

# Southwest Energy Efficiency Workshop

November 15, 2012



# Agenda

- Overview of 2012 & 2013 Programs
- What's New in
  - Education
  - Commercial
  - HVAC
  - Advanced Building Techniques
  - Demand Response
- Freeridership and Spillover Study
- Traction
  - Responding to Lost Revenue Requirements

# Nevada Power Proposed 2013-2015 Budgets

Budget	2013	2014	2015	Total
<b>Part I.A</b>				
<b>Energy Education and Consultation</b>				
Non-Profit Agency Grants	\$100,000	\$100,000	\$150,000	\$350,000
Energy Education	\$400,000	\$400,000	\$400,000	\$1,200,000
<i>Subtotal -- Part I.A</i>	<i>\$500,000</i>	<i>\$500,000</i>	<i>\$550,000</i>	<i>\$1,550,000</i>
<b>Part I.B</b>				
<b>Low Income Customers</b>				
Low Income Weatherization	\$500,000	\$500,000	\$500,000	\$1,500,000
<i>Subtotal -- Part I.B</i>	<i>\$500,000</i>	<i>\$500,000</i>	<i>\$500,000</i>	<i>\$1,500,000</i>
<i>Subtotal -- Part I (A&amp;B)</i>	<i>\$1,000,000</i>	<i>\$1,000,000</i>	<i>\$1,050,000</i>	<i>\$3,050,000</i>
<b>Part II.</b>				
<b>Misc. Market and Technology Trials</b>				
Market and Technology Trials	\$400,000	\$400,000	\$400,000	\$1,200,000
Energy Efficiency Measures Financing	\$0	\$450,000	\$1,300,000	\$1,750,000
<i>Subtotal -- Part II -- Misc and Market &amp; Technology Trials</i>	<i>\$400,000</i>	<i>\$850,000</i>	<i>\$1,700,000</i>	<i>\$2,950,000</i>
<b>Part III.</b>				
<b>Demand Response</b>				
Demand Response	\$17,350,000	\$19,150,000	\$21,400,000	\$57,900,000
<i>Subtotal -- Part III -- Demand Response</i>	<i>\$17,350,000</i>	<i>\$19,150,000</i>	<i>\$21,400,000</i>	<i>\$57,900,000</i>
<b>Part IV.</b>				
<b>All Other Programs</b>				
Residential Energy Efficient Lighting	\$1,300,000	\$2,300,000	\$1,700,000	\$5,300,000
Second Refrigerator Collection and Recycling	\$1,200,000	\$1,200,000	\$1,200,000	\$3,600,000
Energy Smart Schools	\$1,300,000	\$1,600,000	\$1,800,000	\$4,700,000
Commercial Incentives	\$9,700,000	\$10,650,000	\$11,800,000	\$32,150,000
Residential High Efficiency Air Conditioning	\$7,500,000	\$9,000,000	\$10,000,000	\$26,500,000
Energy Efficient Pools and Spas	\$1,500,000	\$1,500,000	\$1,600,000	\$4,600,000
Advanced Building Techniques	\$500,000	\$500,000	\$500,000	\$1,500,000
Consumer Electronics and Plug Loads	\$1,000,000	\$0	\$0	\$1,000,000
Energy Plus New Homes	\$0	\$0	\$0	\$0
Residential Solar Thermal Water Heating	\$250,000	\$250,000	\$250,000	\$750,000
<i>Subtotal -- Part IV -- All Other Programs</i>	<i>\$24,250,000</i>	<i>\$27,000,000</i>	<i>\$28,850,000</i>	<i>\$80,100,000</i>
<b>Total Demand Side Programs</b>	<b>\$43,000,000</b>	<b>\$48,000,000</b>	<b>\$53,000,000</b>	<b>\$144,000,000</b>

