CABA

State of the CONNECTED HOME MARKET

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The research was undertaken by Zanthus Corp.

State of the CONNECTED HOME MARKET

The Continental Automated Buildings Association (CABA) is an industry association dedicated to the advancement of intelligent homes and intelligent buildings technologies. CABA is an international association, with over 300 major private and public technology companies committed to research and development within the intelligent buildings and connected home sector. Association members are involved in the design, manufacture, installation and retailing of products for home and building automation. CABA is a leader in initiating and developing cross-industry collaborative research, under the CABA Research Program.

In 2011, CABA conducted its fourth wave of the State of the Connected Home Market Landmark Research, to update its understanding of North American consumer attitudes and behaviors about "connected home" products and services. The research was previously conducted in 2003, 2005 and 2008. The broad purpose of this study is to validate past and current trends, and to characterize consumers' understanding of the connected home today, and in the future.

The 2011 State of the Connected Home Market study identifies key emerging areas of opportunity over the next two years to advance the connected home space in the U.S. and Canada. In addition, the 2011 study has a special focus on uncovering how converged solutions can and should map to key unmet consumer lifestyle-related needs, particularly in the areas/ecosystems of entertainment, family and energy management.

Organizations that participated in CABA's State of the Connected Home Market 2011 study included: 3M Company, ADT Security Services, Best Buy Co., Inc., Broan-NuTone LLC, BSH Home Appliances Corporation, Carrier Corp., Consolidated Edison Company of New York, GE Energy Services, Honeywell International, Hydro One Networks Inc., IBM, Ingersoll Rand/Trane/Schlage, Landis+Gyr, LG Electronics, Microsoft Corporation, Moen Inc., NYSERDA, Pacific Gas & Electric, Qualcomm, Schneider Electric, SecurTek Monitoring Solutions, Sempra Utilities, Shell, Southern California Edison Company, TELUS Corporation, USNAP Alliance, Verizon Wireless and Whirlpool Corporation.

CABA commissioned Zanthus (www.zanthus.com), an independent market research and consulting firm, to conduct several State of the Connected Home Market research studies over the years, including the current 2011 research study.

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1. EXECUTIVE SUMMARY

Benefits & Barriers

At a high level, interest in the connected home concept has picked up since this study was last conducted in 2008. About one-third of U.S. online consumers, and more than one-fourth in Canada now say the connected home concept is very appealing. The increased prevalence of mobile technology in consumers' lives is clearly associated with interest in the connected home concept.

Key Benefits. Consumers say the top four benefits of the connected home are:

- **Remote control**. This is seen as the key benefit among consumers in general, but those with more interest in the connected home are drawn by this benefit more strongly than those with less interest in the connected home. Women are somewhat more interested than men in remote control, though both strongly value this benefit.
- **Saving money on energy bills**. This is important to all consumer types. And, while everyone is interested in saving *money* on energy bills, interest in reducing energy *consumption* is not associated with interest in the connected home. In fact, those who care the least about the connected home are most interested in saving energy.
- **Safety and security**. Like saving money, this is important to all consumer types. Consumers talk about peace of mind that results from always knowing that their home is safe and secure. They like the idea of getting notified if any threat or malfunction occurs (such as a break-in or water leak); many like being able to view their home via webcam as well.
- **Ease of use**. This primarily stems from having centralized, coordinated control of all home systems and appliances through a variety of Internet-connected devices. People talk about the convenience, the time savings, feeling more organized, and generally making life easier. Men and those with the most interest in the connected home value having an easier way to control home systems more than other consumers.

Key Barriers. Consumers say the top four barriers to adopting connected home products and services are:

- **Cost**. Not surprisingly, this comes up as the number-one barrier—especially for those who are most interested in the connected home concept. To many, having a connected home just sounds like an expensive proposition. Consumers talk about the cost of initial set-up, as well as ongoing maintenance and service fees—and they expect these costs would multiply quickly as the number of devices and connection points expands. They may have a hard time justifying the expense when the benefits are hard to measure, especially in economically uncertain times.

- **Lack of familiarity**. This is an issue for all types of consumers, primarily because they don't know what products and services are available, or where to obtain them. Fewer consumers say they don't understand how their household might benefit from connected home products or services.
- **Complexity**. This is particularly problematic for older consumers (55+), women and those who are least interested in the connected home. Like with costs, consumers picture the complications multiplying as more devices are linked together, possibly leading to worst-case scenarios like technology failing and putting their household at risk without their knowledge. Or, at the least, they say connected home products and services would require climbing a (possibly steep) learning curve.
- **Security and privacy**. Exposing their home's power, heat, lights, locks and security system to potential threats can seem highly risky to consumers; those with children in the household are especially sensitive to exposing their home and family to such risks. Some also say the idea is too "Big Brother-ish"—making too much information about their household available to government or corporations.

State of Networking & Connectivity

It's no secret that the increase in connected mobile lifestyles in recent years has been fueled by wireless connectivity. Wireless is by far the leading method that consumers use for connecting devices to the Internet or each other. The ease of accessing the Internet wirelessly has fueled an increase in the number of households with multiple computers, with laptop computer ownership rising at the expense of desktop computer ownership.

After computers, top connected devices are: smartphones, webcams, game devices and iPod Touch media players. Security systems are popular among homes with expanded device ecosystems, and e-readers and tablet PCs are starting to emerge in substantial numbers among households with other devices—used mostly for entertainment and communication.

While the options for accessing information, communications and entertainment are expanding, only a minority of consumers are currently satisfied with their ability to access desired content on any device. However, they are reluctant to pay ongoing fees in order to have the seamless experience they desire. Our study tested consumer interest in a consumer electronics "Concierge" tech support service concept, which received tepid reviews. It is not seen as sufficiently superior to available alternatives, and also likely suffers from a proposed monthly fee. We also tested interest in a "Cloud" service, described as a way to access digital content from any Internet-connected device. Interest in the concept is moderate; the associated monthly fee likely hampers potential demand.

Desired Features & Activities

Consumers increasingly view their cell phones as a kind of universal remote control, something they can envision using whether they are at home, or away. In both the U.S. and Canada, the largest *unmet* need on a cell phone is the ability to control home systems—including security, temperature, lights and entertainment.

Computers are preferred over smaller form factors for home entertainment—setting up TV programs to record and selecting music or other audio to play on networked home speakers. Many consumers also want to control home systems from a computer.

We also asked about current and desired activities on other devices. Key findings indicate that consumers have difficulty envisioning alternative uses for devices originally designed for specific purposes:

- **In-home display screens** are seen primarily as thermostats and security devices.
- **Game devices** are primarily desirable for entertainment; in the U.S., there is some interest in using game devices to stream music in the home.
- **Tablets** are primarily viewed as consumption devices for entertainment and communication, and only by a minority of consumers thus far.

Entertainment. In the area of entertainment, much demand has been fulfilled in recent years. Online consumers now watch digital video on multiple screens from a variety of sources, dominated by YouTube—and in the U.S., Netflix and Hulu are working hard to catch up. They have also found ways to listen to digital music using various methods (though many settle for low-fidelity computer speakers). Most have game devices of some kind, and among those with current-generation game consoles (Wii, Xbox 360 or PS3), most are connected to the Internet, providing access to an ever-expanding set of game services and other entertainment options. Currently, about one-fifth of target online consumers in the U.S. use a game console to watch digital video on a television set. In Canada, where Netflix or viable alternatives have not fully taken hold, the number is a bit lower (15%).

Looking at potential areas for innovation, we tested interest in an on-demand entertainment service, described as an alternative to the typical package of channels offered by cable/satellite providers that also includes movies, music, games and more. Consumers clearly like the idea of paying only for what they watch or use; this is the most well received concept tested in the study.

At the opposite end of the price spectrum, we also tested interest in a web-enabled, high-definition "Smart TV" that accesses personalized entertainment and media stored on any connected device. Potential demand is lower than for the on-demand service, but clearly, there is interest (primarily in the U.S.).

Home management. Home management and control continue to represent the area of greatest unmet demand in our study, particularly when it comes to controlling and monitoring home systems via a cell phone. A home management dashboard concept tested in the study was described as providing a secure central control point to key home systems and devices, accessible via any connected device. Consumers think the idea clearly has merit, as evidenced by the rating for superiority over existing products and services. However, it was seen as complex. A family calendar and communication system that scans emails, texts and social network updates for tasks and events is seen as offering a modest but not very compelling advantage over current ways of doing things.

Energy Management. Substantial numbers of consumers would be interested in signing up for dynamic pricing with their electric utility, and a lower but still promising number would be interested in using a home dashboard concept coupled with dynamic pricing to track prices in real time and manage their energy consumption. Interest in the dashboard is relatively stable at the prices tested: free, $49, and $99.

Consumers also indicated their interest in a demand response program, described as a way to pay lower rates in exchange for allowing their utility to automatically adjust their home's heating or

cooling settings, or postpone running certain appliances, during peak times (with the ability for the consumer to override such actions by the utility). Interest in this type of arrangement is moderate. In the U.S., it is not seen as particularly superior to alternatives for saving energy; Canadians are more positive about its advantages.

Consumers also evaluated several concepts designed to help them manage their energy consumption. A wireless smart plug that transmits energy consumption data to a software app, at $49, is modestly attractive in the U.S. By contrast, interest in a home energy audit at $199 is relatively low. An "Entertainment Plus" concept that bundles energy management with cable TV, broadband Internet, and home security has some appeal, primarily in the U.S., but likely suffers from the need to commit to a multi-year contract and pay a monthly fee.

Potential demand for smart appliances (designed to save energy and alert owners about maintenance needs) is relatively robust—primarily because of interest in saving money on energy costs. Reducing energy *usage* is less important than saving *money* on energy bills in the U.S., while in Canada, reducing consumption is nearly as important as saving money on energy costs. The ability to get maintenance alerts, and having remote access to smart appliances, are of lower importance—though these features still have value.

Interest is roughly even across appliance types, but consumer appliance replacement habits show that some appliances may be more appealing than others. Clothes washers and dryers, refrigerators, dishwashers and water heaters represent good opportunities because they are the appliances most often replaced by current home occupants. Clothes washers and dryers also are the most anticipated appliance purchases in the coming year—mostly as replacements for appliances that are already 10 years old, or older. And, window air conditioning units and thermostats represent viable opportunities because they tend to be replaced more frequently than other appliance types.

In general, U.S. consumers seem more willing to replace appliances than their Canadian counterparts. However, in both the U.S. and Canada, whole-home heating and cooling systems are expected to have long lives (15+ years)—likely, until they wear out.

Target Markets

Connected home. The real key to identifying consumers interested in the connected home is finding those living a connected mobile lifestyle. Specific lifestyle factors associated with interest in the connected home are: use of the Internet at work and elsewhere while away from home, use of smart phones, laptops and tablet PCs, plus mobile navigation maps and overnight travel for work.

Demographically, the connected home concept resonates across different groups. Men and women of all ages have interest (though interest starts to drop off after age 55, and different ages like the connected home for different reasons). Both homeowners and renters are interested. Even income has less impact than some might guess. Home type also is not a driver of interest in the connected home. Those who find the connected home concept appealing are no more likely than other consumers to own their home, or to live in a single-family home, a large home, or a new home.

Energy management. Like with the connected home concept, all types of consumers are interested in smart appliances, but mobile, connected consumers represent the best initial target. Demographically, in the U.S., interest in smart appliances is strong among younger adults, regardless of whether they own or rent their home; while in Canada, it is higher among older homeowners.

In terms of appliance purchase decisions, men and women are somewhat divided along traditional lines, with women taking more responsibility for kitchen and laundry decisions, and men making more decisions about home heating and cooling and security.

While both men and women would be involved in decisions about energy management and demand response, men are more often expected to be the main decision-maker.

Channel Preferences

To learn more about the connected home, consumers naturally turn to online search and knowledgeable users for information. Online reviews are especially important to those who have the highest interest in the connected home. Telcos/broadband providers also attract a modest amount of attention as potential sources of information.

When they need help, consumers also tend to ask friends and family or conduct online searches to get the help they need, while industry support options (guidance from the product manufacturer or retailer) are largely unused, and typically less than satisfying.

Consumers think the best providers of a "cloud" content service would be the major tech brands, led by Google, Apple and Microsoft. In the U.S., wireless carriers Verizon and AT&T also get substantial mentions.

2. CONCLUSIONS & RECOMMENDATIONS

This study illustrates that once exposed to the connected home concept in a way that fully explains the key features and benefits, **people are now more able to envision themselves living this kind of lifestyle than they were three years ago**, when this research was last conducted.

The challenge then, is twofold: 1) to get consumers' attention, and 2) to deliver a quality experience. The following recommendations focus on strategies for achieving these aims.

Benefits & Barriers

First—to get attention, **focus on benefits of enhanced control via remote access, plus ease of control** while at home, or away.

- Recognize the connected home is about a *lifestyle* (or more simply, a *life*), not a building. "Home" goes beyond the walls of the home to work, school, and being on the go.
- Be mindful of differences in how women and men think about benefits. Women may have more interest in access while away from home, while men may like the centralized, more convenient access, regardless of whether they are away or at home.
- Benefits must be obtainable through ubiquitous, multi-function mobile devices—first, cell phones, but also laptops and increasingly, tablets.
- Beyond the hardware, a well-engineered user interface that is easy to learn and customize will be key to convincing consumers this truly is a better way to manage their home. Minimize differences between interfaces on different hardware and screen sizes.
- Technology should be a means to an end—being in control. Carefully craft and position offerings so that technology does not seem to be taking control—unless specifically given permission by the user.

Saving money is a key benefit sought by all types of consumers—solutions will need to deliver here.

- The connected home lifestyle needs to be made affordable, and where possible, positioned as a way to actually reduce expenses. New types of bundles (think on-demand video and games on any device) may offer value here while creating "sticky" experiences to earn consumer loyalty.
- Smart appliances and energy management solutions will have to deliver on the promise of lowering expenses in order to maximize their potential. Rebates and incentives will get the process started, but proof points must demonstrate the ability to reduce the cost of energy bills and home repairs.

- Saving money on energy bills using smart appliances and dynamic pricing will require consumers to climb a learning curve. Establish energy management user communities to share successes and struggles managing and reducing energy bills. Provide incentives for energy conservation efforts in the form of points redeemable for valuable merchandise or services.

Safety and security are perceived as key benefits of the connected home, and are major reasons for interest in remote access.

- Drive home the "peace of mind" message when talking about remote access.
- The addition of energy monitoring to safety and security will be appealing to some without the emphasis on remote monitoring and control—especially older consumers who mainly want to feel safe and save money.

Lack of familiarity is a key barrier to adoption, which must be addressed through strong branding efforts by companies that are ready to earn consumer trust by delivering a stellar user experience.

- Connected home branding and messaging should be prominent in online search results for home security, home broadband, smartphones, tablets, home entertainment subscription services, etc. Links should take users to rich media, including videos and virtual tours of the connected home lifestyle.
- Websites need to feature easy access to customer reviews, and social networking should be aggressively leveraged to expose newcomers to experienced users. Contests for user-generated video and product placement in entertainment media also could help demonstrate the benefits in ways that consumers can relate to.
- Traditional retail can play a large role here, providing one of the few opportunities to actually experience the connected home lifestyle hands-on. Beyond the store, set up demonstrations in mall concourses and parking lots and other high-traffic venues (casinos, movie lobbies, state fairs) to expose people to the possibilities.
- A high-profile consumer-facing certification body (think "Good Housekeeping Seal of Approval") also could help attract attention and provide the necessary confidence for consumers to take the first steps.

Complexity, also a key barrier, is related in consumers' minds to the term "connected" and to "technology."

- Reduce usage of the term "connected home," and focus instead on key features and related benefits (remote access, saving money, etc.). The term "smart" as an alternative may provide a halo effect from the positive association people have with smartphones.
- Beyond messaging and positioning, the key point here is to deliver on the promise of a seamless experience. Work to promote interoperability standards with hardware, software and service partners, and provide fast, effective customer support for when things inevitably don't go as expected.
- Despite companies' efforts to provide the best products and support, customers will still envision worst-case scenarios. Directly address fears by clearly explaining how to bypass systems if needed (for example, in the event of a power outage).

Privacy and security is a key top-of-mind concern to consumers, and must be addressed up-front with proof points, and where feasible, certifications from neutral third parties attesting to robust security efforts.

State of Networking & Connectivity

Wireless is the way that consumers expect to access desired content. Leverage their experience with Wi-Fi, and minimize signal interference problems as the number of connected devices expands.

New service models are needed to integrate home appliances, communications, and home entertainment, and get past underuse and low satisfaction with existing networking support services.

- Successful providers will be adept across platforms, and regard the activity as a revenue source rather than as a cost center. Some customers are willing to pay for maintenance contracts and/or monitoring, and may not balk at service costs if they are bundled into a fee they are otherwise used to paying. Others will be open to a pay-as-you-go model if it is easy to access and reasonably priced.
- The key will be pricing support services realistically; consumers shy away from ongoing fees and commitments.
- Those inclined to install/support themselves may need a new kind of "do it with me" service, between DIY and professional installation, where live chat or other on-demand support is available as needed.

