Business Plan – Residential Sector

2016

Stage II

Version I

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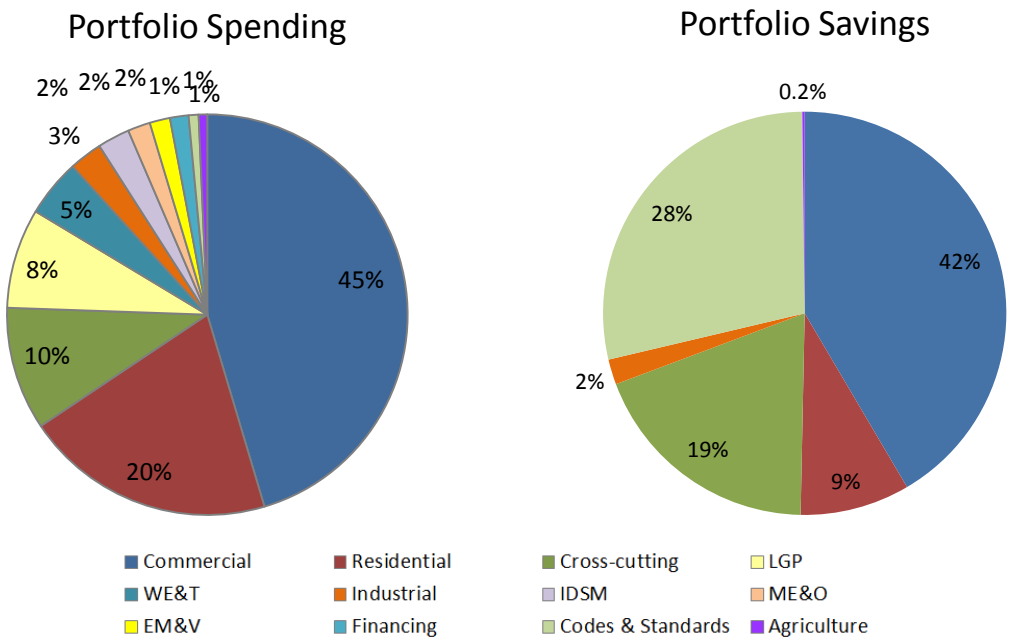
Market Characterization

The Market Characterization section of the Residential Business Plan provides a snapshot of the Residential Segment as it relates to: 1) energy efficiency portfolio savings and spending by segment; 2) residential account distribution; and 3) energy usage by segment and climate zone. This section sets the stage for subsequent discussions regarding barriers and opportunities within the Residential sector and across segments.

Portfolio Spending and Savings[1]

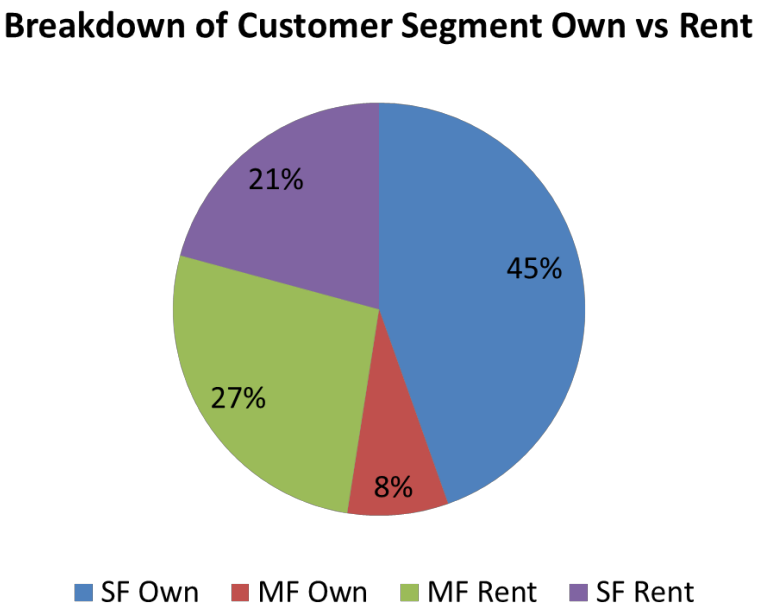


Key observation:

For the 2013-2015 program cycle, 20% of SDG&E energy efficiency spend was attributable to residential programs, which yielded 9% of portfolio savings

[1] Source: EEStats Dec 2015 Monthly Report, final numbers expected to be reconciled by May 2016

Residential Account Distribution[2]

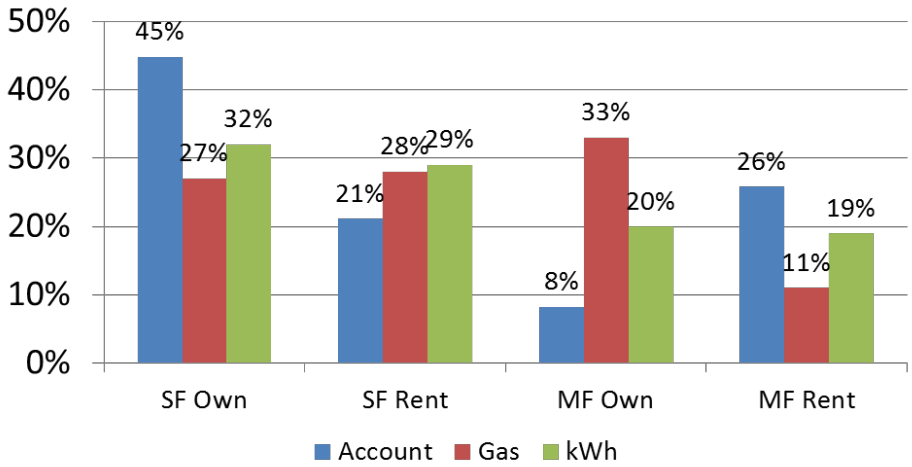


Key observations:

1. The majority of residential accounts are single family owners
2. The next largest group of residential accounts are multifamily renters

[2] Source: SDG&E Data

Usage by Customer Segments[3]

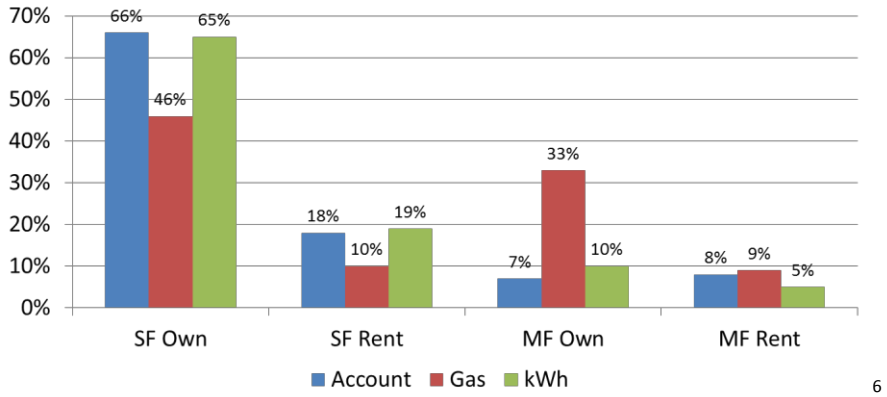


[4]

Key observations:

1. Multifamily owners use disproportionately more gas than multifamily renters
2. Single family renters use disproportionally more gas and electricity than multifamily renters

Savings by Customer Segment[5]



[6]

Key observations:

1. Multifamily and single family owner's realization of gas savings is disproportionately higher than multifamily and single family renter counterparts
2. Owners participate in SDG&E programs at a much higher rate than renters

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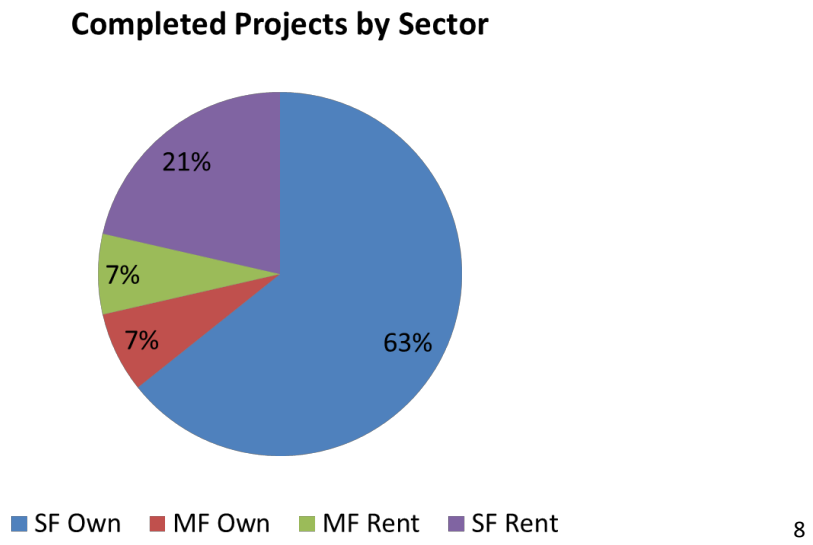
[3] Source: SDG&E Data
[4] Note: This data has been normalized based on population
[5] Source: SDG&E data obtained on 3-22-16 for 2015 only; data is showing customer accounts and savings achieved
[6] Note: Percentages represent savings of total residential portfolio

