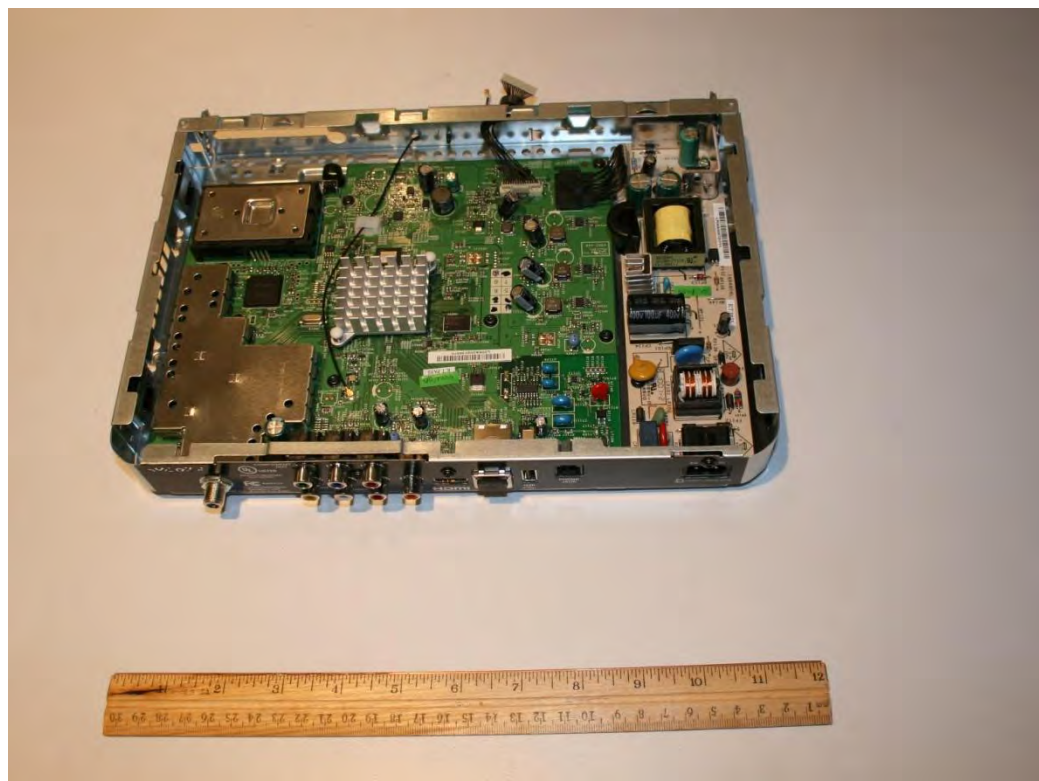


- 2007: DIRECTV H21 & H23 High Definition STBs
  - Higher integration of functionality
  - Reduced cost and greater reliability

**46%**  
**less power**  
**22%**  
**smaller**



- 2010: DIRECTV H24 High Definition STBs
  - Addition of MoCA Advanced Home Networking
  - Did not sacrifice energy efficiency
- Average
  - ON power = 14.5W
  - TEC = 122 kWhr/yr
- W x D x H (inches)  
12" x 9" x 1.75"

