PHRC Webinar Series | Tuesday, April 10th @ 1pm

Future Proof Home Design

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Description

- Technology is an ever changing component within a home. Taking that into consideration, this webinar will look at some of that technology and how it can be incorporated into the functionality of the home now and in the future. This will range from standard wireless capabilities to complete home automation.

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Learning Objectives

- Review standard home automation techniques that can improve the safety of the occupant through security
- Review home monitoring systems that will give the ability to follow daily patterns of aging family members
- Understand the different levels of technology that can be incorporated into the home and how it can increase both the health of the occupants but also the health and durability of the structure
- Understand that "Future Proofing" is not only understanding the technology side of home automation, but also occupant education. Not only does maintenance need to be performed on the physical structure, but components within the structure also need to be maintained

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What Does Future Proof Home Design Mean??

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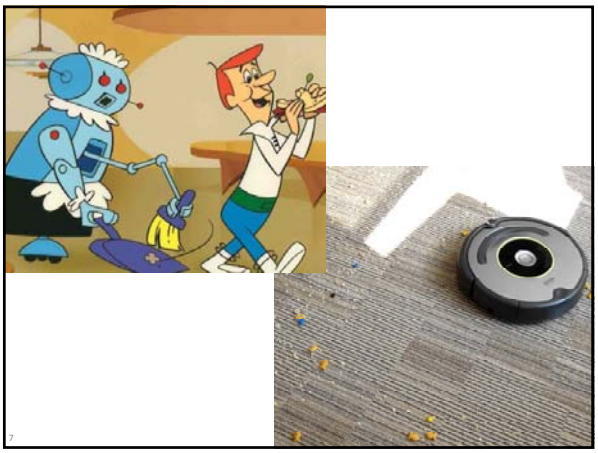

Changing Needs

- Technology
- Higher utility bills
- Growing family
- Reduction in carbon footprint
- Changing physical conditions

Technology

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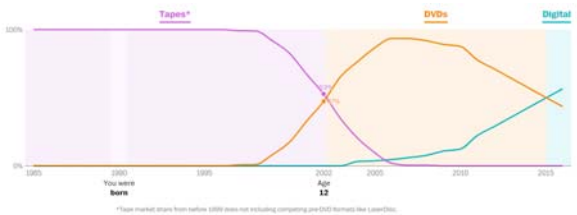
How Did People Watch Videos?



When you were 12 in 2002, 53% of U.S. home entertainment spending was Tapes, and the top movie in theaters was *Spider-Man*.

When you were born in 1990, most of U.S. home entertainment spending was Tapes, and the top movie in theaters was *Home Alone*.

Source: washingtonpost.com

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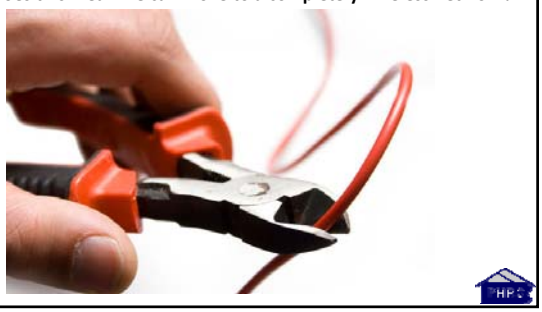
Entertainment Cables

- **Does this mean we can move to a completely wireless network?**



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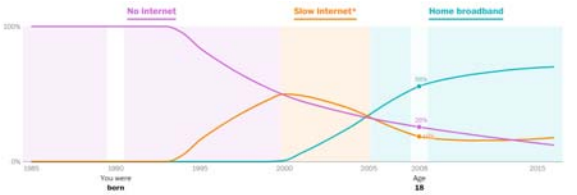
Did People Have Internet Access?



When you were 18 in 2008, 56% of U.S. households had Home broadband, and the top website was Google.

When you were born in 1990, over 99% of U.S. households had No internet.

Source: washingtonpost.com

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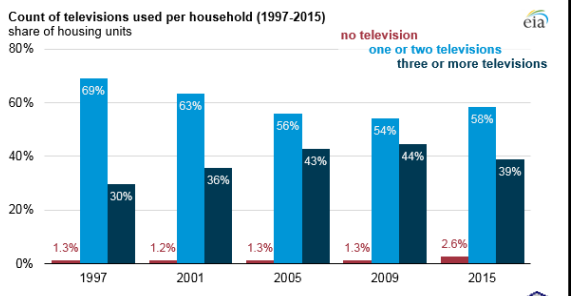
Devices per Household



Source: eia.gov

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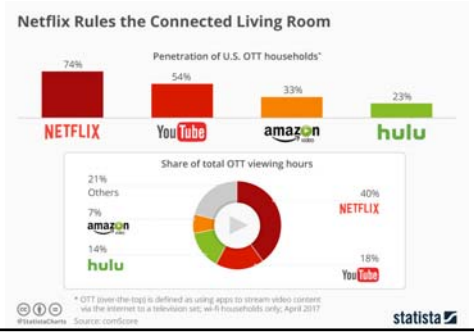
How Much Data is Being Streamed?



