



Green Advantages of DVB-T2

*Saving Power helps the environment
and your bottom line*

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Featuring
GatesAir's



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GREEN ADVANTAGES OF DVB-T2

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Evolving Economy

- In analogue television systems of the past, power consumption was rarely considered key to the choice of technology or vendor
 - neither from the perspective of overall, end-to-end efficiency, nor for any single component of the broadcasting chain
- Skyrocketing energy prices impact the economic balance
- Many broadcasters find they are in the top energy consumers in a country and face possible “carbon taxes” in the future
- Green becomes more than a statement in social responsibility - it impacts the bottom line

New Technology ' 3 Main Areas of Power Savings

- **Playout Systems**
- **Compression Systems**
- **Transmitter Systems**

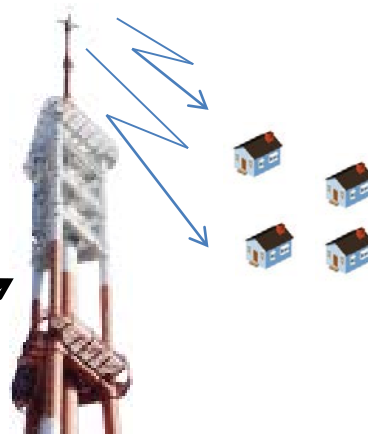


Traditional 4 Channel Analogue System

Playout
4 Channel

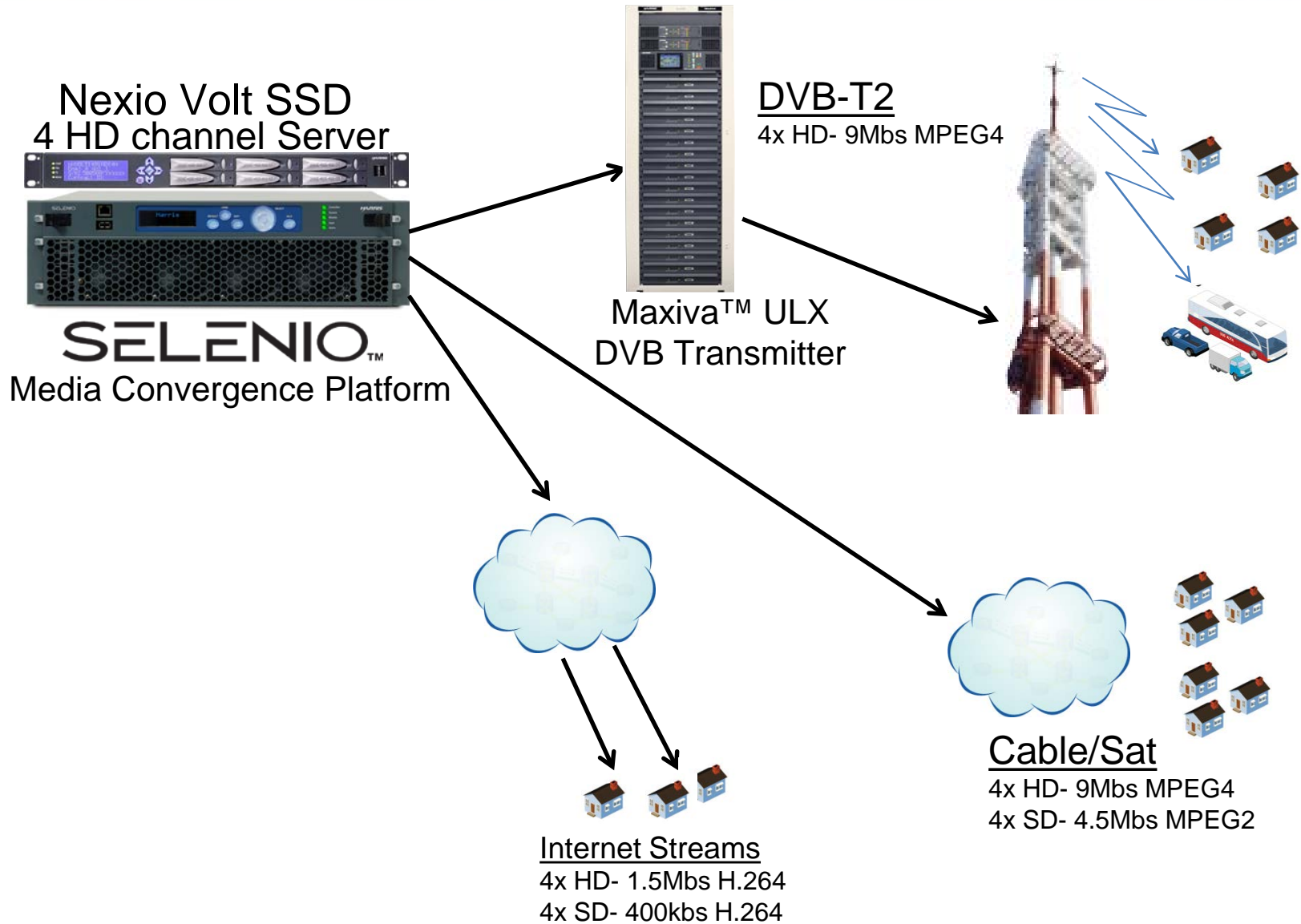


Terrestrial
4 x PAL



Cable/Sat
4x 4.5Mbs MPEG2

DVB-T2 4 Channel System with New Media Feeds