**Preferred Energy Savings Table - kWh 2013-2015**

<b>Program</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Non-Profit Agency Grants	240,000	240,000	360,000	840,000
Low Income Weatherization	500,000	500,000	500,000	1,500,000
Demand Response	8,170,000	8,170,000	7,150,000	23,490,000
Residential Energy Efficient Lighting	11,300,000	12,600,000	5,200,000	29,100,000
Second Refrigerator Collection and Recycling	6,200,000	5,890,000	5,580,000	17,670,000
Energy Smart Schools	6,000,000	7,400,000	8,300,000	21,700,000
Commercial Incentives	64,000,000	71,000,000	78,000,000	213,000,000
Residential High Efficiency Air Conditioning	16,000,000	20,000,000	22,500,000	58,500,000
Energy Efficient Pools and Spas	8,250,000	8,250,000	9,000,000	25,500,000
Consumer Electronics and Plug Loads	4,500,000	0	0	4,500,000
Energy Plus New Homes	0	0	0	0
Residential Solar Thermal Water Heating	180,000	180,000	180,000	540,000
Advanced Building Techniques	400,000	400,000	400,000	1,200,000
<b>Portfolio Total</b>	<b>125,740,000</b>	<b>134,630,000</b>	<b>137,170,000</b>	<b>397,540,000</b>

**On Peak Demand Savings Table - KW Preferred**

<b>Program</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Non-Profit Agency Grants	33	33	50	116
Low Income Weatherization	171	171	171	513
Demand Response	55,000	65,000	70,000	190,000
Residential Energy Efficient Lighting	1,147	1,279	528	2,954
Second Refrigerator Collection and Recycling	910	864	819	2,593
Energy Smart Schools	907	1,117	1,254	3,278
Commercial Incentives	8,831	9,820	10,749	29,400
Residential High Efficiency Air Conditioning	5,928	7,410	8,336	21,674
Energy Efficient Pools and Spas	1,184	1,184	1,291	3,658
Consumer Electronics and Plug Loads	602	0	0	602
Energy Plus New Homes	0	0	0	0
Residential Solar Thermal Water Heating	15	15	15	46
Advanced Building Techniques	239	239	239	717
<b>Portfolio Total</b>	<b>74,967</b>	<b>87,132</b>	<b>93,452</b>	<b>255,550</b>



# Sierra Pacific Proposed 2013 Budgets & Targets

Programs	Budget	kWh	kW
Low Income Weatherization	\$ -	-	-
Residential Energy Efficient Lighting	\$ 800,000	7,125,000	718
Second Refrigerator Collection and Recycling	\$500,000	2,950,000	377
Energy Star® Manufactured Homes	\$ -	-	-
Consumer Electronics & Plug Loads	\$400,000	1,680,000	279
Residential Solar Thermal Water Heating	\$250,000	150,000	14
<b>Residential Total</b>	<b>\$1,950,000</b>	<b>11,905,000</b>	<b>1,389</b>
Non-Profit Agency Grants	\$110,000	270,000	23
Commercial New Construction	\$600,000	3,400,000	325
Energy Smart Schools	\$400,000	1,600,000	71
Commercial Retrofit Incentives	\$3,150,000	26,000,000	2,302
<b>Commercial Total</b>	<b>\$4,260,000</b>	<b>31,270,000</b>	<b>2,721</b>
Energy Education and Consultation	\$250,000	NA	NA
Market and Technology Trials	\$100,000	NA	NA
<b>Total Other</b>	<b>\$350,000</b>	<b>N/A</b>	<b>N/A</b>
<b>Total Energy Efficiency</b>	<b>\$6,560,000</b>	<b>43,175,000</b>	<b>4,109</b>
Demand Response	\$800,000	NA	2,000
<b>Total Demand Response</b>	<b>\$800,000</b>	<b>-</b>	<b>2,000</b>
<b>Total All Categories</b>	<b>\$7,360,000</b>	<b>43,175,000</b>	<b>6,109</b>

