

# Energy Savings Measure Packages: Existing Homes

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## Energy Savings Measure Packages: Existing Homes

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*All tables were created by NREL.*

## Definitions

ACH	air changes per hour
AFUE	annual fuel utilization efficiency
BA	Building America
BEopt	Building Energy Optimization Program
CDD	cooling degree day
CFL	compact fluorescent lamp
EF	energy factor
ESMP	Energy Savings Measure Package
HDD	heating degree day
IECC	International Energy Conservation Code
MEF	modified energy factor
Pa	pascal
SEER	seasonal energy efficiency ratio
SHGC	solar heat gain coefficient

## Executive Summary

There is a pressing need among residential retrofit market stakeholders (homeowners, contractors, researchers and utility and government program administrators) to understand how collections, or packages, of retrofit measures affect home energy use. The combined effects of multiple measures can be significantly different than the effects of individual retrofit measures.

The higher levels of energy savings that are currently being targeted by the Department of Energy require implementation of multiple measures. It is important that interactions between measures be considered when determining the costs and benefits of advanced retrofit strategies. The impacts of these interactions cannot generally be determined using historical data from retrofit programs that target a single measure. This document provides a reference point that stakeholders can consult and use to educate themselves about how to most cost effectively achieve significant energy savings in existing homes. The most immediate audiences are stakeholders for the Department of Energy's Better Buildings Neighborhood Program and Building America program. However, the information is equally useful for others who need an initial point of reference when choosing between myriad retrofit options for meeting their own cost and energy savings needs.

This document presents a simple starting point to determine the most cost-effective Energy Savings Measure Packages (ESMP) for existing homes to achieve 15% and 30% savings in 37 locations across the United States. These packages are optimized for minimum cost to homeowners for known source energy savings given the local energy cost, climate and prevalent building characteristics (i.e. foundation types). To provide consistency among grantees, the reference home for each retrofit energy savings optimization is based on the definition provided by NREL (Polly et al 2011). Details on the reference houses for Mixed Fuel and All Electric houses are provided in Table 2 and Table 5 respectively.

The information in the tables was developed using state-of-the-art building energy simulation software, BEopt (Building Energy Optimization) (Christensen et al 2006) and reflects advanced energy models for a variety of retrofit measures. Climate-related details that are provided in Table 2 and Table 5 provide details on the reference buildings and measures that were enabled in the optimizations. Summary tables for the 15% and 30% packages are provided in Tables 3 and 4 (Mixed Fuel Prototype) and Tables 6 and 7 (All Electric Prototype). Additionally, summary tables sorted by Building America Climate Zones are provided for the 15% and 30% packages for both the Mixed Fuel and All Electric Prototypes in Tables 8 through 11.

Optimum retrofit packages for higher energy savings levels are also provided in the Appendix for each location, of up to 60% savings in some instances. The analysis period is 30 years with an inflation rate and discount rate of 3%. The retrofit measure capital costs are financed via a five-year loan at an interest rate of 7%. All measure costs are assumed to be installed capital costs taken from NREL's National Residential Efficiency Measures Database (NREL 2011).



**Table 1. Summary of Climate, Fuel Costs, and Reference Building Characteristics that Change with Location**

Grantee	HDD (65°F)	CDD (65°F)	BA ZONE	IECC ZONE	Electricity Rate (\$/kWh)	Gas Rate (\$/therm)	Foundation Type	Ceiling R-value (ft <sup>2</sup> ·h·°F/Btu)
Austin, Texas	1699	2946	Hot-Humid	2A	\$ 0.12	\$ 1.07	Slab	11
Bainbridge Island, Washington	4257	214	Marine	4C	\$ 0.07	\$ 1.22	Vented crawlspace, 4 ft	11
Bedford, New York	5272	599	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Boulder County, Colorado	5664	984	Cold	5B	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
California	1198	435	Hot-Dry	3B	\$ 0.12	\$ 0.81	Slab	11
Camden, New Jersey	4710	1260	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Chicago, Illinois	6206	943	Cold	5A	\$ 0.11	\$ 1.08	Unfinished Basement, 8 ft	19
Cincinnati, Ohio	4815	1072	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Connecticut	5792	795	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Eagle County, Colorado	7905	167	Cold	6B	\$ 0.11	\$ 1.08	Unfinished Basement, 8 ft	19
Greensboro, North Carolina	3780	1427	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Indianapolis, Indiana	5709	1146	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Kansas City, Missouri	4210	2046	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Las Vegas, Nevada	1234	1904	Hot-Dry	3B	\$ 0.12	\$ 0.81	Slab	11
Lowell, Massachusetts	5808	660	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Madison, Wisconsin	7479	729	Cold	6A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Maine	7390	396	Cold	6A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Maryland	4492	1346	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Michigan	6105	999	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Missouri	5176	1287	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
New Hampshire	8503	172	Cold	6A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
New York	6516	595	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Omaha, Nebraska	6168	1294	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Oregon	4158	370	Marine	4C	\$ 0.07	\$ 1.22	Vented crawlspace, 4 ft	11
Philadelphia, Pennsylvania	4710	1260	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
Phoenix, Arizona	4822	1009	Hot-Dry	2B	\$ 0.12	\$ 0.81	Slab	11
Reno, Nevada	2989	462	Cold	5B	\$ 0.12	\$ 0.81	Slab	11
Riley County, Kansas	4402	1695	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented Crawlspace, 4 ft	11
San Antonio, Texas	1479	3051	Hot-Humid	2A	\$ 0.12	\$ 1.07	Slab	11
Santa Barbara County, California	2269	126	Marine	3C	\$ 0.07	\$ 1.22	Slab	11
Seattle, Washington	4257	214	Marine	4C	\$ 0.07	\$ 1.22	Vented crawlspace, 4 ft	11
Southeast Community Consortium	2746	1863	Mixed-Humid	3A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
St. Lucie, Florida	684	3074	Hot-Humid	2A	\$ 0.12	\$ 1.07	Slab	11
Toledo, Ohio	6307	705	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
Uniontown, Pennsylvania	5707	829	Cold	5A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19
University Park, Maryland	4516	1247	Mixed-Humid	4A	\$ 0.09	\$ 1.18	Vented crawlspace, 4 ft	11
West Rutland, Vermont	7336	570	Cold	6A	\$ 0.11	\$ 1.08	Unfinished basement, 8 ft	19

## Mixed Fuel Prototype

**Table 2. Summary of Reference Building for Mixed Fuel Prototype With Retrofit Options Considered in Optimizations**

Retrofit Category	Reference Condition	Retrofit Options Modeled					
Foundation – basement	Uninsulated	R-5 rigid, 4 ft	R-10 rigid, 4 ft	R-5 Rigid, 8 ft	R-10 rigid, 8 ft	R-15 rigid, 8 ft	R-20 rigid, 8 ft
Windows	Single pane (U = 0.869, SHGC = 0.619)	Double pane (U = 0.285, SHGC = 0.266)	Double pane (U = 0.285, SHGC = 0.295)	Double pane (U = 0.298, SHGC = 0.417)	Double pane (U = 0.325, SHGC = 0.511)	Triple pane (U = 0.257, SHGC = 0.345)	Quad pane (U = 0.197, SHGC = 0.324)
Ducts	Leaky, uninsulated	Leaky, R-6	Leaky, R-8	Typical, uninsulated	Typical, R-6	Typical, R-8	
Foundation – crawlspace wall	Uninsulated	R-5 rigid	R-10 rigid	R-15 rigid	R-20 rigid		
Unfinished attic	R-19 Climate Zone 5 and above; R-11 for all other climate zones	R-38	R-49	R-60	–	–	–
Water heater	Gas, tank, EF = 0.59	Gas, tank, EF = 0.67	Gas, tankless, EF = 0.82	Gas, tankless, condensing, EF = 0.96	–	–	–
Foundation – slab	Uninsulated	R-5 rigid, 2 ft	R-10 rigid, 2 ft	–	–	–	–
Infiltration	19 ACH @ 50 Pa	15 ACH @ 50Pa	10 ACH @ 50Pa	–	–	–	–
Lighting	20% CFL	40% CFL	60% CFL	–	–	–	–
Air conditioner	SEER 10	SEER 13	SEER 15	–	–	–	–
Exterior walls	Uninsulated	R-13	–	–	–	–	–
Refrigerator	Standard (480 kWh/yr)	ENERGY STAR® (374 kWh/yr)	–	–	–	–	–
Dishwasher	Standard	ENERGY STAR	–	–	–	–	–
Clothes washer	Standard (1.41 MEF)	ENERGY STAR (2.47 MEF)	–	–	–	–	–
Furnace	Gas, AFUE 78%	Gas, AFUE 92.5%	–	–	–	–	–
Hot water pipes	Uninsulated	R-2	–	–	–	–	–

**Table 3. Summary of 15% Energy Savings Retrofit Packages for Mixed Fuel Prototypes. Measures are organized with the most cost-effective on top**

15% Energy Savings Retrofit Packages	Austin, Texas	Bainbridge Island, Washington	Bedford, New York	Boulder County, Colorado	California	Camden, New Jersey	Chicago, Illinois	Cincinnati, Ohio	Connecticut	Eagle County, Colorado	Greensboro, North Carolina	Indianapolis, Indiana	Kansas City, Missouri	Las Vegas, Nevada	Lowell, Massachusetts	Madison, Wisconsin	Maine	Maryland	Michigan	Missouri	New Hampshire	New York	Omaha, Nebraska	Oregon	Philadelphia, Pennsylvania	Phoenix, Arizona	Reno, Nevada	Riley County, Kansas	San Antonio, Texas	Santa Barbara County, California	Seattle, Washington	Southeast Community Consortium	St. Lucie, Florida	Toledo, Ohio	Uniontown, Pennsylvania	University Park, Maryland	West Rutland, Vermont	
Lighting: 60% CFL replacement	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Exterior wall: Drill and fill from uninsulated to R-13				X			X		X	X		X		X	X	X	X		X		X	X	X			X					X			X	X			X
Basement: Insulate wall from uninsulated to R-5, 4 ft				X			X		X						X	X			X			X													X	X		
Infiltration: Air seal from 19 ACH @ 50 Pa to 10 ACH @ 50 Pa	X																								X			X	X									
Crawlspace wall: Insulate with R-5 rigid		X	X			X		X			X		X					X		X				X	X			X			X							X
Ducts: Insulate with R-6	X				X																				X			X	X				X					
DHW: Replace with gas tankless					X																												X					

**Table 4. Summary of 30% Energy Savings Retrofit Packages for Mixed Fuel Prototypes. Measures are organized with the most cost-effective on top**

30% Energy Savings Retrofit Packages	Austin, Texas	Bainbridge Island, Washington	Bedford, New York	Boulder County, Colorado	California	Camden, New Jersey	Chicago, Illinois	Cincinnati, Ohio	Connecticut	Eagle County, Colorado	Greensboro, North Carolina	Indianapolis, Indiana	Kansas City, Missouri	Las Vegas, Nevada	Lowell, Massachusetts	Madison, Wisconsin	Maine	Maryland	Michigan	Missouri	New Hampshire	New York	Omaha, Nebraska	Oregon	Philadelphia, Pennsylvania	Phoenix, Arizona	Reno, Nevada	Riley County, Kansas	San Antonio, Texas	Santa Barbara County, California	Seattle, Washington	Southeast Community Consortium	St. Lucie, Florida	Toledo, Ohio	Uniontown, Pennsylvania	University Park, Maryland	West Rutland, Vermont		
Lighting: Replace 60% fluorescent, hardwired	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Exterior wall: Drill and fill from uninsulated to R-13	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Infiltration: Air seal from 19 ACH @ 50 Pa to 15 ACH @ 50 Pa	X			X		X	X		X	X		X		X	X	X	X	X	X	X	X	X	X		X			X	X						X	X	X	X	
Ducts: Insulate from uninsulated to R-6	X			X	X		X		X	X									X								X		X	X						X	X		
Crawlspace: Insulate wall from uninsulated to R-5		X	X			X		X			X		X						X		X			X	X			X			X	X						X	
Ceiling: insulate to R-38	X			X	X		X		X			X			X	X	X		X		X	X	X	X			X		X	X				X	X	X	X		X
Basement: Insulate wall from uninsulated to R-5, 4 ft				X			X		X	X		X			X		X		X				X													X	X		
Ducts: Seal and insulate from uninsulated to R-6														X												X													
Clothes washer: Install ENERGY STAR					X																																		
DHW: Replace with gas tankless	X			X		X		X			X			X														X	X			X	X						
Basement wall: Insulate with R-10 rigid (4 ft)																X					X	X																X	
Ducts: Seal to 15% leakage and insulate with R-8																																			X				