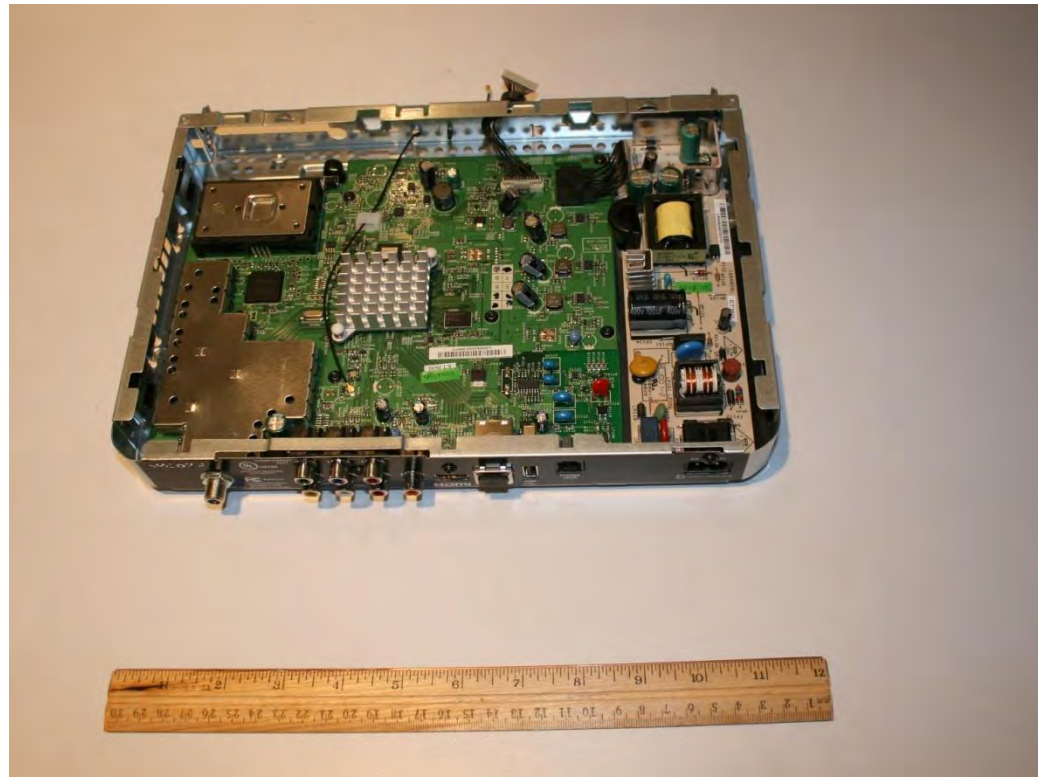




- 2010: DIRECTV H24 High Definition STBs
  - Addition of MoCA Advanced Home Networking
  - Did not sacrifice energy efficiency

**47%**  
**less power**

**63%**  
**smaller**



- 2011: DIRECTV H25 High Definition STBs
  - Higher integration of functionality (again)
  - Reduced cost and greater reliability (again)
- Average:
  - ON power = 11.2W
  - TEC = 92 kWhr/yr
- W x D x H (inches)  
8.5" x 6.5" x 1.25"

