

Excerpted from EPA / Energy Star slides
for **Displays** Stakeholder Meeting
September 25, 2008

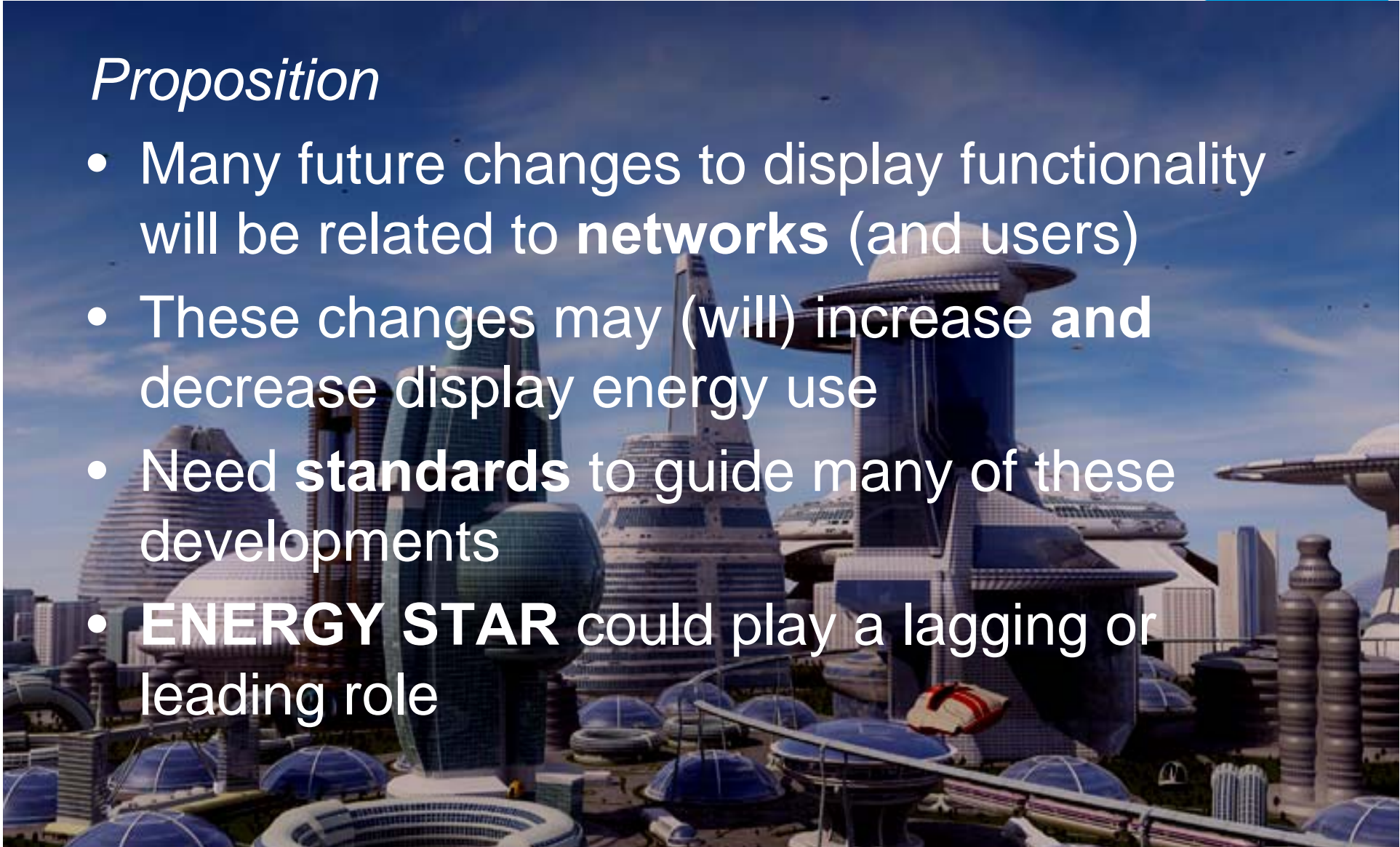
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Future Networking of Displays



Proposition

- Many future changes to display functionality will be related to **networks** (and users)
- These changes may (will) increase and decrease display energy use
- Need **standards** to guide many of these developments
- **ENERGY STAR** could play a lagging or leading role





Displays today

- Connected to a single source device
 - With a data, not network link
- Source only determinant of power state
 - (aside from power switch)
- No user input capability
- No environmental sensors