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Connection Speeds Needed

- **To stream Netflix, the following connection speeds are recommended:**
  - 0.5 Megabits per second - Required broadband connection speed
  - 1.5 Megabits per second - Recommended broadband connection speed
  - 3.0 Megabits per second - Recommended for SD quality
  - 5.0 Megabits per second - Recommended for HD quality
  - 25 Megabits per second - Recommended for Ultra HD quality

Source: netflix.com

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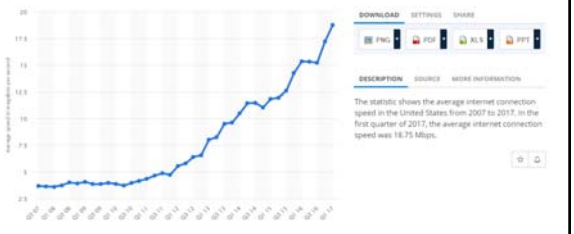
U.S. Internet Speed

Average internet connection speed in the United States from 2007 to 2017 (in Mbps), by quarter



Source: statista.com

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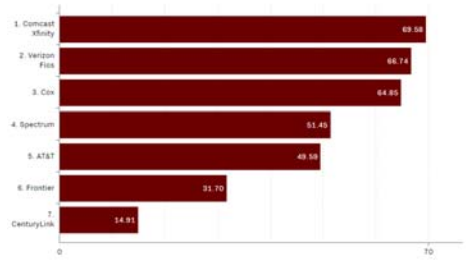
Highest Broadband Speeds

U.S. internet service providers ranked by speed, first half of 2017



Source: recode.net

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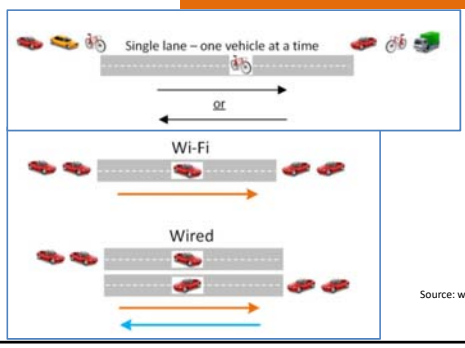
Bottom Line



Source: wififorbeginners.com

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Future Proof Structure

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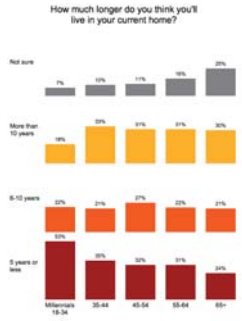
How Long are People Staying in Their Home?



- **Plan for the future.**

Source: themorteagereports.com

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Blocking for Future Grab Bars

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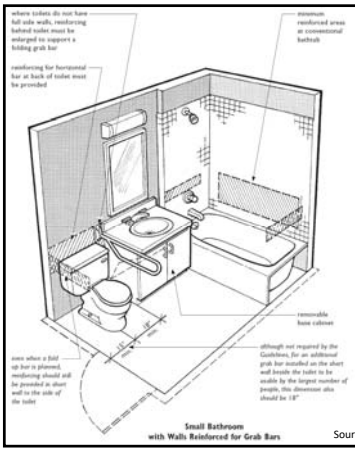
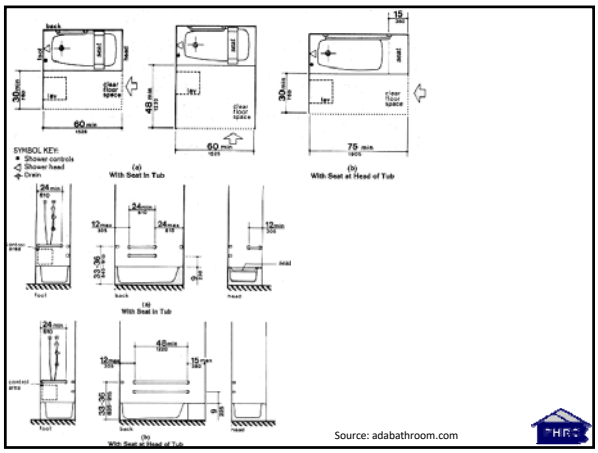