## All Electric Prototype

**Table 5. Summary of Reference Building for All Electric Prototype With the Retrofit Options Included in Optimizations**

Retrofit Category	Reference Condition	Retrofit Options Modeled					
Foundation – basement, 8 ft, wall	Uninsulated	R-5 rigid, 4 ft	R-10 rigid, 4 ft	R-5 rigid, 8 ft	R-10 rigid, 8 ft	R-15 rigid, 8 ft	R-20 rigid, 8 ft
Windows	Single pane (U = 0.869, SHGC = 0.619)	Double pane (U = 0.285, SHGC = 0.266)	Double pane (U = 0.285, SHGC = 0.295)	Double pane (U = 0.298, SHGC = 0.417)	Double pane (U = 0.325, SHGC = 0.511)	Triple pane (U = 0.257, SHGC = 0.345)	Quad pane (U = 0.197, SHGC = 0.324)
Ducts	Leaky, Uninsulated	Leaky, R-6	Leaky, R-8	Typical, uninsulated	Typical, R-6	Typical, R-8	–
Foundation – crawlspace, wall	Uninsulated	R-5 rigid	R-10 Rigid	R-15 rigid	R-20 rigid	–	–
Unfinished attic	R-19 Climate Zone 5 and above; R-11 for all other climate zones	R-38	R-49	R-60	–	–	–
Foundation – slab	Uninsulated	R-5 rigid, 2 ft	R-10 Rigid, 2 ft	–	–	–	–
Infiltration	19 ACH @ 50 Pa	15 ACH @ 50 Pa	10 ACH @ 50 Pa	–	–	–	–
Lighting	20% CFL	40% CFL	60% CFL	–	–	–	–
Air conditioner	SEER 10	SEER 13	SEER 15	–	–	–	–
Exterior walls	Uninsulated	R-13	–	–	–	–	–
Refrigerator	Standard (480 kWh/yr)	ENERGY STAR (374kWh/yr)	–	–	–	–	–
Dishwasher	Standard	ENERGY STAR	–	–	–	–	–
Clothes washer	Standard (1.41 MEF)	ENERGY STAR (2.47 MEF)	–	–	–	–	–
Furnace	Electric	None	–	–	–	–	–
Water heater	Electric tank, EF = 0.92	Electric tank, EF = 0.95	–	–	–	–	–
Hot water pipes	Uninsulated	R-2	–	–	–	–	–

**Table 6. Summary of 15% Energy Savings Retrofit Packages for All Electric Prototypes. Measures are organized with the most cost-effective on top**

15% Energy Savings Retrofit Packages - All Electric Homes	Austin, Texas	Bainbridge Island, Washington	Bedford, New York	Boulder County, Colorado	California	Camden, New Jersey	Chicago, Illinois	Cincinnati, Ohio	Connecticut	Eagle County, Colorado	Greensboro, North Carolina	Indianapolis, Indiana	Kansas City, Missouri	Las Vegas, Nevada	Lowell, Massachusetts	Madison, Wisconsin	Maine	Maryland	Michigan	Missouri	New Hampshire	New York	Omaha, Nebraska	Oregon	Philadelphia, Pennsylvania	Phoenix, Arizona	Reno, Nevada	Riley County, Kansas	San Antonio, Texas	Santa Barbara County, California	Seattle, Washington	Southeast Community Consortium	St. Lucie, Florida	Toledo, Ohio	Uniontown, Pennsylvania	University Park, Maryland	West Rutland, Vermont		
Lighting: Replace 60% fluorescent, hardwired	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Exterior wall: Drill and fill from uninsulated to R-13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Basement: Insulate wall from uninsulated to R-5, 4 ft																X																						X	
Infiltration: Air seal from 19 ACH @ 50 Pa to 15 ACH @ 50 Pa																X																						X	

**Table 7. Summary of 30% Energy Savings Retrofit Packages for All Electric Prototypes. Measures are organized with the most cost-effective on top**

30% Energy Savings Retrofit Packages - All Electric Homes	Austin, Texas	Bainbridge Island, Washington	Bedford, New York	Boulder County, Colorado	California	Camden, New Jersey	Chicago, Illinois	Cincinnati, Ohio	Connecticut	Eagle County, Colorado	Greensboro, North Carolina	Indianapolis, Indiana	Kansas City, Missouri	Las Vegas, Nevada	Lowell, Massachusetts	Madison, Wisconsin	Maine	Maryland	Michigan	Missouri	New Hampshire	New York	Omaha, Nebraska	Oregon	Philadelphia, Pennsylvania	Phoenix, Arizona	Reno, Nevada	Riley County, Kansas	San Antonio, Texas	Santa Barbara County, California	Seattle, Washington	Southeast Community Consortium	St. Lucie, Florida	Toledo, Ohio	Uniontown, Pennsylvania	University Park, Maryland	West Rutland, Vermont		
Lighting: Replace 60% fluorescent, hardwired	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Exterior Wall: Drill and fill from uninsulated to R-13	X		X	X	X		X	X	X	X		X	X	X	X	X	X		X	X	X	X	X		X			X						X	X	X		X	
Infiltration: Air seal from 19 ACH @ 50 Pa to 15 ACH @ 50 Pa			X	X		X	X	X	X	X		X			X	X	X	X	X			X	X				X								X	X	X	X	
Ducts: Insulate from uninsulated to R-6	X			X	X					X				X										X													X		
Crawlspace: Insulate wall from uninsulated to R-5		X				X	X				X	X						X		X				X	X			X	X	X	X						X		
Ceiling: Insulate to R-38		X					X	X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	
Basement: Insulate wall from uninsulated to R-5, 4 ft				X			X	X	X			X			X	X	X		X		X	X	X												X	X		X	
Ducts: Insulate from uninsulated to R-6 and air seal																									X										X				
Clothes washer: Install ENERGY STAR																																			X				
Infiltration: Air seal from 19 ACH @ 50 Pa to 10 ACH @ 50 Pa	X																											X											











## **Appendix: National Pathways Analysis - Detailed Cost and Performance Results for All Locations, Measures, and Performance Levels**

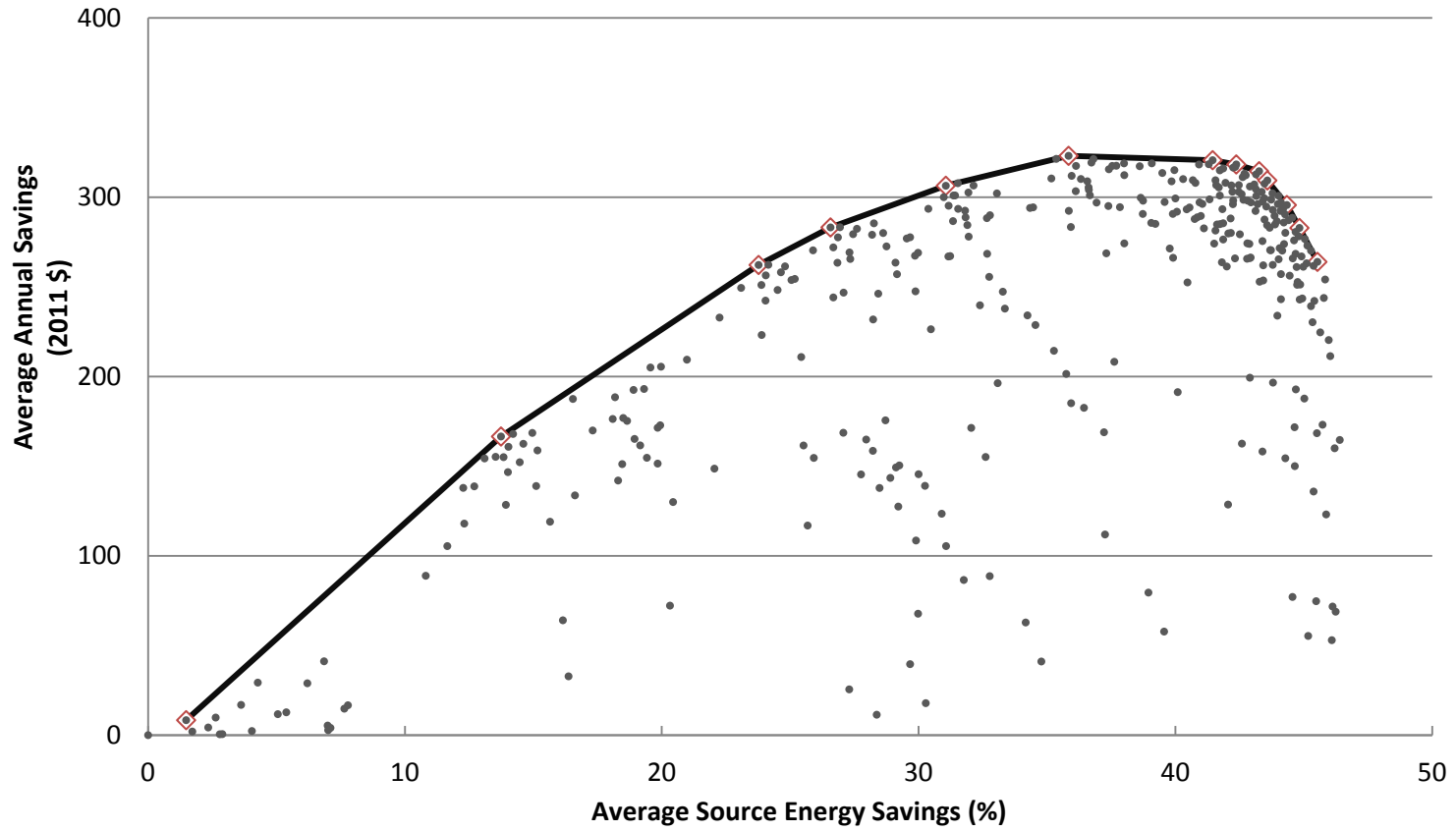
The following graphs describe optimal retrofit packages for locations across the United States. The tables describe these packages according to increasing source energy savings. The average annual dollar savings to the homeowner is also included; this dollar savings represents the average annual net savings including utility bill savings due to lower energy bills and the additional costs associated with paying for the retrofit measures. A positive number represents net savings to the homeowner relative to not implementing any of the measures; a negative number represents a net cost. Two levels of energy savings are highlighted, 15% and 30%, which are the goals for the Better Buildings Neighborhood Program and Building America programs, respectively.

The graphs show the average annual dollar savings to the homeowner for each level of energy savings. All simulations performed in BEopt appear in the graph as points. Each point represents a different package of energy savings measures. The dark line shows the package that saves the homeowner the most money for a given level of energy savings. Retrofit packages on this line represent the optimal path to achieving cost effective energy savings. Each optimal retrofit package is shown in the corresponding table.