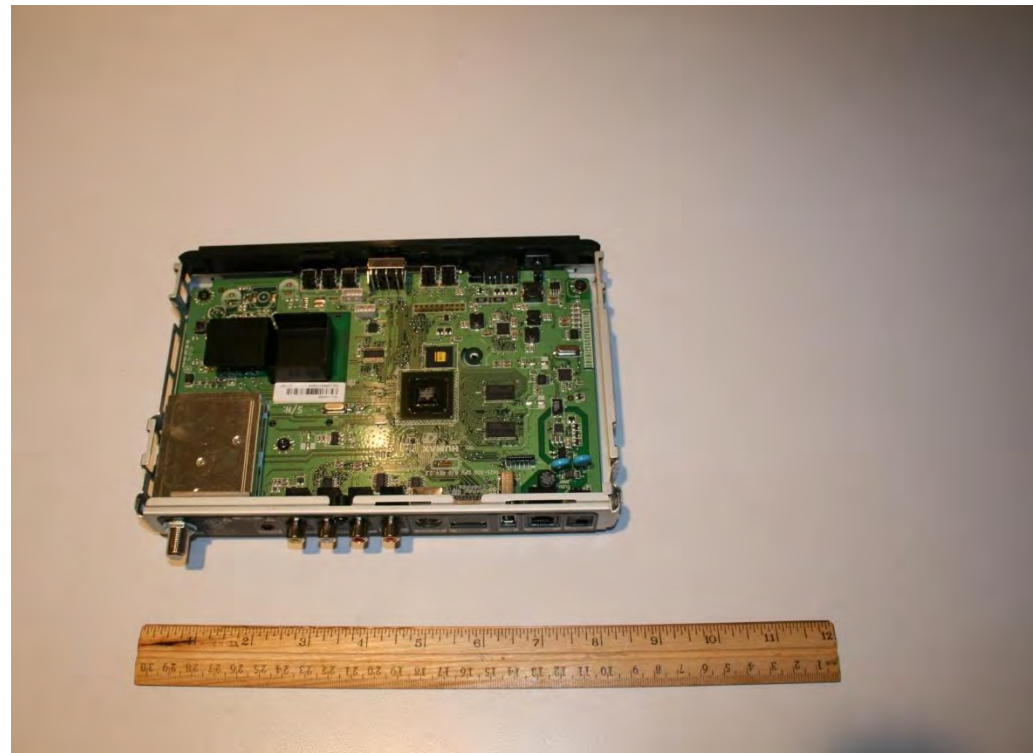




- 2011: DIRECTV H25 High Definition STBs
  - Higher integration of functionality (again)
  - Reduced cost and greater reliability (again)

