



Battle for the home of the future: How utilities can win

New technologies for the home will reshape energy markets, forcing utilities to develop new capabilities to capture value in the residential sector.

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Energy consumption is growing more slowly in Europe as energy-efficiency measures begin to take hold. Our research indicates that if select existing technologies were to be fully deployed by 2020, a new home could consume about 90 percent less energy, whether gas or electricity, from the grid than it does today (Exhibit 1). For existing homes, which form the majority of housing stock, the energy-savings opportunity is also substantial: cuts of 35 to 40 percent could be achieved.

If such savings are realized, energy utilities will be hit with lower revenues and profits, both in retailing and generating power. For the latter, margins could fall by 30 percent in a scenario in

which new homes become almost energy neutral. Even in our less aggressive deployment scenarios, margins would still drop significantly—by close to 10 percent. Our findings are likely to be relevant in any market where energy prices are high and regulations emphasize sustainability in the home, as is the case in Europe. They may be less relevant in markets such as the United States, where there is less regulatory pressure in this direction and where fewer incentives are in place to encourage energy efficiency.

In the very near future, business as usual will no longer be an option for most energy utilities. To cope with this discontinuity, utilities will



benefit from seeking new sources of revenues and profits in emerging energy-related businesses. These include building fabrics (for example, roof and wall insulation), central systems (including heat pumps and lighting), appliances and electronics (energy-efficient white goods), “smart” applications (home area networks and energy-storage devices), advanced metering infrastructure, distributed generation (for instance, small-scale wind turbines, combined heat and power systems, and solar panels), and the delivery of power for charging electric vehicles, as well as financing, insurance, and consulting services.

Energy utilities, with their technical competence in managing networks, see themselves as natural “owners” of the metering and infrastructure for charging electric vehicles. They are also potential players in distributed generation, energy-efficient products, and smart applications—areas in which they can draw on their brands, relationships with energy customers, and knowledge of consumption patterns. But in most of the categories listed above, utilities face stiff competition, including technology and telecom companies and retailers, as well as construction and media companies.

Our research covers four countries—Germany, Italy, Sweden, and the United Kingdom—that combined make a good proxy for the European market.¹ It shows how technology, regulation, and consumer behavior are likely to transform the residential energy market in the coming 10 years. To succeed in this new environment, utilities should place fine-grained bets on the segments in which they can best create value for themselves and develop winning capabilities beyond their traditional business, often by seeking partnerships with companies from other sectors.

Navigating uncertainties

A number of challenges face utilities looking to capture the value generated by innovations in energy-efficient products and services for the home. Successful utilities will need to establish a position in what promises to be a crowded market, where the rate of change in technology, regulation, and consumer behavior remains uncertain.

A crowded marketplace

More than 200 companies from a wide range of industries operate in this market, often as entrants exploring ways to compete most effectively.

Among these companies are utility incumbents that are moving fast, seeking to deploy portfolios of products and services from basic insulation to systems that automatically adjust energy consumption to the needs of people in their homes. Others are utilities that offer targeted solutions—for example, distributed generation—that have regulatory support from governments in the markets in which they operate. Some are utilities that are not yet responding at all.

Companies in other sectors—such as telecom, technology, media, finance companies, and home building—are also developing and selling energy-efficiency products. And automotive players are getting involved across the electric-vehicle value chain.

Technology development

Consumer adoption will depend on the pace at which a range of relatively mature and emerging technologies develop and become commercially viable.

Many technologies already recoup their investments, sometimes with regulatory support. Such

Exhibit 1

A broad range of technologies are likely to increase their share of the residential-energy-market value pool.

Energy needed from the grid,

baseline consumption = 100¹



- **Central systems and smart applications**

Electric heat pump, nanotechnologies and smart applications (eg, membrane in air-conditioning unit), energy-efficient lighting, home control network