**Austin, Texas (Mixed Fuel)**

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>		Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Water Heater: Install Gas Tankless (0.82 EF)	Ceiling: Insulate from R-11 to R-38	Ducts: Seal and Insulate to R-8	Windows: Replace with Double Pane, Low-e, low SHGC	Infiltration: 20% Reduction	Clothes Washer: Replace with ENERGY STAR	Hot Water Pipes: Insulate from Uninsulated to R-2	Refrigerator: Replace with ENERGY STAR	Ceiling: Insulate from R-11 to R-49	Water Heater: Install Gas Tankless Condensing (0.96 EF)
1	8	X														
15	167	X	X							X						
24	262	X	X	X						X						
27	283	X	X	X	X					X						
31	306	X	X	X	X	X				X						
36	323	X		X	X	X	X	X								
41	321	X		X	X	X	X	X	X							
42	318	X		X	X	X	X	X	X	X						
43	314	X		X	X	X	X	X	X	X	X					
44	309	X		X	X	X	X	X	X	X	X	X				
44	296	X		X	X	X	X	X	X	X	X	X	X	X		
45	283	X		X	X	X		X	X	X	X	X	X	X	X	
46	264	X		X	X	X		X	X	X	X	X	X	X	X	X

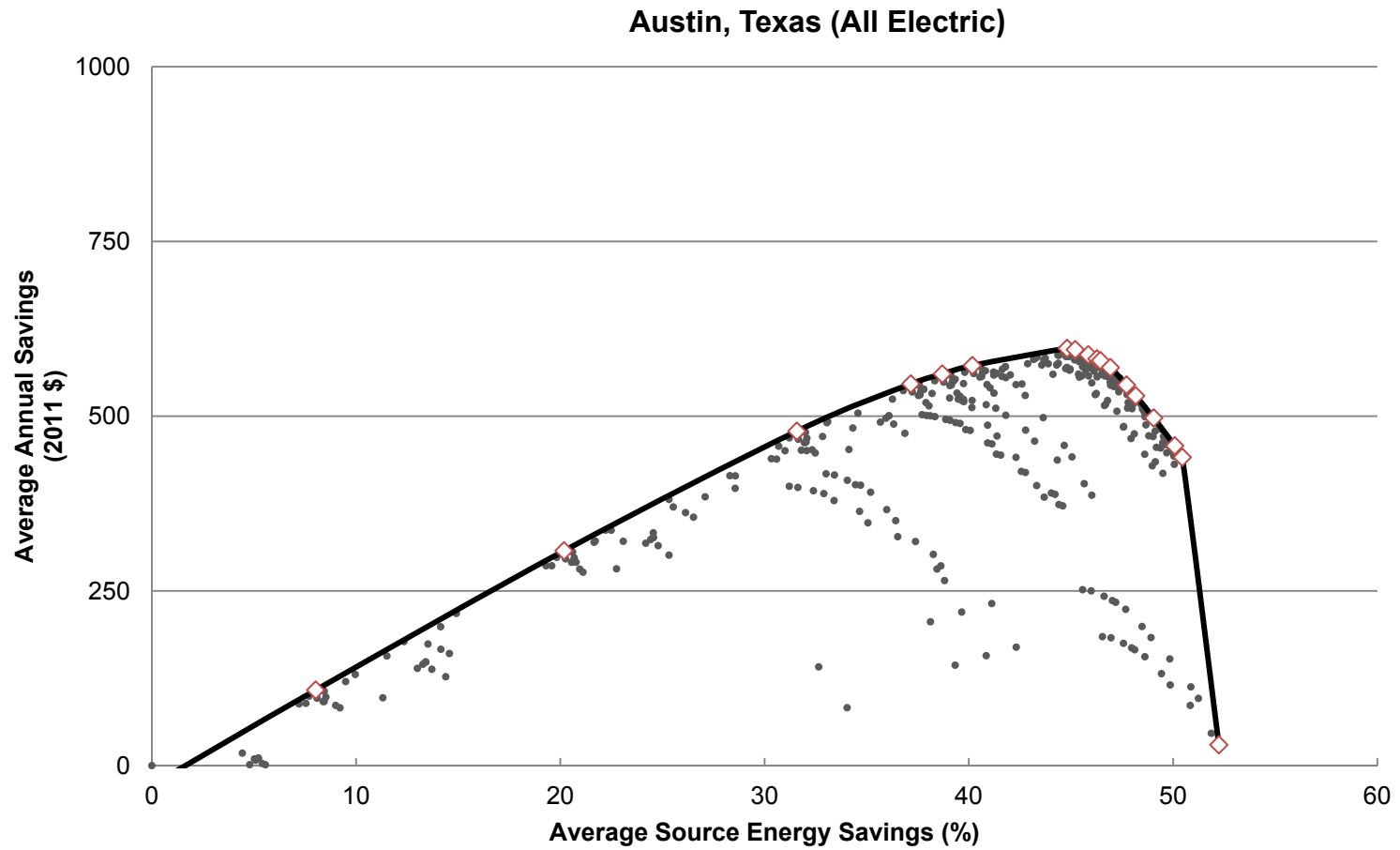
### Austin, Texas (Mixed Fuel)



◇ - Denotes an optimal retrofit package and is included in summary table above.

### Austin, Texas (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																		
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, low SHGC	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Ducts: Seal and Insulate to R-8	Water Heater: Install Electric Premium (0.95 EF)	Windows: Replace with Quadraple Pane	Refrigerator: Replace with ENERGY STAR	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Infiltration: 40% Reduction	Air Conditioner: Replace with SEER 15	
8	108	X	X				X													
15	218	X			X															
20	307	X		X															X	
30	438	X		X	X														X	
37	546	X		X	X	X													X	
39	560	X		X	X	X	X												X	
40	572	X		X	X	X	X	X											X	
45	597	X		X	X	X	X	X	X										X	
45	595	X		X	X	X	X	X	X	X									X	
46	588	X		X	X		X	X	X	X	X								X	
46	582	X		X	X		X	X	X	X		X							X	
46	580	X			X		X	X	X	X		X	X						X	
47	570	X			X		X	X	X	X		X	X	X					X	
48	545	X			X		X	X	X	X		X	X	X	X				X	
48	529	X			X		X	X		X		X	X	X	X	X			X	
49	497	X			X		X	X		X		X	X	X	X	X	X		X	
50	458	X			X			X		X		X	X	X	X	X	X		X	
50	441	X			X			X		X		X	X	X	X	X	X		X	
52	30	X			X			X		X		X	X	X	X	X	X		X	X



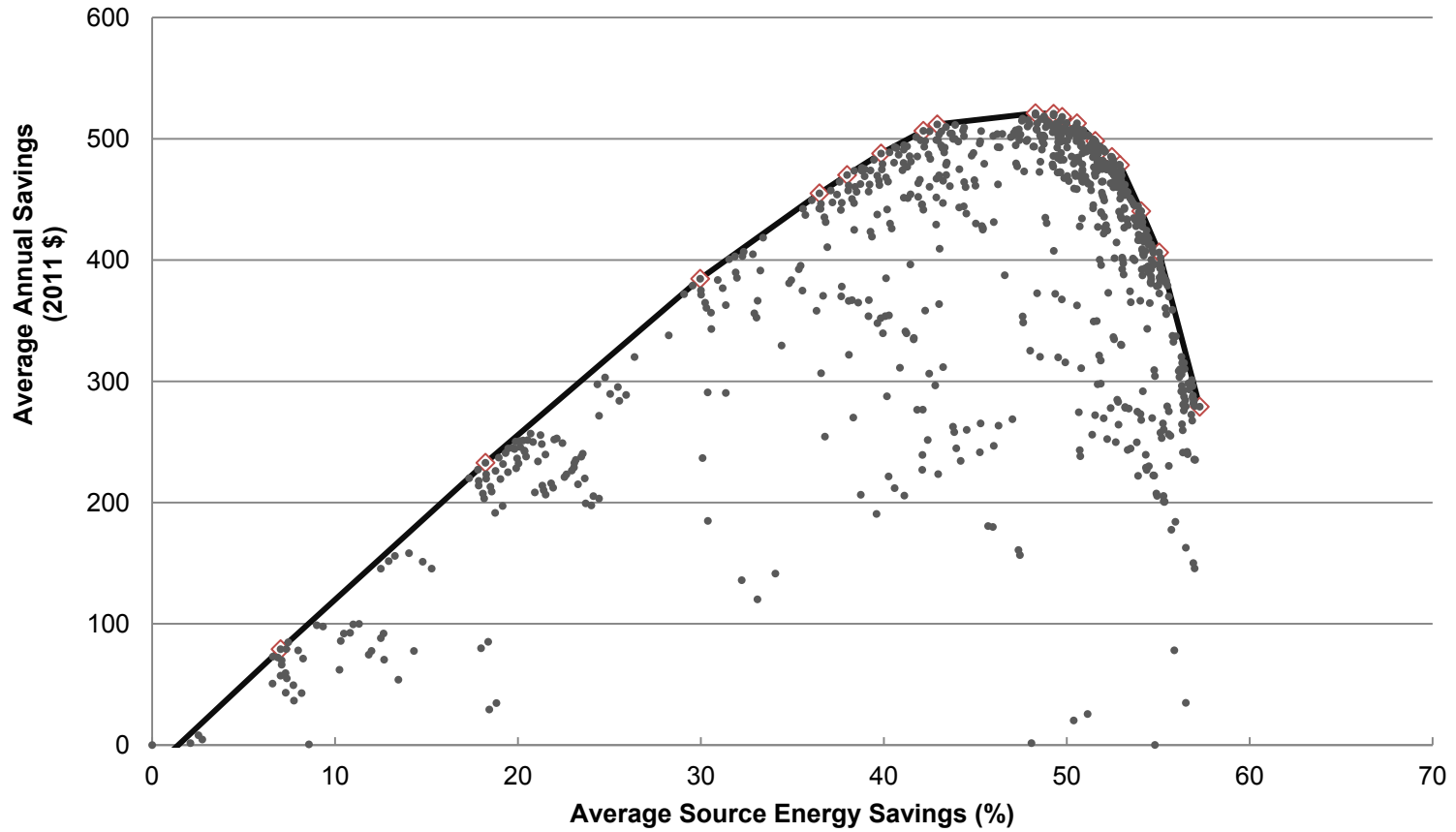
◇ - Denotes an optimal retrofit package and is included in summary table above.



### Bainbridge Island, Washington (Mixed Fuel)

		<table border="1" style="margin: auto;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #92d050;">15%</td></tr> <tr><td style="background-color: #a52a2a;">30%</td></tr> </table>																	Energy Savings Levels		15%	30%
Energy Savings Levels																						
15%																						
30%																						
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Ducts: Insulate to R-6	Crawlspace Wall: Insulate with R-5	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Crawlspace Wall: Insulate with R-10	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, very high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate with R-20	Ceiling: Insulate from R-11 to R-49	Windows: Replace with Double Pane, Low-e, high SHGC	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-60	Infiltration: 40% Reduction	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	Furnace: Replace with 92.5% AFUE	
7	79	X						X														
15	151		X	X																		
30	385		X	X	X																	
36	455		X	X	X	X																
38	470			X	X	X	X															
40	488			X	X	X	X	X														
42	507			X	X	X	X	X	X													
43	512			X	X	X		X	X	X												
48	521			X	X	X		X	X	X	X											
49	521			X	X	X		X	X	X												
50	518			X	X	X		X	X		X	X	X									
51	513	X		X	X	X		X	X	X	X		X									
52	498	X		X	X			X	X			X	X	X	X							
52	485	X		X	X			X	X			X	X	X	X	X						
53	478	X		X	X			X	X			X	X		X	X	X					
54	440	X		X	X			X	X			X	X		X	X	X	X				
55	406	X		X	X			X	X			X	X			X	X	X	X			
57	279	X		X	X			X	X			X	X			X	X	X	X	X	X	X