This simplifies

- Test procedures
- Specifications
- Product design
- Use



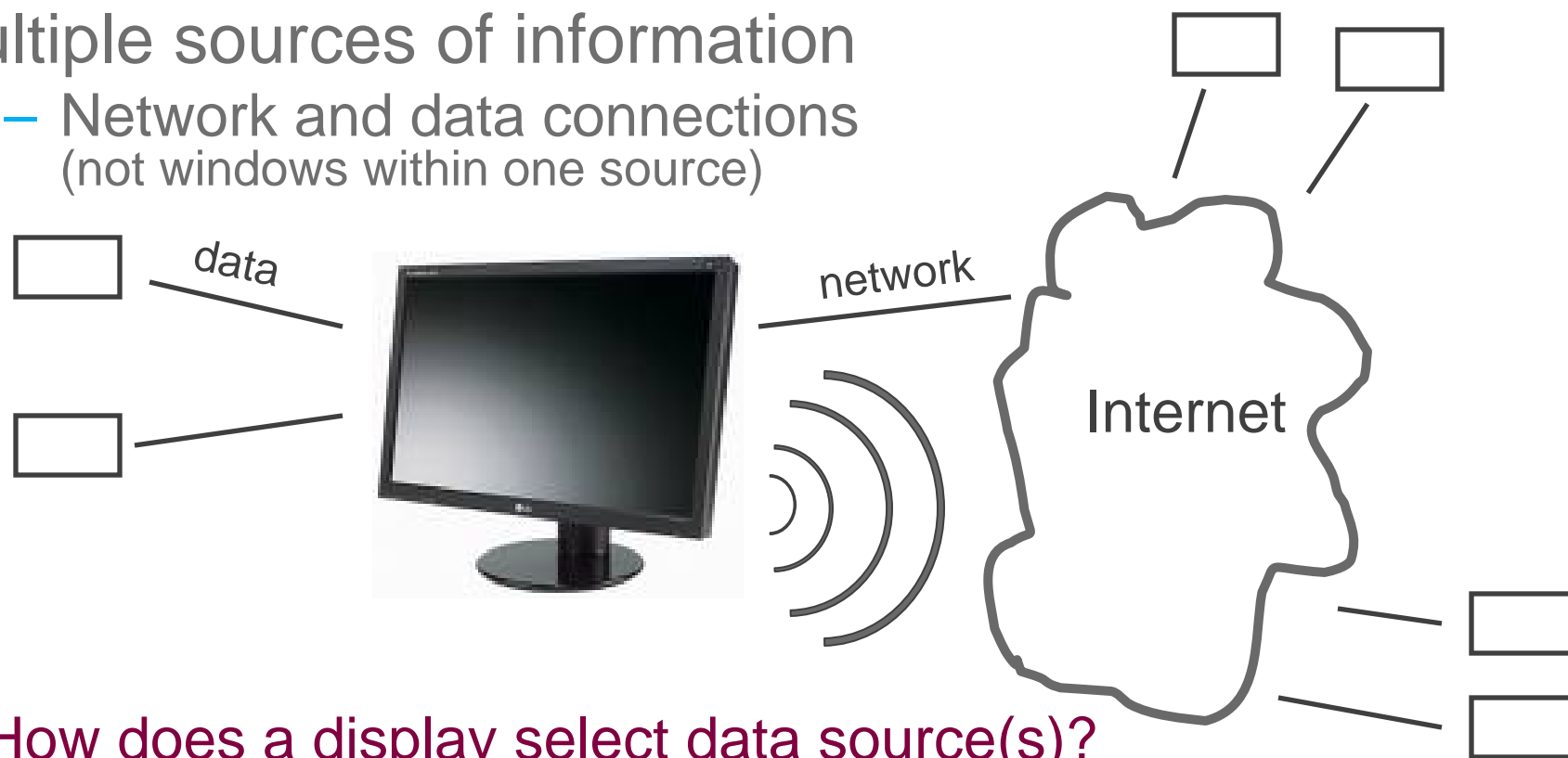
Future - Usage models

- Convergence of TVs and other display
 - Continuum from phones to monitors to large screen TVs
- Content available from many sources
 - Multiple PCs and Set-top Boxes (of various sorts)
 - Webcams in homes or offices (or anywhere)
 - User interfaces for other devices
 - Appliances, utility meter, etc.
 - User interfaces for building controls / elements
 - Lights, HVAC, security system, etc.
 - Multiple sources (windows) per display
 - Multiple displays per display
- Adding User Interface capability

Future - Sources

Multiple sources of information

- Network and data connections
(not windows within one source)

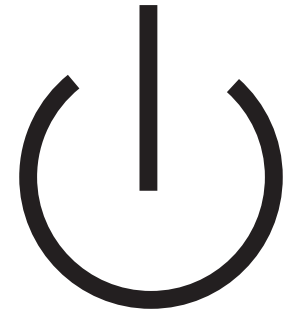


- How does a display select data source(s)?
- When should it “listen” (or not) to a source?
- What are power requirements for sources in different states?

Future - Power State



Power State: On, Sleep, Off
(Sleep has network connectivity)



Many determinants of display power state

- Multiple data sources
- Context within a source
- Environmental sensors
 - Ambient light, ambient sound, ...
- Occupancy sensors
- User interfaces
 - Touch, cameras, remotes,
- How to test shifting between power states?
- How to measure power for particular states?
- What are the implications for usage patterns (TEC)?



Future - Inputs and Sensors



Possible User Interfaces

- Touch
- Remotes
- Keyboards / Mice
- Audio / Speech
- Cameras / Gestures



Possible Sensors

- Ambient light
- Ambient sound
- Occupancy (direct and inferred)



Future - Inputs and Sensors



- How does the user know what inputs / sensors exist?
 - Symbols
- What inputs / sensors are active during sleep?
 - Indicators
- What (display or other) does an input or sensor wake up?
- What (display or other) do sensors influence?
- What are power requirements for inputs / sensors?
 - How active could / should they be?
 - How to test?

Impacts on ENERGY STAR



Test Procedures

- Data / network context for testing
- Functions to enable / disable / exercise
- Key functions for particular power states
- What to report

Specifications

- Features to reward with additional power
- Features to
 - encourage / discourage
 - require / prohibit



Standards needs

User expectations / User interface

- Dynamic operation
- Symbols / terms / colors
 - Power state, sources, inputs/sensors

Data / network interfaces

- Mediation of power control
- Role of user inputs / sensors

What venues to address these?

How does ENERGY STAR engage?

Ideal Result



Use ENERGY STAR to help:

- Develop and bring into market new energy-saving features
- Discourage or reduce consumption of energy-intensive features
- Create a universal set of user expectations for how to use displays
 - Enhances user experience
 - Saves energy