GREEN ADVANTAGES OF PLYOUT SYSTEMS

Server technology advancements

- Improvements in industry standard computing hardware has driven dramatic increase in storage capacity and reducing the size and number of drives
- Developments in multi-port playout servers such as the Harris Nexio family consolidate multiple SD and HD playout and record channels to a single server
- Inclusion of integrated format and aspect ratio conversion, audio manipulation, signal quality monitoring and other functionality has eliminated the need for disparate unconnected boxes to reduce complexity, power consumption and cost.
- Innovation in solid state storage eliminates spinning disks.

Increased flexibility & reduced power



Conventional PAL Servers

- Outboard converters and test solutions
- Large quantity of spinning disks
 - Limited life span
 - high maintenance costs
- Power hungry CPUs with hardware CODECs



1RU SSD 4 channel Server

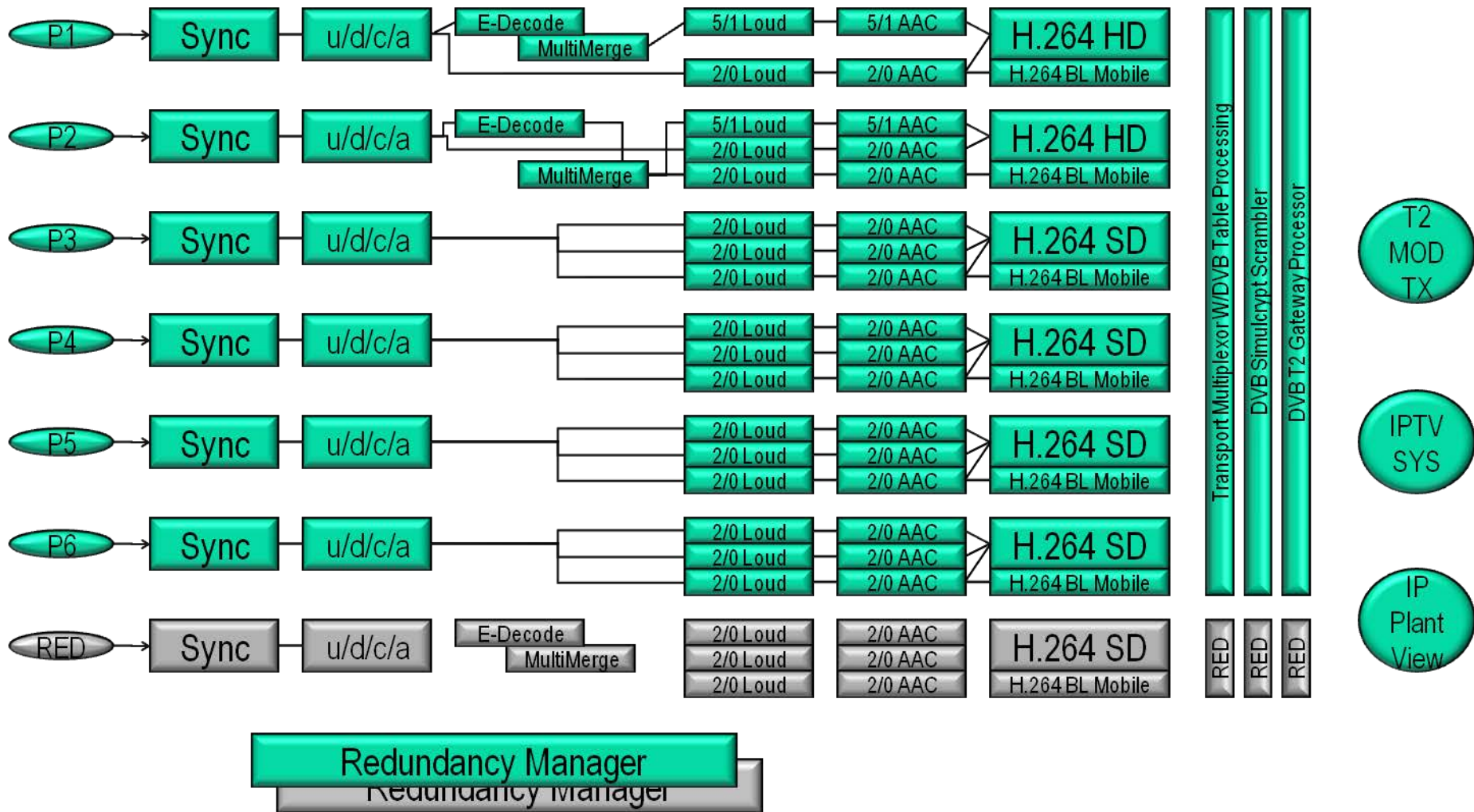
- Solid state drives reduce power cost by over 30%
- Reduced maintenance
- On the fly software CODECs and quality measurements
- Compact footprint
- Multiple I/O supports many playout channels
- Green solution