Desired Activities

Mobile devices are strongly desired as they are tied to a top desired benefit—remote control and access. Build in mobility and remote access wherever possible for connected home solutions.

- Home control and management features continue to have the most unfulfilled demand of the features and activities tested, and mobile devices are the most desired control mechanisms.
- Concepts involving centralized control of a number of different devices from one place (like the home dashboard tested) will benefit from larger screens on their control devices. Tablet PCs and laptops will likely emerge as the preferred options; partner with device manufacturers and application developers to provide consumers with compelling experiences on these devices.

To expand consumer access to desired content and home systems, tie mobile connected devices with a variety of subscription services via compelling packages.

- Initially, higher-value customers will appreciate the advantages of centralized, remote access to everything in one secure location. For example, Xbox Live could offer a platform that provides access on any device to gaming, music, communications (via Skype) and webcam home monitoring—among other services. The added value of backup also will be a key selling point.
- The mass market will be sensitive to associated fees with integrated services and "cloud" concepts, and wary of privacy and security issues. Explore ad-based options for revenue generation, while proactively engaging consumers in setting up their privacy preferences.

An engaging, attractive user interface will be key for any integrated or cloud offering—both for early adopters, and those who come on board later.

Recognize that while those interested in the connected home want to save money on their energy bills, not everyone who wants to save money on energy bills likes the connected home.

- Energy management and smart appliances should be offered unbundled from other connected home features to attract those who are uninterested in the connected home concept.
- Smart appliances offer clear opportunities; the trick will be delivering on promises of automatically saving energy in addition to the added convenience of managing the devices via the Internet.
- Smart appliance success will be dictated by providing a full set of appliance types—there is no one "killer" smart appliance. That said, window air conditioners, thermostats, refrigerators, dishwashers, water heaters, clothes washers and dryers will likely be most attractive to consumers, at least initially. Target those with older (10+ years) appliances with messaging and even fun contests for the "oldest" unit.
- Dynamic pricing is relatively appealing to consumers, and will make smart appliances even more attractive, but demand response programs will be more controversial, particularly in the U.S. Consumers will need to clearly understand the benefits to them, and know how to easily override demand response actions when desired.
- People also need other low-cost ways to get started with energy efficiency. The smart plug concept tested in this research is promising, and could introduce consumers to the ease of remote home control.

Target Markets

Those with a mobile, connected lifestyle offer the best all-around target for connected home offerings.

- As mentioned earlier, focus on users of mobile connected devices, targeting them through broadband providers, wireless providers, and retail outlets offering these services.
- Within this group, identify sub-segments according to life stage, and appeal to their unique interests: entertainment for younger people, tracking household members for those with families, and security for older people.
- Both women and men have a stake in the connected lifestyle, but may bring unique perspectives; recognize the needs of all adult decision-makers in the family when positioning offerings.

Younger consumers are showing interest in the connected home, bringing with them a new set of habits and expectations.

- They may rent rather than own their homes, opening up opportunity for condo and apartment developers to offer smart home applications as a way to differentiate their offerings.
- Younger consumers have strong interest in accessing entertainment from any device—in addition to having an interest in monitoring their home and managing their energy usage. Lead with entertainment, and offer home control as a value-add for this group.
- They are active, engaged, and want to provide feedback and be heard. Building customer engagement mechanisms will be as important as delivering the solutions themselves for these new customers.

Channel Approaches

Recognize that shoppers turn to experienced users for information first.

- Aggressively leverage online user reviews and social networking opportunities via consumer-facing websites, other online properties, and paid search, to expose consumers to the connected home possibilities.

Consumers strongly desire saving money, and will make investments to do so.

- Retailers and service providers should signal value through bundles and deals.
- Proof points are needed to demonstrate energy cost savings for smart appliances and other energy management solutions.

As devices and content converge, new partnerships and business models will be possible.

- Consumers say the top channel outlets they would turn to for connected home information are Telcos and retailers; the two could cooperate to drive leads to one another and provide a consistent experience to consumers seeking information and considering purchase.
- Utilities can also partner with connected home product and service providers in new ways to drive demand for smart appliances, mobile devices and monitoring services.
- In general, more services can be bundled with more devices. For example: home security deals could be offered with a smart phone purchase; a tablet PC deal could be made available to consumers who sign up for dynamic pricing with their electric utility.
- Pay-as-you-go software and services will be attractive to consumers. The on-demand entertainment service tested in this research is one such example. Consumers have become accustomed to the on-demand model through their experiences with digital music, app stores and subscription TV services. Expand opportunities to leverage this behavior.

3. BACKGROUND & OBJECTIVES

CABA has commissioned Zanthus, an independent market research and consulting firm, to conduct several State of the Connected Home Market research studies over the years to track consumer attitudes and behaviors.

This "landmark" research was repeated again in 2011 in the U.S. and Canada. Prior waves of the research were conducted in the U.S. in 2005 and 2008, and in Canada in 2008.

The majority of the 2011 study reflects new lines of questioning, focusing on key topics of interest, including convergence-oriented capabilities and networking. A small set of core questions was maintained for tracking to prior waves.

Also new in 2011 is a special focus on energy-related topics.

The overall goal of the 2011 study is to identify North American consumer behaviors and attitudes surrounding the connected home, in order to identify concept development opportunities and marketing strategies to drive greater adoption.

Specific objectives are:

- Understand how to make the benefits of connected home solutions clearer to consumers, while effectively addressing barriers and concerns.
- Identify the state of enabling network technologies for the most desired solutions, and needed improvements to facilitate adoption.
- Identify the most desired features and combinations of features for connected home solutions, and how these map to improving consumer lifestyles.
- Characterize the most promising consumers in terms of their lifestyles, family dynamics, demographics, likely purchases, and decision-making processes for new purchases.
- Update channel approaches to more easily entice consumers to consider purchase of connected home solutions.

4. METHODOLOGY

For the most recent wave of this study, we conducted three separate 25-minute web surveys during September through October 2011 in the U.S. and Canada, each with a special focus on a specific "ecosystem" or lifestyle domain:

- **Entertainment**, including music, video, gaming, etc.
  Target respondents: 18-64 years old, have Internet at home.
- **Family**, including home control and automation, communications, health and fitness.
  Target respondents: 18-64 years old, have Internet at home, live in multi-family household.
- **Energy** (new in 2011), including home energy management and smart appliances.
  Target respondents: 18 or older, have Internet at home, able to make changes to save energy at home.

Prior waves of this study (in 2005 and 2008) included a "Career" ecosystem focusing on those who use computers at work. This segment is not included in views of prior wave data in this report.

U.S. sample size is approximately 600 per ecosystem (1800 total); Canadian sample size is approximately 200 per ecosystem (600 total). Exact sample sizes and margins of error are shown in Figure 1.

Figure 1. Sample Sizes & Margins of Error

	Sample Sizes & Margins of Error at 95% Confidence Level						
Segment	Online Consumers 18-64					Online Energy Consumers 18+	
Survey Track	Entertainment & Family					Energy	
Country & Wave	U.S. 2005	U.S. 2008	U.S. 2011	Canada 2008	Canada 2011	U.S. 2011	Canada 2011
Sample Size	1230	1231	1234	434	411	618	209
Margin of Error	+/- 2.8%	+/- 2.8%	+/- 2.8%	+/- 4.7%	+/- 4.8%	+/- 3.9%	+/- 6.8%

Note that smaller sample sizes for sub-segments have correspondingly higher margins of error.
Survey respondents evaluated a number of proposed product and service concepts described in the

survey on three key dimensions. Results are reported on a "top-2 box" basis (6-7 on a 7-point scale):

- **Superiority** – the degree to which the concept offers an advantage over current methods,
- **Simplicity** – the degree to which the concept sounds like it is simple,
- **Likelihood to adopt**, either at a "reasonable price," or at a specific price, depending on the concept under test.

For likelihood to adopt, discounted demand is used as an estimate of terminal market penetration (maximum adoption within the market). To compute discounted demand, responses at each point on a 7-point scale were weighted to account for likely actual adoption (see Figure 2 for weighting factors).

Figure 2. Discounted Demand Weighting Factors

Response	Discounted Demand Weighting Factors
Definitely not: 1	0%
2	2%
3	10%
Might or might not: 4	25%
5	45%
6	65%
Definitely: 7	77%

As a result, 77% of those who say they will "definitely" buy (select a 7 on a 7-point scale) are counted as buying; 65% of those who select a 6, 45% of those who select a 5, and so on.

Generally speaking, for concepts tested in this study, discounted demand results in a higher estimate of market penetration than the "top-2 box" approach, which only reports the percentage of respondents who selected a 6 or a 7 on a 7-point scale. Both measures are shown for concepts tested in this study; when discounted demand is substantially higher than top-2 box; this is because a significant portion of estimated demand is derived from consumers who are only moderately positive about the concept.

See the Appendix for full descriptions of concepts tested.

5. NOTES ON READING THIS REPORT

This report depicts data for two main consumer groups within each country (U.S. and Canada):

- Online consumers 18-64. This includes data from the Entertainment and Family ecosystem tracks for 2011, and where available, 2005 and 2008.
- Online energy consumers 18+. This includes data from the Energy ecosystem track for 2011 only.

Additional segments are depicted within these groupings for purposes of comparison. For example, those who find the connected home concept very appealing are contrasted with those who are neutral or negative about it.

Percentages reported in tables should be interpreted as the share of consumers identified within the column header as possessing that characteristic. Superscript letters in tables and graphs denote statistically significant differences between segments.

For example, in Figure 3, among U.S. consumers 18-64 who say the connected home is very appealing, 53% live in multi-person households with children. This is statistically significantly higher than for those who say the connected home is not very appealing; within that group, only 39% have children in the household.

Figure 3. Table Example

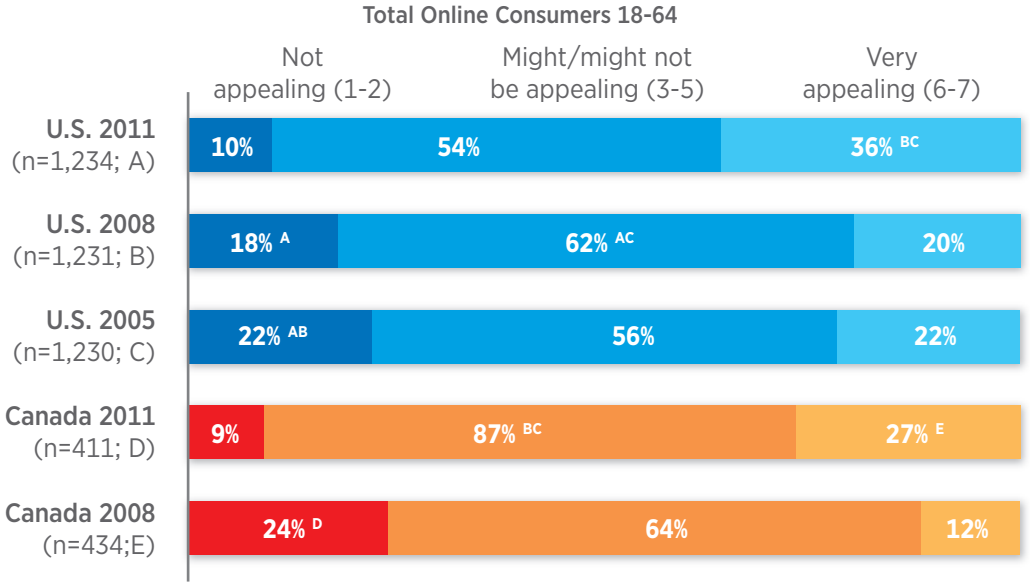
	U.S. 2011		Canada 2011	
	Consumers 18-64 Who Say Connected Home is:		Consumers 18-64 Who Say Connected Home is:	
	Very Appealing (n=416-420; A)	NOT Very Appealing (n=807-814; B)	Very Appealing (n=133-140; C)	NOT Very Appealing (n=254-271; D)
Household Composition				
Single-person HH	7%	12%[A]	12%	10%
Multi-person HH	93%[B]	88%	88%	90%
Multi-person HH: with at least one child aged 0-17	53%[B]	39%	36%	43%
Multi-person HH: with no children aged 0-17	40%	48%[A]	52%	47%

6. KEY FINDINGS

At a high level, interest in the connected home concept has picked up since this study was last conducted in 2008. While a majority still retains a neutral, "wait and see" attitude, more people say it is "definitely appealing," and fewer are negative about it. However, a change in survey methodology that involved providing a more detailed explanation of connected home features and benefits during 2011 may have contributed to increased interest; see below survey methodology note.

Survey Methodology Note: In 2011, the connected home concept presented to survey respondents was revised to focus on a variety of specific features and benefits, and these revisions may have positively influenced consumer response to the concept. Notable new benefits mentioned in 2011 included: improved access to home entertainment; saving money on energy bills; one-step "away" and "nighttime" modes for doors, lights and temperature; and alerts for maintenance, security or safety issues. Also, the concept was presented to survey respondents in a visual slideshow format during 2011. In prior years, it was presented as text only. See the Appendix for the full concept description presented in 2005/2008 and 2011.

Figure 4. Appeal of the Connected Home



Q14B.

The increased prevalence of mobile technology in consumers' lives is clearly associated with interest in the connected home concept.

Ubiquitous broadband Internet, a growing number of Wi-Fi connectivity options, expanding online entertainment offerings and explosive smartphone adoption have all set the stage. In fact, it appears that increasingly, people are more interested in a connected *lifestyle* that encompasses all aspects of their lives—including home—than merely in a connected *home*.

Among the specific factors associated with interest in the connected home are: use of the Internet at work and elsewhere while away from home, use of smartphones, laptops and tablet PCs, plus mobile navigation maps and overnight travel for work.

Figure 5. Mobile Lifestyle a Clear Driver

	U.S. 2011		Canada 2011	
	Consumers 18-64 Who Say Connected Home is:		Consumers 18-64 Who Say Connected Home is:	
	Very Appealing (A)	NOT Very Appealing (B)	Very Appealing (C)	NOT Very Appealing (D)
Own at least one laptop computer	**86%**[B]	76%	87%	79%
Own a smartphone	**76%**[B]	58%	69%	57%
Use Internet at work	**65%**[B]	56%	**73%**[D]	59%
Use navigation on cell phone	**62%**[B]	40%	**45%**[D]	29%
Use Internet somewhere else (other than home or work)	**26%**[B]	15%	18%	13%
Take 6+ overnight work trips per year (Those in multi-person households only)	23%	17%	**49%**[D]	22%
Own tablet PC	**23%**[B]	14%	27%	15%

Q408, Q409, Q9, Q35, Q475

Perceived Benefits

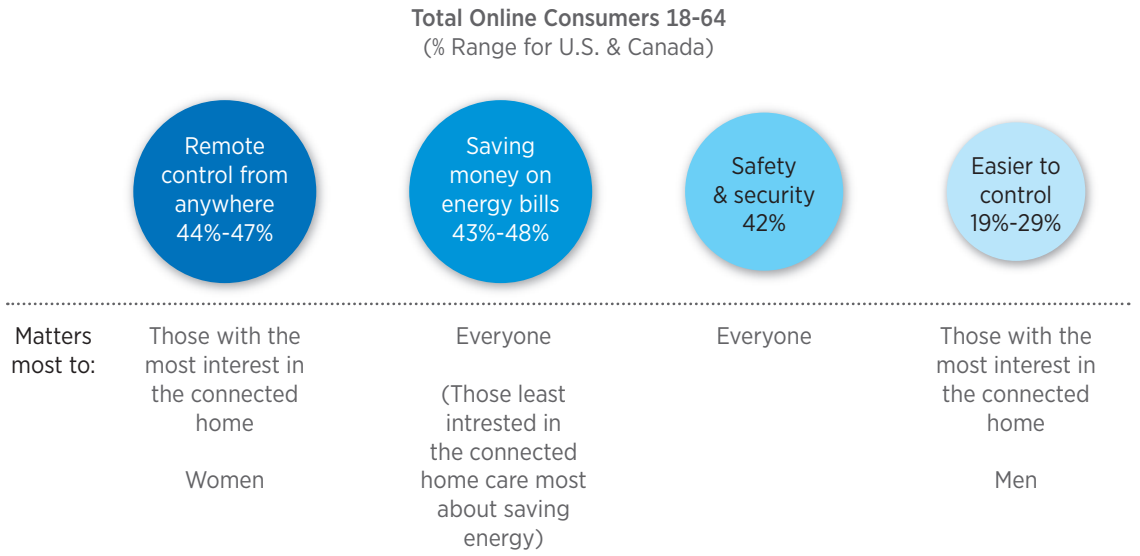
After they reviewed the connected home concept, respondents were asked to explain in their own words what benefits—if any—their household would enjoy from connected home products and services. Next, they were asked to select their top three key benefits from a pre-set list.

From these questions, four distinct benefits rise to the surface. They are listed below, in order of influence, starting with the most influential.

