



## Set-top Box Energy Efficiency

Motorola General Business Information, Security Level 1  
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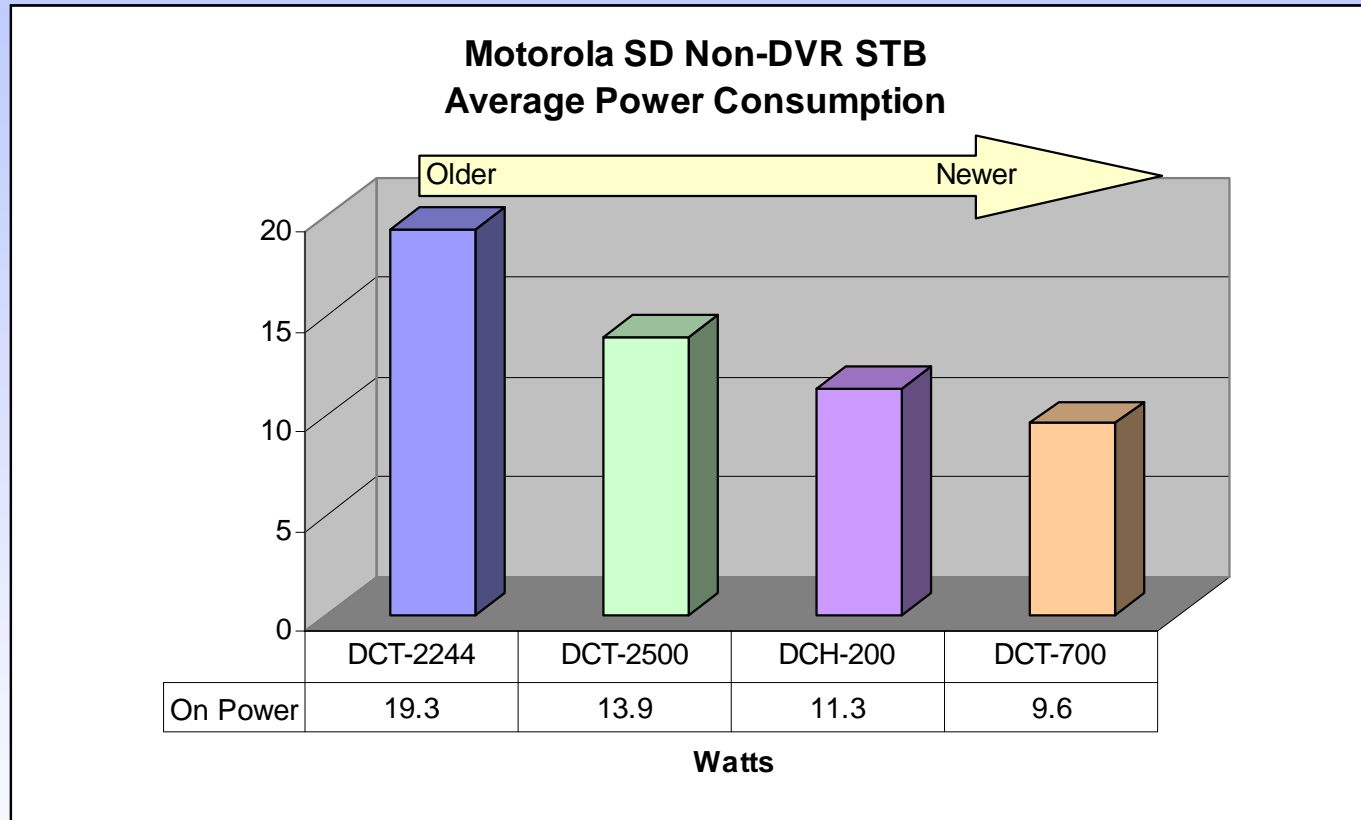
# Innovation Reducing Energy Consumption

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- **Power Supply efficiency**
  - **Technology has driven more efficiency into power supplies**
    - **Power supplies Motorola used several years ago ~65% efficient**
    - **Power supplies Motorola uses today are ~80-85% efficient**
  - **Motorola STBs that utilize external power supplies ship with power supplies that meet California's appliance efficiency regulations**
  
- **Silicon**
  - **More and better silicon solutions**
    - **DCT-700 STB – silicon based tuners, allows for smaller less energy consuming device**
      - **~9 Watts**
    - **Single chip solutions**
      - **Features being driven into single chips for cost effectiveness and performance also provide better energy utilization**