Residential Projects Completed by Sector [7]



[8]

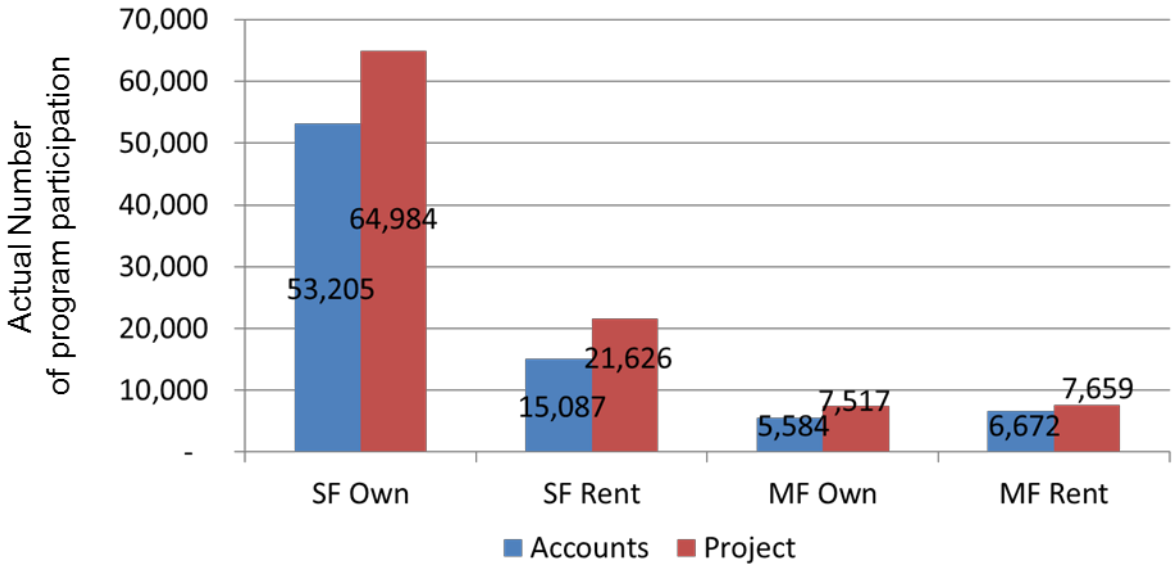
Key observations:

1. The majority of projects completed by sector come from the single family own group at 63% for the 2013-2015 cycle
2. The next largest sector, which represents 21% of completed projects, is the single family rent group

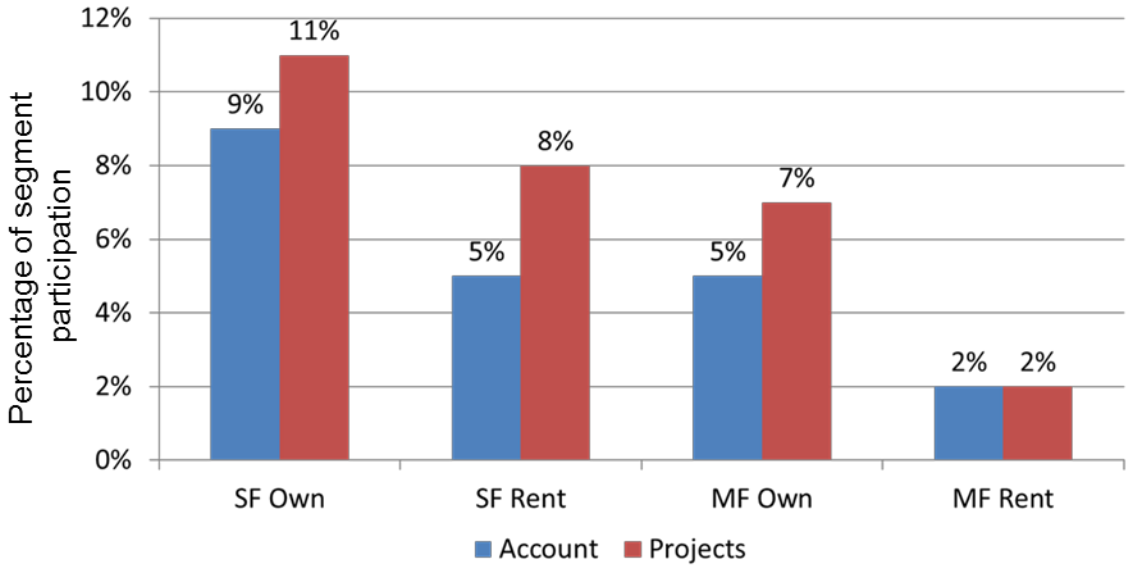
[7] Source: SDG&E Data obtained on 3-22-16 for 2015 only; data is counted by number of projects completed vs accounts that have completed projects

[8] Note: May not equal 100% due to unknown factor of customer own or rent status

2015 Program Participation Data by Segment



[9]



Key observations:

1. The majority of customers that participate in multiple programs are single family home owners
2. Multifamily renters do not see a significant increase in multiple program participation

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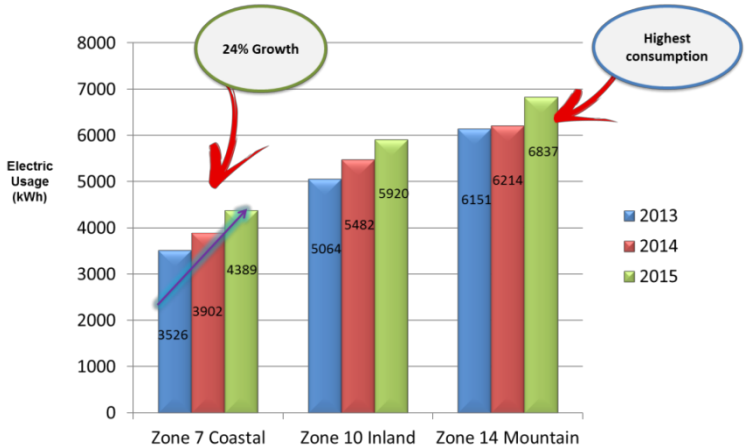
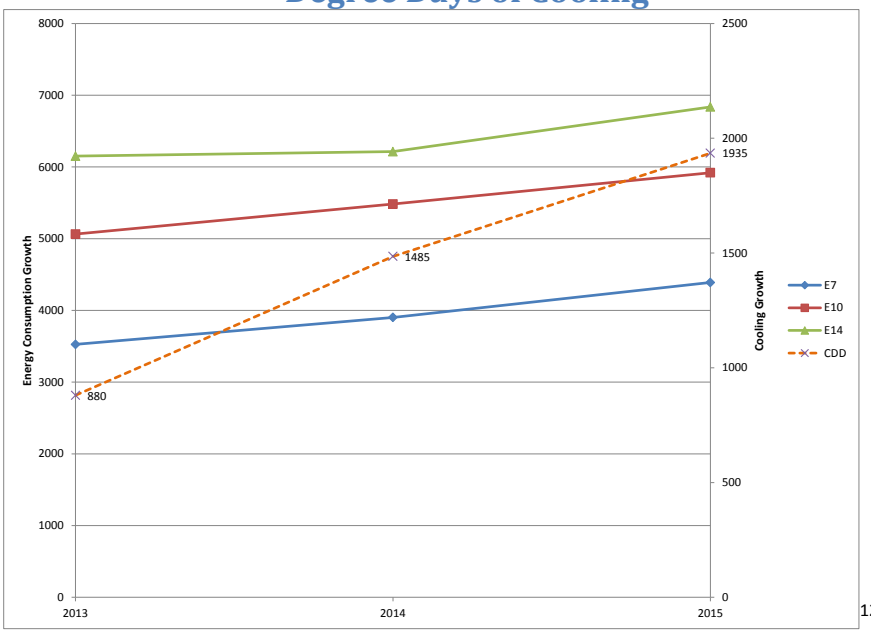
[9] Source: SDG&E data obtained 3-29-16

Energy Consumption by Climate Zone[10]



[11]

Degree Days of Cooling



[12], [13], [14]

Key observations:

1. Climate zone 7 has the greatest number of customers, however it's consumption is the lowest
2. Inland and Mountain areas typically use more energy
3. The greatest growth in energy usage from 2013-2015 comes from climate zone 7
4. Climate zone 14 had a growth rate of 11%
5. Climate zone 10 had a growth rate of 17%