GREEN ADVANTAGES OF COMPRESSION SYSTEMS

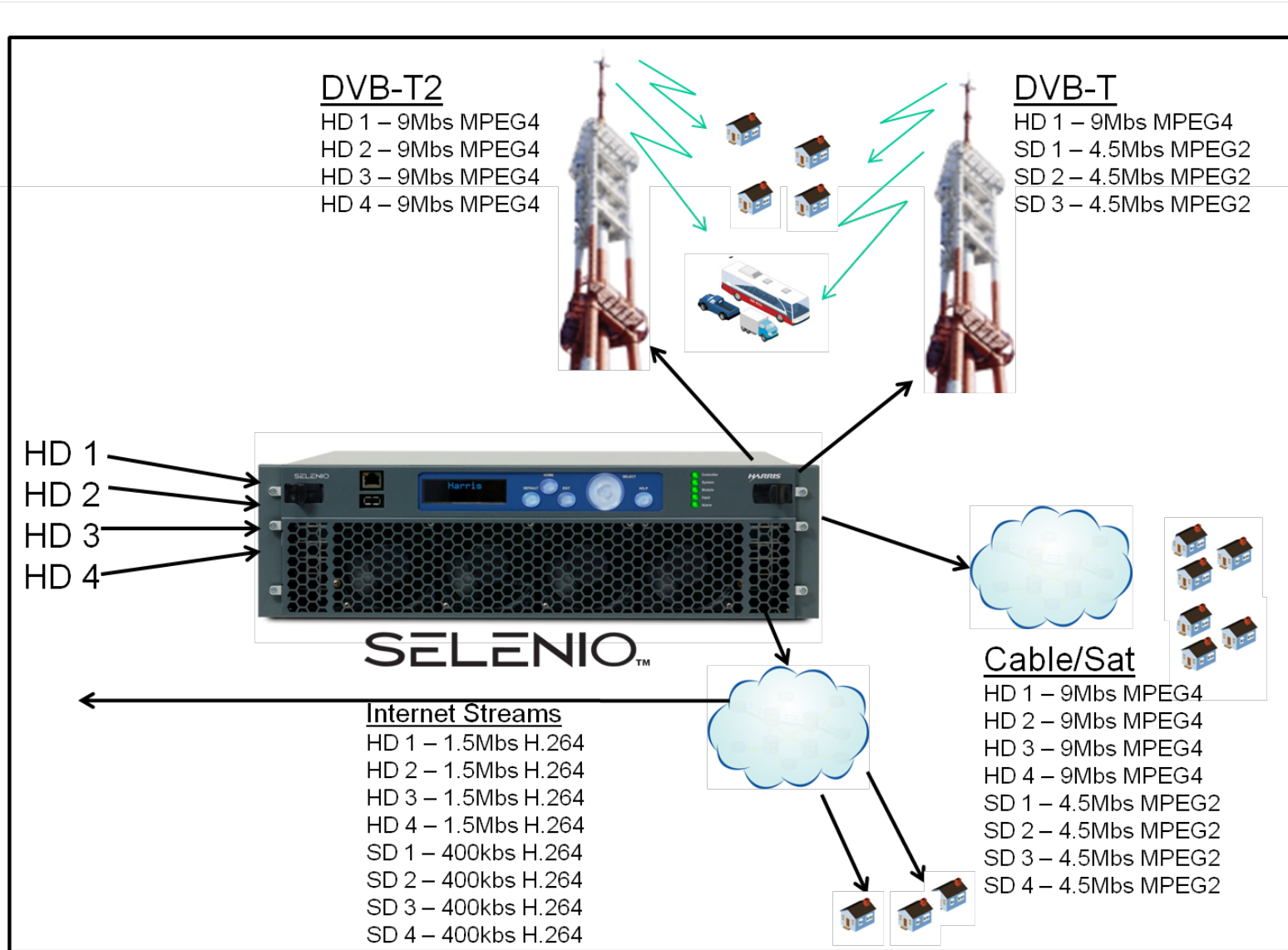
Compression and distribution

- Today's viewers expect their content over every delivery platform — appropriately branded, edited, and conformed
 - Analogue, DVB-T/T2, HD, SD, Cable, DTH, Web, in house monitoring.....
 - Call it multiplatform or multiscreen delivery, today's broadcasters are challenged with the same moving targets of providing more and more different types of program feeds all in different formats
- Advances in baseband and compression technology have been architected to take advantage of higher channel counts with green operations in mind.
- New Media Convergence Platforms consolidate these functions into a high-density integration platform

DVB-T2 Head-End, Mixed SD-HD, with Up-Down-Cross and ARC



Selenio Multi-Platform Head End



DVB-T2 Headend: Units, Power, Cables, Racks

67 Separate Functional Items

- 7 Frame Syncs