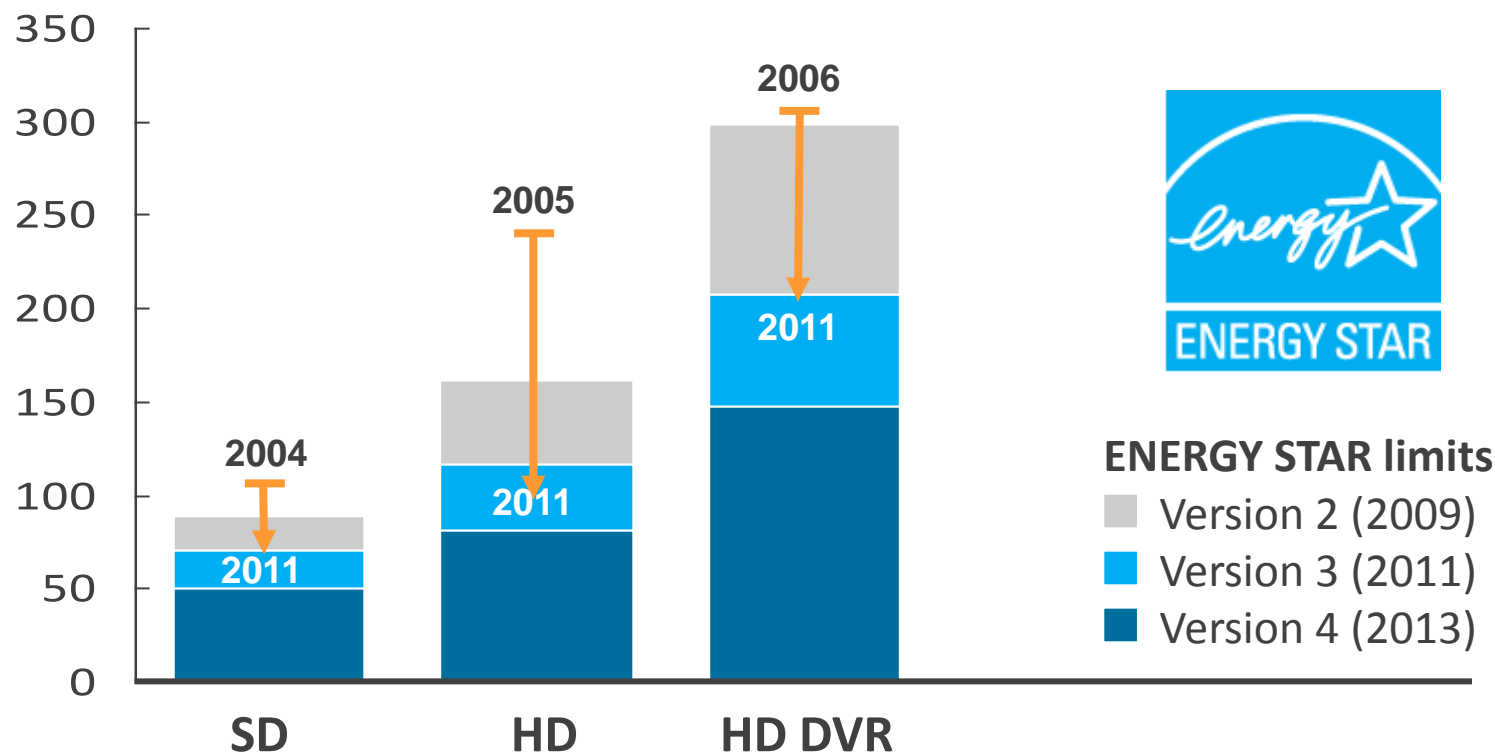
**60%**  
**less power**

**87%**  
**smaller**



## Typical Energy Consumption (TEC) kWH/year

Change in energy consumption  
from 1<sup>st</sup> generation to current

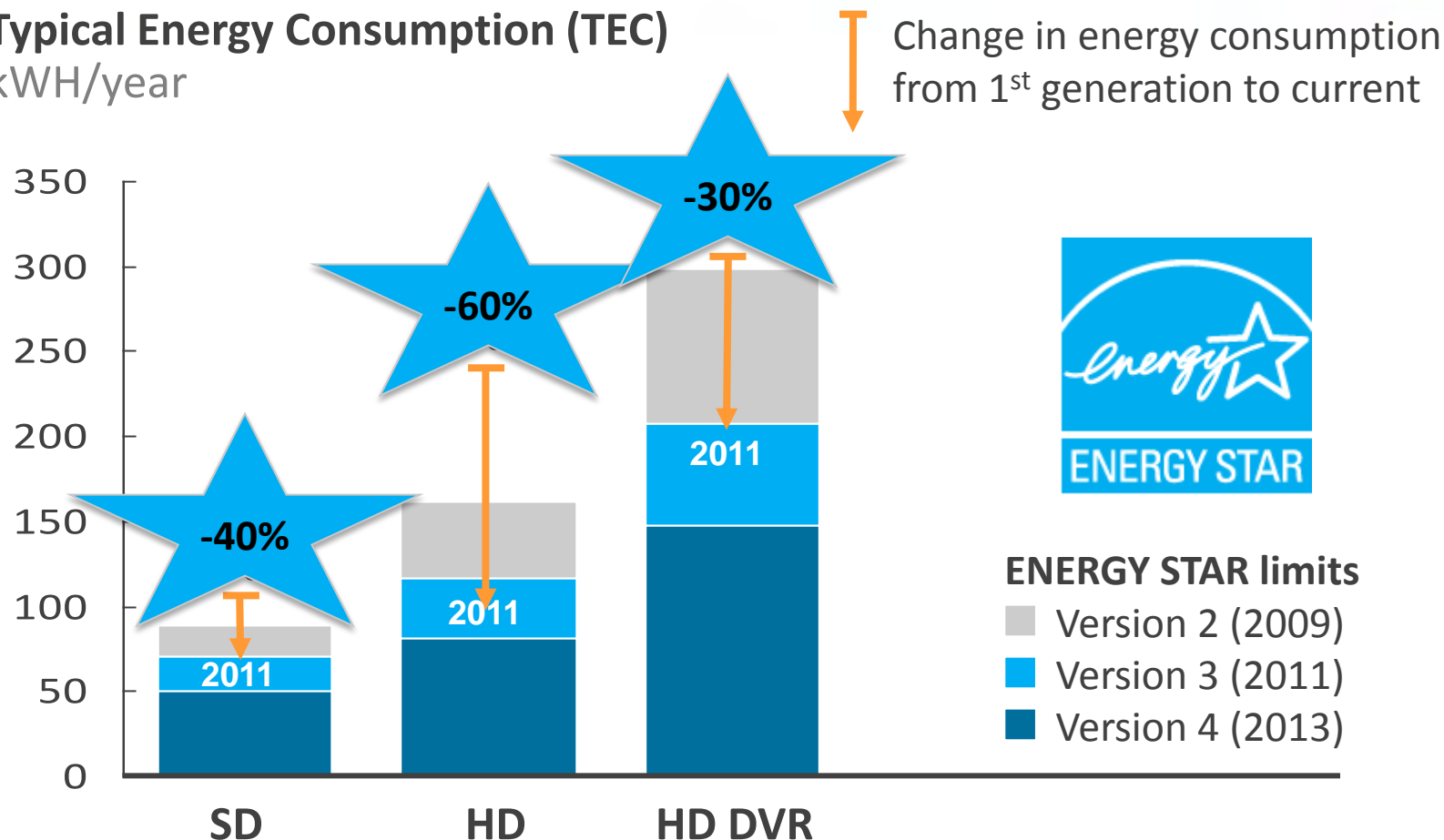


**Current DIRECTV models have substantially better energy consumption than 1<sup>st</sup> generation DIRECTV models, while adding more functionality and processing power**

# Energy Consumption Trend



## Typical Energy Consumption (TEC) kWH/year



**Current DIRECTV models have substantially better energy consumption than 1<sup>st</sup> generation DIRECTV models, while adding more functionality and processing power**