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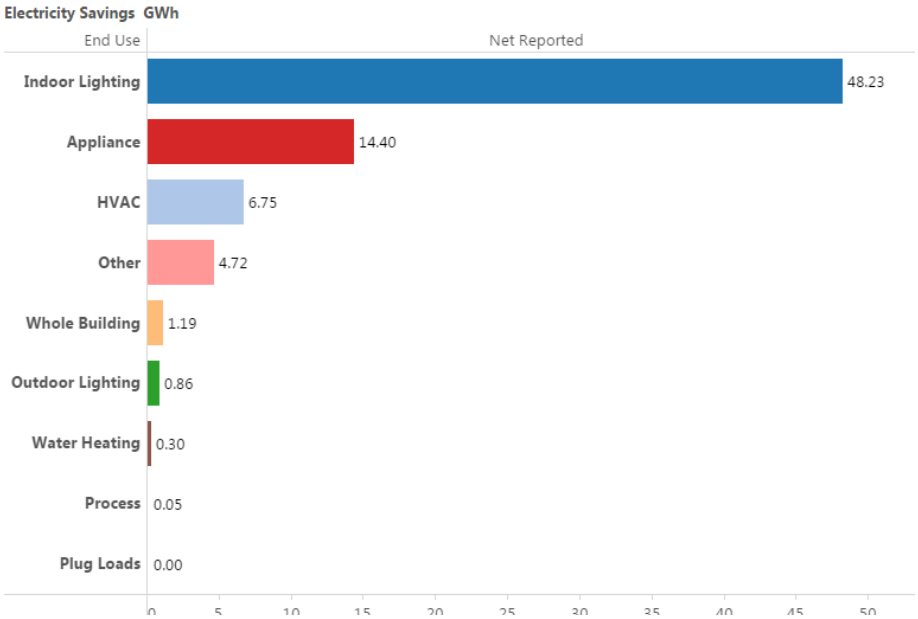
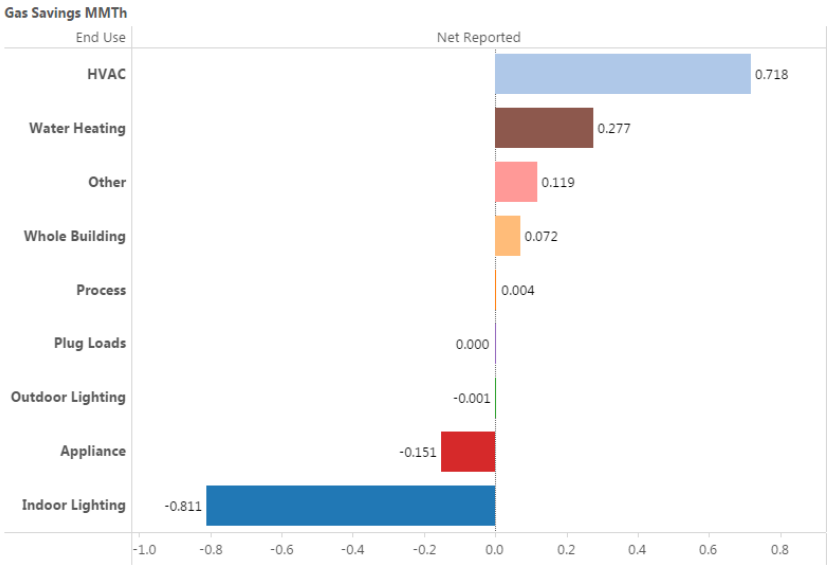
[10] Source: SDG&E Data; data obtained on 2-17-16
[11] Note: The numbers have been normalized based on population
[12] Note: Data for cooling was based only off of one location
[13] Note: Data does not include first three months of cooling in 2013 due to limit on data pull
[14] Source: SDG&E data combined with data obtained from http://www.degreedays.net/#generate on 4/11/16.

Historical Energy Savings by End Use[15]



Historical Gas Savings by End Use



Key observations:

1. Indoor lighting accounts for the majority of electric savings but contributes the greatest to the negative therm effects
2. HVAC is the greatest contributor to therm savings, followed by water heating

[15] Source: EEStats 2013-2015 Program Cycle, final numbers expected to be reconciled by May 2016

SDG&E Vision

San Diego Gas & Electric's vision for the residential sector is to create the foundation for an innovative, integrated and sustainable energy future for our customers.

SDG&E Mission

SDG&E's mission for the residential sector is to empower customers on their path to zero net energy by providing interactive energy tools and information, simple program offerings, and access to assistance.

SDG&E Role

In order to fulfill the vision and mission, SDG&E Residential Customer Programs will develop and employ various interactive strategies based on segment needs. SDG&E's role is to ensure that programs are simplified and responsive to past barriers which are described within the document. Additionally, it is SDG&E's role to ensure that a "first in class" customer experience is built into final program implementation plans. To fulfill these goals, SDG&E will offer a single entry point for residential customers and drive them through the adoption curve. The customer journey will include participation in behavioral programs which will then leverage data to provide customized solutions and assistance.

Problem Statements

Problem Statement 1: There is low market demand for Zero Net Energy new construction in the SDG&E service territory and to date only two homes have been built to ZNE in San Diego County.

Observations

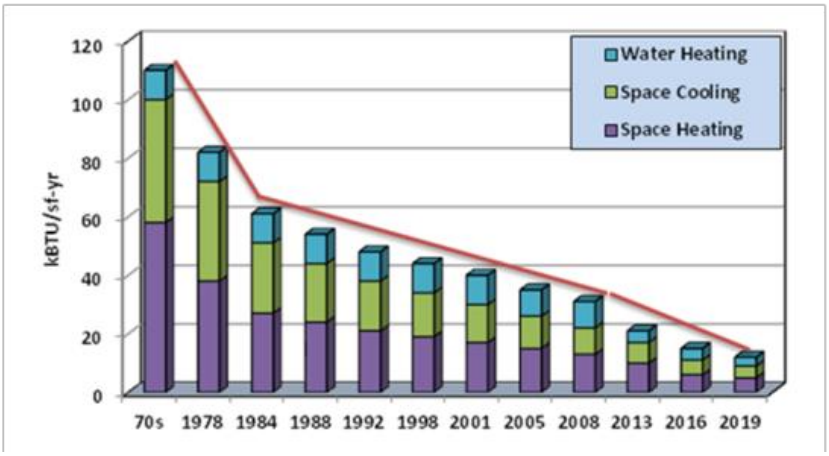
Utilities have noted multiple challenges that inhibit ZNE-ready homes, most notably as code becomes more stringent and complex, it becomes harder (more time, additional costs) for builders and designers to exceed code. With the additional resources required to design and build ZNE construction, increased cost and low demand have followed. [16]

Data

Since 2009, just one out of 15-20 production builders has committed to building ZNE single family homes in the service territory, and to date has only built two ZNE homes.

Code has expanded significantly since the inception of Title 24 in 1978 and led to a reduction in energy intensity of buildings. In 2013, code was 30% more stringent than the last code cycle, and in 2017 when the new code takes effect, it will be 30% more stringent as well.

Impacts of Building Standards on Home Energy Use



[17]

[16] E Source Forum 2015 / Notes from Electrify Your DSM Portfolio!

[17] Source: CEC

While code has improved the efficiency of buildings and helped maximize resources, it is becoming increasingly difficult for builders and owners to meet code. ZNE by 2020 for new construction is at risk of not being achieved due to the lack of support services available for those interested in building ZNE homes.

Strategies

Work with builders and other industry stakeholders to increase customer market demand for ZNE new construction

Education

SDG&GE will work to communicate the benefits of ZNE new construction to designers, builders, real estate professionals, various industry stakeholders, and customers. Furthering customer awareness of the economic benefits and perceived value of ZNE construction can be a starting point to spur customer demand and further builder participation.

Offer additional design assistance through education to encourage building single family and multifamily ZNE homes

Education

Builders and designers will be provided with education on the SDG&E website, information through account executives, and attend enhanced trainings through Workforce Education and Training (WE&T) on how to build to ZNE for single and multifamily buildings. SDG&E will educate energy consultants, builders, Home Energy Rating System (HERS) raters and building industry professionals on specific measures and new design options that can allow multifamily homes to be more efficient than existing Residential Title 24 Code. It is important to influence all of the different decision makers early on to allow multifamily buildings to be designed to maximize efficiency. Lessons learned and case studies will be used as part of the education process.

Offer design incentives to encourage building single family and multifamily ZNE homes and incentivize demand response technologies for new homes

Incentives

SDG&E will provide incentives to design single family and multifamily buildings to ZNE. Similar to Connecticut's Zero Net Energy Challenge, SDG&E will create a leader board to encourage design to ZNE. Multiple prizes will be awarded throughout several categories to showcase best practices.[18] After ZNE has been achieved, the new construction programs could shift focus to demand response technologies to allow those homes to manage energy use in response to price signals. Building awards and recognition for high performing buildings will be a key component to allowing builders to communicate benefits to buyers and renters.

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[18] E Source Forum 2015 / Notes from Electrify Your DSM Portfolio!

Assist with ZNE compliance efforts

Compliance

Once code has been enacted, SDG&E will continue to assist designers and builders to achieve compliance through codes and standards. For more information please refer to the Codes and Standards: Cross Cutting Section of the Business Plan.