- Remote control
- Saving money on energy bills
- Safety and security
- Providing an easier way to control home systems

As shown in Figure 6, the first two benefits—remote control, and saving money—are in a dead heat for first place. And, some benefits matter more to some types of consumers than to others.

Figure 6. Top Connected Home Benefits



Q405.

Next, we'll examine these benefits one at a time.

Remote Control

The ability to access and control the home while away at work or elsewhere is a clear driver when it comes to interest in the connected home. While this is seen as the key benefit among consumers in general, those with *more* interest in the connected home are drawn by this benefit more strongly than those with *less* interest in the connected home. And, women are somewhat more interested than men in remote control.

Saving Money

Saving money on energy bills is important to all consumer types. But, while everyone is interested in saving money on energy bills, interest in reducing energy *consumption* is not associated with interest in the connected home. In fact, those who care the *least* about the connected home are *most* interested in reducing their energy consumption.

Safety & Security

Like saving money, security—perhaps not surprisingly—is important to all consumer types. Consumers talk about the peace of mind that results from always knowing that their home and its occupants are safe and secure. They like the idea of getting notified if any threat or malfunction (such as a break-in or water leak) occurs; many also like being able to view their home via webcam.

Ease of Use

The notions of ease of use primarily stems from having centralized, coordinated control to all home

systems and appliances, through a variety of Internet-connected devices. People talk about the convenience, the time savings, feeling more organized, and generally making life easier.

Men and those with the most interest in the connected home value having an easier way to control home systems the most.

Figure 7. Enhanced Control Associated with Ease of Use

"I love the concept, I think it would make life easier. Controlling everything from a single source, awesome!!!"

"The ability to control all the household features in one easy way, through the computer. It would put my mind at ease."

"It would save a lot of time for me because now I have to do all those things, monitoring and setting things individually, and with no coordination."

"Time saving efficiency, not needing to purchase multiple devices for different areas of the home. If you could stick a webcam in the 'fridge so you could see what you needed to pick up, think of how much easier it would be!"

"Currently, I need to keep track of many different systems, which means that some things inevitably get forgotten. I think this would help in coordinating my home's numerous systems in a way that would save me time."

Other Benefits

Other benefits that were selected by only a minority of consumers are:

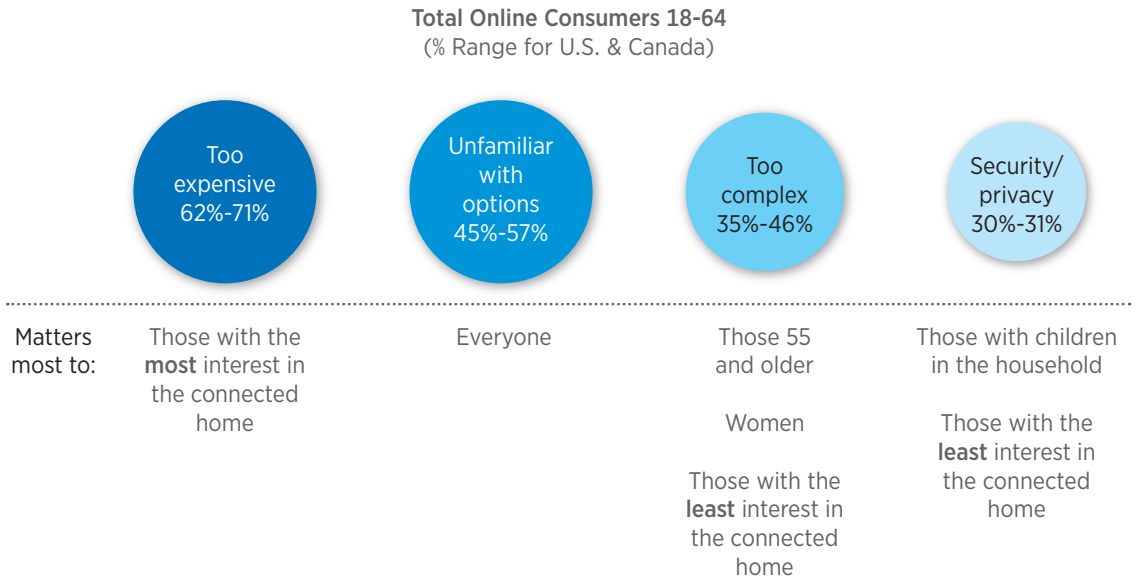
- Having a more comfortable and pleasant home environment (15% U.S.; 16% Canada). Interestingly, in the U.S., renters (21%) are more likely to cite this benefit than homeowners (12%).
- The ability to know when household members have arrived or left (13% U.S.; 11% Canada). This is more important to those who like the connected home concept, and—not surprisingly—to those who have children at home.

Perceived Barriers

We also asked consumers to tell us in their own words what barriers would prevent them from acquiring connected home products and services, and then to select their top three barriers from a precoded list. The top barriers, in order of importance, are:

- Cost
- Lack of familiarity with options
- Complexity
- Security and privacy

Figure 8. Top Connected Home Barriers



Q406.

Again, we'll take these one at a time.

Not surprisingly, cost comes up as the number-one barrier—especially for consumers who are most interested in the connected home concept. To many, having a connected home just sounds like an expensive proposition. They talk about the cost of initial set-up, including upgrading to newer or more compatible devices and installation costs. They also have concerns about ongoing maintenance and service fees—and they expect these costs would multiply quickly as the number of devices and connection points expands. Some have a hard time justifying the expense when the benefits are hard to measure, especially in economically uncertain times.

Figure 9. Cost as a Barrier

"Something like this is bound to be expensive, and the extra convenience is not enough to warrant the cost."

"Every connection point is an additional cost, and many would require appliance upgrades."

"Cost of the system and the cost to upgrade to appliances and electronics that could utilize this service."

"Concerns about cost—installation, maintenance and repair."

"In this economic climate of uncertainty, an additional monthly outlay of money is not wise."

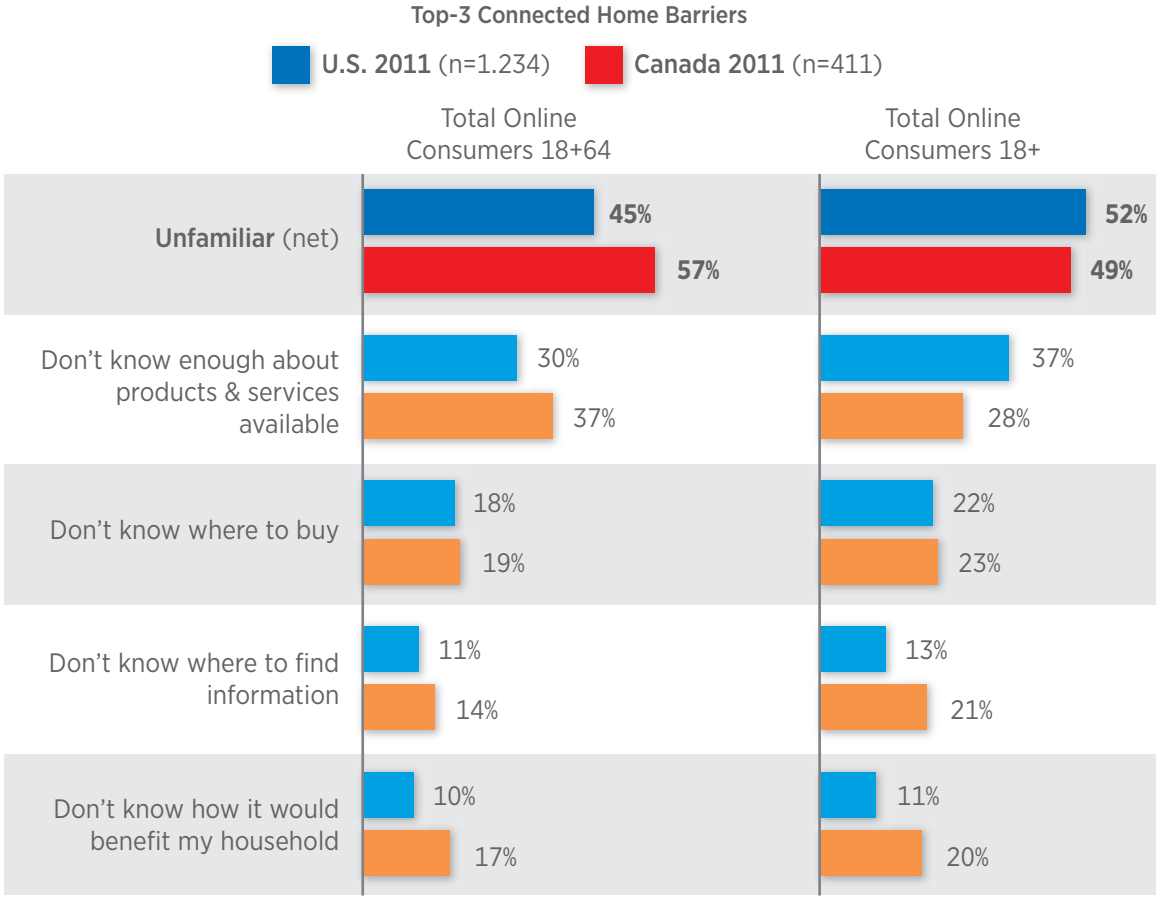
"I can't imagine that the price would be reasonable enough. It's worth it in the hundreds price range, but once you start getting to the thousands, it's not as appealing."

Lack of Familiarity

When asked to tell us in their own words what barriers prevent them from adopting connected home solutions, no one in our survey mentions they simply wouldn't know where to go for more information. But, once directly asked if lack of familiarity is a barrier, many consumers select it as a key roadblock.

Lack of familiarity is an issue across the board for all types of consumers. The chief elements of unfamiliarity are not knowing what products and services are available, or where to obtain them. Fewer consumers say they don't understand how their household might benefit. This is good news—once exposed to a detailed concept description, they are generally able to envision the benefits in their own lives.

Figure 10. Elements of Lack of Familiarity



Q406.

A close review of verbatim comments reveals that—beyond knowing about available brands and channels for buying them—lack of familiarity also may stem from a disconnect between the language used by consumers and the terminology established by the connected home industry. For example, consumers say "away" instead of "remote." They emphasize "home" in "connected home"—and don't talk so much about being "connected." They talk less about "peace of mind" and more about "less worry," more "control" and enhanced "ability."

Complexity

Older consumers (55+), women and those who are least interested in the connected home are most concerned about complexity. Like with costs, consumers picture the complications multiplying as more devices are linked together, possibly leading to worst-case scenarios like technology failing and putting their household at risk without their knowledge. Or, at the least, they say it would require climbing a (possibly steep) learning curve. And again, with unproven benefits, the effort can be hard to justify.

Figure 11. Concerns About Complexity

"I like to keep things fairly simple at home, and if this meant too much fiddling around with gadgets and trying to get things to work right, I'm not interested."

"Think of the impact on your life when the bank machine decides, even for a few hours, that you cannot access your funds. Convenience most of the time does not trump hair-tearing, teeth-gnashing chaos."

"Cross talk/interference (i.e., your neighbor's signal starts to turn up your furnace)."

"My spouse does not even know how or where to point a mouse, effectively use the TV remote, etc. This would be way too complicated."

"I have enough to worry about; I don't need to look for more problems."

"Maintenance would be a nightmare."

"I am technologically challenged. I may not be able to utilize the system once in place."

"I feel weary of too much technology/connectivity in the home. Keeping some facets of life traditional has its benefits."

Security & Privacy

After cost, security and privacy is a key concern—the very concepts of "connected" and "technology" can be associated with security and privacy threats. To consumers, exposing their home's power, heat, lights, locks and security system to potential threats can seem highly risky; those with children in the

household are especially sensitive to exposing their home and family to such risks. Some also say the idea is too "Big Brother-ish"—that it would make too much information about their household available to the government or corporations.

Figure 12. Security and Privacy Concerns

"If hackers can break into banks and government servers, then breaking into a house should be easy as well."

"I don't like the idea of everything being connected, especially via the Internet due to the chances of information being hacked and someone else having control over your power, security, etc."

"It's not difficult to intercept a cell phone signal, and the world's most expensive and popular smartphones (the ones capable of running connected devices) are regularly being hacked. The more a single device has access to, the less work a hacker or thief needs to do. In this case, hack one device and have access to door locks, security alarms, even know when everyone's left the house, or worse, when specific family members are home alone to be targeted for assault, etc."

"I do not like the idea of so much of my private information being readily accessible. I think we are already heading in the wrong direction regarding government controls, and freedoms we voluntarily surrender for the sake of security."

"Why would I want even more of my private information potentially available?"

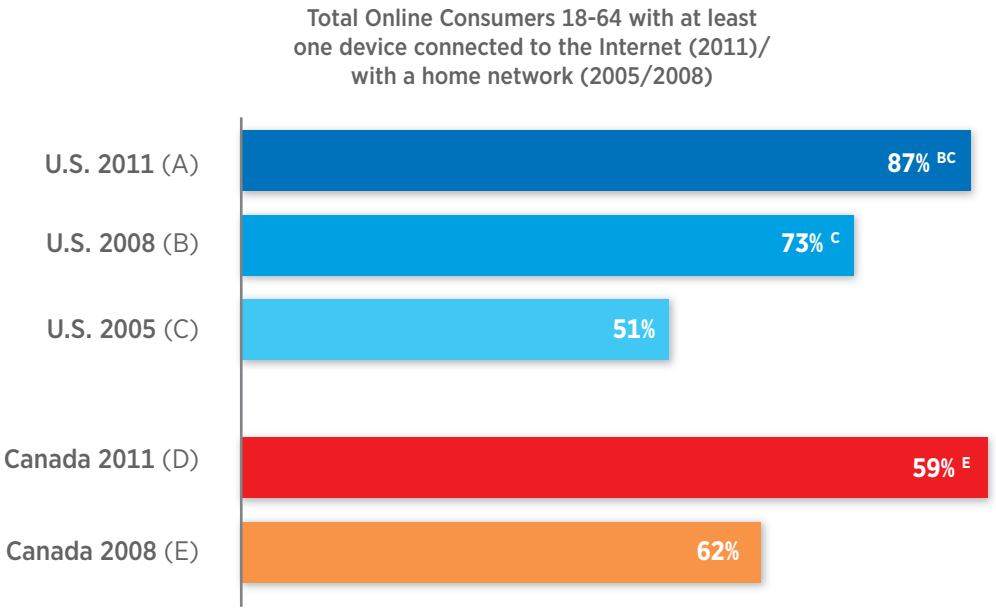
"The loss of privacy to second and third parties having the ability to monitor your energy consumption, etc."

State of Networking & Connectivity

We took a look at how consumers are connecting their devices together, and which devices are most often connected.

It's no secret that the increase in connected mobile lifestyles in recent years has been fueled by wireless connectivity, and our study bears this out. It's by far the leading method that consumers use for connecting devices to the Internet or each other.

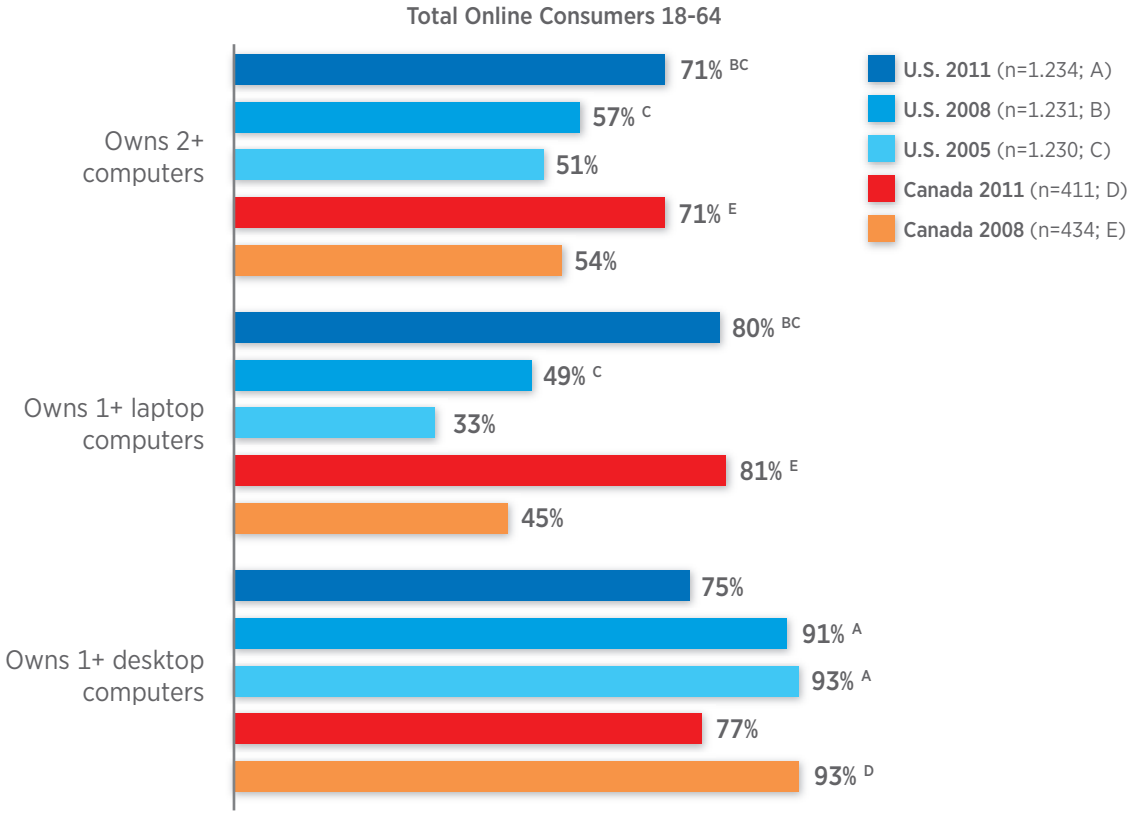
Figure 13. Use of Wireless (Wi-Fi)



Q27, Q409.