# NPC 2012 Approved Budgets

<b>NPC Program</b>	<b>Approved Budget</b>
Advanced Building Techniques - NPC	\$ 500,000
Commercial New Construction - NPC	\$ 2,750,000
Commercial Retrofit - NPC	\$ 7,000,000
Consumer Electronics - NPC	\$ 1,064,000
Energy Efficient Pools and Spas - NPC	\$ 1,000,000
Energy Efficient Schools - NPC	\$ 1,270,000
Energy Plus New Homes -NPC	\$ 1,930,000
Energy Educ-Trade/Home Shows - NPC	\$ 80,000
ES New Construction Builder Support - NPC	\$ 80,000
Non-Profit Agency Grants - NPC	\$ 110,000
Residential High Efficiency AC - NPC	\$ 6,000,000
Second Refrigerator Collection and Recycling - NPC	\$ 1,000,000
Senior Energy Ambassador - NPC	\$ 20,000
Small Commercial Customer Education - NPC	\$ 120,000
Solar Thermal Water Heating - NPC	\$ 500,000
Technology & Market Trials - NPC	\$ 400,000
Demand Response - NPC	\$ 11,714,074

# 2012 Sierra Approved Budgets

Programs	2012 Approved Budget
Low Income Weatherization	\$ -
Residential Energy-Efficient Lighting	\$ -
Second Refrigerator Collection and Recycling	\$ 350,000
Consumer Electronics & Plug Loads	\$ 400,000
Residential Solar Thermal Water Heating	\$ 250,000
<b>Residential Total</b>	<b>\$ 1,000,000</b>
Non-Profit Agency Grants	\$ 110,000
Commercial New Construction	\$ 750,000
Energy Smart Schools	\$ 320,000
Commercial Retrofit Incentives	\$ 3,000,000
<b>Commercial Total</b>	<b>\$ 4,180,000</b>
Energy Education and Consultation	\$ 250,000
Market and Technology Trials	\$ 100,000
<b>Total Other</b>	<b>\$ 350,000</b>
<b>Total Energy Efficiency</b>	<b>\$ 5,530,000</b>
Demand Response	\$ 100,000
<b>Total Demand Response</b>	<b>\$ 100,000</b>
<b>Total All Categories</b>	<b>\$ 5,630,000</b>



# What's New





# Energy Education



	<b>Page</b>
<b>1. Electrical Systems: Appliances</b>	
a. Prepare (Lesson Plan)	1
b. Activity: Watt Does it Cost	6
c. Simple Payback worksheet	8
d. Clean Energy Analyst: Appliances	9
e. Connect: Home Appliances	10
<b>2. Electrical Systems: Lighting</b>	
a. Prepare (Lesson Plan)	11
b. The Light Bulb Debate class discussion worksheet	16
c. Activity: Comparing Bulbs	18
d. Life Cycle Cost worksheet	19
e. Clean Energy Analyst: Lighting	21
f. Connect: Lighting Energy Conservation Measures worksheet	22
g. Connect: Lighting at home	23
<b>3. Thermal Systems: Water Heating</b>	
a. Prepare (Lesson Plan)	24
b. Activity: Measuring Flow Rate	29
c. Clean Energy Analyst: Water Heating	32
d. Connect: Water Heating ECM worksheet	33
<b>4. Thermal Systems: Building Envelope</b>	
a. Prepare (Lesson Plan)	34
b. Activity 1: Investigating Insulators	41
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d. Calculating Heat Loss worksheet	47
e. Clean Energy Analyst: Building Envelope	50
<b>5. Electrical Systems: Cooling</b>	
a. Prepare (Lesson Plan)	51
b. Activity: Keep It Cool	55
c. Clean Energy Analyst: Cooling	62
d. Connect: Cooling Energy Conservation Measures worksheet	63
<b>6. Thermal Systems: Heating</b>	
a. Prepare (Lesson Plan)	64
b. Activity: Passive Heating Design	68
c. Clean Energy Analyst: Heating	74
d. Connect: Heating Energy Conservation Measures worksheet	75



workforce CONNECTIONS  
PEOPLE. PARTNERSHIPS. POSSIBILITIES.



## Post-Workshop: In School Program

After the workshop, teachers will be able to use the lessons, activities and materials provided by Envirolution to educate their students about energy conservation and building performance over a 6-week period. Lessons will include homework assignments that have students return home to assess their family's energy consumption through various building systems. Lessons and activities cover the six building systems (lighting, appliances, hot water, building envelope, heating, and cooling) and no-cost and low-cost measures for reducing energy consumption in each system.