Metrics

- Number of zero net energy projects will increase each year
- Number of designers trained will increase each year

Key Partners

- Energy Commission
- Utility (IOU)
    - Account executives
    - Marketing, education and outreach
    - Program staff
- Trade Professional Groups
    - Designers
    - Builders
    - Energy Consultants
    - Home Energy Rating System (HERS) Raters

Problem Statement 2: Energy consumption in existing homes has not declined sufficiently to meet the Long Term Strategic Goal in the Single Family sector. As of 2015, consumption in existing homes decreased by only tbd% (single family) from 2008 levels. [19]

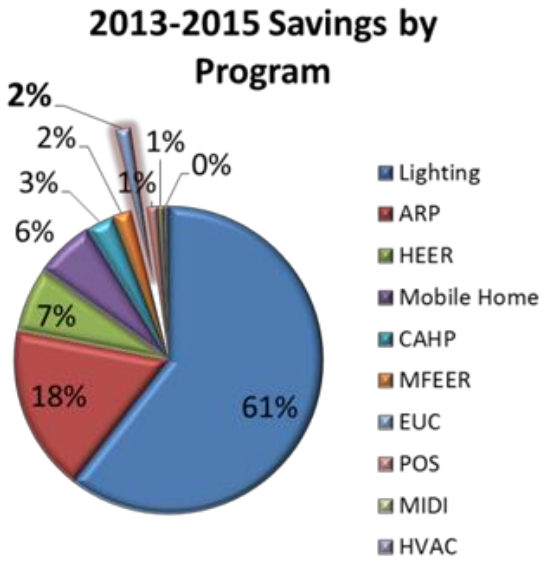
Observations

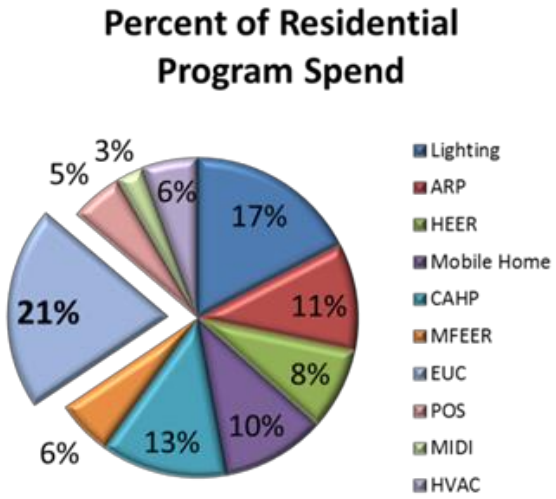
The majority of "whole home approach" programs currently available through utilities require significant customer co-pay and time commitment from customers. The largest whole home program in the state is the Home Upgrade Program (HUP). HUP has its own set of problems that present barriers to participation. Barriers noted by customers and/or program administrators include:

1. Large outlay requirement
2. Low return on investment (ROI)
3. Lack of integration with financing such as Property Assessed Clean Energy (PACE) loans
4. Low cost effectiveness (TRC<1)

Data

In 2013-2015, Home Upgrade accounted for 21% of the residential sector budget and only 2% of the residential sector savings.





[20]

[19] Note: This is SDG&E's perspective. Working to obtain quantifiable data to support or reject this problem statement.
[20] Source: EEStats, final numbers expected to be reconciled by May 2016

Strategies

Leverage data to compel the "decision maker" to do as many things facility appropriate and economically feasible

Information

The 2010-2012 PG&E and SCE Whole House Retrofit Program Process Evaluation Study identified a key strategy for future whole home programs that involves leveraging data to compel the "decision maker" to pursue facility appropriate and economically feasible measures.[21] This strategy relies on data analytics and customer segmentation to inform SDG&E of key customer attributes (customer profile):[22]

- Customer preferences (contact preferences)
- Customer values and drivers (environment, energy rates)
- Customer economic status (household size, income level)
- Customer property (sq. footage, vintage, consumption, peak use & times, etc.)

Once a customer profile is created, SDG&E can embark upon a more successful dialogue that will engender trust.

Raise customers' energy efficiency awareness and promote gradual energy efficiency upgrades

Information

Although some customers may be responsive to behavioral programs and therefore not require further intervention, many customers will warrant further personalized assistance. Customers that require and qualify for further support will benefit from long-term relationship management tactics designed to promote gradual energy efficiency upgrades. A long-term approach is further supported by research indicating the "decision-making period to commit to participation in [Whole Home Programs] can extend over a period of months or even years" due to cost and time investments required.[23]

In recognition of the need to customize, SDG&E is proposing:

- Creating a zero net energy roadmap for qualifying customers to identify upgrades over several years. The roadmap would prioritize improvements based on cost and return on investment and leverage data analytics to determine timing.

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[21] Source: 2010-2012 PG&E and SCE Whole House Retrofit Program Process Evaluation Study (PGE302.01) Published December 12, 2012

[22] Source: 2010-2012 PG&E and SCE Whole House Retrofit Program Process Evaluation Study (PGE302.01) Published December 12, 2012

[23] Source: Comments on Research Plan: Energy Upgrade California Home Upgrade Research and Evaluation

- Developing a relationship management databases to engage with customers and track energy efficiency implementation at a premise.
- Generating a "home energy guide" that would showcase improvements made at the premise and detail the added value associated with the improvements. It would also outline pending upgrades - something which could spur prospective owners to negotiate additional financing at the time of purchase.

Increase engagement in the real estate market

SDG&E will increase engagement in the real estate market in a variety of ways. First, SDG&E will offer training through WE&T to better inform real estate professionals on the value of energy efficiency in homes. Next, by engaging home appraisers to include energy efficiency as part of the criteria for a home's value, potential home buyers can be made aware of important efficiency characteristics within the home. To further that initiative, SDG&E will work with real estate websites such as Redfin, Zillow, SDLookup, and Sandicor to have home ratings included with other features listed.

SDG&E will also leverage incentives and financing to increase engagement in the real estate market. By incentivizing customers through rebates or better financing, public market demand for residential asset ratings will increase. Additionally, SDG&E will work with the real estate industry to include an energy efficiency audit as part of a home inspection so that sub-par homes will be required to have upgrades included at the buyers' request.

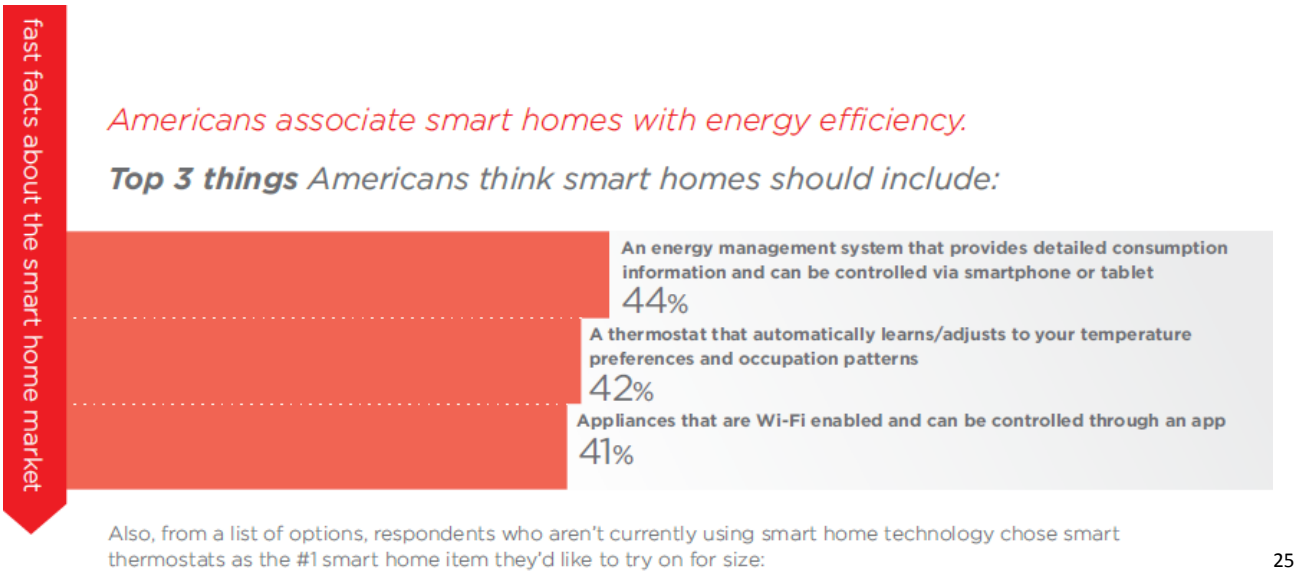
Investigate home management system as part of home upgrade package

Incentives

Customers are increasingly demanding tools that simplify their life, making home management systems a logical technology to incorporate into a whole home program. Home management systems *"quickly gain customer's mind share, wallet share, and trust by providing new connected products and services"*.[24] Even though there are energy efficiency benefits associated with home energy management systems, research has indicated that it is important to inform customers of other benefits besides energy efficiency to improve uptake. Key considerations and strategies involve:

- Leading with comfort, convenience, and safety, and then combining benefits with environmental messages.
- Leveraging segmentation data to tailor messaging based on customer profiles and preferences

[24] Top Utility Industry Trends to Keep an Eye on in 2015, Alanya Schofield, June 10, 2015



[25]

SDG&E is also proposing to provide incentives for home management systems. This will involve first working through the ideation process to determine which home management systems are effective at managing technology within a customer's home.[26] A good approach to first introducing/incentivizing a home management system is through Demand Response (DR) programs. If the approach is successful, then the next phase would be to fully launch the new offering in connection to the whole home approach and eventually have bi-directional interaction between SDG&E and the equipment.