- 7 Up/Down/ARC
- 3 Dolby-E decoders
- 3 MultiMerge™ procs
- 3 Loudness Control 5.1
- 18 Loudness
- 7 HD/SD H.264 Encoders
 - With 3 AAC-5.1 encoders
 - With 18 AAC-2.0 encoders

- Control 2.0
- 7 H.264 BL encoders
- 2 Transport Muxes
- 2 DVB Scramblers
- 2 DVB-T2 Gateways
- 2 Multi-Channel IP Gateways
- 2 Ethernet Switches
- 2 Redundancy Managers

2500 Watts Total Power

- 21 metal boxes
- 42 Power Supplies

25 Rack Units of Space

- 8RU FS-UDA-AudioProc
- 7RU Encoding
- 6RU Muxes, Scramblers, GWs
- 2RU Ethernet Switches
- 2RU Redundancy Managers

156 Total Cables

- 84 Coaxial Cables (Video, Audio)
- 34 Ethernet Cables
- 42 line cords

SELENIO™

One Selenio Frame

- 3+1 Sync/XHD w/AAP
- 6+1 Encoders
- 1+1 DVB Mux w/T2GW

3RU Space (88% less)

600W Power (76% less)

15 Total Cables (91% less)

- 7 Video Cables go in
- 2 (main, red) ASI go out
- 2 (main, red) Mgmt Eth
- 2 (main, red) Data Eth
- 2 (main, red) line cords