Our vision is to coordinate a fundraising campaign at two or three schools in which students in a pilot program will be able to leverage their energy efficiency knowledge to distribute energy conservation measures to the local community. These conservation measures will help their families, neighbors and relatives to cut energy consumption. Additionally, students will be provided with informational materials on the HomeFree Nevada program and will be rewarded by HomeFree Nevada for each home they sign up for the program through a contribution to the school. In a real-world application of their education, participating students will explain the benefits of the program, including rebates available, types of improvements that can be made, and long-term energy and monetary savings to the homeowner.



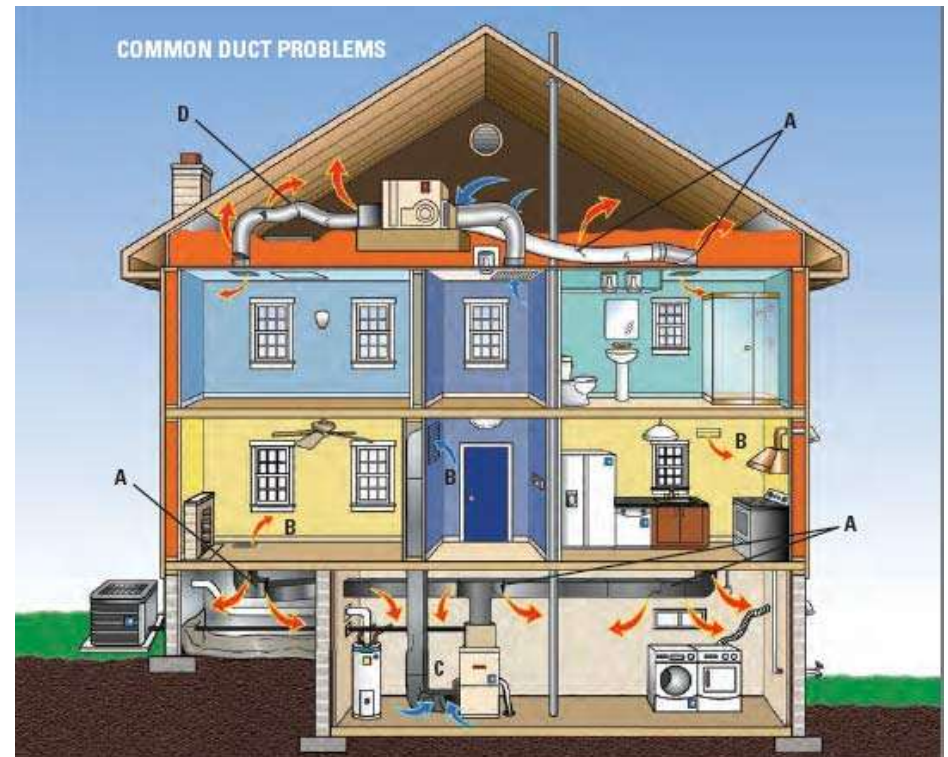
# Commercial

- Guest Room Energy Management Systems
- Commercial Pools
- Comprehensive Commercial Program
  - Market Flexibility



# HVAC

- Western Cooling Controls
- Duct Test & Seal
- Tune Ups



# Advanced Building Techniques

## Current (2012)

- Spray Foam Insulation
- Conditioned Attics
- AirCycler Fresh Air System
- Windows- Argon Gas Filled

## 2013 and Beyond

- Cool Roofs
- Mini-Splits (Zonal Control)
- Ducts in Conditioned Space
- MELS (Smart-Wiring, Green Wiring)