Provide or connect customers to financial assistance

Financing

One of the barriers for customers to adopt a whole home approach as identified in a Whole House Retrofit Impact evaluation can be cost: *"Financial constraints are the largest reason for not being able to take action"*.[27] In order to assist with that barrier, SDG&E will provide or connect customers to financial assistance. Loans will be available for SDG&E single family customers through the Residential Energy Efficiency Loan (REEL) program and local Property Accessed Clean Energy (PACE) financing. Financial programs will continue to be evaluated, adapted if needed, or otherwise continued.

Metrics

- Tbd % increase each year in customers committing to a whole home approach
- Tbd % increase each year in customers reaching deep energy savings.

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[25] Source: Smart Home Strategies for Utilities: Five Reasons You Should Get in the Game, Shelton Communications Group

[26] RECONSIDERING WHAT WE MEASURE: A WHITE PAPER Residential Decision-Making and Proposed Standard Questionnaire Items (aka AKAB Whitepaper) (SCE0305); Published August 1, 2011

[27] Whole House Retrofit Impact Evaluation - Evaluation of Energy Upgrade California Programs (CPU0093.01) Published September 9, 2014

Key Partners

- Energy Commission
- Utility (IOU)
    - Marketing, education and outreach
    - Program staff
    - Analytics
    - IT
- Trade Professional Groups
    - Contractors
    - Technology vendors
    - Real Estate Agencies
    - Appraisers
- Financial and Investment community
- Water Agencies

Problem Statement 3: Energy consumption in existing multifamily homes has not declined sufficiently to meet the Long Term Strategic Goal in the Multifamily sector[28]. As of 2015, consumption in existing homes decreased by only tbd% (Multifamily) from 2008 levels. [29]

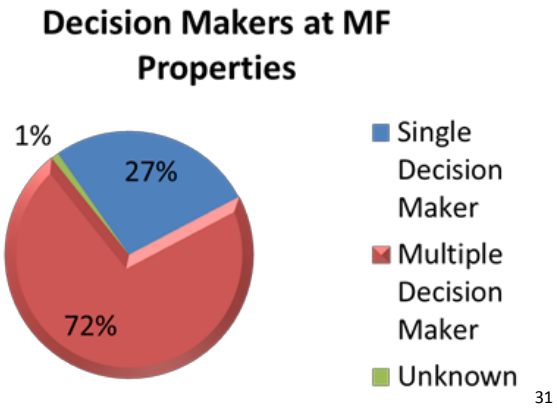
Observations

For multifamily properties the lack of a comprehensive uptake in a whole building approach continues to be challenging. There are many reasons for this including but not limited to:

- The multifamily sector has multiple buildings that can make it challenging to provide a comprehensive energy analysis;
- Facility operators understand and can identify the energy efficiency upgrades needed but do not have the authority to make the decisions;[30]
- Multiple decision makers (property owner, property manager, tenant) make it difficult for a comprehensive uptake in program participation in multifamily properties;
- Split-incentive continues to be challenging;
- Energy efficiency is often not a priority for property owners/managers;
- Zero percent financing is currently offered by SDG&E, however, participation is limited due to program requirements and lending laws;
- Future finance offerings through SDG&E will be available to customers at market interest rates

Data

For multifamily properties, 72% stated that there are multiple decision makers.



[31]

[28] Note: This is SDG&E's perspective. SDG&E is working to obtain quantifiable data to support or reject this problem statement.
[29] Note: This is SDG&E's perspective. SDG&E is working to obtain quantifiable data to support or reject this problem statement.
[30] Note: SDG&E program staff anecdotal data
[31] Source: 2010-2012 *Multifamily Property Owner and Operator Study, April 15, 2013*

Anecdotal feedback from SDG&E program staff suggests that slightly more than half of property owners and managers think energy efficiency is important to their tenants. Other factors such as property amenities, floor types, counter types, appliance design, etc. are frequently viewed as more important to tenants than energy efficiency.

Strategies

Provide potential tenants and owners/managers with the building's energy cost information so they can make informed decisions

Education

The 2013-2014 Multifamily Focused Impact Evaluation highlighted that, "There is [no] consistent way to bundle MFEER program measures into projects or properties, making it challenging to survey a single property owner on all his or her incented measures."[32]

In order to address a lack of uptake multifamily it is important to provide potential tenants, owners, and managers with the information on a building's energy cost information so informed decisions can be made. The first step in this process is to benchmark a portfolio of properties to identify properties with the highest energy use index. The next step would be for a percentage of buildings to perform a comprehensive audit to identify Integrated Demand Side Management (IDSM) opportunities that could be included as part of a whole building package. Finally, there needs to be a tracking mechanism in place so a certain number of properties will begin to actively track all post install performance and progress through Energy Star Portfolio manager and identify new and deeper savings.

Identify best offerings for customers based on needs and assessment and provide project implementation assistance

Education

SDG&E will provide customers with a Single Point of Contact (SPOC). "The Single Point of Contact (SPOC) concept offers improved outreach, education and better program experiences for participants."[33] SDG&E will then lead customers to the most appropriate program based on needs and assessment and provide assistance to implementation of the actual whole building project. Based on a customer's needs and budget, the most suitable program and approach will be identified.

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[32] Source: 2013 -2014 Residential Roadmap Multifamily Focused Impact Evaluation, DNV Published December 4, 2015
[33] Source: Multifamily Process Evaluation (2014-15): Contractor Workshop Results Published December 31, 2015

Incentive

SDG&E will provide incentives to property owners for IDSM improvements regardless of account holder in order to overcome the split incentive barrier. The program will be evaluated, adapted if needed, or continued as-is in the long term.

Provide or connect customers to financial assistance

Financing

The number one barrier to the whole home approach is cost. In order to assist with this barrier, SDG&E will provide or connect customers to financial assistance. Multifamily master-metered properties will be able to access specialized loans for affordable housing to facilitate greater energy efficiency uptake. PACE is available today for multifamily properties interested in holistic energy efficiency/IDSM improvements and will be leveraged further by SDG&E in the upcoming years.[34] Financial programs will continue to be evaluated, adapted if needed, or otherwise continued.

Metrics

- The percentage of properties that go through the multifamily process will increase each year
- The number of properties that receive financial assistance will increase each year

Key Partners

- Energy Commission
- Utility (IOU)
    - Marketing, education and outreach
    - Program staff
    - Analytics
- Landlords
    - Property owners
    - Property managers
- Tenants
- Trade Professional Groups
    - Contractors
    - Vendors
    - Facility maintenance operators
- Financial and Investment community
- Water agencies

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[34] Source: 2010-2012 PG&E and SCE Whole House Retrofit Program Process Evaluation Study (PGE302.01) Published December 12, 2012

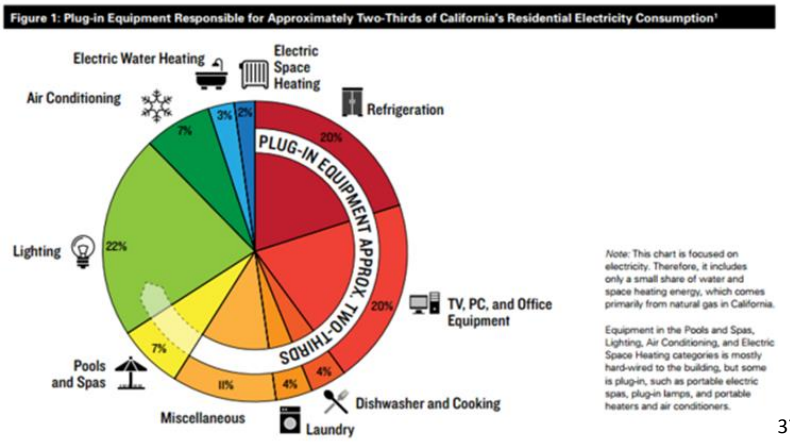
Problem Statement 4: Plug-loads are continuing to grow and do not show signs of declining. Plug loads have grown 66% from 1990 to 2015 and are forecasted to grow to 77% by 2024.[35]

Observations

As plug loads continue to grow, their increased consumption will play an effect on what is employed to better manage the growth and slow/reduce it. Plug loads consist of anything that is plugged in to the wall including but not limited to the following: refrigeration, electronic equipment, dishwasher and cooking, laundry, pools and spas, some lighting, and miscellaneous. A study done by Silicon Valley Power indicated that "Home Electronics is one of the fastest-growing categories of home energy use."[36] This may be due to a variety of reasons; one example would be that even though televisions are getting more efficient, customers choose to buy larger televisions which would use more energy than just replacing their existing television with one of the same size. Additionally, customers are not necessarily getting rid of their old television but instead moving it to a different room that did not originally have a television in it. Another component of plug-loads that has the potential for energy savings is the miscellaneous category, which currently accounts for 8% of the plug-load energy use, and consists of products such as cell phones, coffee makers, and rechargeable tooth brushes.