# **“Power Saving” STB Setting**

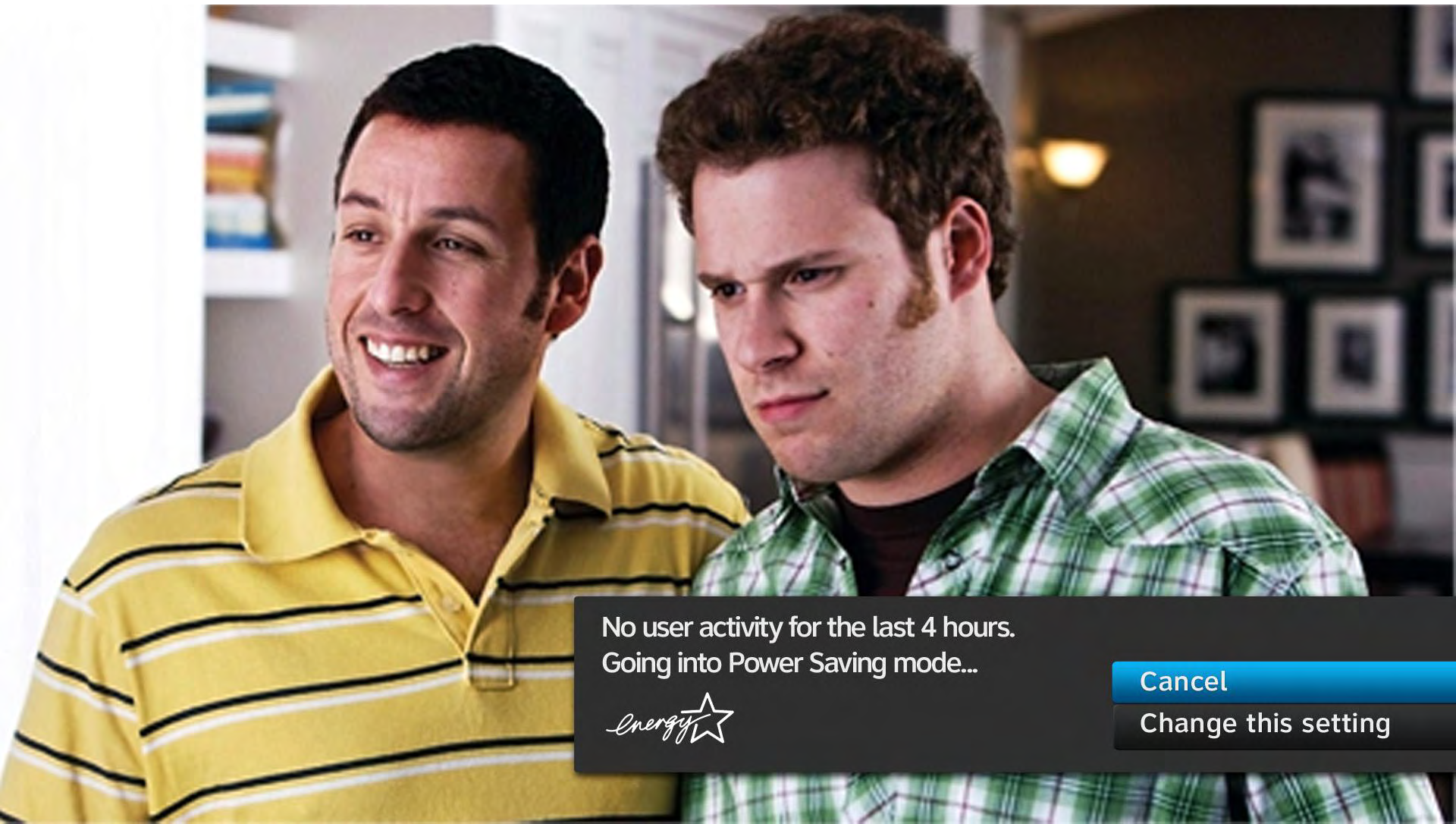


- **Rolling out January-March 2012 to HD STBs**
- **STB switches to standby after 4 hours with no user interaction**
- **Default setting is auto-power down enabled**
  - **Complies with ENERGY STAR 3.0 guidelines**
  - **Subscriber may disable feature through new “Power Saving” STB setting**
- **Future energy savings controls could be implemented under “Power Saving” setting**
  - **e.g. a home power monitoring application**

# “Power Saving” STB Setting, cont.



- Going into power saving mode...



No user activity for the last 4 hours.  
Going into Power Saving mode...



Cancel

Change this setting

# “Power Saving” STB Setting, cont.



## ● New menu location for managing energy efficiency



### Power Saving



11:39a  
Thu 3/4

Info & Test

Display

Audio

Network Setup

Remote Control

Satellite

Whole-Home

Power Saving

Reset

Done

To save electricity and help the environment, when Power Saving is set to ON, the receiver will turn off after 4 hours of no user activity. This will not affect any scheduled recordings.

Power Saving:

On

Off



## Multi-Room

- The new DIRECTV HR34 “Smart Box” works directly with TVs capable of supporting the new RVU industry standard (e.g. Samsung 32” TV model UN32D6000).
- **DIRECTV’s Smart Box rolled out nationwide as of December 2011.**

*The new DIRECTV HR34 “Smart Box” multi-room architecture allows a service provider to deploy only one set-top box in the home while still being able to serve TVs throughout the home. In other words, a family with four television sets would need only one set-top box for the entire house. That means three fewer boxes and significant energy savings.*



**Samsung RVU Capable TV**  
(32” model UN32D6000)



**DIRECTV HR34 “Smart Box”**  
(RVU Server)



[www.rvualliance.org](http://www.rvualliance.org)

- **2012: DIRECTV C31 High Definition Client**
  - New RVU based server-client architecture
  - Reduced cost and greater reliability (again)
- **Prototype:**
  - ON power = 5.7W
  - TEC = 47 kWhr/yr
- **W x D x H (inches)**  
**8.5" x 6.5" x 1.25"**



[www.rvualliance.org](http://www.rvualliance.org)



- 2012: DIRECTV C31 High Definition Client
  - New RVU based server-client architecture
  - Reduced cost and greater reliability (again)

**80%**  
**less power**

**94%**  
**smaller**



[www.rvualliance.org](http://www.rvualliance.org)



- **Samsung Announces Set-top “Boxless” Viewing in all 2012 Smart TVs [LAS VEGAS, January 9, 2012]**
  - Today at the 2012 International CES, DIRECTV and Samsung Electronics Co, Ltd. unveiled their plans to offer DIRECTV's more than 19.7 million customers the ability to watch live broadcast and stored content from a compatible DIRECTV DVR on Samsung's 2012 line of Smart TVs without the need for additional set-top boxes...
- **“Samsung 2012 SmartTVs will access DirecTV without a set top box, minimalists rejoice”**  
[[www.engadget.com](http://www.engadget.com)]