### Bainbridge Island, Washington (Mixed Fuel)

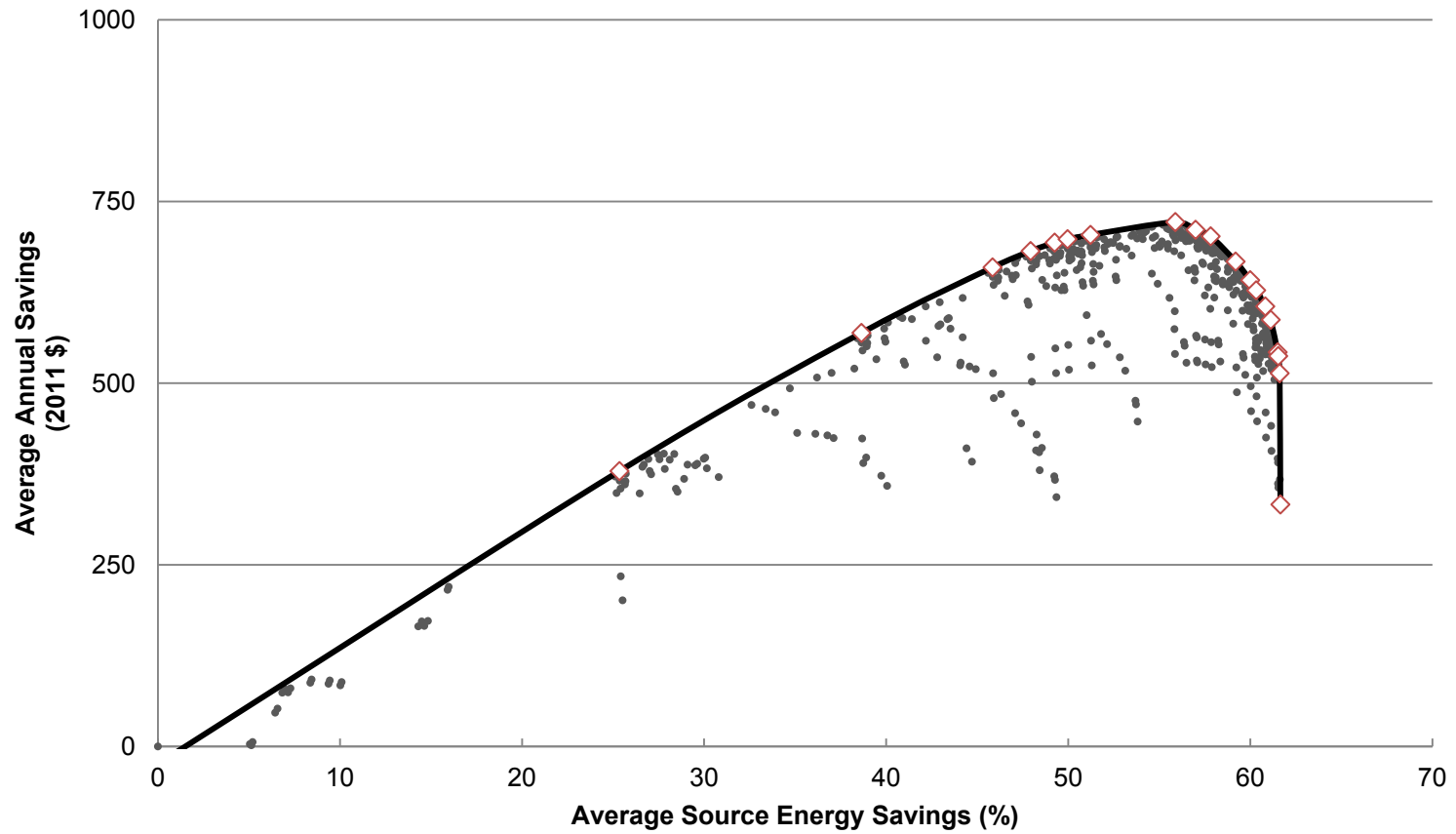


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Bainbridge Island, Washington (All Electric)

		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Energy Savings Levels</th> </tr> <tr> <td style="width: 50%; text-align: center;">15%</td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%; text-align: center;">30%</td> <td style="width: 50%;"></td> </tr> </table>																Energy Savings Levels		15%		30%	
Energy Savings Levels																							
15%																							
30%																							
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Crawlspace Wall: Insulate to R-15 Rigid	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, very high SHGC	Ceiling: Insulate from R-19 to R-49	Crawlspace Wall: Insulate to R-20 Rigid	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Infiltration: 40% Reduction	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Ducts: Seal and Insulate to R-8	Refrigerator: Replace with ENERGY STAR	Air Conditioner: Replace with SEER 15	
16	220	X		X																			
25	379	X	X																				
31	470	X	X	X																			
46	659	X	X	X	X																		
48	682	X	X	X	X	X																	
49	693	X		X	X	X	X																
50	698	X		X	X	X		X															
51	704	X		X	X	X		X	X														
56	722	X		X	X	X		X	X	X													
57	711	X		X		X			X	X	X												
58	702	X		X		X			X	X													
59	667	X		X					X	X													
60	642	X		X					X														
60	628	X		X					X								X						
61	606	X		X		X			X							X	X	X					
61	587	X		X		X			X							X	X	X					
62	542	X		X					X							X	X	X					
62	537	X		X					X							X	X				X		
62	514	X		X					X							X	X				X	X	
62	333	X		X					X							X	X				X	X	X

### Bainbridge Island, Washington (All Electric)

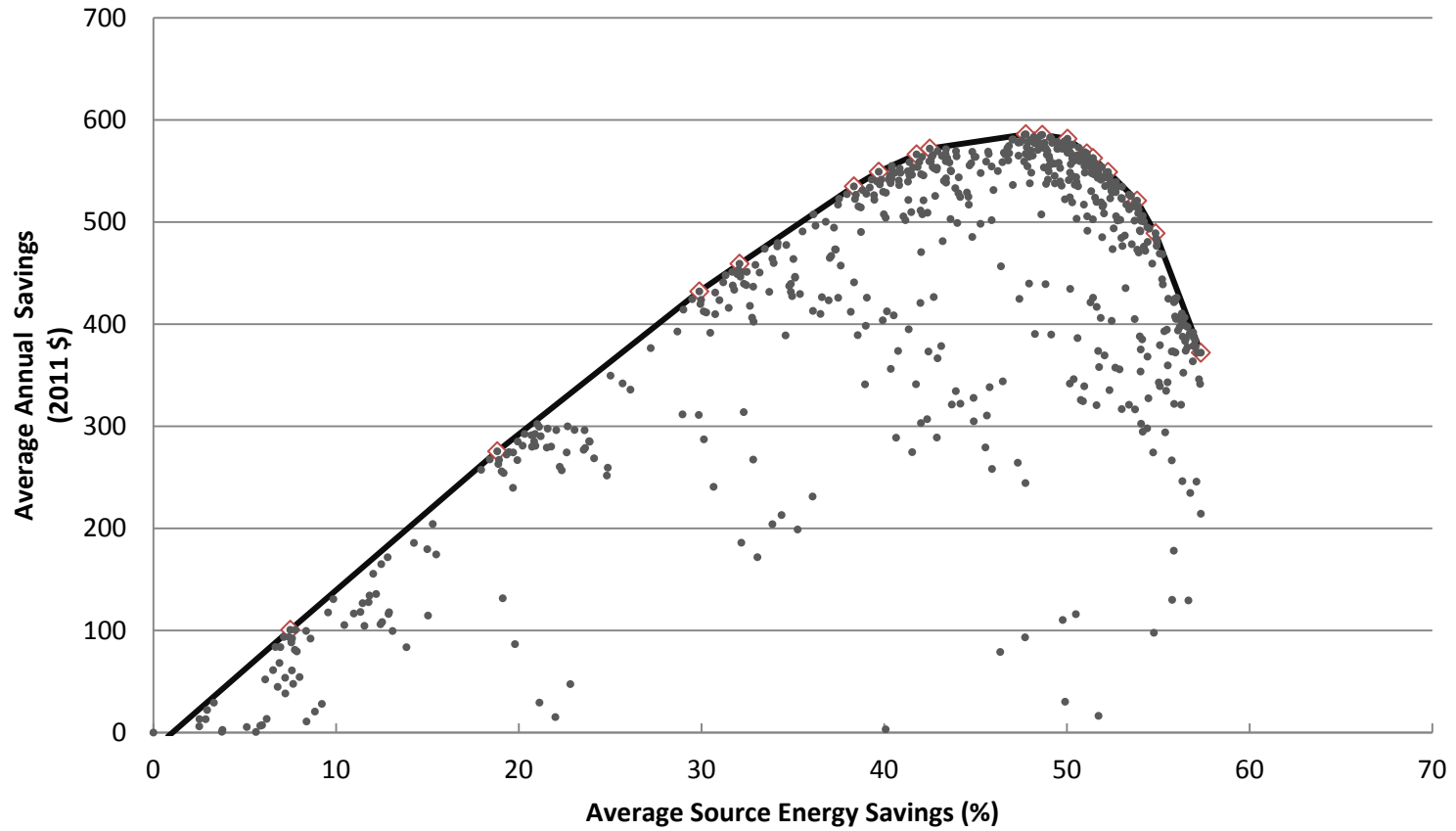


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Bedford, New York (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																			
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Crawspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-11 to R-38	Crawspace Wall: Insulate with R-10	Water Heater: Install Gas Tankless (0.82 EF)	Crawspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-60	Crawspace Wall: Insulate with R-20	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	Furnace: Replace with 92.5% AFUE	
7	101	X	X			X							X								
15	204	X		X																	
30	432	X		X	X																
32	459	X		X	X	X															
38	535	X		X	X	X	X														
40	549	X			X	X	X	X													
42	566	X			X	X	X	X	X												
42	572	X			X	X	X		X	X											
48	586	X			X	X	X		X	X	X										
49	585	X			X	X	X		X	X	X	X									
50	582	X	X		X	X	X		X	X	X	X	X								
51	567	X	X		X	X			X	X	X	X	X	X							
51	563	X	X		X	X			X		X	X	X	X	X						
52	549	X	X		X	X			X		X	X	X	X	X	X					
54	521	X	X		X	X			X		X	X	X	X	X	X	X				
55	489	X	X		X	X			X			X	X	X	X	X	X	X		X	
57	372	X	X		X	X			X			X	X	X	X	X	X	X	X	X	X

### Bedford, New York (Mixed Fuel)

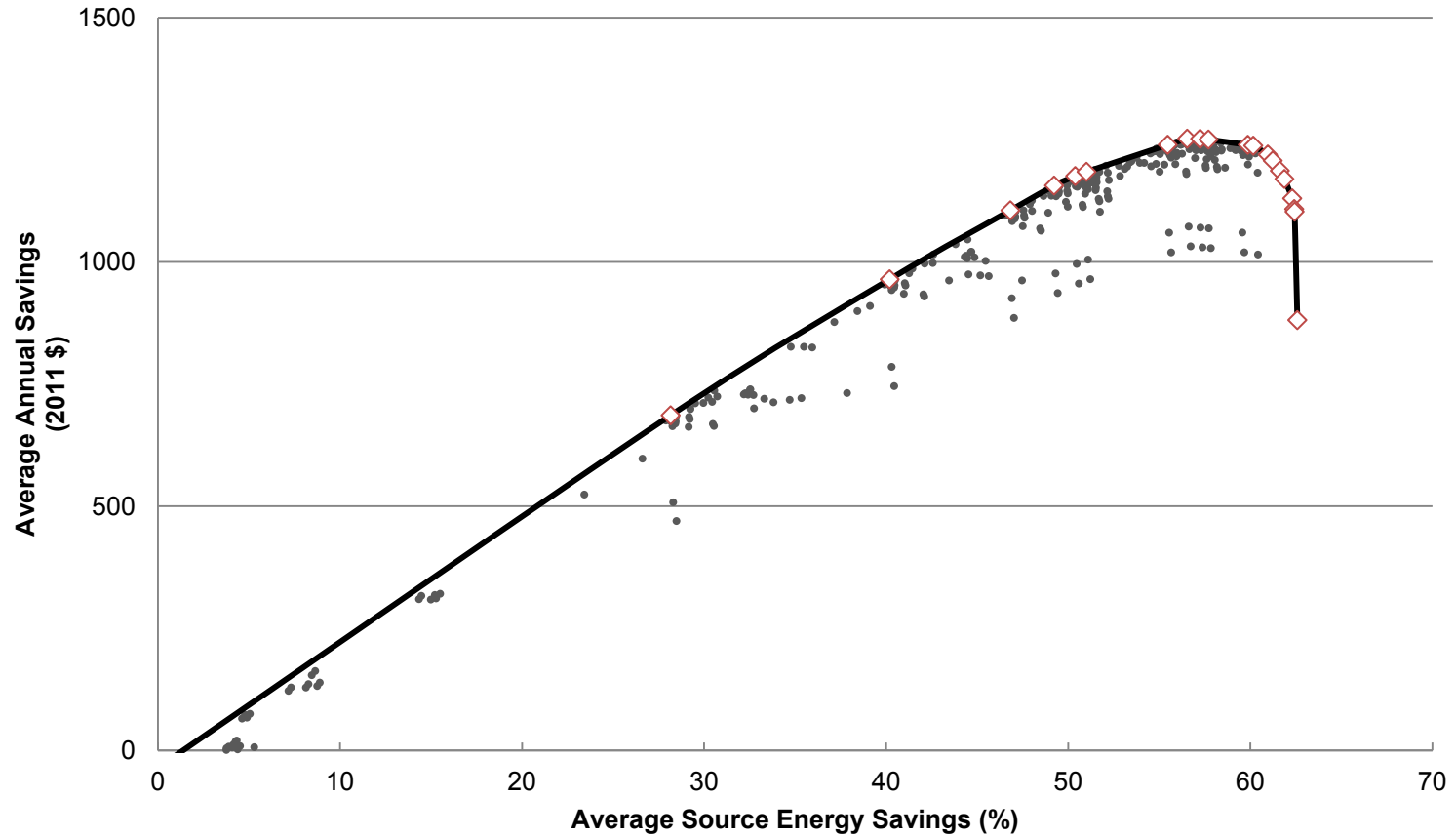


◇ - Denotes an optimal retrofit package and is included in summary table above.