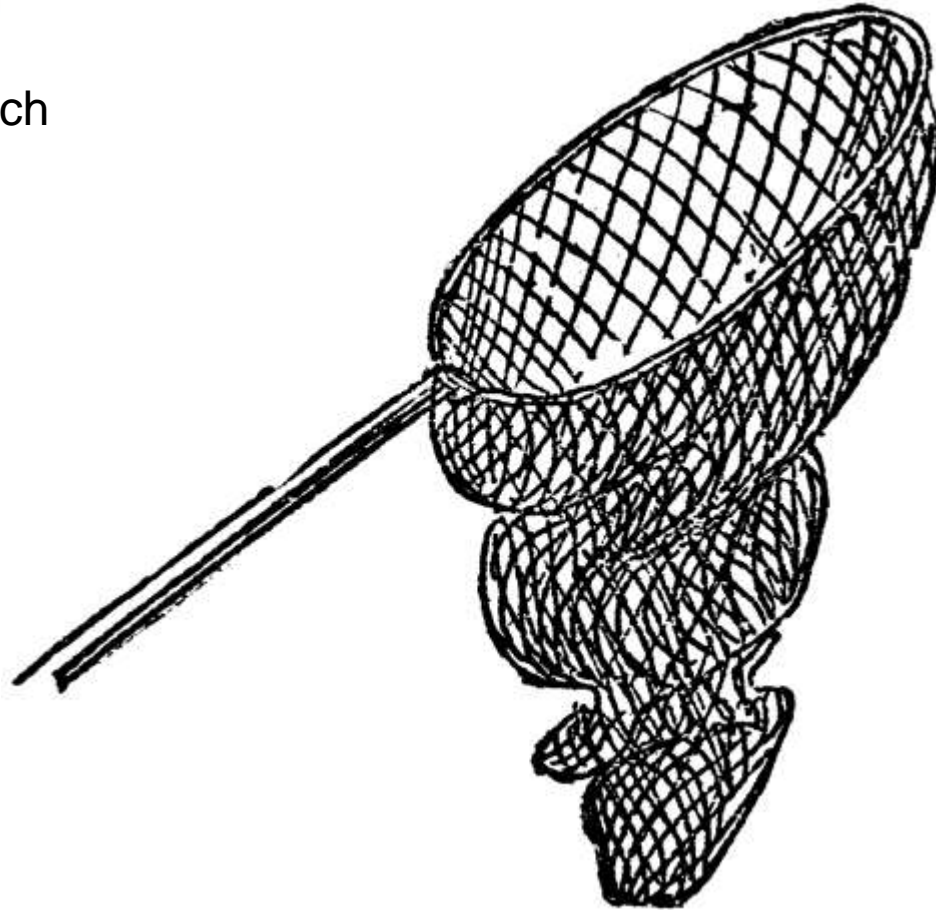
# Demand Response

- Cut Home Cooling Costs by 13% in Summer Months
- Shave 3 kW Per Home
- Learns from Occupant Behavior
- 1623 Enrollments
- 709 Installations to Date



# Freeridership & Spillover Study

With Special Thanks  
To Lark Lee of Tetra Tech



# Study Background

- Deemed free-ridership rates were used in the current DSM Action Plans
- NV Energy conducted a net-to-gross study in the spring of 2012 to inform the next DSM Action Plans for each utility as well as provide more accurate estimates of program attribution for the current plan
- NV Energy selected Tetra Tech and ADM Associates to conduct the net-to-gross study



# Study Objectives

- Determine net-to-gross (NTG) values\* for NPC's and SPPC's current programs through rigorous methodologies tailored to program type
  - Nonresidential programs
  - Downstream residential programs
  - Mid- to upstream residential programs
- Inform future program design to maximize NTG
- Project NTG values for the 2013-2015 programs
- Inform the next DSM Action Plan for each utility that is part of the integrated resource plan filing

\* NTG = 1 - (free-ridership + spillover)

# Terminology

- 100% or Pure free riders
  - Would have adopted exactly the same quantity of the energy efficient end-use equipment at that time, absent the program
- Partial free riders
  - Would have adopted some of same end-use equipment on their own, but of a lesser efficiency or lesser quantity, or at a later time
- Participant spillover
  - Energy efficient end-use equipment adopted by a participant due to program influences, but without any financial or technical assistance from the program
- Nonparticipant spillover (free drivers)
  - Energy efficient end-use equipment adopted by program nonparticipants due to the program's influence