- **Building fabrics**

Insulation of roof and walls with aerogel, active windows, double-shell building

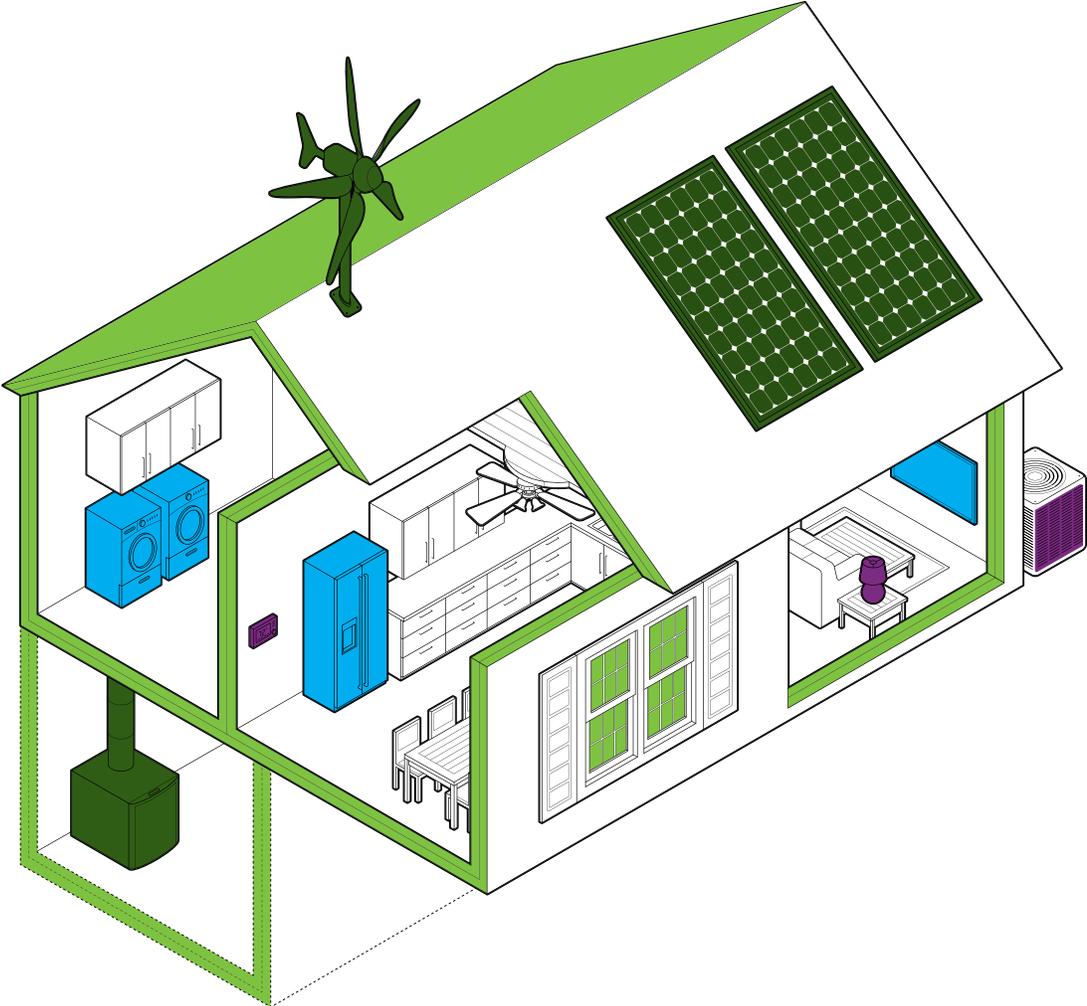
- **Appliances and electronics**

Includes appliances and electronics with most advanced potential for reducing energy consumption: advanced washing machines, refrigerators, and freezers; energy-efficient televisions; and other electronics

- **Distributed generation**

Solar-photovoltaic systems, mini-combined heat and power, microwind

¹Baseline consumption index: 1-kilowatt consumption of all fuels = 100. Assumes 2010 volume and fuel mix; figures reflect weighted average of Germany, Italy, Sweden, and United Kingdom. Figures do not sum to 100 because of rounding.



technologies include heat pumps, double- and triple-glazed windows, energy-efficient lighting, and distributed-generation products (such as solar panels). Other technologies have a largely unexploited potential, most notably heating, ventilation, and air-conditioning systems using occupancy sensors that automatically manage when and where heating and air-conditioning are applied.

We do not expect truly disruptive home-energy technologies to be ready for mass-market adoption in the next 10 years. But there are technologies now under development that have huge potential and could be commercially viable by the end of the decade. One example is “active windows” with coatings that block incoming light when temperatures are high. When installed in new homes, such windows could recoup investments in less than three years.