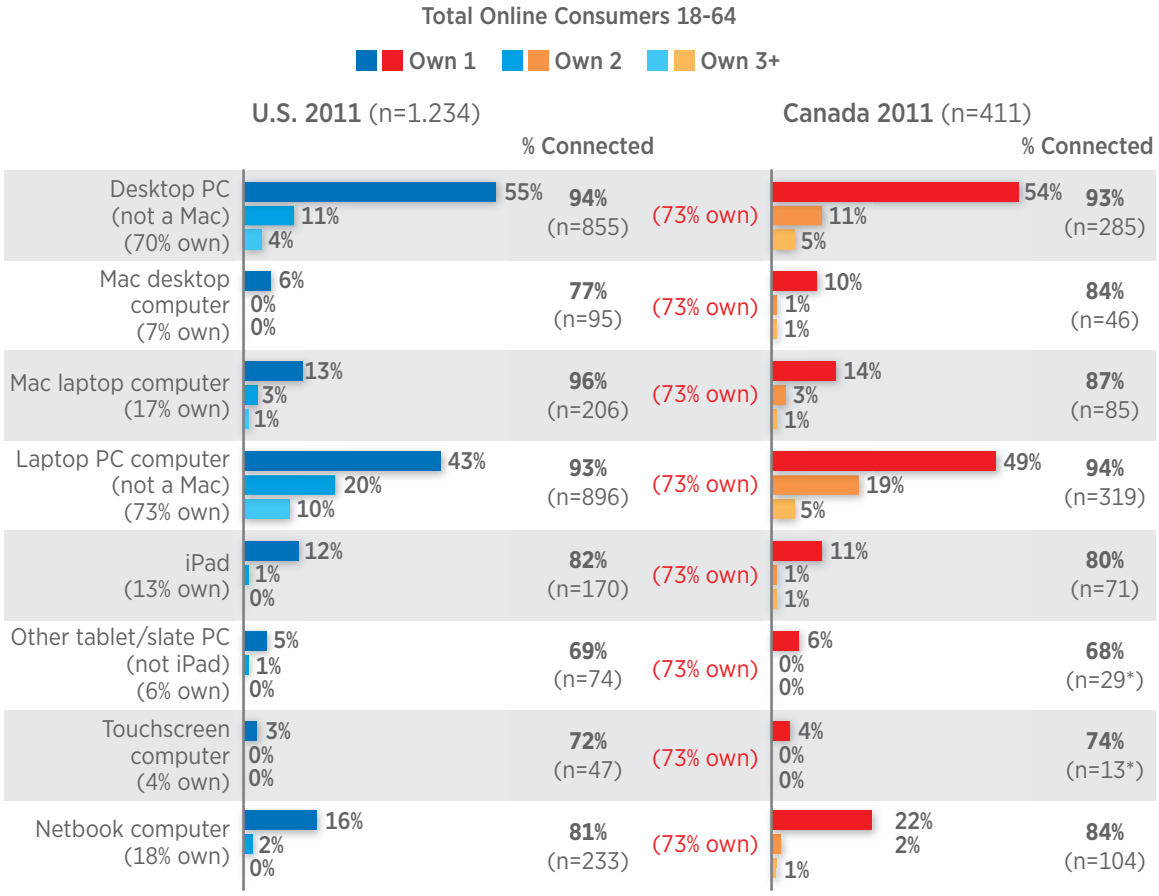
The number of households with multiple computers has increased in recent years, owing to the ability to easily access the Internet wirelessly. In fact, laptop computer ownership has risen at the expense of desktop computer ownership.

Figure 14. Computer Ownership



While most desktop and laptop computers are now connected to the Internet and/or other devices, tablet PCs other than iPads are less often connected than other types of computers—perhaps revealing a reluctance to pay for additional wireless data services.

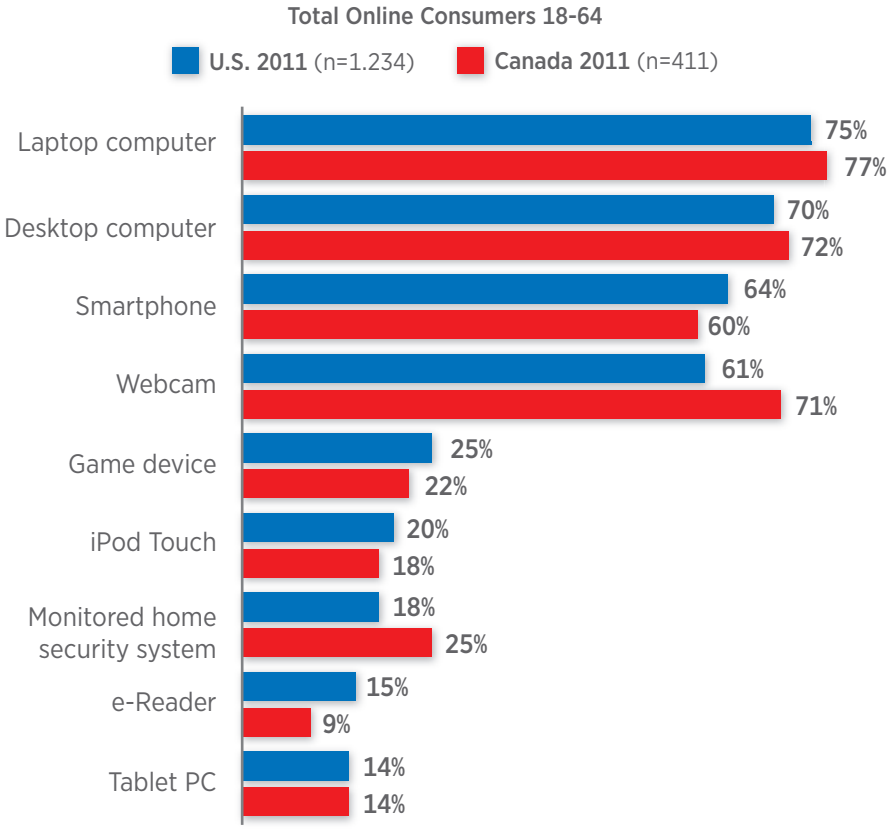
Figure 15. Number of Computer/Printing Products Owned & Connection Status



Q408, Q30.

After computers, top connected devices are: smartphones, webcams, game devices and iPod Touch media players. Security systems are popular among homes with expanded device ecosystems, and e-readers and tablet PCs are starting to emerge in substantial numbers among households with other devices.

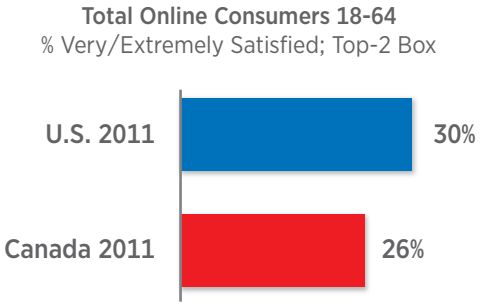
Figure 16. Top Connected Devices Owned



Q408, Q409, Q30, Q412.

While the options for accessing information, communications and entertainment are expanding, only a minority of consumers are currently satisfied with their ability to access desired content on any device.

Figure 17. Satisfaction with Ability to Access Desired Content on Any Device



Q430.

Expecting that there might be consumer interest in improving access to desired content, we tested some concepts designed to make it easier for consumers to connect their devices and systems. While none of the concepts tested are major hits, they offer up some interesting lessons about what consumers want.

- A connected home starter kit (available as DIY or with installation services for an additional fee) attracts moderate interest, but is seen as fairly complex.
- A "Cloud" service, described as a way to access digital content from any Internet-connected device, is about as attractive as the starter kit. However, the associated monthly fee may hamper its attractiveness.
- A consumer electronics "Concierge" tech support service concept, designed to assist with networking and other electronics needs, gets tepid reviews. It is not seen as sufficiently superior to available alternatives, and also likely suffers from a proposed monthly fee.

Figure 18. Interest in Device Networking & Management Concepts

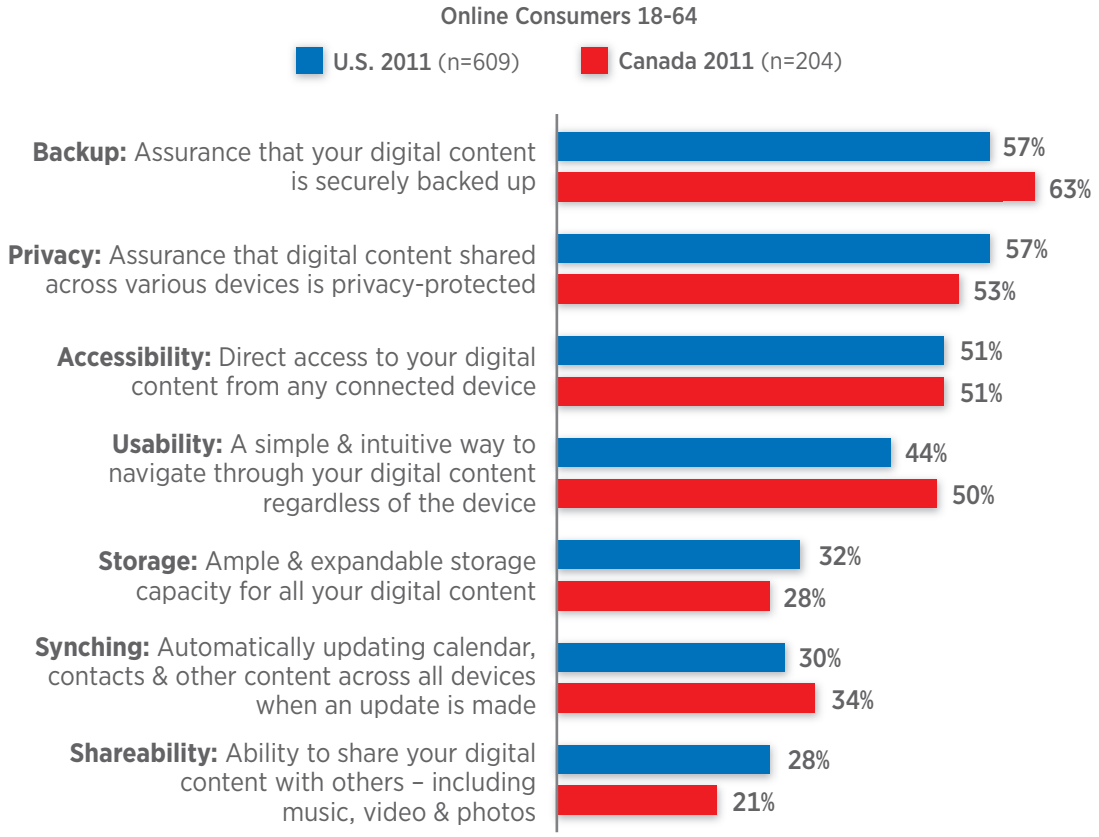
	U.S. 2011 (n=303-609)				Canada 2011 (n=104-204)			
	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple
Networking								
Connected Home Starter Kit at a "reasonable price" (Base: Online Consumers 18-64 in Multi-Person Households)	10%	23%	31%	11%	4%	19%	30%	12%
Cloud Service for a monthly fee at a "reasonable price" (Base: Online Consumers 18-64)	9%	24%	28%	17%	5%	19%	23%	10%
Consumer Electronics Concierge Service for a monthly fee at a "reasonable price" (Base: Online Consumers 18-64)	3%	14%	14%	17%	1%	15%	15%	17%

C452, C523: Q461, Q462, Q463; C524: Q531, Q532, Q533.

In addition to providing access to desired content on any device, the most valued aspects of a cloud service are backup, privacy protection and usability. In fact, privacy and ease of use are likely considered to be *requirements* more than merely desired capabilities.

Interestingly, the ability to share content with others via the cloud (not shown below) is relatively unimportant—this implies that current ways of sharing (email, social networking) are considered satisfactory enough.

Figure 19. Cloud Service Feature Importance



Q535.

Desired Features and Activities

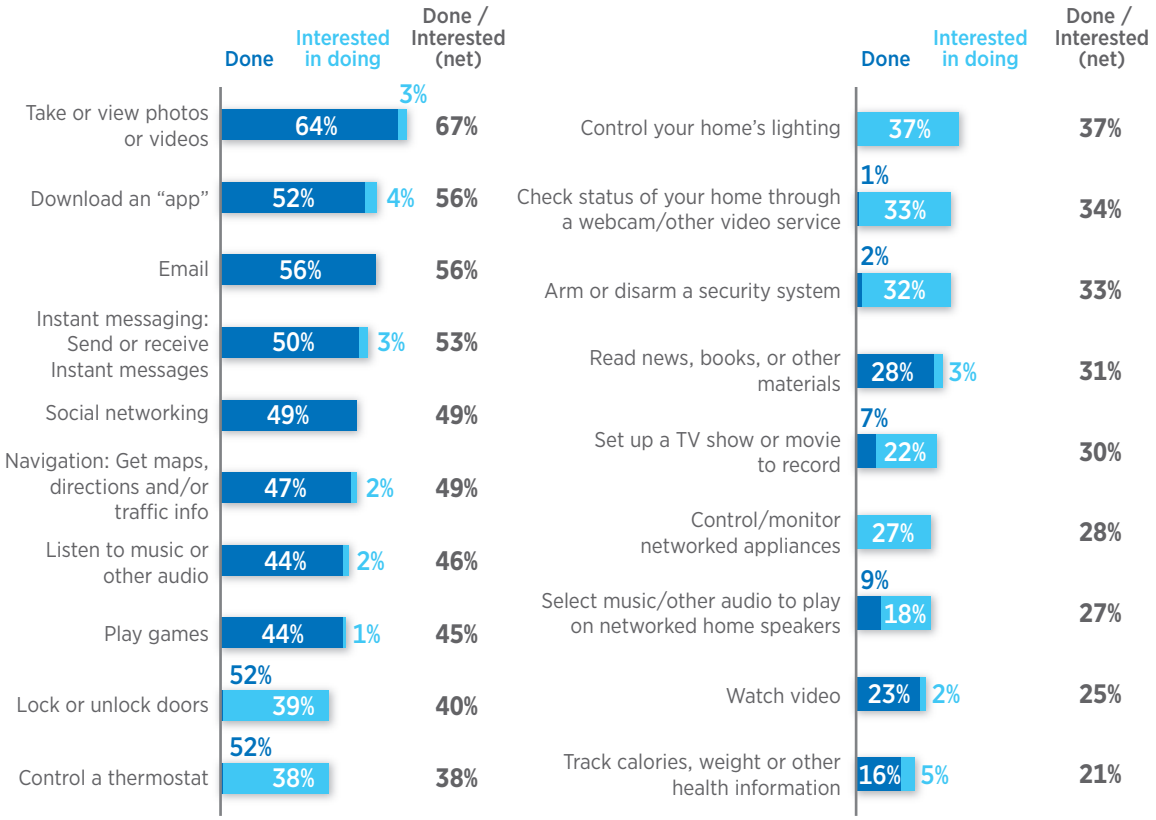
Overview

We asked target consumers about activities their households currently engage in—and would like to engage in—on a variety of devices. The results clearly indicate that consumers view their cell phones as a kind of universal remote control, something they can envision using whether they are at home, or away.

In both the U.S. and Canada, the largest *unmet* need on a cell phone is the ability to control home systems—including locks, temperature, lights, security, and entertainment.

Figure 20. Household Activities Done/Desired on a Cell Phone (U.S.)