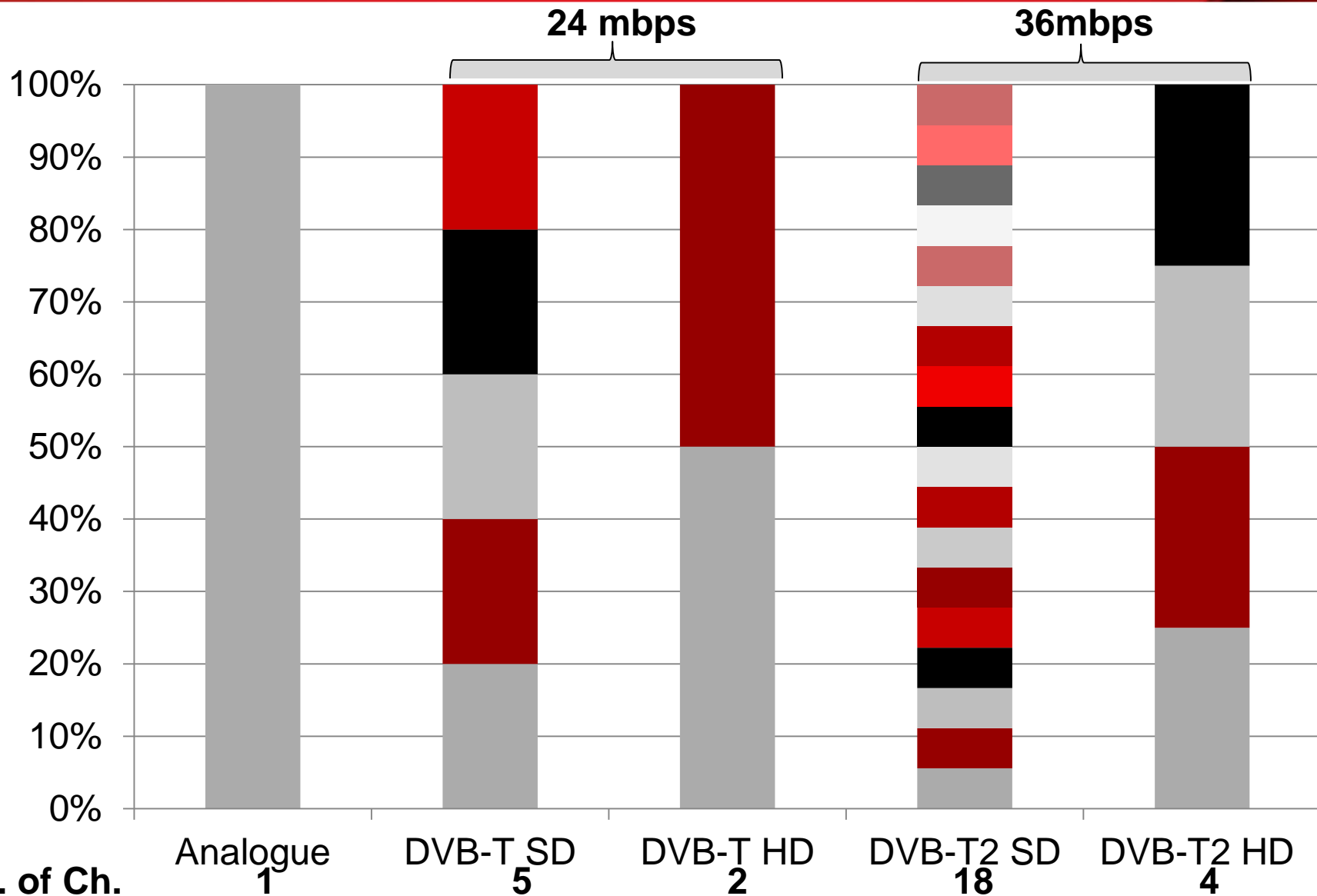
10 year power savings alone is more than \$20,000.00

GREEN ADVANTAGES OF TRANSMISSION SYSTEMS

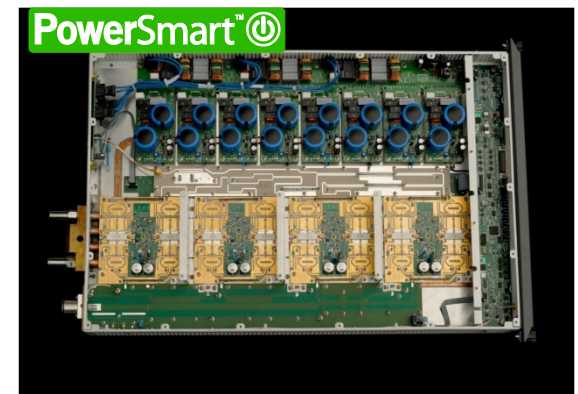
Transmission Overview

- Digitisation brought significant power advantages by enabling far higher channel density over similar spectrum
- DVB-T2 digital terrestrial transmission standard, offers dramatically improved modulation schemes that give users a choice between signal robustness (choice of constellations, number of carriers, error correction choices, etc.) or data capacity (payload)
- DVB-T2 transmitter consumes approximately 35% less power than an analogue transmitter for the same coverage area
 - four analogue transmitters can be replaced with one DVB-T2 system; with a single transmitter, you can now encompass the same coverage area with four high-definition programs
- Power consumption drops
 - using four 20 kW analogue transmitters consumes 144kW of power versus a single 5.0 kW DVB-T2 transmitter that consumes 22.5kW)
- Infrastructure requirements are reduced