Data

Currently in California 66% of residential electric energy consumption is comprised of plug loads.



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Plug loads in California are forecasted to grow to 77% in 2024.

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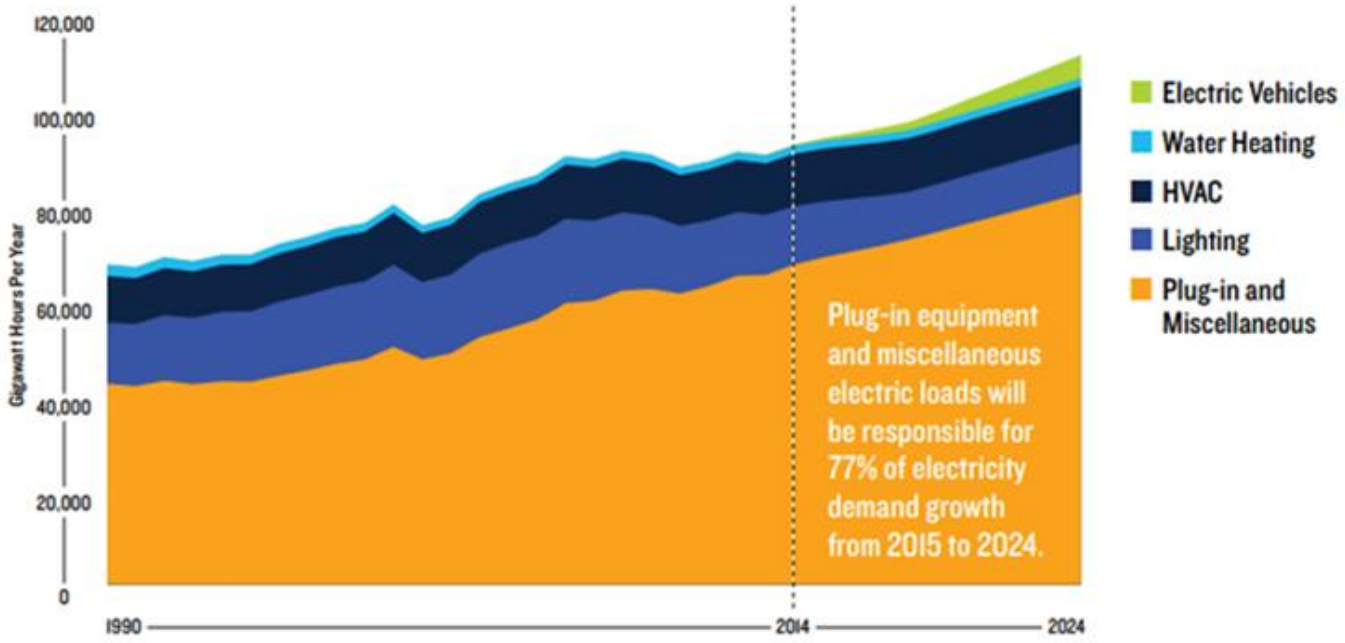
[35] Source: *Plug-In Equipment Efficiency: A Key Strategy to Help Achieve California's Carbon Reduction and Clean Energy Goals; NRDC Issue Brief*

[36] Source: E source, Silicon Valley Power, Saving Energy on Home Electronics

[37] Source: *Plug-In Equipment Efficiency: A Key Strategy to Help Achieve California's Carbon Reduction and Clean Energy Goals; NRDC Issue Brief*

Figure 2: California Residential Electricity Growth Forecast[7]



[38]

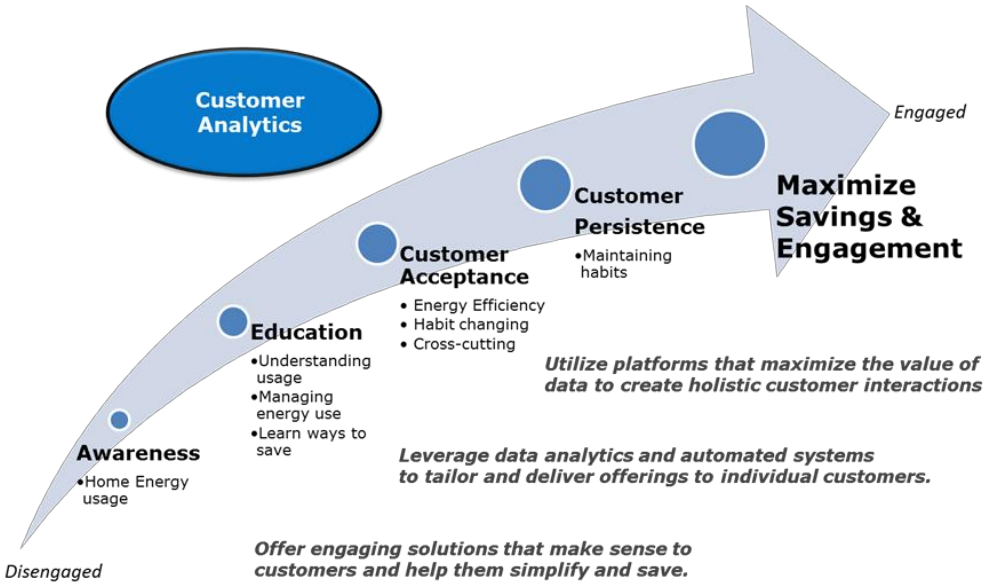
[38] Source: *Plug-In Equipment Efficiency: A Key Strategy to Help Achieve California's Carbon Reduction and Clean Energy Goals; NRDC Issue Brief*

Strategies

Empower customers to better manage their energy usage by providing them with granular level information on end-use and personalized recommendations on how to save

Education

Due to the many benefits of smart meters, AMI/interval data is available to customers to better manage energy use through Green Button and SDG&E behavioral programs. In order to get customers fully engaged and maximize savings, SDG&E will need to bring customers along the customer engagement curve.



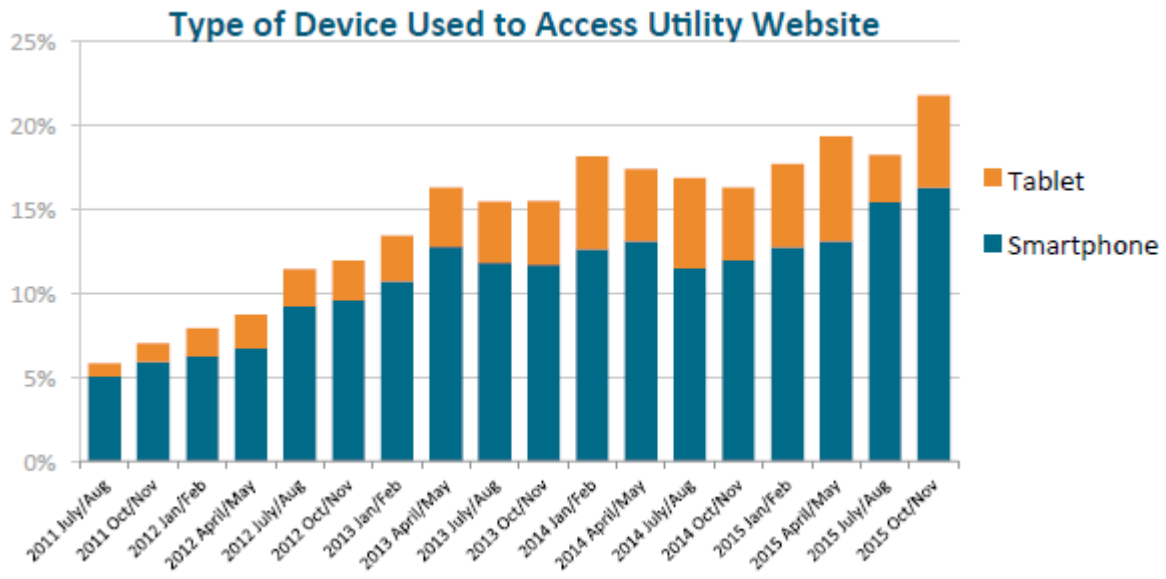
The first step involves making customers more aware of their energy usage. One example of how this can be done is through a behavior program that provides customers with an "attention grabbing" normative comparison report. The report informs customers on ways that they can save and encourages customers to go to the web platform to learn more about their energy usage. An article titled *Is It Time For a Behavior Change* indicated that "engaged customers are typically better targets for other program offerings."[39] SDG&E will continue to provide targeted messaging through the behavior program and encourage customers to activate onto the online platform as that has been shown to increase engagement and savings.

The next step along the engagement curve process is to get customers more educated on the energy they are using and identify tools available to improve energy management. Customers will need to complete an audit/energy efficiency survey that will not only provide energy efficiency recommendations but also provide information on other resources available for a whole home approach. By making customers aware of utility rebates and efficient appliances, customers will have the knowledge and tools to adopt energy efficiency into

[39] Source: Aleana Reeves and Kim Burke, Is It Time For a Behavior Change, published July, 17, 2013

their lifestyle, make smarter purchases, and ideally continue to make smart energy choices in their home in the future.