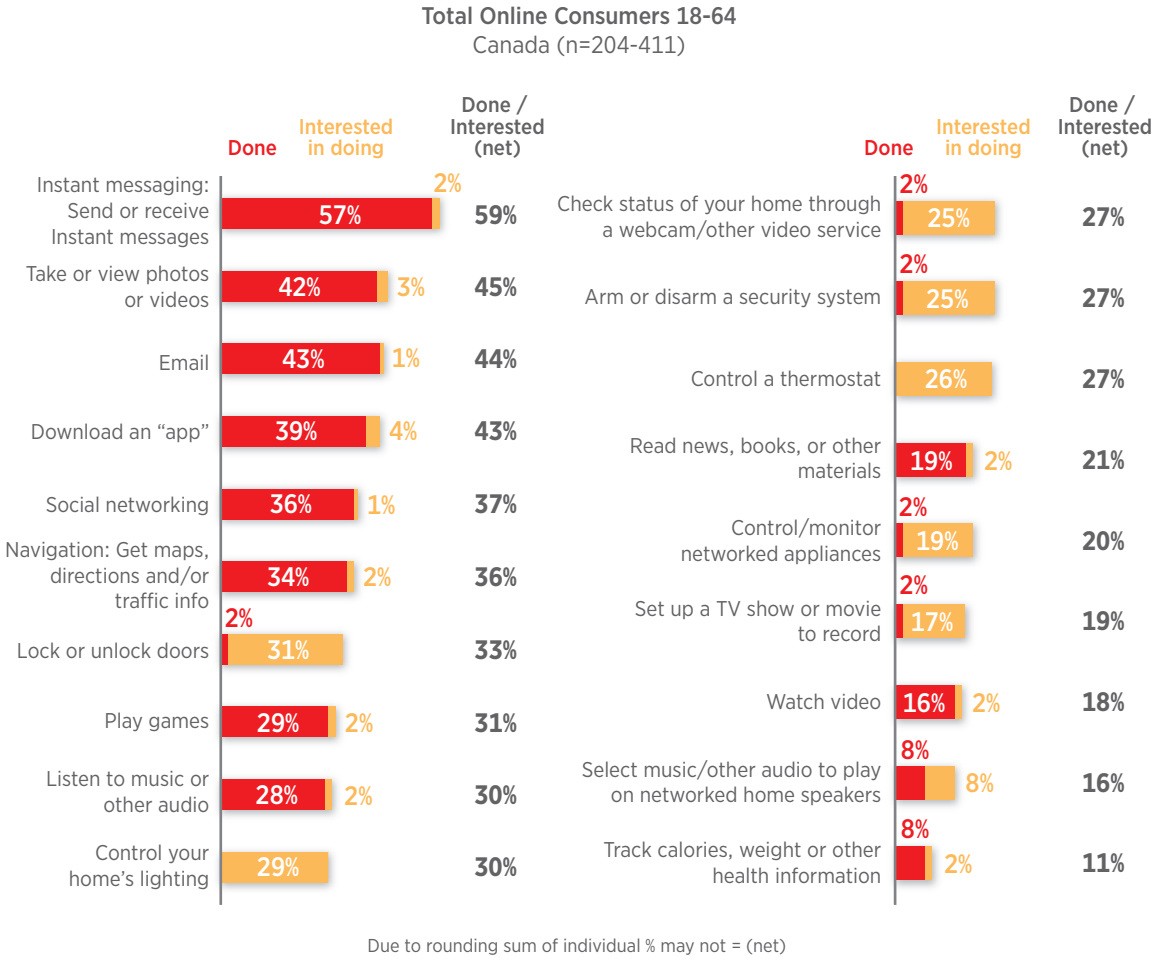
Total Online Consumers 18-64
U.S. (n=609-1,234)



Due to rounding sum of individual % may not = (net)

Q35/Q36.

Figure 21. Household Activities Done/Desired on a Cell Phone (Canada)

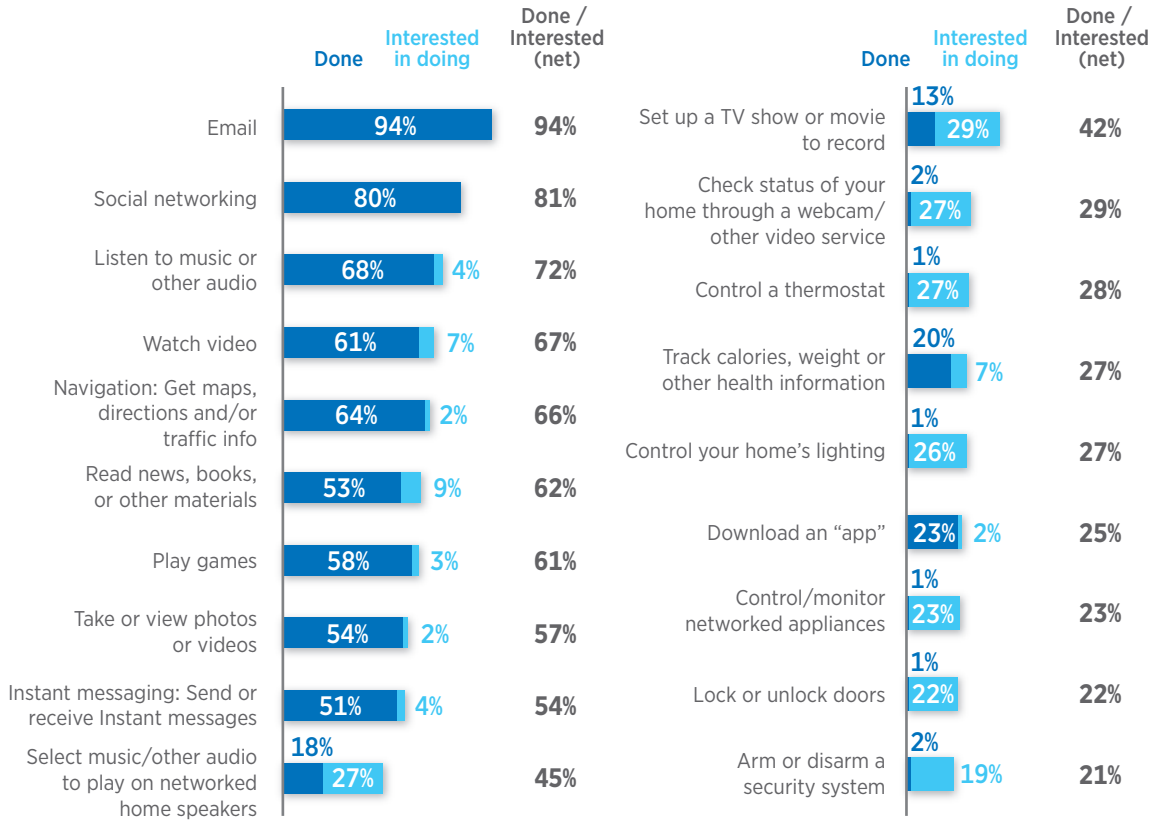


Q35/Q36.

Computers are preferred for home entertainment—setting up TV programs to record and selecting music or other audio to play on networked home speakers. However, many consumers also want to control home systems from a computer.

Figure 22. Household Activities Done/Desired on a Computer (U.S.)

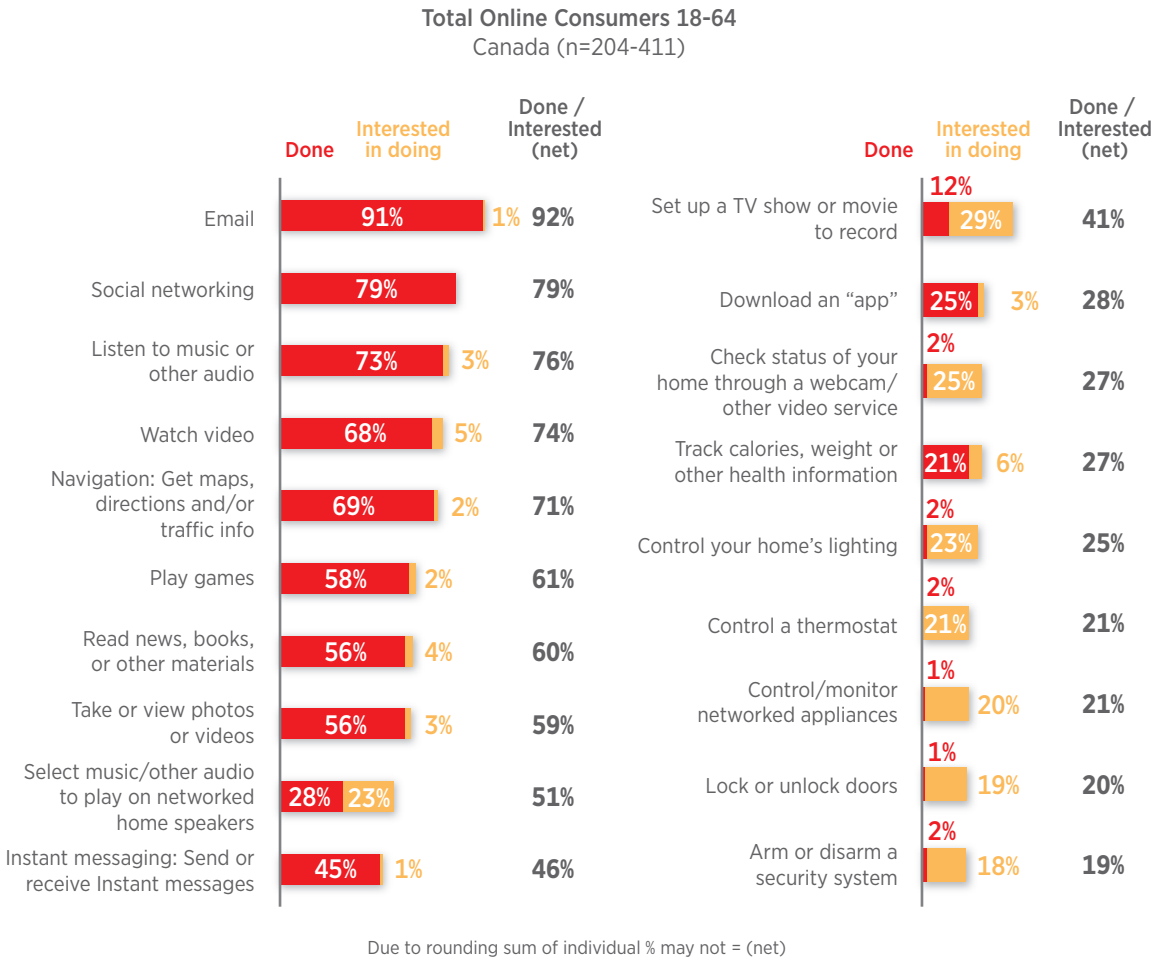
Total Online Consumers 18-64
U.S. (n=609-1,234)



Due to rounding sum of individual % may not = (net)

Q35/Q36.

Figure 23. Household Activities Done/Desired on a Computer (Canada)



Due to rounding sum of individual % may not = (net)

Q35/Q36.

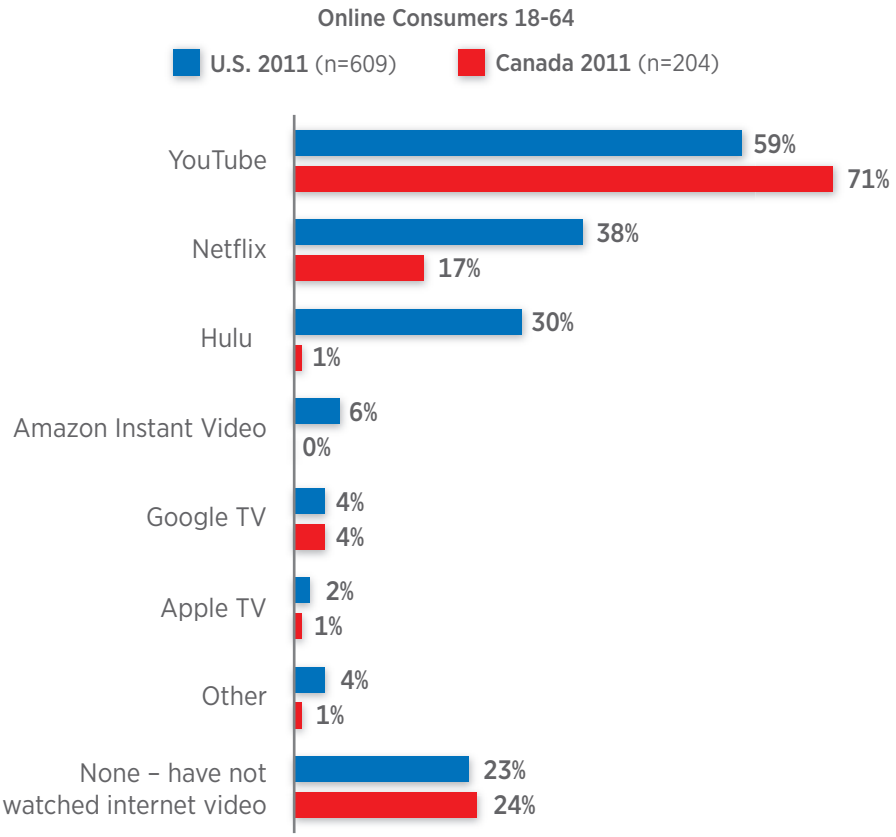
We also asked about current and desired activities on other devices. Key findings indicate that consumers have difficulty envisioning alternative uses for devices originally designed for specific purposes:

- In-home display screens are seen primarily as thermostats and security devices.
- Game devices are primarily desirable for entertainment; in the U.S., there is some interest in using game devices to stream music in the home.
- Tablets are primarily viewed as consumption devices for entertainment and communication, and only by a minority of consumers thus far.

Entertainment

In the area of entertainment, much demand has been fulfilled in recent years. Online consumers now watch digital video on multiple screens from a variety of sources, dominated by YouTube—and in the U.S., Netflix and Hulu are working hard to catch up.

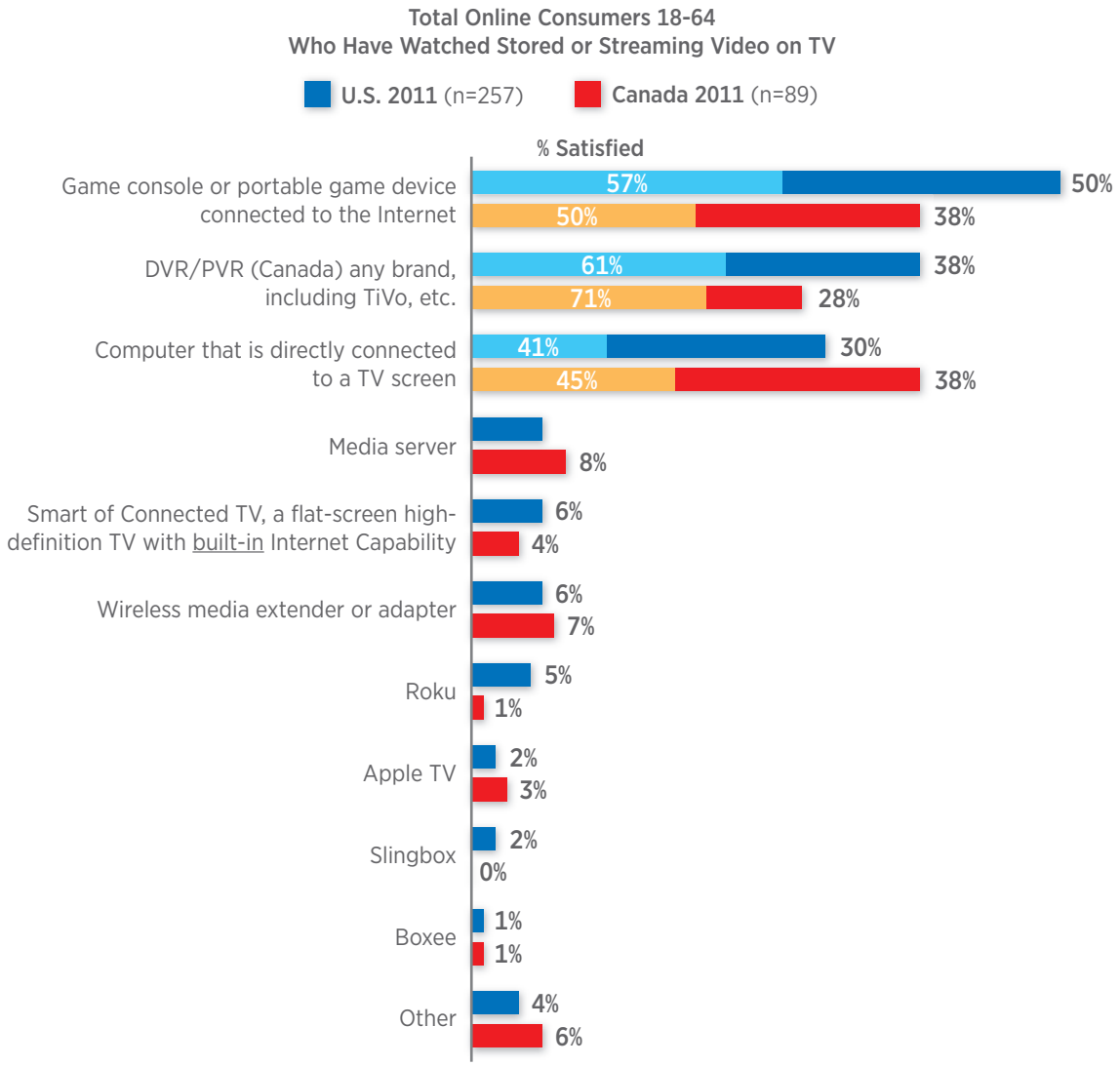
Figure 24. Internet Video Providers



Q501.