Bedford, New York (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; display: inline-block; margin-bottom: 2px;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; display: inline-block;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Crawlspace Wall: Insulate to R-15 Rigid	Windows: Replace with Double Pane, Low-e, very high SHGC	Clothes Washer: Replace with ENERGY STAR	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Crawlspace Wall: Insulate to R-20 Rigid	Infiltration: 40% Reduction	Hot Water Piping: Insulate to R-2	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
16	321	X		X																			
28	686	X	X																				
30	714	X	X	X																			
47	1106	X	X	X	X																		
49	1156	X	X	X	X	X																	
50	1176	X		X	X	X	X																
51	1185	X		X	X	X		X															
55	1240	X		X	X	X		X	X														
57	1252	X		X	X	X		X	X	X													
57	1252	X		X		X		X	X	X	X												
58	1251	X		X		X		X	X	X													
60	1240	X		X					X	X													
60	1238	X		X					X	X													
61	1220	X		X						X						X							
61	1207	X		X						X					X	X	X						
62	1187	X		X		X				X					X	X	X	X					
62	1170	X		X		X				X					X	X	X	X	X				
62	1130	X		X						X					X	X	X	X		X			
62	1108	X		X						X					X	X	X	X		X	X		
62	1103	X		X						X					X	X	X	X		X	X		
63	881	X		X						X					X	X	X	X		X	X	X	X

### Bedford, New York (All Electric)



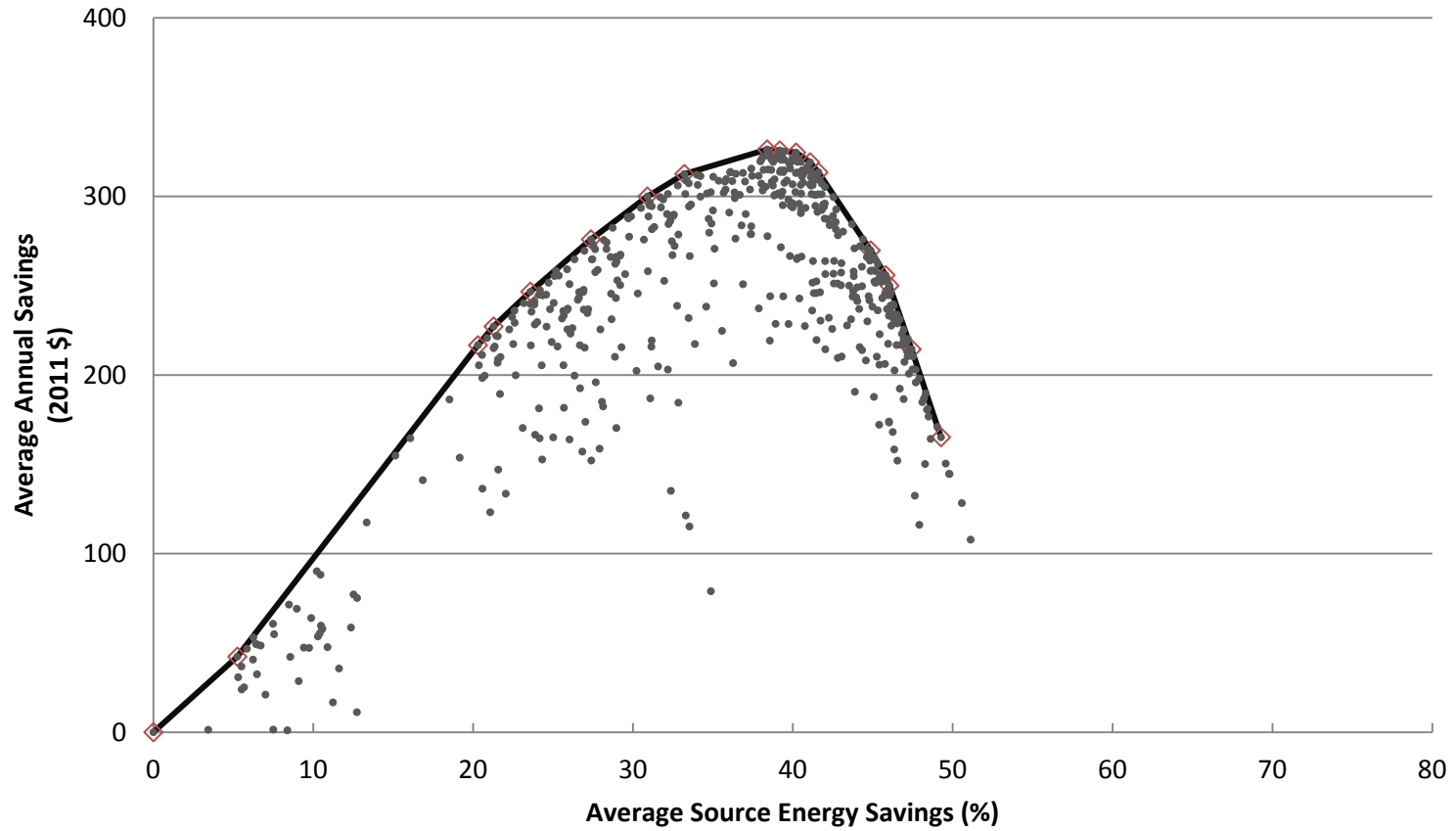
◇ - Denotes an optimal retrofit package and is included in summary table above.



**Boulder County, Colorado (Mixed Fuel)**

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall : Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ducts: Insulate to R-6	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Hot Water Piping: Insulate with R-2	Air Sealing: 40% Reduction in Air Leakage	Basement Wall: Insulate to R-15 Rigid, 8 feet height
5	42	X	X															
20	217	X	X	X														
24	247	X	X	X	X													
27	276	X	X	X	X	X												
31	300	X	X	X	X	X	X											
33	313	X	X	X	X	X	X	X										
38	326	X	X	X	X	X	X	X	X									
39	326	X		X	X	X	X	X	X	X								
40	325	X		X	X	X	X	X	X	X	X							
41	319	X		X	X	X		X	X	X	X	X						
42	314	X		X	X	X		X	X	X	X		X					
45	270	X		X	X	X		X	X	X	X		X	X				
46	256	X		X	X	X		X	X	X	X		X	X	X			
46	250	X		X	X	X		X	X	X	X		X	X	X	X		
47	214	X		X	X	X		X	X	X	X		X	X	X	X	X	
49	165	X		X	X	X		X	X		X		X	X	X	X		X

### Boulder, Colorado (Mixed Fuel)

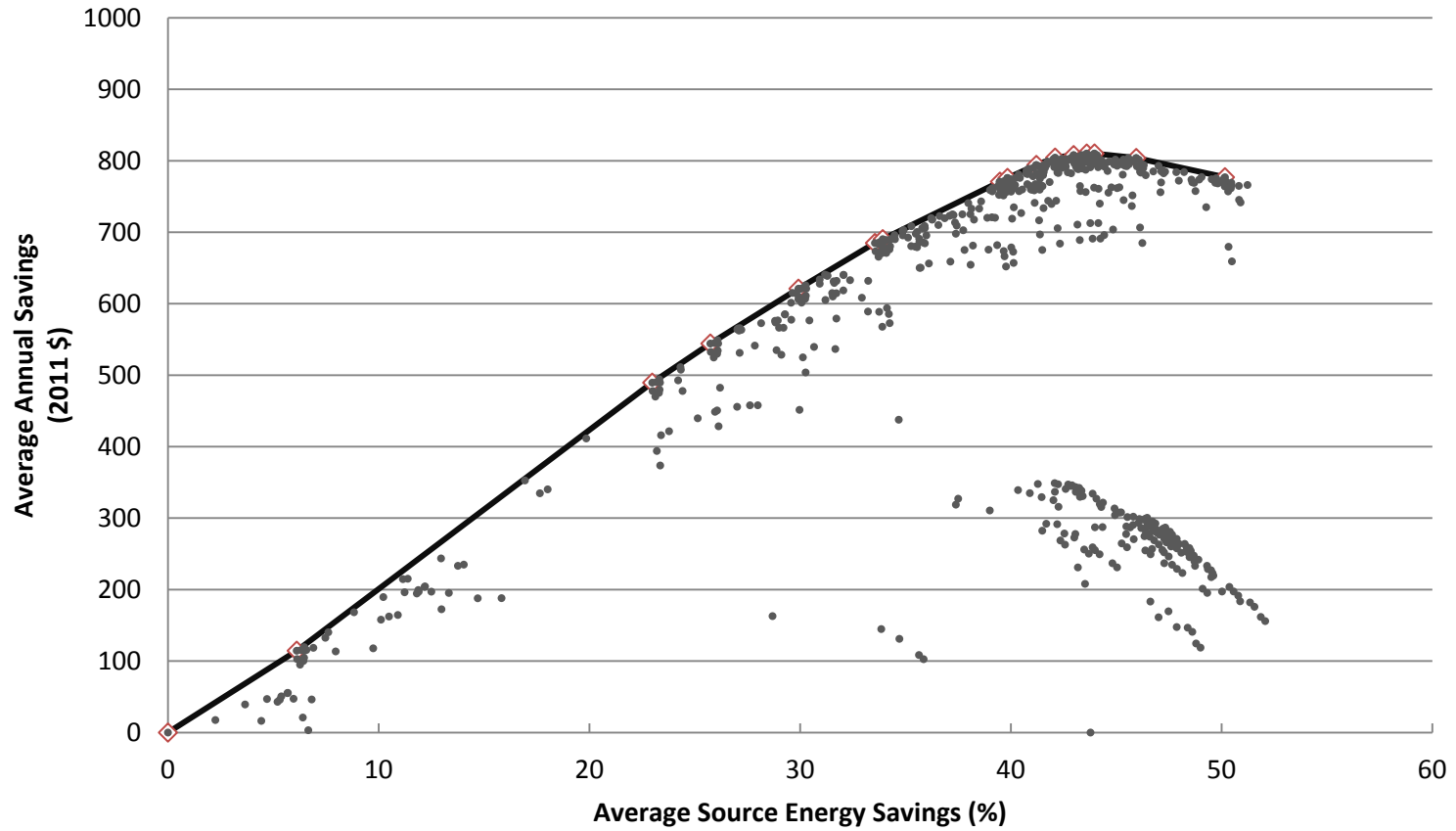


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Boulder County, Colorado (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%
Energy Savings Levels																			
15%	30%																		
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Lighting with CFL	Wall 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Ducts: Insulate to R-6	Lighting: Replace 60% of Lighting with CFL	Windows: Replace with Double-Pane, Low-e, Std SHGC	Clothes Washer: Replace with EnergyStar	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Air Sealing: 40% Reduction in Air Leakage	Basement Wall: Insulate to R-15 Rigid, 8 feet height			
6	114	X	X																
15	313	X	X	X															
23	490	X	X	X															
26	544	X	X	X	X														
30	621	X	X	X	X	X													
34	685	X	X	X	X	X	X												
34	690	X	X	X	X	X	X	X											
39	771	X	X	X	X	X	X		X										
40	776	X	X	X	X	X	X	X	X										
41	794	X	X	X	X	X	X	X	X	X									
42	804	X		X	X	X	X	X	X	X	X								
43	808	X		X	X		X	X	X	X	X	X							
44	810	X		X	X		X	X	X	X	X		X						
44	810	X		X	X		X	X	X	X	X		X	X					
46	804	X		X	X		X	X	X	X	X		X	X	X				
50	777	X		X	X		X	X		X			X	X	X	X			