Regulation

Many European governments are pursuing a mix of supply- and demand-side measures to meet the European Union’s commitment to a 20 percent reduction in greenhouse-gas emissions by 2020. On the supply side, they can increase the share of low- or no-emission power-generation sources, such as natural gas, nuclear, and renewables. But there are challenges. In some cases, availability of natural gas may raise security-of-supply issues. Nuclear power is again under scrutiny in some European countries. And renewables require costly incentives—which may be harder to come by given current budget deficits—that make energy more expensive for all consumers. Therefore, we expect the push for low-energy homes, where energy-efficiency measures reduce demand

for power, to remain strong or even be reinforced in some countries.

Because the regulatory outlook for different home-energy technologies varies by country, companies need to watch developments closely and act on opportunities as they arise. Sweden, for example, increasingly supports the conversion of electric heating to heat pumps and biofuels, and the United Kingdom is introducing a “green deal” to help consumers finance energy-efficiency packages.

Consumer behavior

Consumers are positive about saving energy, according to our market research in the United Kingdom. Yet rather than act on their own initiative, consumers expect business and the government to take the lead on the journey toward the low-energy home.

For most consumers, cost is the only reason to reduce energy consumption. But when people purchase appliances, features like functionality, technological simplicity, brand, and design take priority over saving energy. Most consumers perceive low-energy products to be below par on these attributes and on performance as a whole.

Our research suggests that consumers want to have more control over their energy usage. When they tested energy-management products and services, for instance, they were most excited about technologies, such as sensor-lighting and home-automation systems, that increased their level of control. But while consumers see utilities as possible suppliers of specific



products—for example, distributed-generation and insulation offerings—some are skeptical that utilities really want to help customers use less energy.

The path to value

To help utilities navigate a crowded and uncertain landscape, we developed three scenarios that characterize the likely evolution of the energy market leading up to 2020. The first assumes incremental reductions of technology costs, a relaxation of the European carbon-reduction targets, and uptake of only some measures that recoup consumer investments. The second scenario implies a faster reduction of technology costs, a regulatory push for meeting Europe's carbon targets through incentives, and the adoption by consumers of most measures that offer attractive returns. The third scenario assumes even faster development, in which many new homes are almost energy neutral (Exhibit 2).

We quantified the opportunities related to the three scenarios for Germany, Italy, Sweden, and

the United Kingdom, looking at new and existing homes and apartments, as well as existing rented homes and apartments, where the motivation to invest in energy efficiency is lower. The 35 measures we analyzed ranged from window glazing and air heat pumps to smart dishwashers and solar distributed-generation gear.

The findings illuminate why utilities would benefit from looking for new revenue sources. Across the three scenarios and four markets, the potential profits that utilities could capture from new value pools would just about compensate them for their losses in power-retailing margins. But as more aggressive energy-efficiency measures are deployed, utilities' generation volumes and revenues are likely to decline.

Despite the challenges, there are significant opportunities for utilities to capture value from innovations in residential energy markets. Some will require deploying existing capabilities and resources in new directions; others will necessitate developing new skills to enter unfamiliar businesses. Success will depend in

Exhibit 2

Three key areas will affect the path toward energy-efficient homes in 2020.

Main drivers	Scenario 1 Incremental development	Scenario 2 Aggressive deployment	Scenario 3 Energy-neutral homes
Technology development	Reductions in technology costs follow past trends	Technology costs decrease, on average, by 15% over 10 years	Costs for new technologies decrease by up to 60%
Regulation	Regulators maintain status quo (implies relaxation of 2020 carbon targets)	Regulators push for meeting 2020 CO ₂ targets through incentives	Regulators increase incentives to achieve 2020 CO ₂ targets by 2018
Consumer behavior	Consumers adopt some economically viable initiatives	Consumers adopt a majority of the economically viable initiatives	Consumers adopt a majority of the economically viable initiatives

part on the ability to approach the challenge in a systematic fashion, informed by an understanding of the full range of available options.

We developed a three-step approach to help utilities pursue the opportunities that are most promising: define the strategy, select the most attractive business models, and establish critical enablers. Utilities can use the approach to prioritize and capture sources of value that are aligned with their overall strategic priorities.