About one-third of online consumers in the U.S. and one-fourth in Canada have watched video streaming from the Internet on a television, primarily using game consoles, DVRs and computers to access their desired content. Smart TVs and dedicated devices like Roku, Apple TV, and the like still have extremely low penetration.

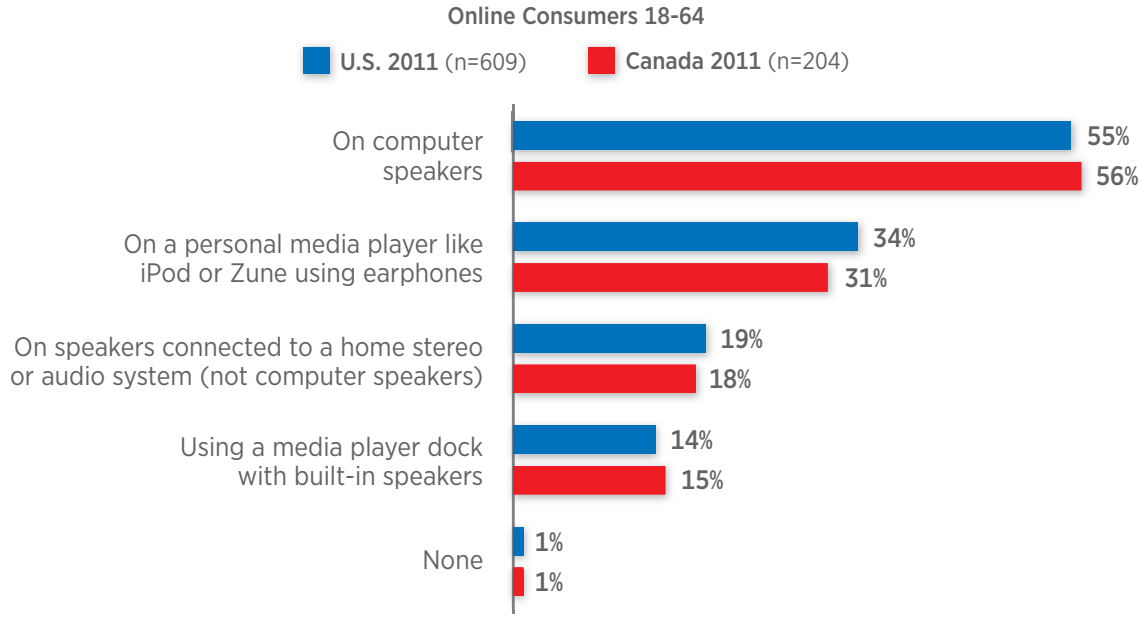
Figure 25. Digital TV Video Method & Satisfaction



Q505, Q507, Q509. Excludes satisfaction for methods with base less than 30.

In the realm of audio, consumers have found ways to listen to digital music using various methods (though the majority settle for low-fidelity computer speakers).

Figure 26. Method of Listening to Digital Music / Audio

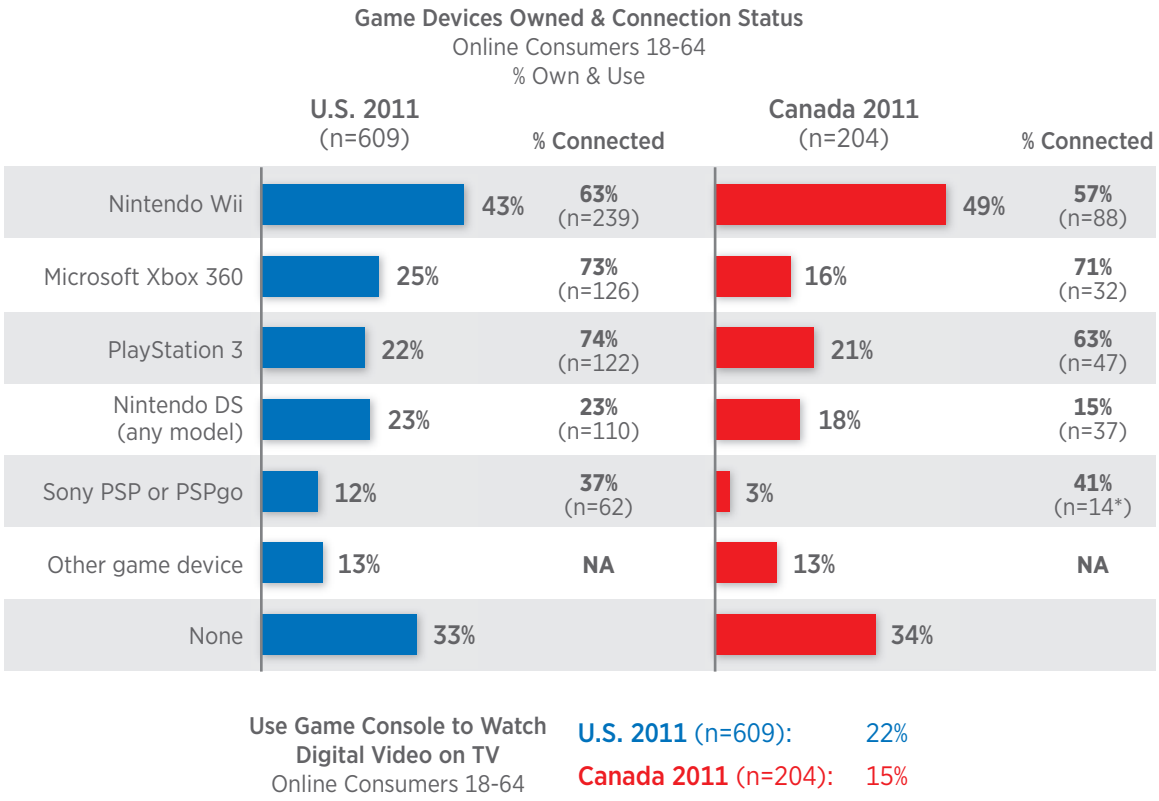


Q510.

Most have game devices of some kind, and among those with current-generation game consoles (Wii, Xbox 360 or PlayStation 3), most are connected to the Internet, providing access to an ever-expanding set of game services and other entertainment options.

Currently, about one-fifth of target online consumers in the U.S. use a game console to watch digital video on a television set. In Canada, where Netflix or viable alternatives have not fully taken hold, the number is a bit lower (15%).

Figure 27. Game Devices Owned & Connection Status



Q408, Q30.

Looking at potential areas for innovation, we tested interest in an on-demand entertainment service, described as an alternative to the typical package of channels offered by cable/satellite providers that also includes movies, music, games and more. Consumers clearly like the idea of paying only for what they watch or use; this is the most well received concept tested in the study.

We also tested interest in a web-enabled, high-definition TV that delivers personalized entertainment and accesses media stored on any connected device, including PCs, tablets, cell phones and media players. Not surprisingly, potential demand is lower than for the on-demand service, but clearly, there is interest (primarily in the U.S.).

Figure 28. Interest in Entertainment Concepts

	U.S. 2011 (n=208-215)				Canada 2011 (n=63-65)			
	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple
Entertainment (Base: Online Consumers 18-64)								
On-Demand Entertainment Service at a "reasonable price"	25%	36%	44%	39%	10%	30%	43%	35%
Smart TV at a "reasonable price"	10%	23%	33%	16%	3%	18%	27%	5%

C520, C522: Q531, Q532, Q533.

Home Management

Home management/control continues to represent the area of greatest unmet demand in our study, particularly when it comes to controlling and monitoring home systems via a cell phone, as seen earlier in this report.

We tested two specific concepts aimed at streamlining home management; again the results help reveal what consumers think about when considering purchasing such a solution.

- A home management dashboard concept was described as providing a secure central control point to key home systems and devices, accessible via any connected device. Features included maintenance reminders and alerts for abnormal activities such as going over budget for energy consumption, and smoke/leak conditions. Consumers think the idea clearly has merit, as evidenced by the rating for superiority over existing products and services. However, it is seen as complex.
- A family calendar and communication system that scans emails, texts and social network updates for tasks and events is seen as offering a modest but not very compelling advantage over current ways of doing things.

Figure 29. Interest in Home Management Concepts

	U.S. 2011 (n=314-316)				Canada 2011 (n=94-106t)			
	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple
Home Management (Base: Online Consumers 18-64 in Multi-Person Households)								
Home Management Dashboard at a "reasonable price"	10%	22%	42%	11%	10%	21%	40%	15%
Family Calendar and Communication System at a "reasonable price"	8%	19%	26%	14%	11%	23%	30%	28%

C451, C453: Q461, Q462, Q463.

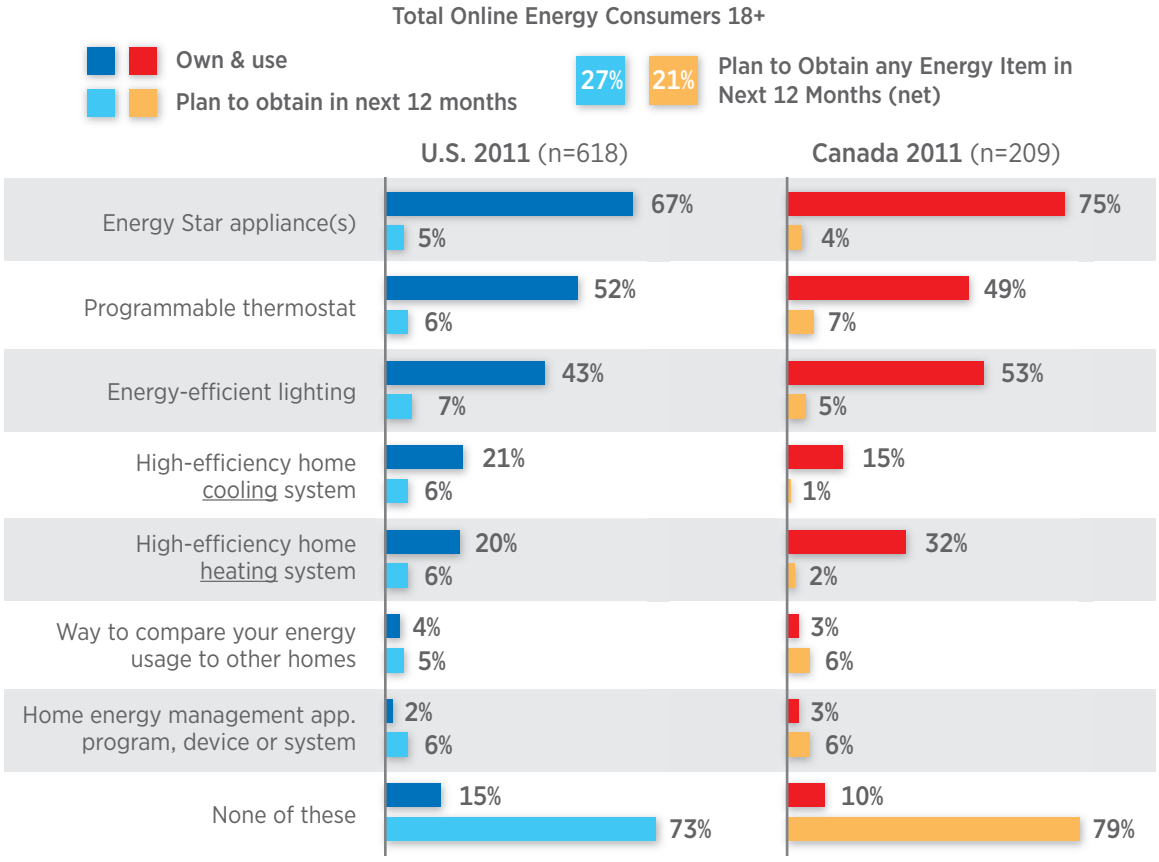
Energy Management

Consumers in our study were asked to indicate what actions they had already taken to save energy, and what they planned to do in the coming year.

The majority says they own some type of Energy Star appliance, and about half have a programmable thermostat or energy efficient lighting. High-efficiency heating and cooling systems are less prevalent, and only a handful has some way to track their energy usage.

Looking ahead, about one-fourth say they will take one of these actions to manage their energy usage in the next 12 months, with no one single action standing out as a clear leader.

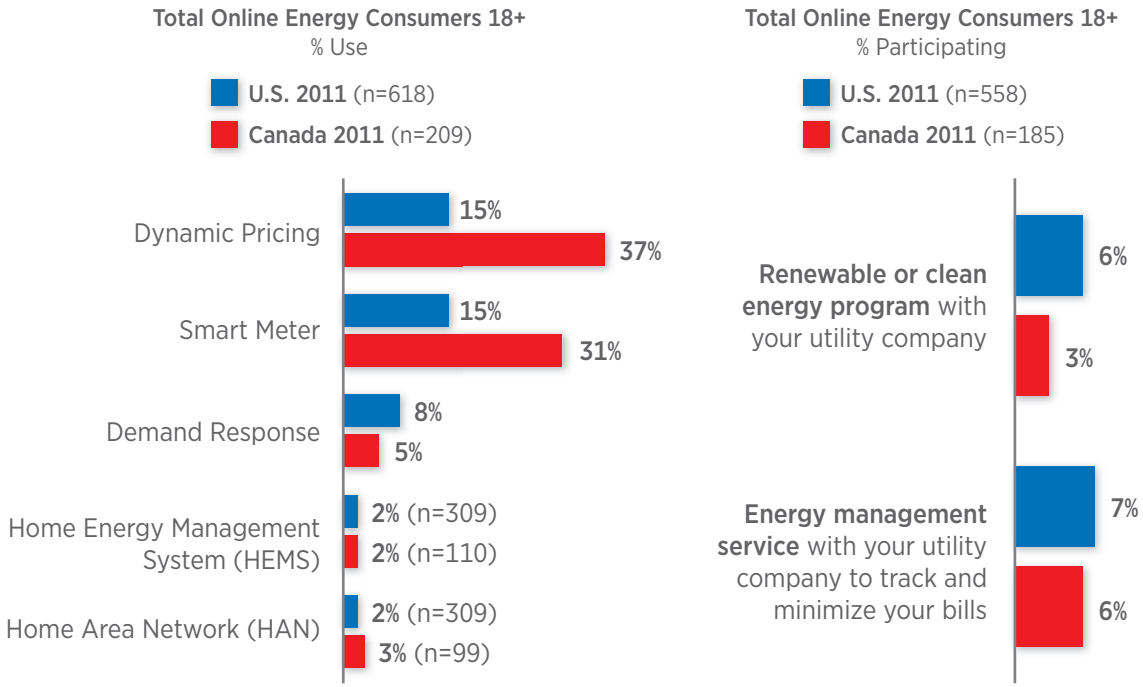
Figure 30. Energy Systems Used/Plan to Use in Next 12 Months



Q717A, Q717B.

We also asked consumers in our survey about the kinds of electric utility programs they currently participate in. About one-third of Canadians have smart meters (31%) and/or use dynamic pricing (37%), far more than Americans (15% each). Less than one-tenth in both the U.S. and Canada are currently part of a renewable/clean energy program, or an energy management service.

Figure 31. Energy Program Participation



Q722, Q727, Q731, Q745, Q749, Q755.

Consumers in our study also evaluated several potential energy programs that could be offered through their electric utility. For starters, dynamic pricing was introduced as a form of time-of-use pricing, and consumers were asked about their interest in this type of rate structure so they could take advantage of power during off-peak hours.

The research shows that substantial numbers of consumers would be interested in signing up for dynamic pricing with their electric utility, and a lower but still promising share would be interested in using a home dashboard concept coupled with dynamic pricing to track prices in real time and manage their energy consumption. The dashboard concept tested in the research also included a number of home energy control features, including one-touch scene setting for "home," "night," and "away" modes; appliance maintenance notifications; a weather center; and robust energy use reporting.

Potential demand for the Home Dashboard concept is relatively stable at the prices tested (particularly in the U.S.)—Free, $49, and $99—indicating consumers are willing to pay for such a product.

Consumers also were asked to indicate their interest in a demand response program, described as a way to pay lower rates in exchange for allowing their utility to automatically adjust their home's heating or cooling settings, or postpone running certain appliances, during peak times. Despite the assurance that they could override these actions, interest in this type of arrangement is relatively modest. In the U.S., it is not seen as strongly superior to alternatives for saving energy, but Canadians are more positive about its advantages.

Figure 32. Interest in Dynamic Pricing & Demand Response Concepts

	U.S. 2011 (n=139-618)				Canada 2011 (n=56-209)			
	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple
Energy Management (Base: Online Energy Consumers 18+)								
Dynamic Pricing	27%	38%	NA	NA	29%	42%	NA	NA
Home Dashboard – FREE	13%	24%	41%	12%	5%	25%	25%	3%
Home Dashboard – $99	12%	25%	32%	15%	9%	22%	36%	16%
Home Dashboard – $49	9%	25%	43%	10%	1%	13%	34%	16%
Demand Response Program	10%	23%	21%	16%	10%	28%	33%	21%

C760: Q772, Q774, Q776, Q780. C768: Q772, Q774, Q778; Q725.

