ENERGY STAR Partner Meeting
CE Panel: “Sleek, Streaming and Smart”

Steve Dulac
Director, Engineering

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Set-Top Box Energy Efficiency

ENERGY STAR

- Service Provider Partner since 2009
- Set-top Box Manufacturer Partner since 2009

DIRECTV joined the ENERGY STAR Set-Top Box program upon its inception, and has delivered more than 40 million ENERGY STAR qualified receivers to customers.
Current DIRECTV models have substantially better energy consumption than 1st generation DIRECTV models, while adding more functionality and processing power.
Current DIRECTV models have substantially better energy consumption than 1st generation DIRECTV models, while adding more functionality and processing power.
“Power Saving” STB Setting (2012)

- Rolled out to more than 20 million active HD STBs & HD DVRs
  - Enabled by default per ENERGY STAR 3.0 guidelines

- STB switches to standby after 4 hours with no user interaction

- New menu location for managing energy efficiency
  - To disable auto-power-down when needed
  - Future energy savings controls could be implemented here e.g. a home power monitoring application
“Power Saving” STB Setting (2012), cont.

- New menu location for managing energy efficiency

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.
Streaming vs. Service

- New “over-the-top” providers offering premium content streamed and downloaded via Internet
  - Netflix, iTunes, Hulu, etc.

- Traditional providers doing this as well...but with more and better premium content! 😊
  - DIRECTV, Comcast, Verizon, etc.
  - Enhances value of pay service, making it available on more devices and in more locations
  - aka “TV Everywhere”, “Authentication”

- Availability of increasingly smart and connected consumer electronics driving this trend
  - PCs, game consoles, tablets, smartphones, smart TVs, etc.
Energy Efficiency Impacts of Smart CE devices

Positive impacts
- Tablets, smartphones, laptops and internet dongles (e.g. Roku) are more energy efficient than traditional set-tops
- New server-client “whole home” architectures allow energy efficient thin-clients & clients embedded in TVs
  - Enabled by new industry standards (e.g. RVU Alliance) and increasingly reliable digital home networks

Negative impacts
- PCs and game consoles are much less energy efficient than traditional set-top boxes
- Availability of programming on additional displays is tending to increase viewing due to increased convenience
DIRECTV “Genie” Multi-room Architecture

DIRECTV C31
RVU Client TEC 47 kWh/yr

www.rvualliance.org
### 2012: New “Multiroom HD-DVR System” install

<table>
<thead>
<tr>
<th>Room</th>
<th>Multiroom HD-DVR</th>
<th>HD STB</th>
<th>HD STB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Mode</td>
<td>Light Sleep</td>
<td>Deep Sleep</td>
<td>Total Energy Consumption</td>
<td></td>
</tr>
<tr>
<td>Watts</td>
<td>Hours</td>
<td>kWh/Yr</td>
<td>Watts</td>
<td>Hours</td>
</tr>
<tr>
<td>24</td>
<td>7</td>
<td>61</td>
<td>23</td>
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<td>7</td>
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<td>11</td>
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<td>13</td>
<td>7</td>
<td>33</td>
<td>11</td>
<td>17</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>127</strong></td>
<td></td>
<td><strong>278</strong></td>
</tr>
</tbody>
</table>

- All ENERGY STAR Version 3 qualified

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

<table>
<thead>
<tr>
<th>Room</th>
<th>HD-DVR Server</th>
<th>HD Thin client</th>
<th>HD Thin Client</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Mode</td>
<td>Light Sleep</td>
<td>Deep Sleep</td>
<td>Total Energy Consumption</td>
<td></td>
</tr>
<tr>
<td>Watts</td>
<td>Hours</td>
<td>kWh/Yr</td>
<td>Watts</td>
<td>Hours</td>
</tr>
<tr>
<td>29</td>
<td>7</td>
<td>74</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>15</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>15</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>104</strong></td>
<td></td>
<td><strong>229</strong></td>
</tr>
</tbody>
</table>

- 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 2012: -18%

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

<table>
<thead>
<tr>
<th>Room</th>
<th>HD-DVR Server</th>
<th>HD Thin client</th>
<th>TV client</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>On Mode</td>
<td>Light Sleep</td>
<td>Deep Sleep</td>
<td>Total Energy Consumption</td>
<td></td>
</tr>
<tr>
<td>Watts</td>
<td>Hours</td>
<td>kWh/Yr</td>
<td>Watts</td>
<td>Hours</td>
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<td>7</td>
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<td>5</td>
<td>13</td>
</tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>83</strong></td>
<td></td>
<td><strong>178</strong></td>
</tr>
</tbody>
</table>

- No set-top box needed whenever RVU TV client is available
- Power consumption compared to 2012: -35%
Past STB energy reductions driven by increased silicon integration and more efficient components

- EPA: “ENERGY STAR qualified set-top boxes are on average 45 percent more efficient than conventional models”

Newest reductions resulting from new “whole home” architectures

- Additional 18 percent improvement vs. today

In near future, many STBs will be replaced due to industry standard interfaces to Smart CE devices

- 35 percent improvement vs. today

Samsung RVU Capable TV (32” model UN32D6000)
Don’t just watch TV. DIRECTV.