Define the strategy

The first step to developing strategy is to understand where the money is, what customers want, and which products and services the organization is best positioned to deliver.

Prioritize sources of value. Until 2020, the majority of the opportunity to improve energy efficiency in the home is expected to be derived from products and services related to building fabrics and central systems. Such brick-and-mortar opportunities represent approximately half the total value pool across the four countries we considered. Appliances and electronics represent about 35 percent, and distributed generation represents another 11 percent. The remaining value is derived from smart applications, advanced metering infrastructure, electric vehicles, and enabling services. Although the market for smart applications such as smart meters is likely to grow rapidly, the value it represents probably will not add up to much until after 2020. The same is true for electric vehicles.

Develop a granular market perspective. Utilities should use two metrics to determine which opportunities can generate value for them and

their customers in different markets and segments: the utility coverage ratio and consumer net present value (NPV). The coverage ratio is the difference between the value a utility can generate for itself by providing a product or service and the losses it will incur due to reductions in power consumption that result from use of the product or service. Consumer NPV is the difference, discounted back to the present, between the cost to consumers of using a traditional approach and the cost of implementing and using a new product or service over its lifetime. Companies should prioritize win-win opportunities that benefit them and their customers. For example, efficient building fabrics typically deliver high coverage ratios for utilities and high NPV for consumers.

Utilities should also segment markets to assess the value of particular offerings by customer group and region. We typically divide markets into six segments to identify priority opportunities: new apartments, both rented and owned; existing owned apartments; existing rented apartments; new homes, both rented and owned; existing owned homes; and existing rented homes. For example, central systems are typically a win-win in new homes, providing energy efficiency for consumers and a new revenue source for utilities.

Select a business model

Our research suggests utilities could pursue one of four business models to achieve their strategic priorities.

Distributor. Utilities could leverage their relationships with existing customers to develop businesses distributing energy-efficient products and services. The model may be most

attractive in cases when the utility can build on existing businesses to develop the new offering. For example, a utility that already installs solar panels in homes could get into distribution by purchasing panels and reselling them to customers, leveraging existing relationships and skills to negotiate volume discounts from wholesalers.

After-sales specialist. Utilities could provide maintenance services for many types of equipment. Through its HomeCare program, for example, British Gas provides customers with options for maintenance and repair of boilers and central-heating units, regardless of where the equipment was purchased. This model can be especially attractive to utilities that have a well-developed field force and large concentrations of customers, typically located in urban areas. The pan-European utility RWE announced partnerships with Microsoft and eQ-3 to install central control units that link customers' appliances and the Renault-Nissan Alliance to test the performance of electric vehicles in commuter traffic in Germany.

Lead generator. Utilities could tap existing customers to provide leads to other companies that sell energy-efficient products and services in return for fees. Leads could be generated through home-energy audits

conducted by utilities, or they could be generated at the point of contact when consumers engage utilities through existing channels. For example, a utility could use its call center to identify leads for companies that sell energy-efficient windows. Lead generation is a relatively easy business to launch and may represent a no-regrets opportunity for most utilities, but it is not likely to generate as much value as the other options.