# Whole-Home HD-DVR Energy Trend: Past



## ● ~2006: HD-DVR new 3-room install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: HD-DVR	34	14	173	33	10	120	0	0	0	293
Room 2: HD-DVR	34	14	173	33	10	120	0	0	0	293
Room 3: HD-DVR	34	14	173	33	10	120	0	0	0	293
Total			519			360			0	879

- Required three HD-DVRs
- Not common: households typically had one DVR & two basic STBs

## ● ~2008: HD-DVR new 3-room install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: HD-DVR	29	14	148	28	10	102	0	0	0	250
Room 2: HD-DVR	29	14	148	28	10	102	0	0	0	250
Room 3: HD-DVR	29	14	148	28	10	102	0	0	0	250
Total			444			306			0	750

- Introduced ENERGY STAR Version 2 HD-DVRs
- Power consumption compared to 2006: -15%

# Whole-Home HD-DVR Energy Trend: Present



## ● ~2010: New “Multiroom HD-DVR System” install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: Multiroom HD-DVR	24	14	122	23	10	83	0	0	0	205
Room 2: HD STB	16	14	81	14	10	51	0	0	0	132
Room 3: HD STB	16	14	81	14	10	51	0	0	0	132
Total			284			185			0	469

- Multiroom HD-DVR & two HD STBs connected via MoCA digital home network
- All ENERGY STAR Version 2 qualified
- Power consumption compared to 2006: -47% and to 2008: -37%

## ● ~2012: New “Multiroom HD-DVR System” install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: Multiroom HD-DVR	24	7	61	23	17	142	0	0	0	203
Room 2: HD STB	13	7	33	11	17	68	0	0	0	101
Room 3: HD STB	13	7	33	11	17	68	0	0	0	101
Total			127			278			0	405

- All ENERGY STAR Version 3 qualified
- Power consumption compared to 2006: -54% and to 2010: -14%



# Whole-Home HD-DVR Energy Trend: Future



## ● ~2014 projection: New “RVU HD-DVR Architecture” install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: HD-DVR Server	29	7	74	27	17	167	0	0	0	241
Room 2: HD Thin client	6	7	15	5	17	31	0	0	0	46
Room 3: HD Thin Client	6	7	15	5	17	31	0	0	0	46
Total			104			229			0	333

- HD-DVR & two HD Thin Clients connected via MoCA digital home network
- Server does not meet ENERGY STAR Version 3 limits
- Power consumption compared to 2006: -62% and to 2012: -18%

## ● ~2016 projection: New “RVU HD-DVR Architecture” install

	On Mode			Light Sleep			Deep Sleep			Total Energy Consumption
	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	Watts	Hours	kWh/Yr	kWh/Yr
Room 1: HD-DVR Server	27	7	68	25	17	155	0	0	0	223
Room 2: HD Thin client	6	7	15	5	13	23	1	4	1	39
Room 3: TV client	0	0	0	0	0	0	0	0	0	0
Total			83			178			1	262

- No set-top box needed whenever RVU TV client is available
- Server will not meet ENERGY STAR Version 3 limits
- Power consumption compared to 2006: -70% and to 2014: -21%

- **2006-2008: New HD-DVR technology deployments**
  - HD-DVR required at each HDTV
  - ENERGY STAR Version 2 incentive
- **2010-2012: “Multiroom HD-DVR System” deployments**
  - >50% improvement vs. 2006
  - ENERGY STAR Version 3 incentive
- **2014-2016 Projection: “RVU HD-DVR Architecture” deployments**
  - Deep sleep becomes a possibility in clients
  - Connected-TV industry standards (e.g. RVU) allow elimination of STBs
  - Projected 70% improvement vs. 2006

# Energy Efficient Multi-room Architecture



Don't just watch TV. **DIRECTV.**