8MHz Channel Utilization Example



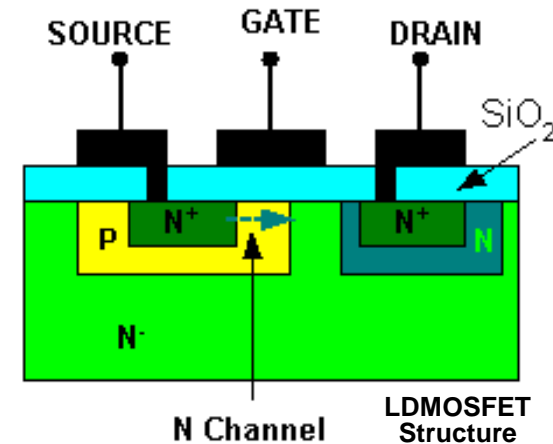
- First available 50 Volt LDMOS Power Devices
- Best in Class Power Density
- Higher Efficiency up to ~66% improvement
- Lower Power Consumption
- Less Complexity - Higher reliability
- Smaller and lighter for ease of handling
- Field serviceable design with sub-assembly repair
- RoHS & CE compliant
- All digital **Real Time Adaptive Correction (RTAC)**
- Incorporates new Apex M2X multimedia exciter
- Easy software upgradeability to new standards as they become available



Laterally Diffused Metal–Oxide–Semiconductor Field-Effect Transistor (LDMOS-FET)

LDMOS-FETs have significant advantages over VMOS-FETs for RF amplifiers:

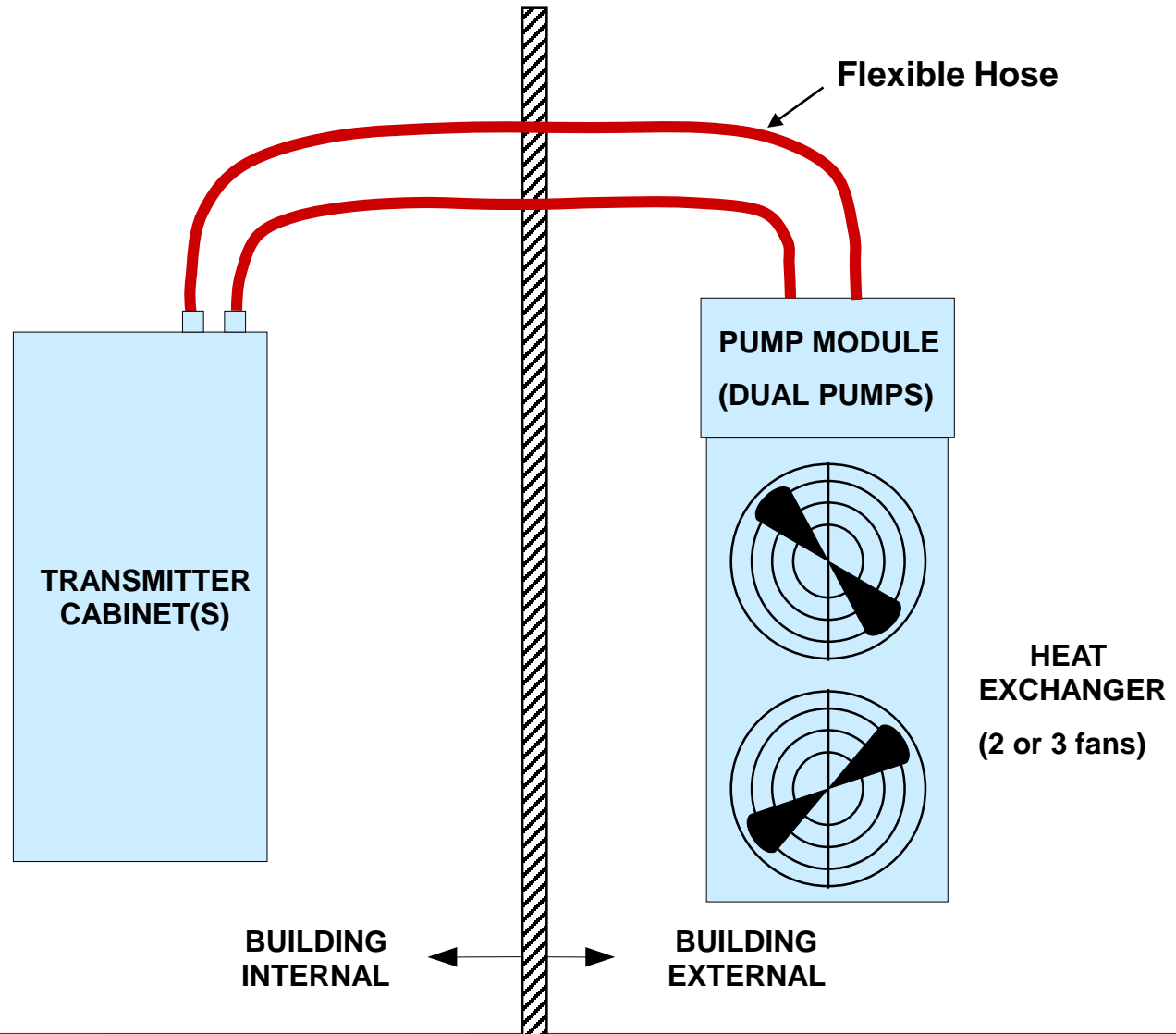
- Higher current handling
- Higher breakdown voltage
- Increased power density (2 x VMOS)
- Increased maximum power output
- Improved linearity
- Higher gain (~20dB) (less drive required)
- Improved efficiency
- Lower thermal resistance
- Increased ruggedness – Can tolerate extreme VSWR reflections of up to 65:1 pulsed at full rated power, at all phase angles