Data shows that customer's attention is quite high for messages delivered on a mobile platform. Therefore it is important to think about ways to leverage that engagement by optimizing programs and offerings for mobile browsing or through the SDG&E app. With the market moving towards mobile applications, it will be important to integrate our offerings with mobile platforms so that customers can be connected to SDG&E at any time through their mobile device.[40]



[41]

Provide customers with an online solution to purchase energy efficient products.

Education

Providing customers with an online solution to purchase energy efficient appliances and home improvements is another method to help simplify the decision-making process for customers. The development of an online solution (Marketplace) to enable customers to make smart choices on appliance purchases that is integrated with rebates is the first step in the process.

Incentives

SDG&E aims to integrate online solutions with rebates to simplify the purchase of energy efficiency products and services. Rebates will be processed through the integrated online channel to allow for a quick turn-around

[40] Source: Efficiency Beyond Widgets: Residential Behavioral Program Options
[41] Source: JD Power, Settling the JD Power Score presentation March 3, 2016

time and more streamlined solution for customers. Continuously adding new products is part of this approach and working through the ideation process to identify new technologies to constantly evolve with the market will keep customers engaged and returning to Marketplace. Some potential new products that can be introduced to the Marketplace besides the common appliances could be pool pumps, advanced power strips[42], electric vehicle (EV) chargers, and battery storage. Marketplace will provide customers with a way to compare different models, prices, rebate information from multiple sources, and purchase the product all in one location.

Provide customers with resources to select qualified trade professionals

Education

Resources will be provided to customers so that they will be able to make informed decisions before selecting qualified trade professionals to assist with installation.

Provide or connect customers to financial assistance

Financing

The incremental cost of higher efficiency products can be a barrier for customers to purchase these products. In order to assist with that barrier, SDG&E will provide or connect customers to financial assistance. Loans will be available for SDG&E single family customers through REEL and through PACE. Financial programs will continue to be evaluated, adapted if needed, or otherwise continued. [43]

Metrics

- Number of rebates processed through online solution will increase each year

Key Partners

- Energy Commission
- Utility (IOU)
    - Marketing, education and outreach
    - Program staff
    - Analytics
    - IT
- Trade Professional Groups
    - Contractors
    - Vendors

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[42] Source: E source, Silicon Valley Power, Saving Energy on Home Electronics
[43] Source: Whole House Retrofit Impact Evaluation - Evaluation of Energy Upgrade California Programs (CPU0093.01) Published September 9, 2014

    - Retailers
    - Manufactures
    - Social scientists
    - Evaluators
- Financial and investment community
- Water agencies

Problem Statement 5: Advanced lighting technologies are more expensive than incandescent or CFLs. Although the SDG&E lighting portfolio has largely converted to LEDs – 77% overall in 2015, the market has not transitioned at the same pace. LEDs still only represent approximately 9% of the market.[44] Availability of advanced lighting controls and qualified CALCTP installers in San Diego is limited (# of installers in San Diego)

Observations

Due to the large energy savings potential and straightforward nature of replacing lamps in sockets, residential lighting has long been a centerpiece of ratepayer-funded energy efficiency program portfolios.[45] Despite many years of support for new lighting technologies via rebates and advocacy initiatives, however, the data noted in the following section clearly demonstrates that California's residential lighting market is not effectively transformed and will continue to require significant support through lighting efficiency programs. As stated in the California Energy Efficiency Strategic Plan, the 60-80 percent reduction in statewide lighting energy consumption proposed for 2020 can only be achieved with the full and aggressive transformation of the residential lighting market.[46] While the standard barriers to a comprehensive and efficient market transformation are well known among industry stakeholders, the persistent effects of economics, customer education and policy conflicts continue to inhibit greater progress in the residential lighting market.

Data

The best source of data describing the current state of residential lighting is the California Lighting and Appliance Saturation Study or "CLASS" published in May of 2014.[47] The latest edition of the CLASS uses data collected in 2012 from 2,000 homes throughout California and compares it to similar data from prior studies conducted in 2000 and 2005. The on-site survey data includes detailed samples of lighting components operated in single family, multifamily and mobile home residences throughout the service territories of all three IOUs.

According to the CLASS report, several important details about the status of residential lighting in California are worth noting:

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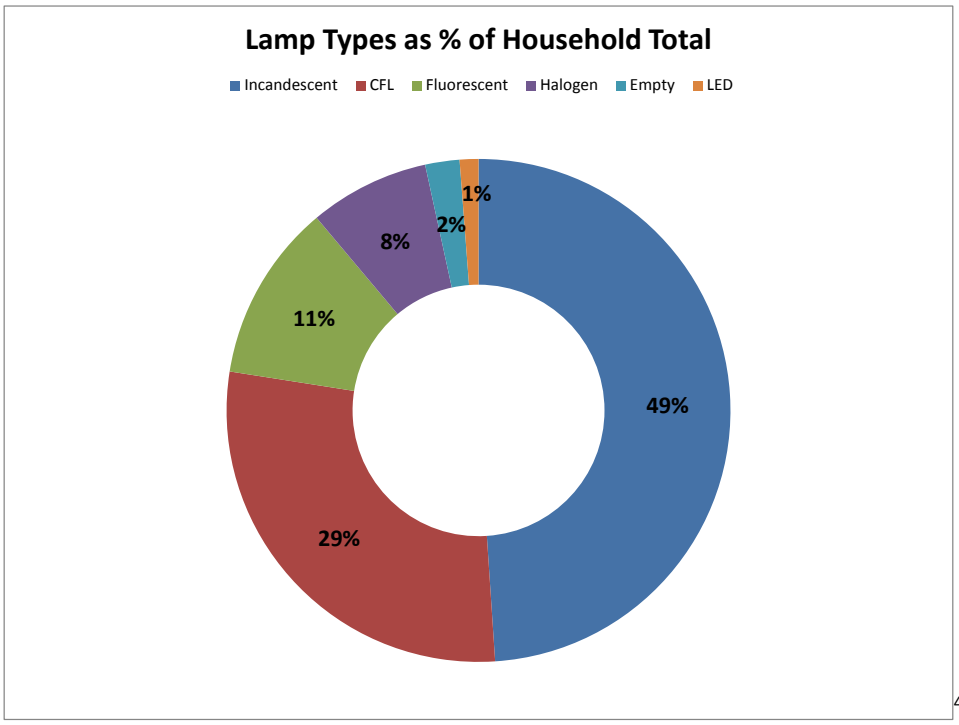
[44] Source: Changes in the Lighting Landscape: What LED – Pun Intended – To Better Bulbs? www.ase.org 04/04/16 Reed Brown
[45] Northeast Energy Efficiency Partnerships. The State of Our Sockets: A Regional Analysis of The Residential Lighting Market. August, 2015.
[46] CPUC. California Energy Efficiency Strategic Plan, January 2011 Update. Page 95.
[47] DNV-GL / KEMA Inc. WO21: Residential On-site Study: California Lighting and Appliance Saturation Study (CLASS 2012). Prepared for the CPUC Energy Division. May 21, 2014.

- The average California home has 31 individual light fixtures operating a total of 47 lamps (some fixture types such as ceiling fans have multiple lamps).
- 97% of the homes surveyed had at least one CFL installed while only 9% of homes had a light-emitting diode (LED).
- As noted in the chart below, incandescent lighting continues continue to have the highest saturation rate with almost half of all lamp sockets in the average home operating these inefficient lamp types.



[48]

Using data from the 2012 CLASS combined with other large-scale studies of the California lighting market published in 2014, analysts developed energy savings estimates for the residential sector as part of the 2014 Lighting Solutions Workbook.[49] Based on the high proportion of inefficient incandescent and other incumbent lighting technologies that continue to dominate the majority of residential lamp sockets, the total technical savings potential is currently estimated to be 7,117 GWh per year.[50] Moreover, much of this potential savings is attributable to the installation of new lighting controls that represent a new growth opportunity in the residential market.

The following table summarizes the estimated energy savings available in the main areas of California's residential space.