### Boulder, Colorado (All Electric)

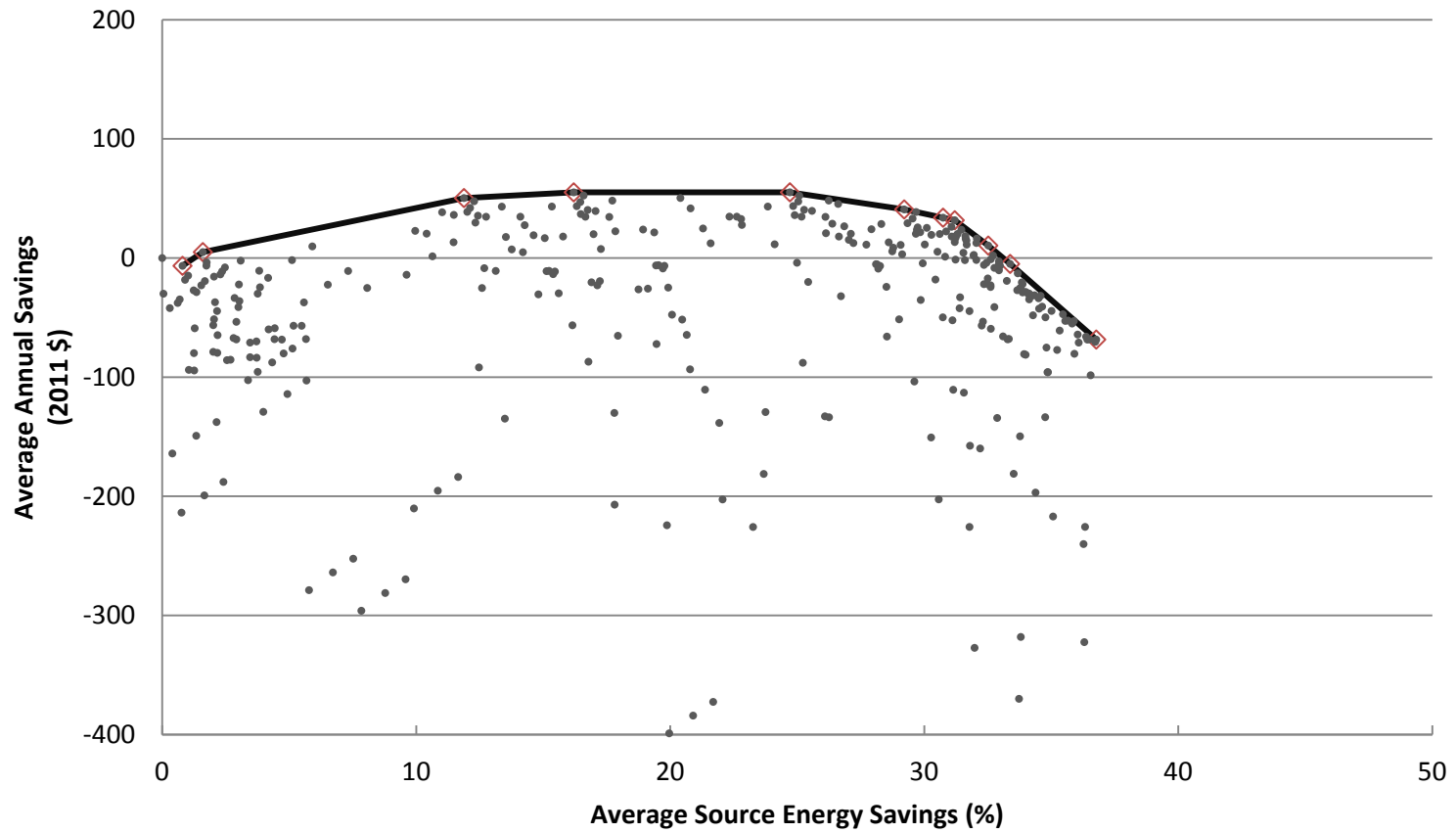


◇ - Denotes an optimal retrofit package and is included in summary table above.

### California (Mixed Fuel)

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>		Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Water Heater: Install Gas Tankless (0.82 EF)	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-8	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Refrigerator: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, high SHGC
2	5	X											
12	50	X	X										
16	55	X	X	X									
25	55	X	X	X	X								
29	41	X	X	X	X	X							
31	34	X	X	X	X	X	X	X					
31	32	X		X	X	X	X	X	X				
33	10	X		X	X	X	X	X	X	X			
33	-5	X		X	X	X	X	X	X	X	X	X	
37	-68	X		X	X	X	X	X	X	X	X	X	X

### California (Mixed Fuel)

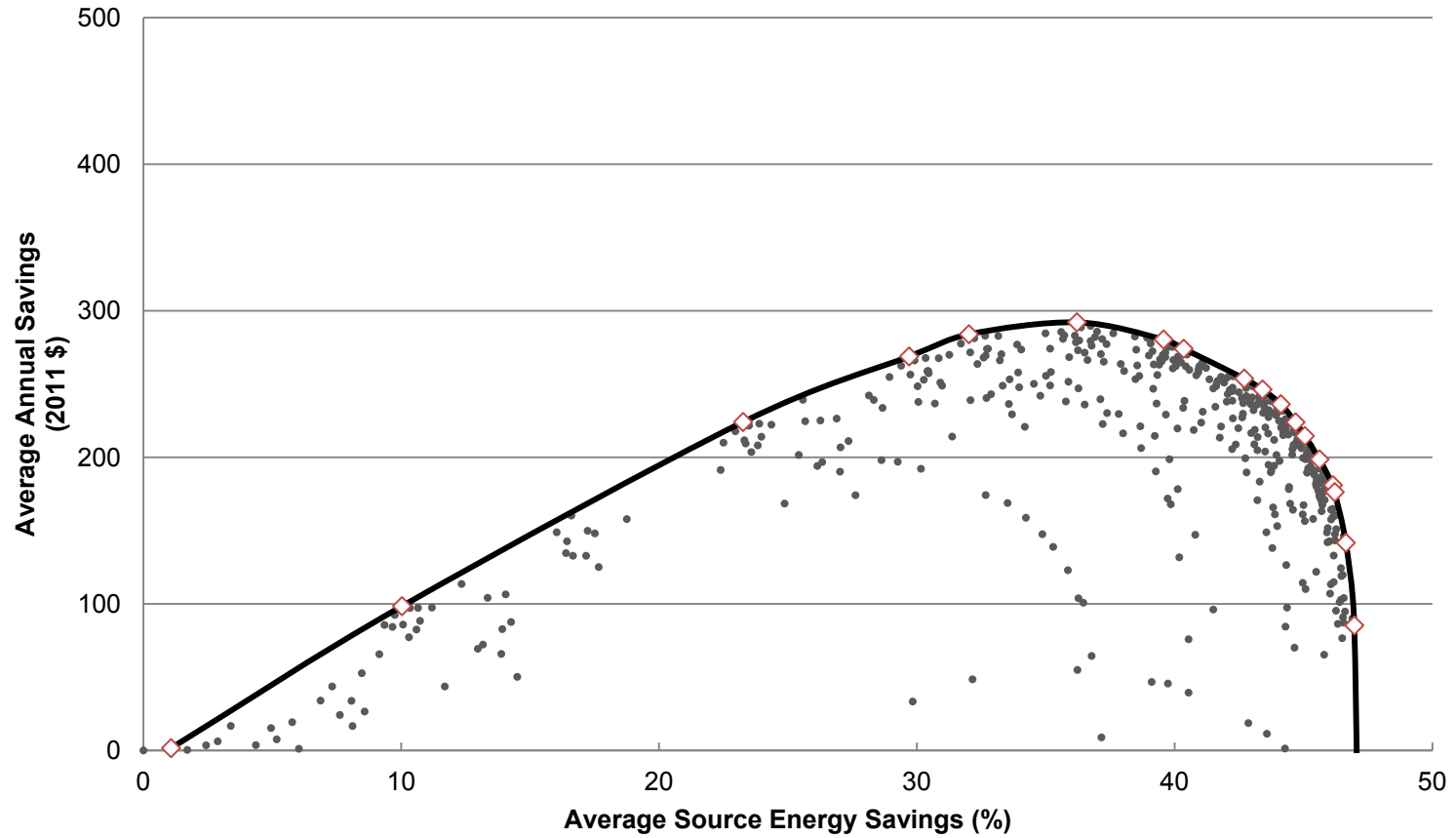


◇ - Denotes an optimal retrofit package and is included in summary table above.

### California (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>															
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Clothes Washer: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-6	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Hot Water Piping: Insulate to R-2	Windows: Replace with Double Pane, Low-e, very high SHGC	Water Heater: Install Electric Premium (0.95 EF)	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Windows: Replace with Quadruple Pane	Infiltration: 40% Reduction
1	2	X															
10	98	X	X														
16	148	X		X													
30	256	X	X	X													
32	284	X	X	X	X	X											
36	292	X		X	X	X	X										X
40	280	X		X	X	X	X	X	X								X
40	274	X		X	X	X	X	X	X								X
43	254	X		X	X	X	X	X	X	X							X
43	246	X		X	X	X	X	X	X	X							X
44	236	X		X	X	X	X	X	X	X	X						X
45	224	X		X		X	X	X	X	X	X	X					X
45	215	X		X		X	X	X	X	X	X		X				X
46	199	X		X		X	X	X	X	X	X		X				X
46	181	X		X		X	X	X	X	X	X		X	X			X
46	176	X		X		X		X	X	X	X		X	X	X		X
47	142	X		X		X		X	X		X		X	X	X	X	X
47	85	X		X		X		X	X		X		X	X	X	X	X

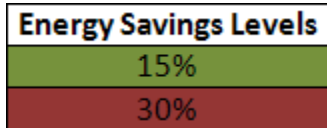
### California (All Electric)



◇ - Denotes an optimal retrofit package and is included in summary table above.