We also invited survey respondents to evaluate a few other concepts related to energy management.

A wireless smart plug that transmits energy consumption data to a software app, at $49, is modestly attractive in the U.S. By contrast, interest in a home energy audit at $199 is relatively low.

An "Entertainment Plus" concept that bundles energy management with cable TV, broadband Internet, and home security has some appeal, primarily in the U.S., but is seen as complex, and likely suffers from the need to commit to a multi-year contract and pay a monthly fee.

Figure 33. Interest in Energy Concepts

	U.S. 2011 (n=157-161)				Canada 2011 (n=45-54)			
	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple	Purchase Likelihood	Discounted Demand	% Clearly Superior	% Very Simple
Energy Management (Base: Online Energy Consumers 18+)								
Smart Plug at $49	6%	20%	27%	38%	2%	9%	15%	33%
Entertainment Plus at a "reasonable price"	3%	19%	18%	5%	0%	14%	7%	1%
Home Energy Audit at $199	2%	14%	12%	23%	0%	9%	2%	28%

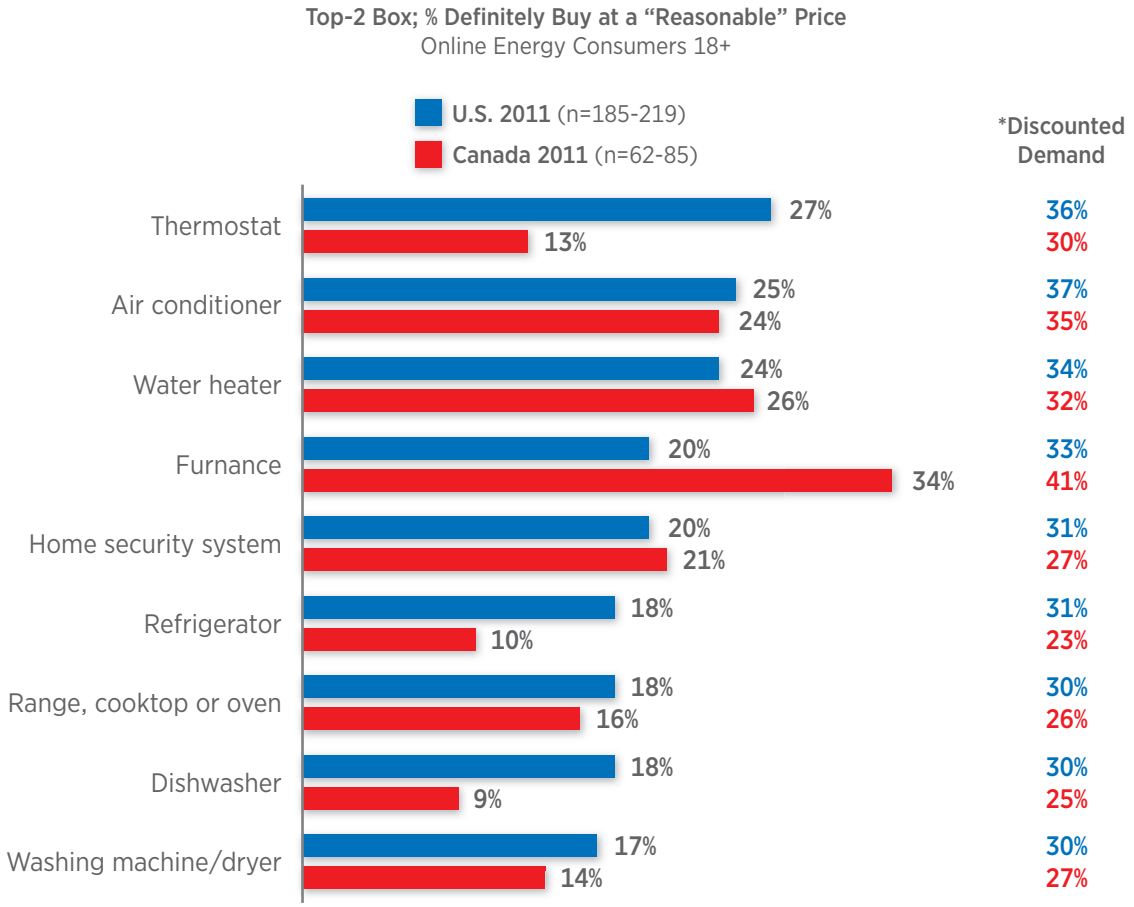
C766, C762, C764: Q772, Q774, Q776.

Smart Appliances

We asked consumers about their interest in buying a "smart" appliance the next time they are in the market to buy a specific appliance. Smart appliances were described as designed to save energy, and able to alert owners about cycle status and maintenance needs.

The result: potential demand is relatively robust, with up to one-third of consumers interested in any given appliance category. Interest is roughly even across device types, though furnaces stand out as compelling in Canada.

Figure 34. Likelihood to Purchase a Smart Appliance



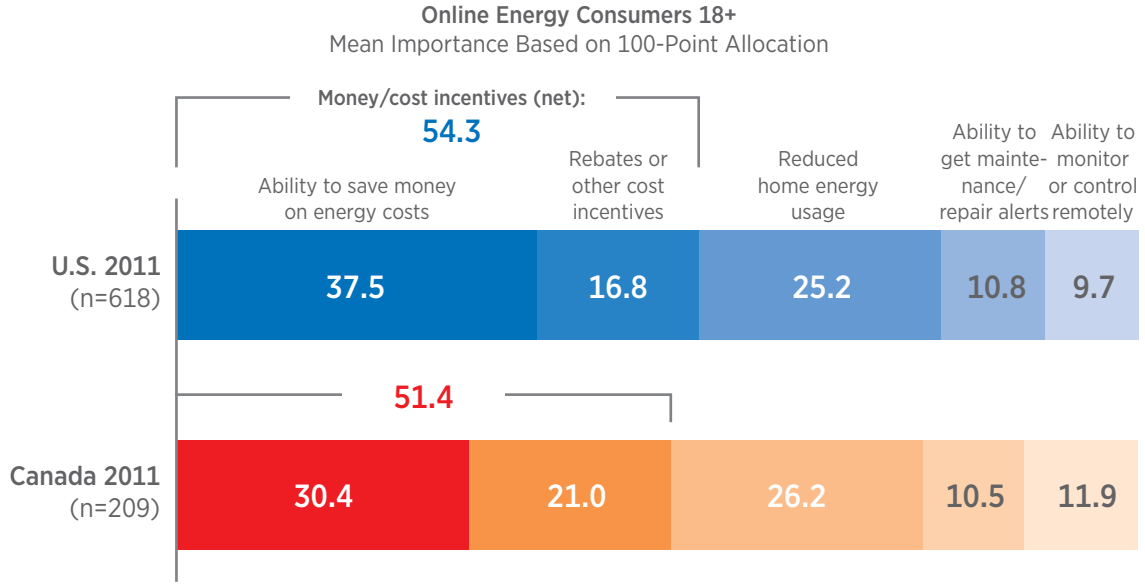
Q739.

The key driver of interest in smart appliances is saving money on energy costs. Reducing energy usage is less important than saving money on energy costs in the U.S., while in Canada, it is nearly as important. Note, however, that obtaining rebates or incentives is very important in Canada.

Ability to get maintenance alerts and remote access are of lower importance—though still have value. In the U.S., users of alarmed security systems are the most interested in maintenance/repair

alerts, and smartphone owners are more interested in remote control and monitoring than other consumers.

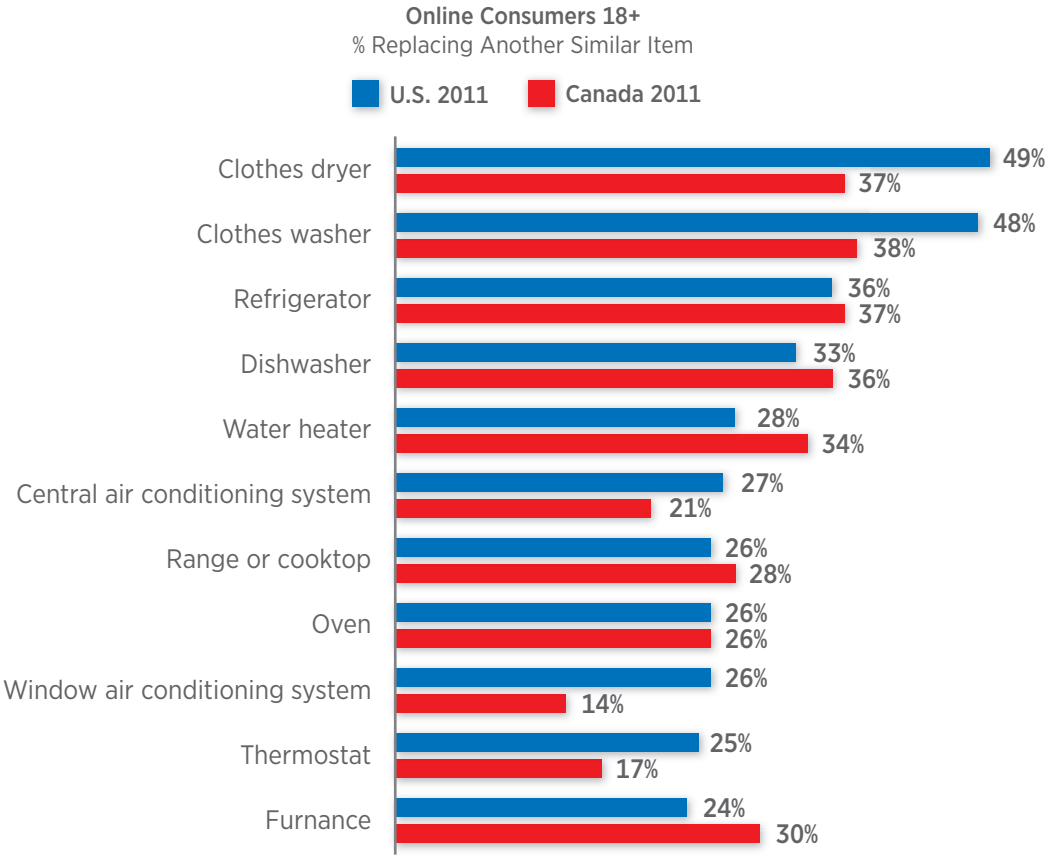
Figure 35. Smart Appliance Feature Importance



Q741.

Laundry appliances, refrigerators, dishwashers and water heaters may represent good opportunities to product manufacturers, because they are among the types of appliances most often replaced by current home occupants.

Figure 36. Appliance Replacement History



Q712, Q713.

Clothes washers and dryers also are the most anticipated appliance purchases in the coming year—mostly as replacements for appliances that are already 10 years old, or older.

Figure 37. Planned Replacement Date, By Current Age of Appliance

	U.S. Online Energy Consumers 18+			
	1 Year	2-4 Years	5-9 Years	10+ Years
Planned Replacement Date – Clothes Washer				
1 year	0%	6%	5%	24%
2-4 years	1%	12%	32%	33%
5-9 years	39%	34%	29%	20%
10+ years	19%	28%	8%	14%
Base	(n=24*)	(n=85)	(n=75)	(n=30)
Planned Replacement Date – Clothes Dryer				
1 year	0%	8%	3%	20%
2-4 years	0%	13%	35%	37%
5-9 years	38%	35%	33%	21%
10+ years	13%	27%	7%	12%
Base	(n=23*)	(n=77)	(n=75)	(n=38)

Q714-Q716.

Window air conditioning units and thermostats represent viable opportunities because they tend to be replaced more often than other appliance types. In the U.S., 35% of window air conditioners are replaced before they are five years old, and 31% of thermostats are replaced with a newer unit within the same time frame.

In general, U.S. consumers seem more willing to replace appliances than their Canadian counterparts. However, in both the U.S. and Canada, whole-home heating and cooling systems are expected to have long lives (15+ years)—likely, until they wear out.

Even once "replacement" appliances are purchased, some consumers do plan to continue to use their old appliance in the home rather than disposing of it. This is especially true for refrigerators and, in the U.S., window air conditioners.

Figure 38. Plans to Continue Using Existing Appliances After Purchasing New Item

	Refrigerator (n=299/83	Range or cook top (=273/73)	Oven (n=277/82)	Dishwasher (n=248/68)	Clothes washer (n=286/81)	Clothes dryer (n=287/80)	Window air conditioner (n=70/NA)
Online Energy Consumers 18+							
U.S.	21%	10%	10%	9%	11%	11%	27%
Canada	20%	12%	16%	18%	18%	17%	NA

Q715.

Target Markets

Connected Home

As mentioned earlier, the real key to identifying consumers interested in the connected home is finding those living a mobile, connected lifestyle. Again, specific mobile lifestyle factors associated with interest in the connected home are: use of the Internet at work and elsewhere while away from home, use of smart phones, laptops and tablet PCs, mobile navigation and overnight travel for work.

Demographically, the connected home concept resonates across a variety of consumer types. Men and women of all ages have interest (though interest starts to drop off after age 55, and different ages like the connected home for different reasons). Both homeowners and renters are interested. Even income has less impact than some might guess.

Figure 39. Consumers Interested in the Connected Home

Those very interested in the Connected Home: Online Consumers 18-64

- Own home (63% U.S.; 71% Canada)
- Median age (39; 39)
- Women (52%; 43%)
- Annual HH income $50K+ (57%; 66%)
- Have smartphone (76%; 68%)
- Have tablet PC (23%; 27%)
- Caucasian (74%; 75%)
- Children under 18 in HH (53%; 36%)

	U.S. 2011 Online Consumers 18-64				
	18-24 (n=164; A)	25-34 (n=269; B)	35-44 (n=271; C)	45-54 (n=291; D)	55-64 (n=239; E)
Benefits of Connected Home Products or Services. By Age (Q405)					
Access to desired entertainment content on any device	24% CDE	24% CDE	16%	12%	10%
Ability to know when household members have arrived or left	8%	10%	20% ABE	15% AE	6%
Enhanced safety and security	38%	38%	44%	40%	50% ABD

Q102, Q2_08, Q1A, Q8, Q409, Q408, Q6, Q63, Q405.

Home type also is not a driver of interest in the connected home. Those who find the connected home concept appealing are no more likely than other consumers to own their home, or to live in a single-family home, a large home, or a new home. Home heating fuel type (electric, gas, etc.) and use of air conditioning are not drivers either.

Smart Appliances & Energy Management

Like with the connected home concept, both men and women, homeowners and renters are interested in smart appliances. And mobile consumers represent the best initial target.

In the U.S., interest in smart appliances is strong among younger adults, regardless of whether they own or rent their home; while in Canada, it is higher among older homeowners.

Figure 40. Consumers Interested in Smart Appliances

Women somewhat more focused on laundry & kitchen

Those very interested in smart appliances:

- Own home (79% U.S.; 97% Canada)
- Median age (41; 56)
- Women (54%; 60%)
- Annual HH income $50K+ (55%; 59%)
- Have smartphone (66%; 55%)
- Use/interested in dynamic pricing (55%; 58%)
- Use equipment maintenance program (18%; 23%)
- Use fiber-optic Internet (17% U.S.)

Tablet PCs are common among those who are interested in dynamic pricing (23% in U.S.)