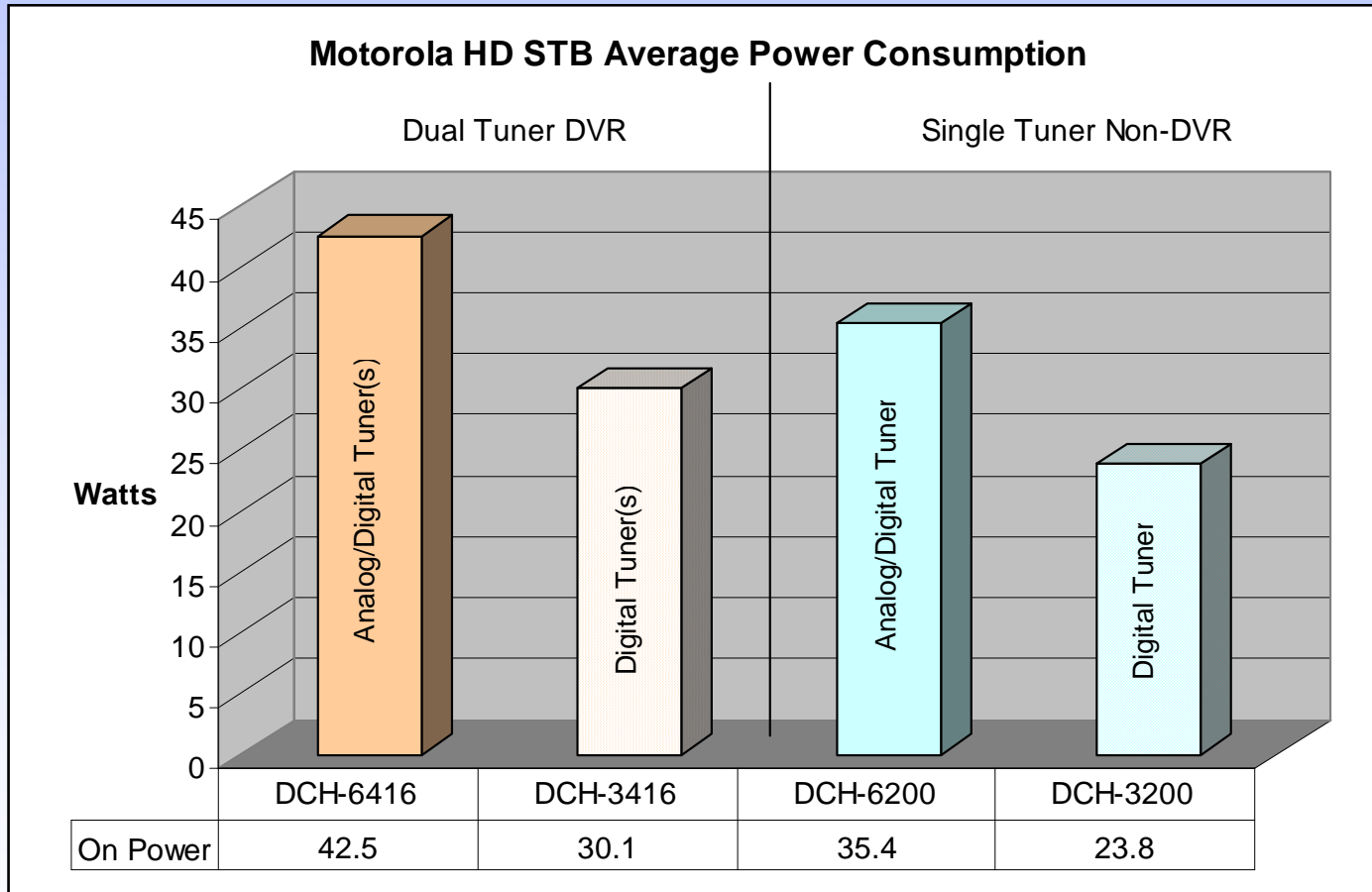
# Lower Energy Consumption Through Innovation



Innovation has reduced the power consumption of STBs while maintaining the consumer's expected functionality



# Lower Energy Consumption via Digital Transition



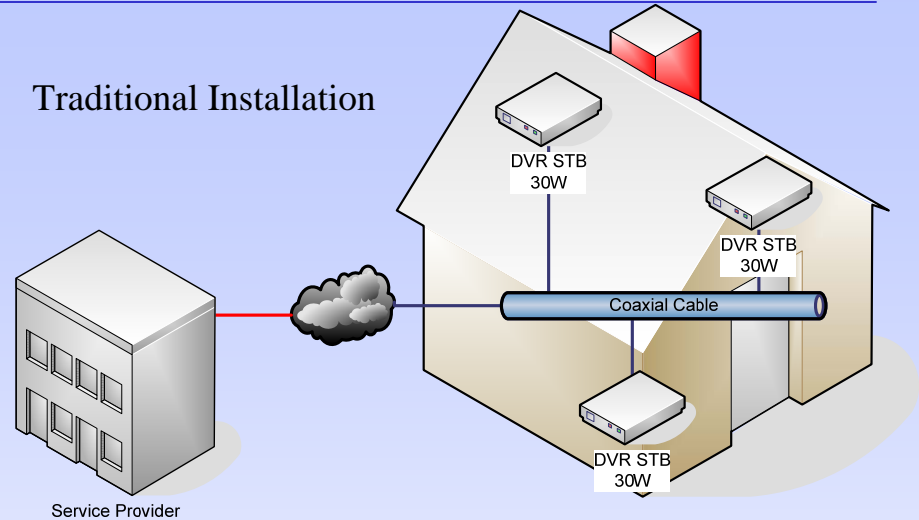
Service Provider's transition to all digital networks allows for the removal of analog tuners and supporting components, thus leading to a reduction in energy consumption of STBs.