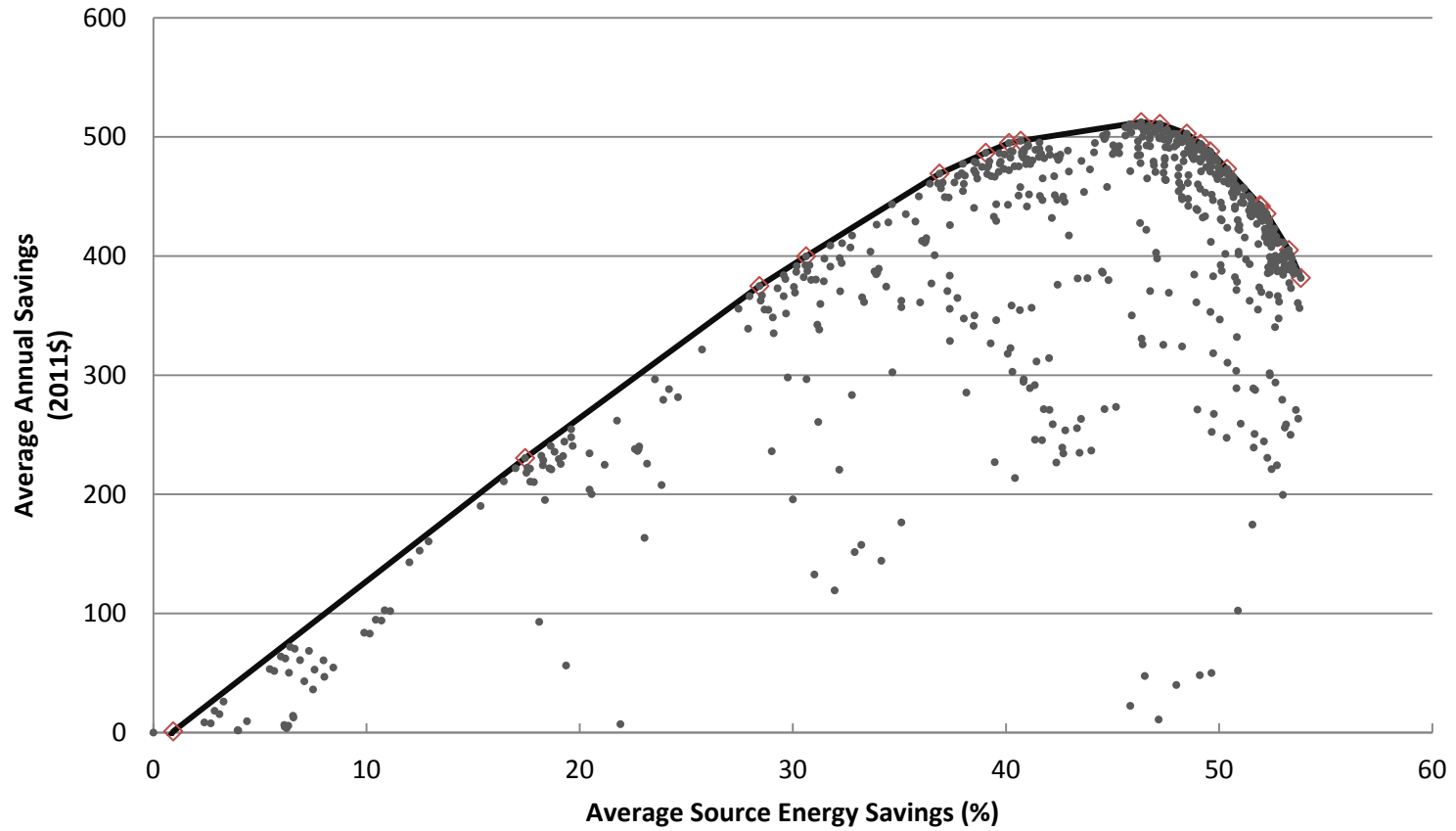


### Camden, New Jersey (Mixed Fuel)



Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-11 to R-38	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Windows: Replace with Double Pane, Low-e, standard SHGC	Crawlspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	Ducts: Insulate to R-8
15	190	X	X																		
28	375	X	X	X																	
31	400	X	X	X	X																
37	469	X	X	X	X	X															
39	487	X	X	X	X	X	X														
40	495	X		X	X	X	X	X													
41	497	X		X	X	X	X		X												
46	512	X		X	X	X	X		X	X											
47	511	X		X	X	X	X		X	X	X										
48	503	X		X	X	X	X		X	X	X	X									
49	494	X		X	X		X		X	X	X	X	X								
50	488	X		X	X		X		X	X	X	X		X							
50	473	X		X	X		X		X	X	X	X		X	X						
52	443	X		X	X		X		X	X	X	X		X	X	X					
52	442	X		X	X		X		X		X	X		X	X	X	X				
52	436	X		X	X		X				X	X		X	X	X	X	X			
53	405	X		X	X		X				X	X		X	X	X		X	X		
54	382	X		X	X		X				X			X	X	X		X	X	X	X

### Camden, New Jersey (Mixed Fuel)

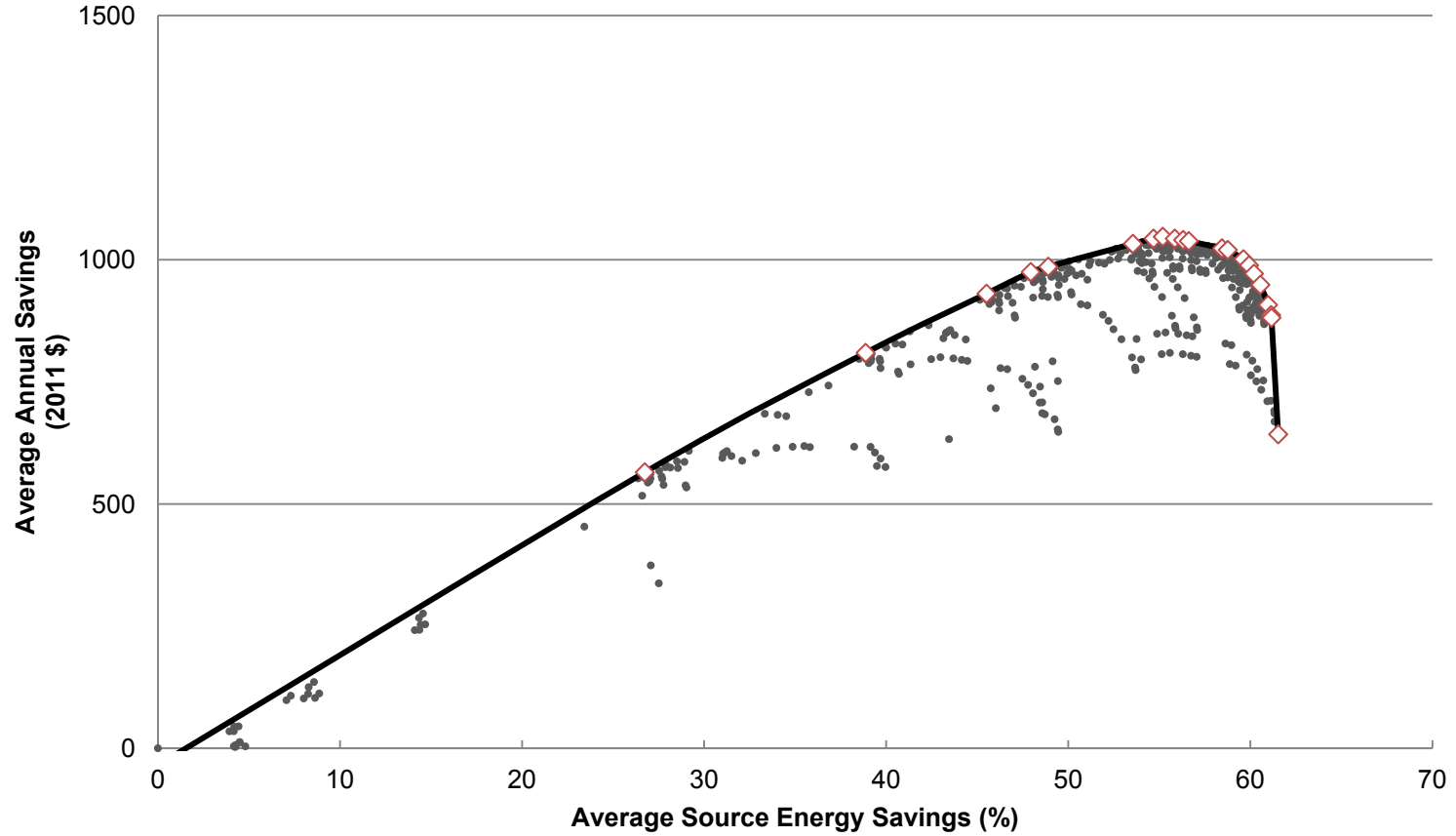


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Camden, New Jersey (All Electric)

Energy Savings Levels																							
15%																							
30%																							
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Infiltration: 40% Reduction	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	254	X		X																			
27	565	X	X																				
30	586	X	X			X																	
39	809	X	X	X																			
46	931	X	X	X	X																		
48	975	X	X	X	X	X																	
49	986	X		X	X	X	X																
54	1033	X		X	X	X	X	X															
55	1043	X		X	X	X	X	X	X														
55	1047	X		X	X	X	X	X	X	X													
56	1043	X		X		X		X	X	X	X												
56	1040	X		X		X		X	X	X		X											
57	1038	X		X		X		X	X	X		X	X										
58	1023	X		X				X	X	X			X	X									
59	1020	X		X				X	X				X	X	X								
60	1001	X		X				X	X				X	X	X	X							
60	989	X		X				X	X				X	X	X	X	X						
60	971	X		X				X	X				X	X	X	X	X						
61	949	X		X		X		X	X				X	X	X	X	X	X					
61	908	X		X				X	X				X	X	X	X	X		X				
61	887	X		X				X	X				X	X	X	X	X		X	X			
61	881	X		X				X	X				X	X	X	X	X				X	X	
62	643	X		X				X	X				X	X	X	X	X				X	X	X