Those very interested in Home Dashboard/HEMS (U.S.):

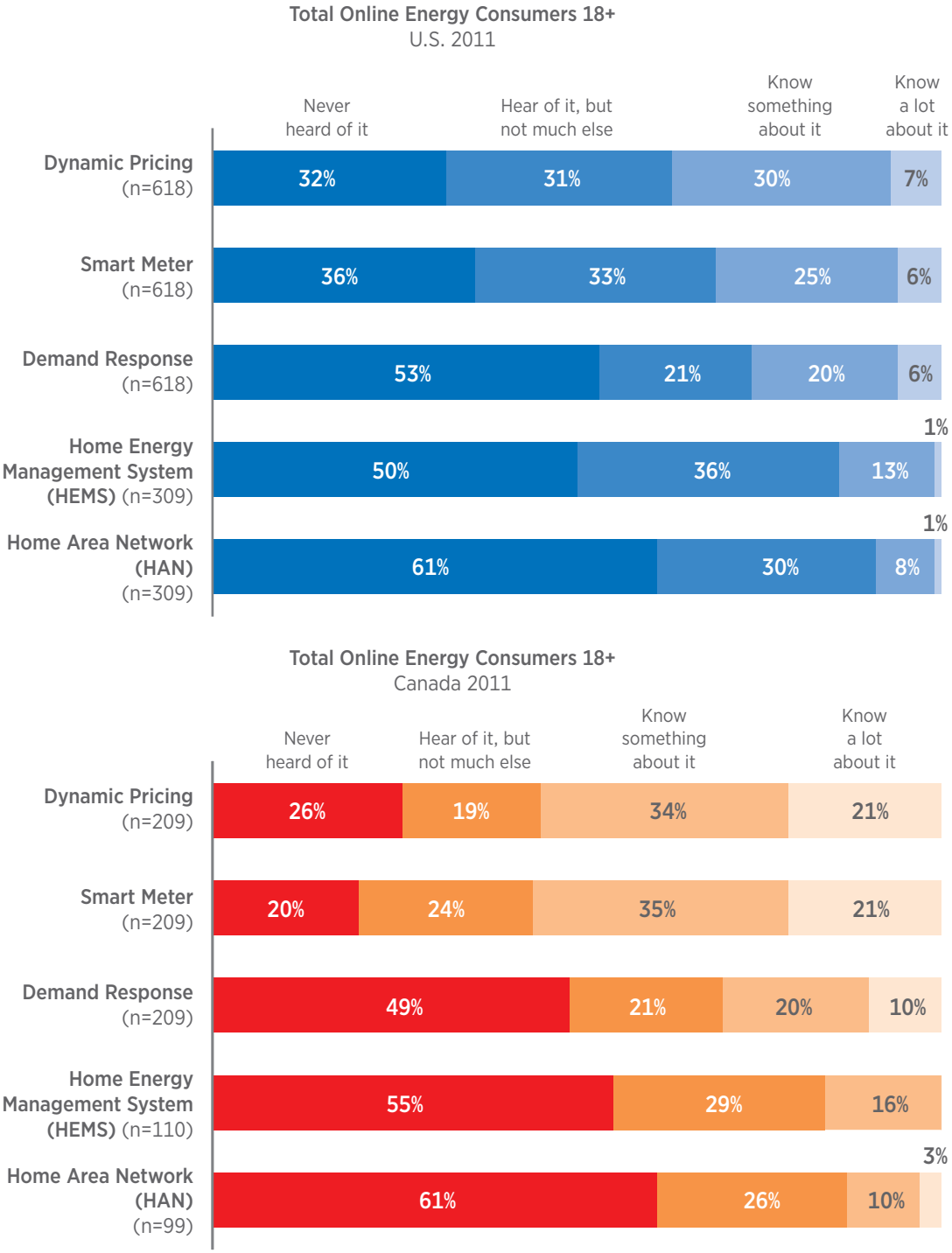
- Have **smartphone** (73%) and/or **tablet PCs** (28%).
- Are more likely to participate in a **clean energy** (16%) or **energy management program** (17%) with their electric utility than those not interested (4%, 5%)

Q102, Q2_08, Q1A, Q8, Q409, Q408, Q722, Q725, Q755, Q9A.

When it comes to smart appliance purchase decision-making, men and women are somewhat divided along traditional lines, with women taking more responsibility for kitchen and laundry appliance decisions, and men making more decisions about home heating and cooling and security. That said, both men and women participate in decisions for all appliance types.

While many types of consumers are interested in smart appliances, they are mostly unfamiliar with smart grid concepts. That said, Canadians are generally more familiar with dynamic pricing and smart meters than Americans—though most still know little if anything about HEMS or HANs.

Figure 41. Smart Grid Familiarity



Q723, Q729, Q733, Q747, Q751.

While both men and women would be involved in decisions about energy management and demand response, men are more often expected to be the main decision-maker. Areas where men are most often the decision-makers: furnaces, thermostats and water heaters. That said, both genders do participate in decisions for all appliance types.

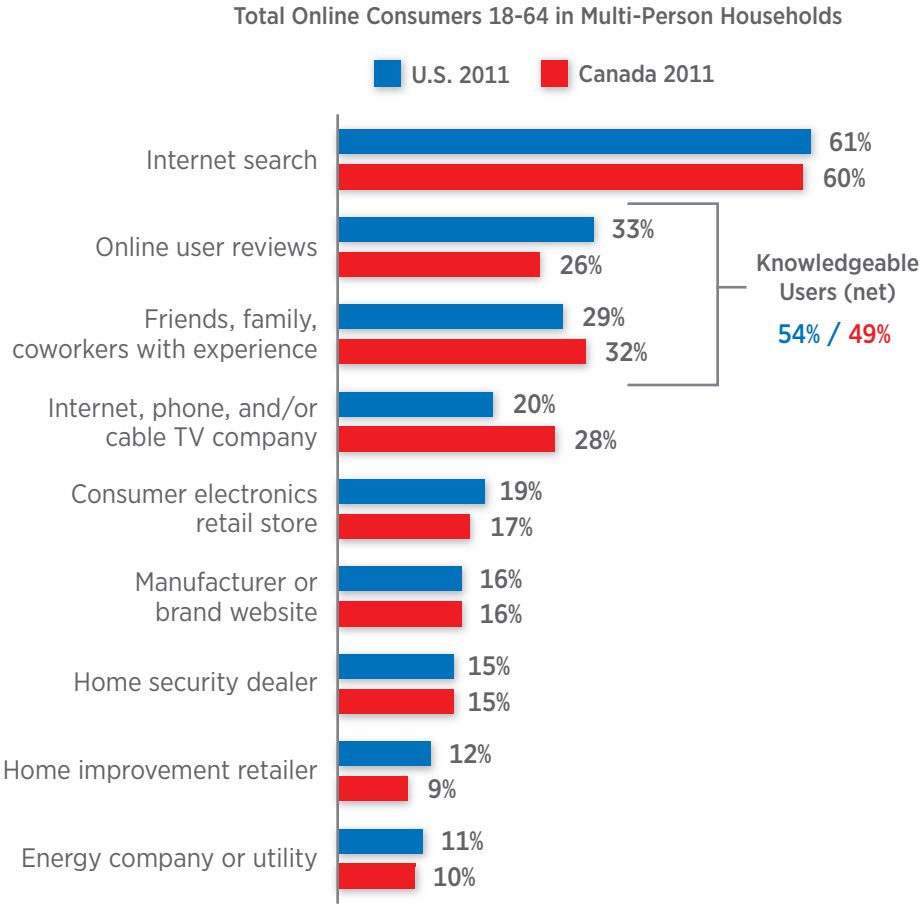
Channel Preferences

Our survey asked consumers some high-level questions about their channel preferences. Overall, the results show they have little idea about current channels or brands.

To start, we asked where they would look for more information about the connected home. The result: they naturally turn to online search and knowledgeable users for information. Online reviews are especially important to those who have the highest interest in the connected home—indicating a need to understand what the experience is "really" like for people like them.

Internet, phone and/or cable TV providers and consumer electronics retailers also attract a modest amount of attention as potential resources, though clearly these are not widely recognized as the "go-to" places to learn more—yet.

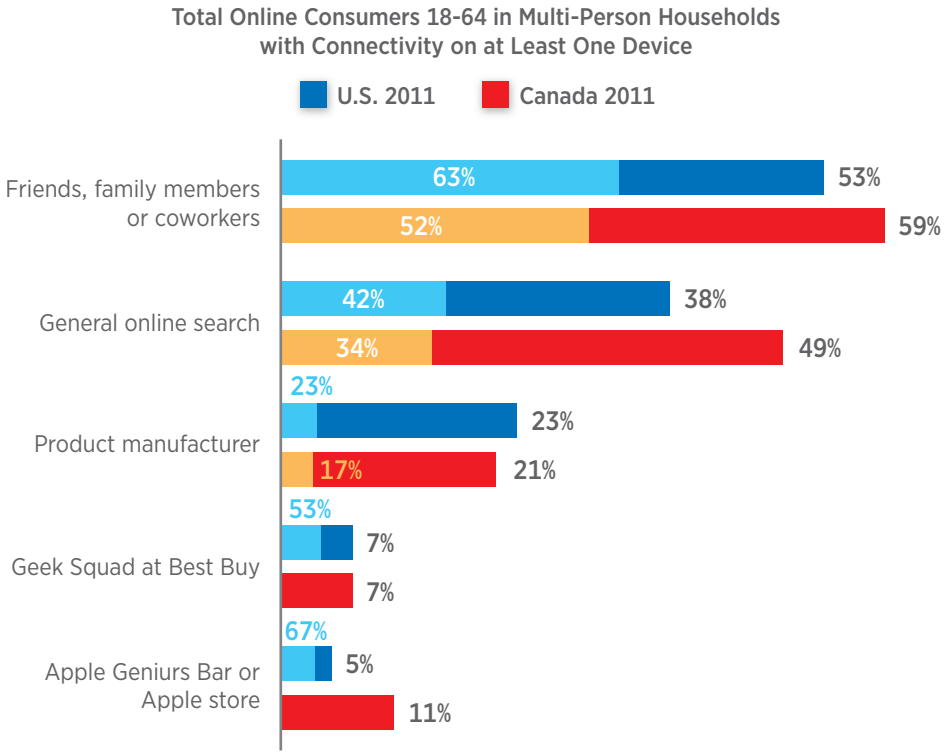
Figure 42. Top Desired Sources of Connected Home Information



Q445.

When they need help with connecting or configuring their electronic devices, consumers also tend to ask friends and family or conduct online searches to get the help they need. Industry support options (guidance from the product manufacturer or retailer) are largely unused, and typically less than satisfying.

Figure 43. Preferred Networking Support Providers

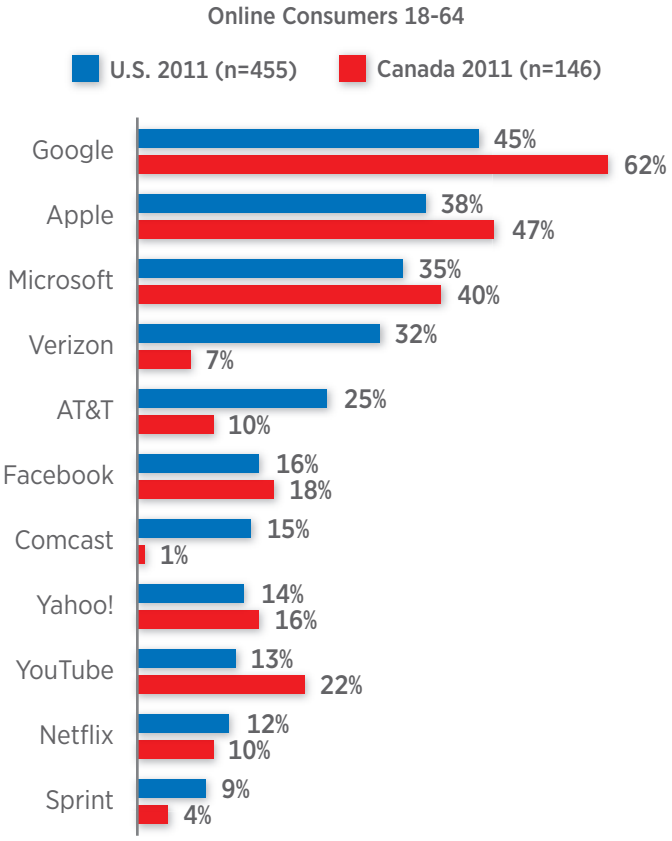


Q441, Q442. Excludes satisfaction for support providers with base less than 30.

Finally, we asked about brand preferences when it comes to the idea of subscribing to an online "cloud" service for storing and accessing digital content. Here, consumers think the best providers would be the major tech brands, led by Google, Apple and Microsoft. In the U.S., wireless carriers Verizon and AT&T also get substantial mentions.

Younger people (under 25) tend to favor Google and Facebook, while older people (45+) favor Telcos and cable companies.

Figure 44. Preferred Cloud Service Providers



Q536.

It's not clear if Google's advantage is due to its relationship to online search (seen as a key source of information), or if consumers see Google as offering a viable connected home platform via Android—or some combination. What is clear is that there is room for brands to gain traction with consumers in the connected home space, and that services and a social experience will play key roles in the years ahead.

7. APPENDIX

Concept Descriptions

Smart TV

This web-enabled high-definition TV delivers entertainment "apps" and provides you with access to personalized entertainment.

It connects seamlessly to the Internet, and accesses media stored online on your connected devices—including PCs, tablet PCs, cell phones, media players and other sources. It also can act as a PC monitor.

On-Demand Entertainment Service

Rather than subscribing to a package of channels determined by the cable/satellite provider, you can select any content offered and only pay for what you watch or use. This could include movies, music, games, etc.

Consumer Electronics Concierge Service

This service provides assistance with any consumer electronics device, software or apps, including: PCs, routers and other networking equipment, mobile devices, home video/audio components, and more.

Topics addressed include (but are not limited to): device and software setup, networking, data backup, virus and spyware protection and parental controls.

You pay a monthly fee, and the service is available anytime, anywhere via phone, email or online chat. Use this service for help setting up or maintaining any device or software, or trouble-shooting any issue.

Cloud Service

This service provides access to your preferred digital content from any Internet-connected device (computer, TV, cell phone, etc.), whether you are inside or outside your home. The content can include music, video (including movies and TV programs) and photos, plus your calendar and contacts, documents, and more.

You can set up your personal online portal to suit your needs, and allow access to certain content (like photos and videos) to others as needed by requiring a password that you set up.

It also includes a messaging platform so you can send and receive emails and other types of text-based messages.

Your content is stored securely on the Internet with a provider of your choosing for a monthly service fee.

Connected Home Starter Kit

This kit provides the networking equipment and software needed to connect different home systems (lighting, heating/cooling, security, door locks, etc.) into an integrated home system.

Once installed, you can monitor and control your home from any Internet-connected device. For an additional fee, optional professional installers are available.

Family Calendar and Communication System

This calendar and communication system is designed to streamline communication for busy families.

The system can scan your email, texts and social network updates as they come in to automatically suggest tasks, reminders and events in your private and/or shared family calendar. The calendar can be linked to school, work and extracurricular event calendars as well.

It sends reminders or other messages to family members by email, text or voice, to any device. And, it can integrate with location-based services to help you track family member whereabouts (via cell phones).

Smart appliances

Connect to the Internet wirelessly, allowing you to view information about cycle status, energy consumption, and maintenance needs from an Internet-connected device like a phone or PC.

You may also be able to control or monitor the appliance from your cell phone or other Internet-connected device.

'Smart' appliances are designed to save energy. They can be linked with smart meters to automatically avoid peak energy rates by delaying start times until rates are low.

Demand Response Program

You pay lower rates for energy in exchange for allowing your utility or energy provider to automatically adjust your home's heating or cooling settings during peak usage periods.

The energy provider also could postpone running certain appliances (such as a dishwasher) in your home during peak periods. You can override these actions by your provider, if desired.

There is no fee charged for signing up with this type of program.

Entertainment Plus

This package offers not only entertainment, such as cable TV, but also phone, Internet, home security and home energy management services (via a connection to a smart meter). You contract with a single provider for all these services, and the provider installs and maintains all services.

You would be able to access and control all features through a personalized portal, from any connected device—including your phone, PC and TV.

A multi-year contract and a monthly fee would be required. Equipment and installation cost extra and will vary depending on your particular set-up.

Home Energy Audit

This professional, in-home evaluation of your home energy usage provides you with recommendations for energy savings while preserving and enhancing your home's comfort and safety.

Recommendations include assistance finding qualified installers as well as instructions for "DIY" fixes.

Price: $199

Smart Plug

Plug this device into an outlet, and then plug your device (any lamp, home appliance, computer, TV, etc.) into the Smart Plug.

It wirelessly transmits energy consumption data for that device or appliance to an easy-to-use software app that you can reference on your phone or PC. The app shows kilowatt-hours by day, week and month for each device using the Smart Plug so you can track your home's energy consumption.

Price: $49 per plug; includes software.

Home Dashboard

This web-based "app"-style dashboard enables you to more easily control your home's systems and appliances while tracking your energy usage.

You access the dashboard on a secure website from any Internet-connected device, including a PC or smartphone.

It collects and analyzes data about your home's energy usage from a smart meter that is provided by your energy utility, as well as any connected appliances you have in your home.

The Dashboard is provided and installed by your energy utility for:

1. Free
2. A one-time cost of $49
3. A one-time cost of $99

Features include:

- **Modes for "At home," "Night," and "Away"** so you can easily adjust light, smart appliance and temperature settings all at once from your PC, smartphone, or other Internet-connected device.
- **A weather center** that displays current conditions and forecasts.
- **Automatic diagnostics**, including notifications of any maintenance or repair needs for your home's connected appliances and systems, including heating and cooling.
- **Comparison of actual household energy usage to a household target** on a daily, weekly and monthly basis.
- **Tracking of energy usage** for individual smart appliances on a daily, weekly and monthly basis.
- **Real-time energy pricing** display that shows current price per kilowatt hour (kWh) for homes that use dynamic pricing with their energy provider.
- **Alerts** for peak energy demand conditions, real-time outages and restoration.

Dynamic Pricing

Some utilities charge a **lower** price for energy use at off-peak times of the day, and a **higher** price for energy at peak times. This is sometimes called **dynamic pricing**.

If your energy utility offered you dynamic pricing, how likely would you be to switch to this rate structure so you could take advantage of power during off-peak hours?

Assume there is no extra fee for switching to this rate structure.

8. CABA CONTACTS

Additional detailed findings are available via a PowerPoint version of this report. Please contact CABA for further information; see contact information below.

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