Source: empoweringthematuremind.com

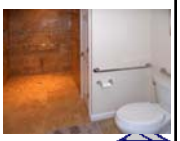


Source: adabathroom.com

Bathrooms

- Zero Threshold shower entry
- Grab bars
- Specialty tubs
- Accessible toilets
- Easy to reach controls



Lifts

- **Chair lifts**
  - For clients with mobility issues, progressive needs that will affect mobility, and difficulty with stairs
- **Platform lifts**
  - Lifting device for clients with mobility devices
  - Allow client to transfer floors while remaining in the mobility device
- **Elevators**
  - Typically a large scale remodel is required
  - Better option for new construction
- **Vertical lifts**
  - Similar to elevators
  - Usually not enclosed



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Elevator Shaft

- **Although it is not free, it is much cheaper to rough-in the shaft during initial construction.**
  - Price
  - Space

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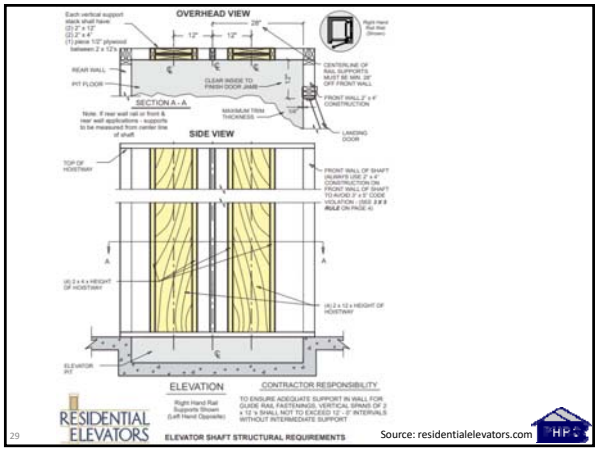
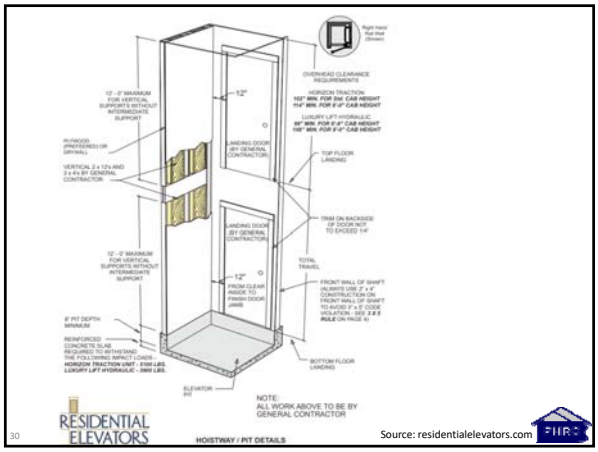


29 Source: residentialelevators.com



30 Source: residentialelevators.com

Future Proof Energy

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Electric Car

- Future proofing garage wiring
- As electric cars become more common, electrical rough ins will be sought after more and more
- Dedicated 240 Volt line needed for both old and newer models

Charging Level	Power Supply	Charger Power	Miles/Hour of Charge	Type of PEV	
				Nissan LEAF	Chevrolet Volt
Level 1	120 VAC	1.4 kW (onboard charger)	~3–4 miles	~17 hours	~9 hours
Level 2	240 VAC	3.3 kW (onboard charger)	~8–10 miles	~7 hours	~3 hours
		6.6 kW (onboard charger)	~17–20 miles	~3.5 hours	~1.5 hours

Source: California PEV Collaborative

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Homeowner Education

- **Include information such as:**
  - Diagrams showing the system, point of connection to the power supply and recommended charging station
  - Home electrical load calculation that estimates if an existing electrical service will handle the extra load
  - Incentives in the area for electric cars
  - List of charging stations that will be supported by 120 VAC or 240 VAC, depending on circuit chosen to install

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Future Proof Electrical Infrastructure

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Solar on Roof

- **Prepare structurally and electrically for future solar panels**
- **Recommended dead load requirement is additional 5-6 psf for a future system**
- **Permanent roof anchor for fall safety is also required**

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Truss Manufacturer Recommendations

- **Do the design up front**
- **Solar PV panels can add 5-6 PSF top cord dead load to the truss**
- **Depending on the roof design and where the panels need to go, this can be rather simple or potentially cause additional design to the truss system**
- **Addition of PV panels on an existing home can:**
  - Require additional structural support like gussets added to the webs
  - Redesign of truss system to ensure it can carry additional loading
  - Potentially not work at all

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In Home Preparation for Solar