# Lower Energy Consumption Through Innovation

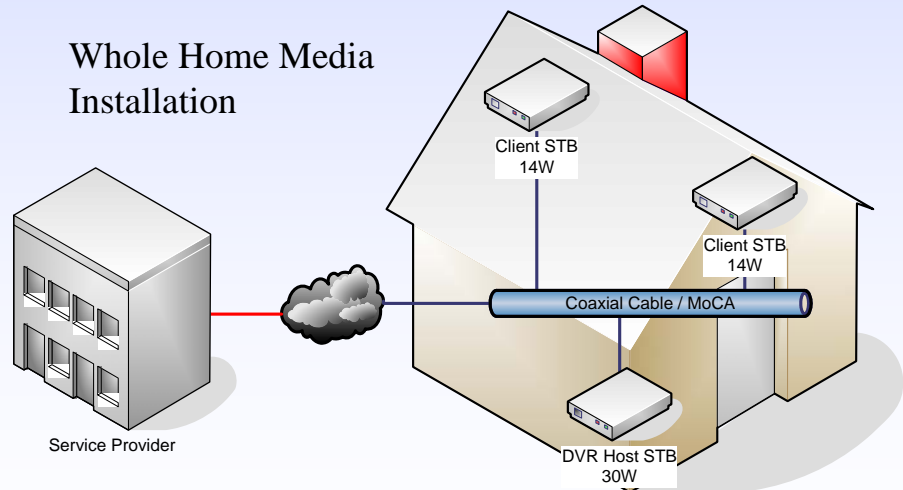
## ■ Whole Home Media

- Rather than placing several “large” STBs in a home to provide DVR capability to many rooms one “large” and several “small” STBs are placed in home and then networked together to provide DVR capability to many rooms, which also adds the bonus of being able to share content.
- “Small” STBs use less power than “Large” STBs, thus less power utilized per home
  - Home with 3 DVR STBs uses 90W (when all STBs are ON)
  - Home with 1 DVR STB and 2 Client STBs uses 58W (when all STBs are on)

Traditional Installation



Whole Home Media Installation



# Next Generation Products

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- Working with chip vendors to incorporate standby features into next generation products that will reduce power consumption when product is in standby mode
  - **Market demand (i.e. our customers the cable MSOs are asking for more efficient products)**



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# Issues and challenges for manufacturers

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- Scope of covered products
  - **IPTV STB, IP based products (e.g. computers that deliver content to the TV)**
- Need for international harmonization of standard ( what is the "gold standard" or model standard?)
  - **There are many efforts in many parts of the world to define STB Energy Efficiency and some manufactures service all of these markets.**
- Problems with "a la carte" approach
  - **Potential to impede innovation**
  - **In a constant state of flux as technology and market demands are constantly changing**
- Need to focus on current products and technologies
- "Aspirational specification" (significant energy savings that will require significant design changes) vs. "achievable specification" (modest improvements with evolving design changes); how is the balance struck?



# Popular functionalities in the next five years

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- **Home Networking**
  - **Wireless**
    - **Next-gen WiFi - 802.11g/n**
    - **Low Data Rate Peripherals – Bluetooth**
    - **High Data Rate Peripherals – WirelessHD, Ultra Wide Band (UWB)**
  - **Wired**
    - **CEA-2005 – Ethernet – IEEE-1394 bridge**
    - **HomePlug – IP over power lines**
    - **Multimedia Over Coaxial Alliance (MoCA) – IP over Coax**
    - **HomePNA – IP over Coax and Phone Lines**
  - **Home Networking Architectures**
    - **High-Definition Audio-Video Network Alliance (HANA)**
    - **Digital Living Network Alliance (DLNA)**
    - **Proprietary – Motorola’s Home Media Architecture (HMA)**





# Popular functionalities in the next five years

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- **Peripherals**
  - **High Definition DVD drives**
    - Blu-Ray
    - HD DVD
  - **External Hard Disk Drives**
    - Some support already
    - Expand the storage capacity of DVRs
  - **Larger Hard Disk Drives**
- **Decode/Encode Technology**
  - **MPEG-4**
  - **Advanced Video Coding (AVC)**
  - **H.264**
  - **Video Codec One (VC-1) - SMPTE 421M video codec standard**



# CableCards (a.k.a POD)

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- CableLabs defined Conditional Access System device that removes the security component of a system from digital set-tops to an external PCMCIA form factor card.
  - **Two flavors:**
    - **S-Card = uni-directional device that supports the FCC Plug and Play mandate**
    - **M-Card = bi-directional device for next generation STB devices**
- **Power Consumption**
  - **2.5 watt maximum average power consumption for combination S-Card/M-Card device**
  - **1.5 watt maximum average power consumption for M-Card only device**