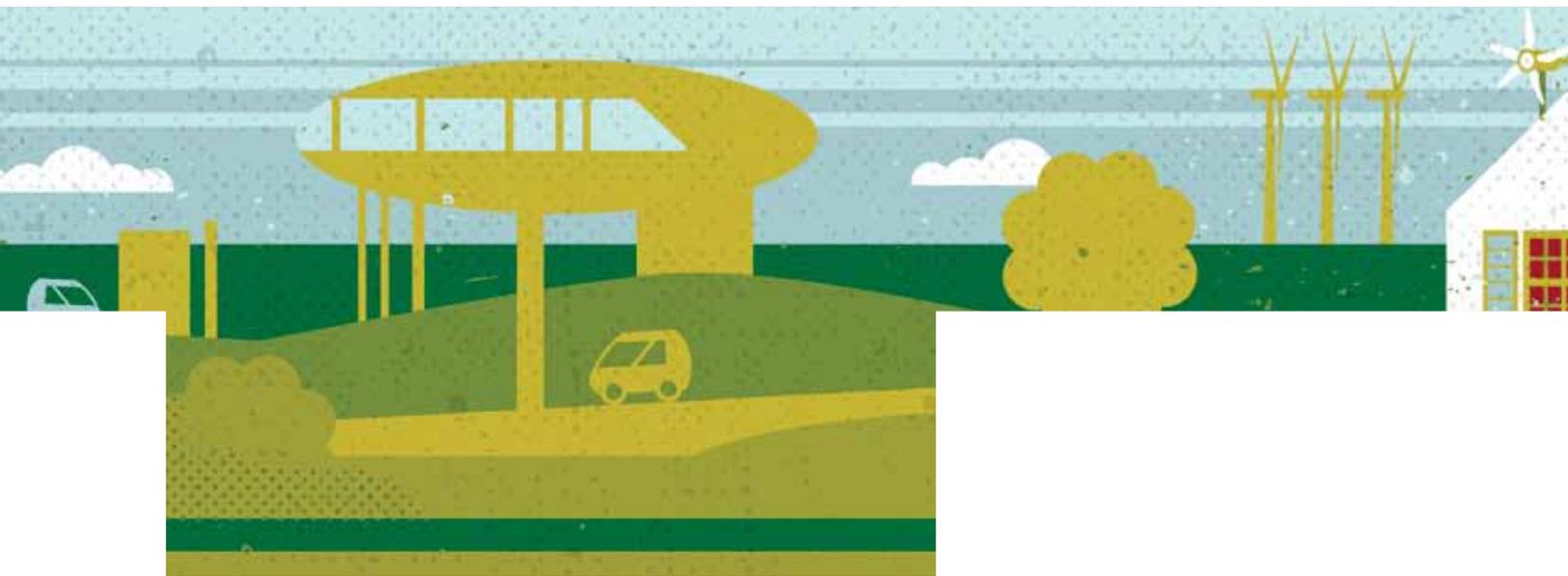
Aggregator. Utilities seeking the broadest opportunity can become aggregators, coordinating the full range of activities for customers across a spectrum of product and service providers. The utility may deliver services itself when it has the capabilities, or it may engage other entities to provide them when it does not. Utilities can act as a single point of contact for customers, enabling them to access anything from financing to maintenance through one source.

Establish critical enablers

We suggest that utilities consider three areas in which to invest to ensure their new business models succeed.

Provide financing options. Utilities should consider establishing partnerships with financial institutions to help customers finance investments in energy-efficient products and services.





A utility could simply act as a sales channel for an existing financial institution, or it could establish an internal division that originates, processes, and distributes loans. Some utilities have developed nontraditional financing options. For example, British Gas has a “rent a roof” program through which it provides free solar power to customers. Under the program, British Gas maintains ownership of the panels, and it earns revenues when they generate extra power that is sold back to the grid.

Develop field-force capabilities. Utilities should train their field forces to act as advisers, consultants, and relationship managers, able to engage consumers at moments when they are likely to make decisions that could affect their energy footprint, such as when they are purchasing a mortgage. Field representatives should be able to help consumers at any point

in the product or service life cycle, from weighing options and securing financing to providing postsales support and maintenance. Some utilities will be able to retrain their existing field forces to deliver the spectrum of energy-efficiency solutions. Others may need to hire and train a new cadre of representatives or even consider outsourcing parts of the job to third-party providers.

Extend brand credibility. Utilities should build on the brand attributes that they have already established with customers to persuade skeptics that they are reliable providers of energy-efficient products and services. This is one of the main assets utilities can exploit, leveraging brand equity as a competitive advantage in the relationship with customers vis-à-vis players from other industries. For example, Enel, Italy’s largest power company, used its strong brand to

expand into the renewable-energy market through Enel.si, which distributes photovoltaic, solar thermal, and mini-wind systems through an extensive network of retail franchises.



The transition to low-energy homes will be a discontinuity for European utilities. But the pace of change is uncertain. Utilities that prepare for several possible scenarios, adapt their organization to the new competitive landscape, and make granular choices about where they can create the most value have an opportunity to shape

a new future for themselves. By doing so, they will also deliver benefits to consumers and society as a whole. ○

¹ We chose Germany, Italy, and the United Kingdom because they are the largest retail energy markets in Central, Southern, and Northern Europe, respectively. We chose Sweden because smart meters have fully penetrated the market, which notably has not greatly shifted energy-usage patterns in the country.