- **4x4 plywood should be installed in wall area for a dedicated space for solar components such as the inverter**
- **Metal conduit from roof to designated wall area for inverter and electrical panel**
- **Designate space in the electrical service panel, or an appropriate subpanel, for a double pole circuit breaker. The circuit breaker should be installed and labeled for use by the PV system.**

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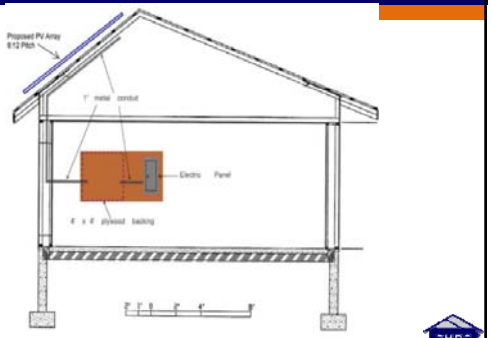

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Homeowner Education

- **Include information such as:**
  - Architectural drawings detailing the proposed array location and square footage
  - Electrical drawings and riser diagram of PV system components that detail the dedicated location for the mounting of the balance components
  - Shading study with percent monthly or adjusted annual shading impact(s)
  - Code-compliant documentation of the maximum allowable dead load and live load ratings of the existing roof

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Smart Homes of the Future

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Smart Homes

- **"Smart homes" are defined as residences equipped with sensors and other advanced technology applications that enhance residents' independence and can be used for those choosing to age in place** – MEDLINE
- **"Smart homes" can help reduce healthcare costs while satisfying older adults' desire to remain in their own homes as they age**
  - Fitted with sophisticated wireless sensors and processors
    - Keep discreet watch over an aging occupant and provide alerts to any sudden breaks in the patient's daily routine
  - Smart homes are connected
    - Family, healthcare providers, neighbors, emergency services

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Smart Home technologies

Six categories of smart home technologies:

1) **Physiological monitoring**
   - Measurements of pulse, respiration, blood pressure
2) **Functional monitoring**
   - Measurement of general activities, motion, meal intake
3) **Safety monitoring and assistance**
   - Automatic lighting, trip and fall reduction, hazard detection
4) **Security monitoring**
   - Intruder detection
5) **Social interaction monitoring**
   - Phone calls, video mediated communication, virtual participation in groups
6) **Cognitive/sensory assistance**
   - Medication reminder, lost key locator

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Smart Homes Providing a Future for the Aging

- **Smart home features:**
  - Personal alarms to a response center
    - Pendants and pull cords
  - Video door entry systems
    - Allow the resident to see who is visiting
    - Open the door remotely
  - Bed and chair occupancy sensors
    - Provide warnings if the resident does not return in determined time
  - Lighting that can be automatically activated
    - A resident gets out of bed – lights illuminate automatically
  - Medical monitoring that can be assessed on site and information forwarded appropriately
    - Pulse, blood pressure and heart rate
  - Increased use of robotics to assist around the house
    - Assists those with mobility restrictions

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What Aging Homeowners Want

- Care Coordination
- Social Interaction Tools
- Fall Detection
- Home Health Options
- Reminders
- Smart Home Sensors
- Wearables
- Automated Home Systems

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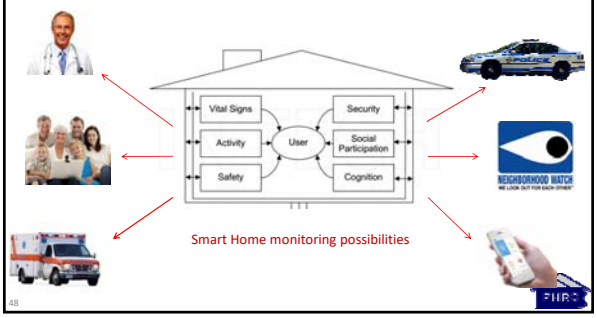
Monitoring Systems



Smart Home monitoring possibilities

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Smart Homes – The Future

- **Technology Companies such as Intel, General Electric, Philips Electronics, and Honeywell are finally starting to deliver "smart home" technologies to the market**
  - Watch over its elderly occupant
  - Spot signs of trouble
  - Alert doctors
  - Teleconference physicians into the living room
- **GE and Intel are committing $250 million over five years to develop products** – Bloomberg Business 2015
- **It is predicted that the market for home monitoring and communications devices could eventually generate $20 billion per year** - Consultancy Aging in Place Technology Watch

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Summary

- **Future proof home design is an ever changing target**
- **Technology can not be predicted so it is important to view the market and stay ahead of the curve**
- **Structurally, there are key components. It is important to have the conversation to see where the end user plans to be in the future**
- **Cost can always be an issue, but in most cases, preplanning can save on the cost of future proofing**

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References

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