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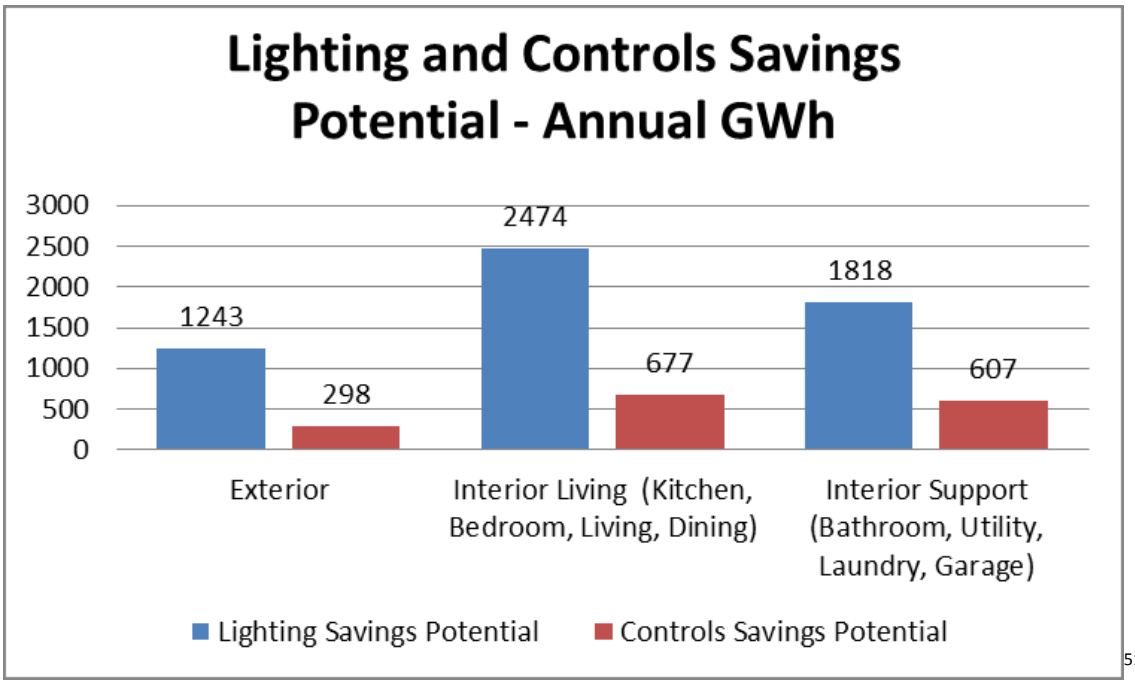
[48] Ibid, page 2-12.
[49] Cadmus. California Lighting Solutions Workbook, 2014 Update Report. Prepared for Southern California Edison, Pacific Gas and Electric, and San Diego Gas and Electric. December 19, 2014.
[50] Ibid, page 42.



[51]

Strategies

Promote consumer education and lighting technology awareness

Education

SDG&E will continue to promote consumer education and lighting technology awareness in order to help create a strong end-user demand for the leading new lighting products arriving in the market. In order to avoid the historical trends of selecting lighting products based solely on lower first-costs and shortest payback terms, continued education must also be provided to end-users. Education about externalities such as longer lifecycles, less frequent replacements and improved comfort attributable to new LEDs will be provided to customers.

Ensure the affordability of premium-efficiency lighting products

Incentives

SDG&E will ensure the affordability of premium-efficiency lighting products by continuing to expand and support retail channels for LEDs as part of SDG&E's highly successful upstream rebate program targeted at all residential customers. In order to assist with the market transformation lighting efforts, SDG&E will offer appropriate incentive amounts on new premium-efficiency products upon market entry in order to offset

[51] Ibid, page 39.

higher initial costs. These incentives will be modified as economies-of-scale gradually lower the market prices of new technologies as sales volumes increase.

Ensure the continual evolution of lighting programs

Incentives

SDG&E will ensure the continual evolution of lighting programs by modifying and adapting incentives, and program support in conjunction with product lifecycles. As seen with the gradual transition from incandescent-to-CFL-to LED over the last ten years, programs must remain nimble in order to continually identify and promote emerging lighting technologies. SDG&E will adjust incentives and other program support of lighting products in proportion to gains in efficacy or other performance criteria. Efficacy improvements in current LED products are occurring from year to year and rebate structures should align with efficacy growth curves. SDG&E will plan for strategic product introductions and accompanying marketing promotions to ensure continued consumer interest in the lighting market. SDG&E will continue to play a critical role in lighting market transformation to ensure advancements continue.

Ensure that lighting controls play a greater role in annual savings targets and program offerings

Incentives

SDG&E will ensure that lighting controls play a greater role in annual savings targets and program offerings. There will be enhanced marketing and cross-promotion of new dimmable LEDs in conjunction with controls that enable significant savings opportunities via daylight harvesting, occupancy scheduling, tuning and scheduling. New program offerings to support network-connected controls and lamps will be developed. Greater incentives to support new premium-efficiency lighting fixtures or lamps that include integrated controls will also be provided.

Collaborate with regulators and industry stakeholders to eliminate policy barriers

Regulatory

SDG&E will collaborate with regulators and industry stakeholders to eliminate policy barriers by organizing workgroups to regularly assess any policy obstacles affecting the performance of lighting programs. All areas of the residential lighting market (lamp types, applications, innovative solutions) will be examined to ensure policies align with the needs of the consumer and market demands.

Metrics

- Growth in the proportion of LEDs or premium-efficiency lamps in the total population of household sockets.
    - From the 2012 CLASS saturation rates of 29.2% CFL and 1.2% LED, a conversion to >80% LED throughout the home would represent a successful market transformation and energy savings goal.

- Growth in the proportion of new, premium-efficiency lamp models on retail shelves relative to the total population of standard products.
- Increase in the fleet average efficacy ratings of all lamps sold by retailers serving the residential market.
- Elimination of policy barriers that inhibit energy efficiency program support for a comprehensive range of premium-efficiency lamps that meet all residential needs. This metric would result in the growth of the number of individual lamps eligible for support from residential energy efficiency programs.
    - Current CEC specifications for LEDs overlook several popular lamps that replace inefficient incumbent models that are widely deployed in many homes. Consequently, energy efficiency programs are not able to offer financial incentives to support these niche products or advocate for customer adoption.
- Increase in the number of incumbent, inefficient lamps removed from manufacturers' and retailers' inventory due to increased consumer demand for higher efficiency products.
- Increase in the usage of network-connected lighting controls in residential applications.
    - Growth in the eligibility of residential lighting controls for support from utility EE programs
- More frequent introduction of new premium-efficiency lamps and controls into the residential lighting market to continually stimulate consumer demand.
- Annual growth in the support for innovative lighting and controls products from utility energy efficiency programs.

Key Partners

- Energy Commission
- Utility (IOU)
    - Marketing, education and outreach
    - Program staff
- Trade Professional Groups
    - Contractors
    - Retailers
    - Lighting manufacturers
    - Lighting control manufacturers
- Architects State Policymakers
- Regulatory Agencies (EPA/DOE/CEC)

Conclusion

San Diego Gas & Electric's vision for the residential sector is to create the foundation for an innovative, integrated and sustainable energy future for our customers.

There are multiple barriers to the achievement of the Long Term Strategic Plan and SDG&E is working through those challenges.

For example, the low market demand is a threat to achieving ZNE new construction by 2020. SDG&E will offer additional design assistance to encourage building single and multifamily homes and will incentivize demand response technologies for new homes. Then when code has been enacted, SDG&E will continue to provide assistance to designers and builders to achieve compliance through codes and standards.

Next, energy consumption in single family and multifamily homes has not declined sufficiently to meet the Long Term Strategic Plan. This is often due to the high initial cost for owners and low perceived benefits and awareness of energy efficiency. SDG&E will seek to provide or connect customers to financial assistance through Residential Energy Efficiency Loan (REEL) program and local Property Accessed Clean Energy (PACE).

As plug loads continue to grow their increased consumption will play an effect on what is employed to better manage the growth. SDG&E will continue to make customers more aware of their energy usage through the behavior program and encourage customers to activate onto the online platform as it has been shown to increase engagement and energy savings. By making customers aware of utility rebates and efficient appliances through Marketplace, customers will have the knowledge and tools to adopt energy efficiency into their lifestyle, make smarter purchases, and ideally continue to make smart energy choices in their home in the future.

As stated in the California Energy Efficiency Strategic Plan, the 60-80 percent reduction in statewide lighting energy consumption proposed for 2020 can only be achieved with the full and aggressive transformation of the residential lighting market. SGD&E will continue to promote consumer education and lighting technology to drive saturation of 1.2% LED to over 80% to achieve a successful market transformation and energy savings. SDG&E will also ensure that lighting controls play a greater role in annual savings targets and program offerings.

These continued and expanded efforts will encourage customer awareness, participation, and market transformation in order to position SDG&E to successfully achieve the Long Term Strategic Plan.

Appendix

Strategy Objective Matrix – Residential Sector

Strategy Objective	**Strategies (Consolidated)**
Create Demand	Create ZNE Cost Benefit Awareness & Provide Design Assistance
	Leverage Data to Compel Decision Makers & Customers to Pursue EE
	Incorporate Cost Benefits of EE in Real Estate Market
	Increase Awareness of EE Benefits of Lighting Technologies to Customers
	Increase Cost Benefit Awareness of EE to Multifamily Tenants & Owners
Simplify Offerings	Create Single Point of Entry & Contact
	Make Behavioral Programs Gateway to Programs
	Provide Resources to Assist in Selection of Qualified Trade Professionals
	Provide Roadmap & Guide Customers Through Multi-Year Upgrades
	Provide Online Marketplace Solution That Integrates Rebates & Discounts
Improve Affordability	Provide ZNE Design Assistance Incentives
	Explore Providing Incentives to Multifamily Owners vs. Tenants
	Ensure Affordability of Premium Efficiency Lighting Products
	Integrate Financing in Whole Home Programs & Plug Load Offerings
Promote Innovation	Ensure Continual Evolution of Lighting Programs
	Evolve Measure Offerings with Assistance of Emerging Technologies
	Explore Integration of Home Management Systems Into Whole Home Programs
	Explore Demand Response/Smart Grid Incentives for New Construction