## Terminology (cont'd)

- Net (Attributable) Savings = Gross Savings – Free Rider Savings + Participant Spillover + Nonparticipant Spillover
- Triangulation
  - The comparison of results of two or more data gathering activities aimed at addressing the same issue to derive a “best” determination from the analysis

# Debate Surrounding NTG

- Extensive debate across the country regarding need for and measurement of what would have happened in the absence of energy efficiency programs
- The top debated arguments and counter-arguments include:
  - Free-ridership and spillover cancel each other out, although there is little quantitative evidence that this is true
  - Too difficult to reliably estimate, although sound data collection techniques can mitigate many of the potential biases
  - Funds are better spent on program implementation, although NTG measurement are needed to improve program design

# Debate Surrounding NTG (cont'd)

- We believe there is considerable value in NTG research to:
  - Understand program and portfolio cost-effectiveness
  - Improve portfolio design and resource allocation
  - Refine program design
  - Understand market transformation
  - Align utility's financial interests with societal interests
  - Understand how programs affect baseline load forecasts and short-term power procurement decisions.

# Overview of Overall Study Methodology

- Principles driving NTG calculation methodology
  - Robust
  - Transparent
  - Appropriate for how program is delivered (downstream, mid-stream, upstream)
- Enhanced self-report approach (SRA)
  - SRA is used in situations where decision-makers are aware of, and able to report on, program impacts
  - ‘Enhanced’ combines or checks against additional data sources to more accurately reflect the decision-making process.

# Overview of Overall Study Methodology (cont'd)

- Benchmarking
  - Examine NTG results for similar programs and measures
  - Provides context to NV Energy's NTG ratios
- Triangulation
  - Compare results of two or more of the data gathering activities to derive a “best” determination of NTG

# Survey Design/Data Collection Elements to Minimize Potential Bias

- Identify the key decision-makers for each project
- Use warm-up questions to help the decision-maker recall the sequence of past events
- Use multiple questions to limit the potential for misunderstanding
- Use questions to rule out rival hypotheses
- Use consistency checks to clarify inconsistent responses
- Make questions measure-specific
- Include questions on all aspects of the decision (timing, quantity, efficiency)
- Use techniques to minimize nonresponse bias (advance letter, multiple attempts)
- Sample a census (or oversample) of largest savers and measures with few installations to ensure these are sufficiently represented



# Residential Downstream Approaches

Program	NTG Approach	Data Collection Completes
<b>Second Refrigerator Collection and Recycling</b>	Participant SRA/retailer interviews	NPC: 69 refrigerator and 62 freezer survey completes SPPC: 65 refrigerator and 67 freezer survey completes 3 retailer interviews
<b>CheckMe! Plus AC (NPC only)</b>	Participant SRA/influential vendor surveys	NPC: 33 CAC/heat pump, 40 Western Cooling Controls, 11 tune-up service, and 25 duct sealing survey completes. 17 trade ally interviews
<b>Mobile and Manufactured Home Retrofit (NPC only)</b>	Participant SRA (both home occupants and property managers/owner) surveys	NPC: 77 Air Conditioner Maintenance and 68 CFL survey completes, 10 property manager interviews
<b>Energy Efficient Pools and Spas (NPC only)</b>	Participant SRA/influential vendor surveys	NPC: 3 seasonal timers and 71 variable speed pool pump survey completes, 10 contractor interviews
<b>Solar Thermal Water Heaters</b>	Triangulation—RASS survey, benchmarking, program staff interviews	N/A
<b>Low –income weatherization</b>	Triangulation—Benchmarking, NV Energy low-income energy usage study	N/A

# Residential Downstream Findings

Program	NPC		SPPC	
	2011 NTG Ratio	2013–2015 NTG Ratio	2011 NTG Ratio	2013–2015 NTG Ratio
Second Refrigerator Collection and Recycling	83.8%	86.2%	58.3%	71.4%
CheckMe! Plus AC (NPC only)	91.3%	89.0%	N/A	N/A
Mobile and Manufactured Home Retrofit (NPC only)	83.8%	N/A	N/A	N/A
Energy Efficient Pools and Spas (NPC only)	78.6%	78.6%	N/A	N/A
Solar Thermal Water Heaters	100%	100%	100%	100%
Low –income weatherization	100%	100%	100%	100%