The LDMOS-FET is an asymmetric MOSFET designed for low on-resistance, higher blocking voltage and current handling capability than their VMOS counterpart. Combined with a short channel length superior thermal performance and high breakdown voltage, these characteristics make them very attractive for high power RF amplifiers in many applications.

Liquid Cooling System

- Directly evacuate heat out side of the building
- Drastically reduced building cooling costs
- Variable speed fans and pumps to reduce power consumption
- Closed-loop system
- Flexible hose for easy install
- Redundant systems can support multiple transmitters

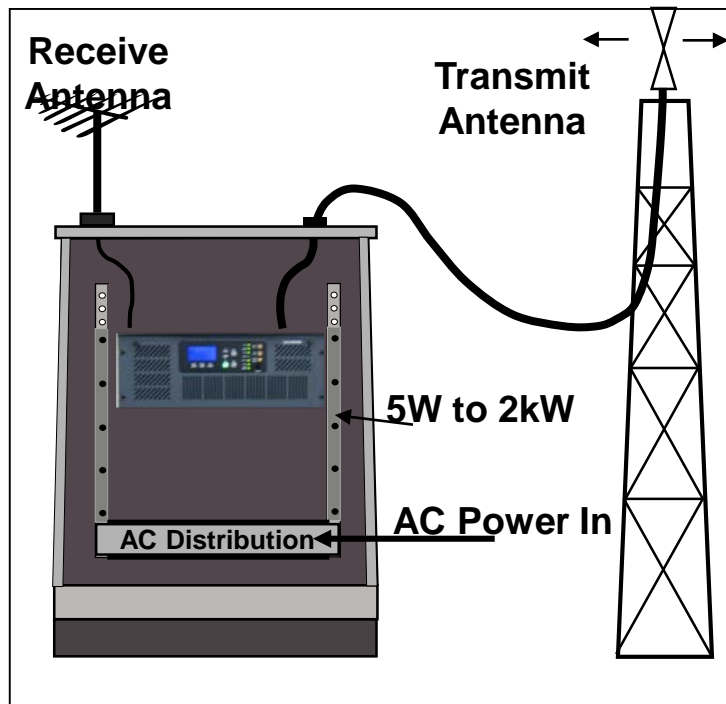


Power Savings installations

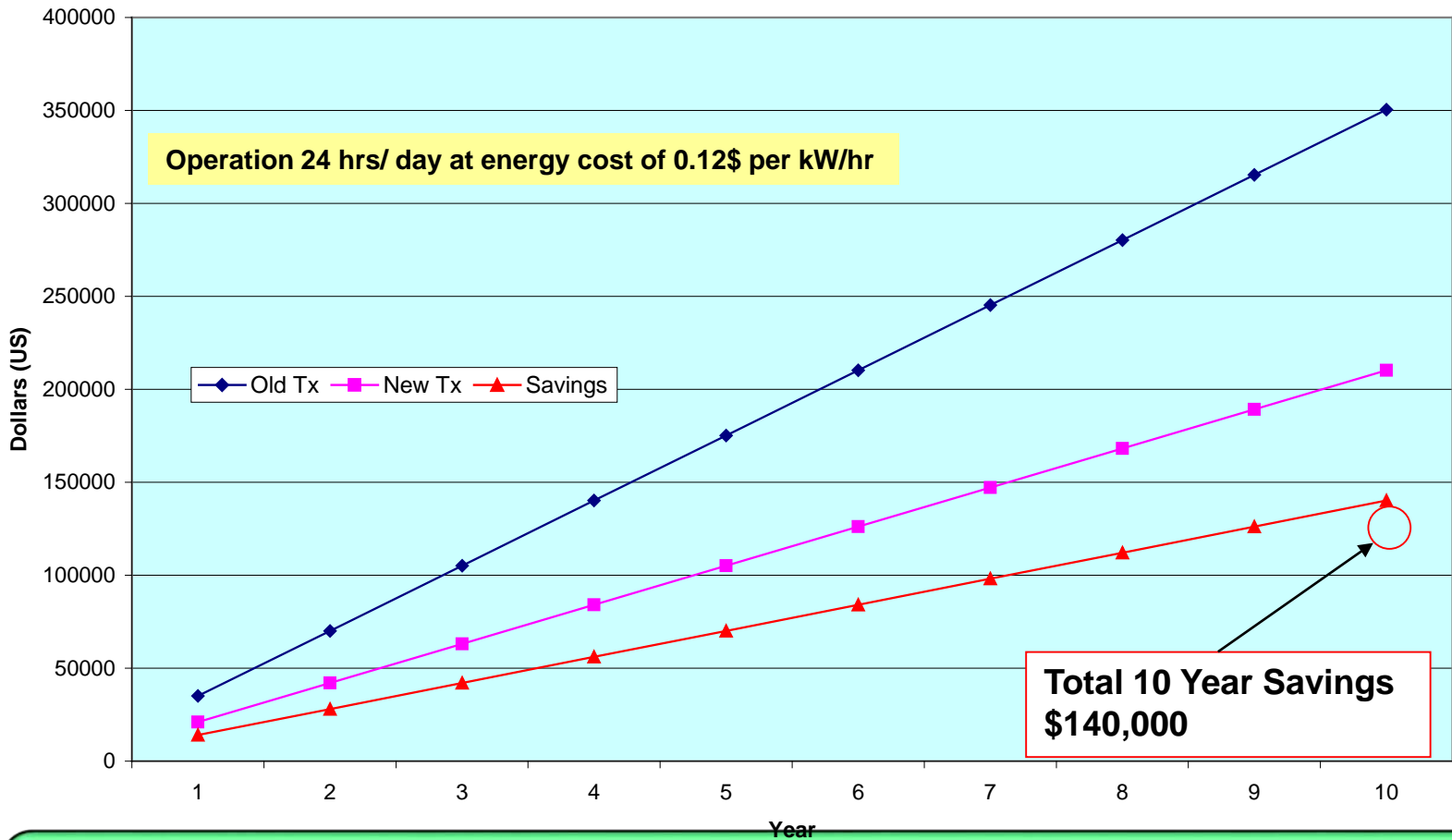
- Ducted Air racks
- Evacuate the heat from the building
- Reduces Cooling costs

- Outdoor shelter
- Reduces site costs
- Fast deployment

- Both solutions reduce operating costs




Current T2 transmitter vs older DVB-T transmitter operating costs



When we take into account the increased capacity of the T2 mux, the power savings double - \$280k

Summary

- Economic factors impact technology selection
- DVB-T2 standard enables green operation and new revenue opportunities
- Three key technologies deliver superior green footprint
 - Video Server technology
 - Media Convergence platform (baseband and compression green technologies)
 - **PowerSmart™**  DVB-T2 transmitters
- Additional savings are realized from facility space, cooling, construction and maintenance costs

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