# Non-Residential Approaches

Program	NTG Approach	Data Collection Completes
<b>Commercial Retrofit</b>	Participant SRA/influential vendor surveys, customer focus groups	NPC: 173 participant surveys, 75 influential vendor surveys SPPC: 128 participant surveys, 50 influential vendor surveys
<b>Commercial New Construction</b>	Participant SRA/influential vendor surveys interviews, file review, customer focus groups	NPC: 10 participant surveys SPPC: 7 participant surveys
<b>Non-Profit Grants</b>	Participant SRA/influential vendor surveys	NPC: 5 participant surveys, 3 influential vendor surveys SPPC: 7 participant surveys, 3 influential vendor surveys
<b>Schools</b>	Participant SRA/influential vendor surveys, case study review	NPC: 22 HVAC equipment and 174 Lighting projects (2 customers) SPPC: 24 Controls, 15 Lighting, 2 HVAC equipment, and 3 Other Custom project surveys (7 unique customers); 1 influential vendor survey
<b>Commercial Pools (NPC only)</b>	Deemed NTG based on blended rate of 2011 retrofit/new construction SRA results	N/A

# Non-Residential Results

Program	NPC		SPPC	
	2011 NTG Ratio	2013–2015 NTG Ratio	2011 NTG Ratio	2013–2015 NTG Ratio
Commercial Retrofit	78.0%	78.6%	66.0% electric, 87.8% gas	70.0% electric, 87.8% gas
Commercial New Construction	82.5%		84.4%	84.4%
Non-Profit Grants	84.7%	84.7%	91.4%	91.4%
Schools	99.2%	99.2%	95.2%	99.0%
Commercial Pools	N/A	78.4%	N/A	N/A

# Residential Upstream Approaches

Program	NTG Approach	Data Collection Completes
Energy Plus New Homes (NPC only)	Builder and home energy rater interviews	NPC: 16 builder and 3 rater interviews
Advanced Building Techniques (NPC only)	Builder interviews	NPC: 3 builders (census)
Consumer Electronics and Plug Load	Triangulation—retailer interviews, industry expert Delphi approach, benchmarking	2 retailer questionnaires and in-depth interviews, four industry expert questionnaires in Delphi panel for both service territories
Residential Lighting	Triangulation—SRA with appliance saturation survey respondents/secondary research on upstream lighting NTG modeling/market assessment trend analysis, Delphi approach, original equipment manufacturer survey	5 manufacturer questionnaires, 3 industry expert questionnaires in Delphi panel for both service territories NPC: 112 SRA surveys for standard CFLS SPPC: 163 SRA surveys for standard CFLS

# Residential Upstream Findings

Program	NPC		SPPC	
	2011 NTG Ratio	2013–2015 NTG Ratio	2011 NTG Ratio	2013–2015 NTG Ratio
Energy Plus New Homes (NPC only)	79.0%*	77.0%	N/A	N/A
Advanced Building Techniques (NPC only)	68.0%**	100.0%	N/A	N/A
Consumer Electronics and Plug Load	78.0%	79.0%	78.0%	79.0%
Residential Lighting	63.4%	84.0%	61.8%	84.0%

\* The 2012 NTG is 73.0% due to changes in builder standard practices in 2012

\*\* The 2012 NTG is 88.0% due to changes in the number of projects completed by one builder

# Impact of Lost Revenue Recovery on DSM Plans & Reports



# Traction on a Slippery Slope

- Master Data Request
- Workshop After the Filing
- M&V Education
- Incremental Cost Explanations
- Discussion of Load Shapes
- Instructions for Portfolio Pro
- Explanation of Units
- Discussion of Rebates Offered
- Measure Life Sources/Explanations
- Improved Input Sheets
- Collaborative Educational Segments



THANK YOU!  
QUESTIONS?