### Camden, New Jersey (All Electric)

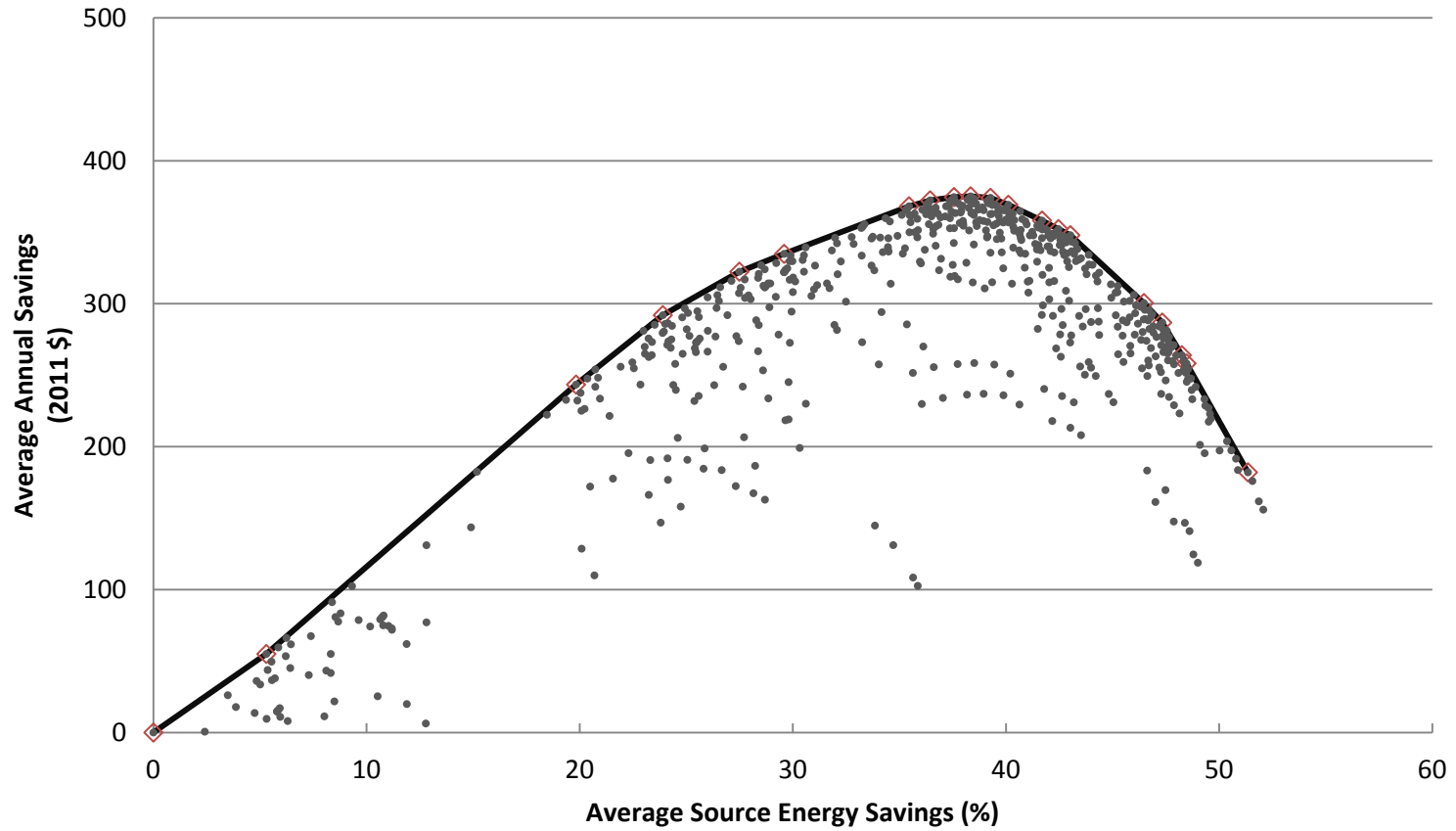


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Chicago, Illinois (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; padding: 2px; text-align: center;">30%</div> </div>																	
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Windows: Replace with Quadruple Pane	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
5	55	X	X																
20	243	X	X	X															
24	292	X	X	X	X														
27	322	X	X	X	X	X													
30	335	X	X	X	X	X	X												
35	368	X	X	X	X	X	X	X											
36	372	X		X	X	X	X	X	X										
38	375	X	X	X	X	X	X	X	X	X									
38	375	X		X	X	X	X	X	X	X									
39	374	X		X	X	X	X	X	X	X	X								
40	369	X		X	X		X	X	X	X	X	X							
42	358	X		X	X	X	X	X	X	X	X	X	X						
42	352	X		X	X		X	X	X	X	X	X	X						
43	348	X		X	X		X	X	X	X	X		X	X					
46	300	X		X	X		X	X	X	X	X		X	X	X				
47	287	X		X	X		X	X	X	X	X		X	X	X	X			
48	264	X		X	X		X		X	X	X		X	X	X	X	X		
48	258	X		X	X		X		X	X	X		X	X	X	X	X	X	
51	182	X		X	X		X			X	X		X	X	X	X	X		X

### Chicago, Illinois (Mixed Fuel)

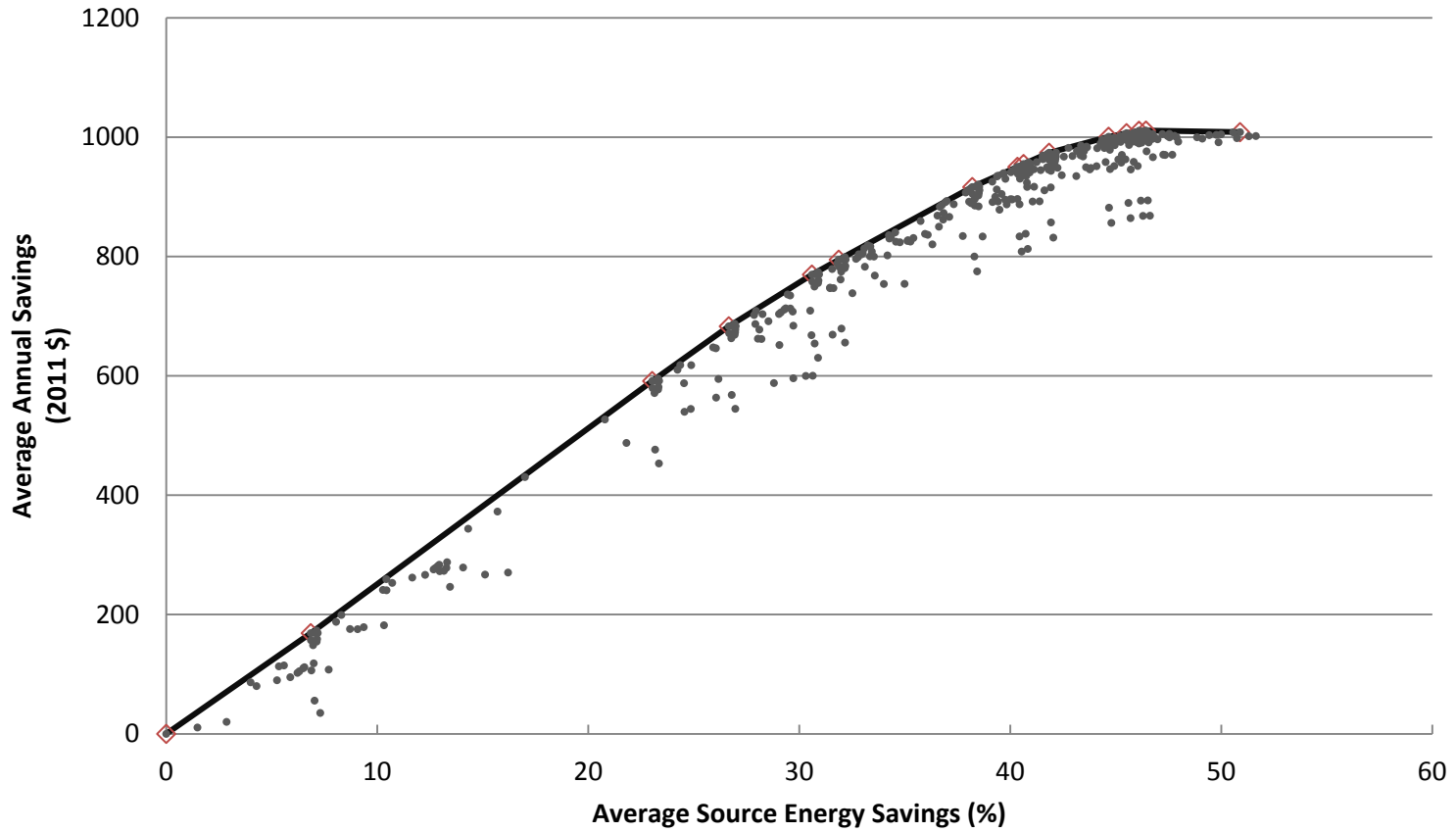


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Chicago, Illinois (All Electric)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels													
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, high SHGC	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	169	X	X												
15	380	X		X											
23	591	X	X	X											
27	683	X	X	X	X										
31	770	X	X	X	X	X									
32	795	X		X	X	X	X								
38	916	X		X	X	X	X	X							
40	950	X		X	X	X	X	X	X						
42	974	X		X	X	X	X	X	X	X					
45	1001	X		X	X	X	X	X	X	X	X				
46	1007	X		X	X		X	X	X	X	X	X			
46	1011	X		X	X		X	X	X	X	X		X		
46	1011	X		X	X		X	X	X	X	X		X	X	
51	1008	X		X	X			X	X	X	X		X	X	X

### Chicago, Illinois (All Electric)



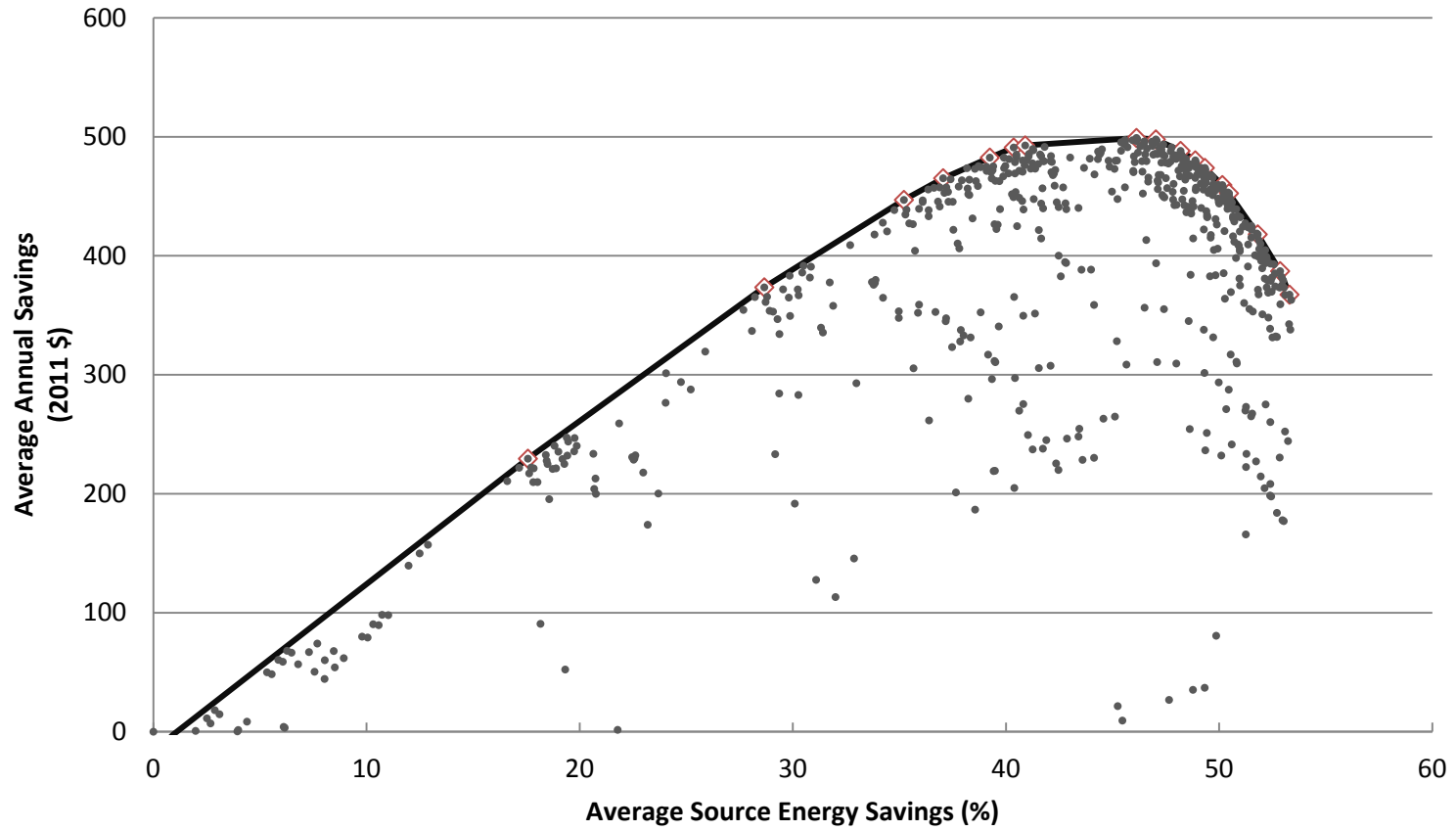
◇ - Denotes an optimal retrofit package and is included in summary table above.



Cincinnati, Ohio (Mixed Fuel)

		<table border="1" style="margin: auto;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #6aa84f; color: white;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>																Energy Savings Levels		15%	30%
Energy Savings Levels																					
15%	30%																				
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Crawlspace Wall: Insulate with R-20	Windows: Replace with Double Pane, Low-e, standard SHGC	Infiltration: 40% Reduction	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	
15	211	X	X																		
30	373	X	X	X																	
35	447	X	X	X	X																
37	465	X	X	X	X	X															
39	483	X	X	X	X	X	X														
40	491	X		X	X	X	X	X													
41	493	X		X	X	X	X		X												
46	499	X		X	X	X	X		X	X											
47	498	X		X	X	X	X		X	X	X										
48	488	X		X	X	X	X		X	X	X	X									
49	480	X		X		X	X		X	X	X	X	X								
49	474	X		X		X	X		X	X	X	X	X	X							
50	459	X		X		X	X		X	X	X	X		X	X						
50	452	X		X		X	X				X	X		X	X	X	X				
52	418	X		X		X	X				X	X		X	X	X	X	X			
53	387	X		X		X	X				X	X		X	X	X		X	X		
53	367	X		X		X	X				X	X		X	X	X		X	X	X	

### Cincinnati, Ohio - Mixed Fuel

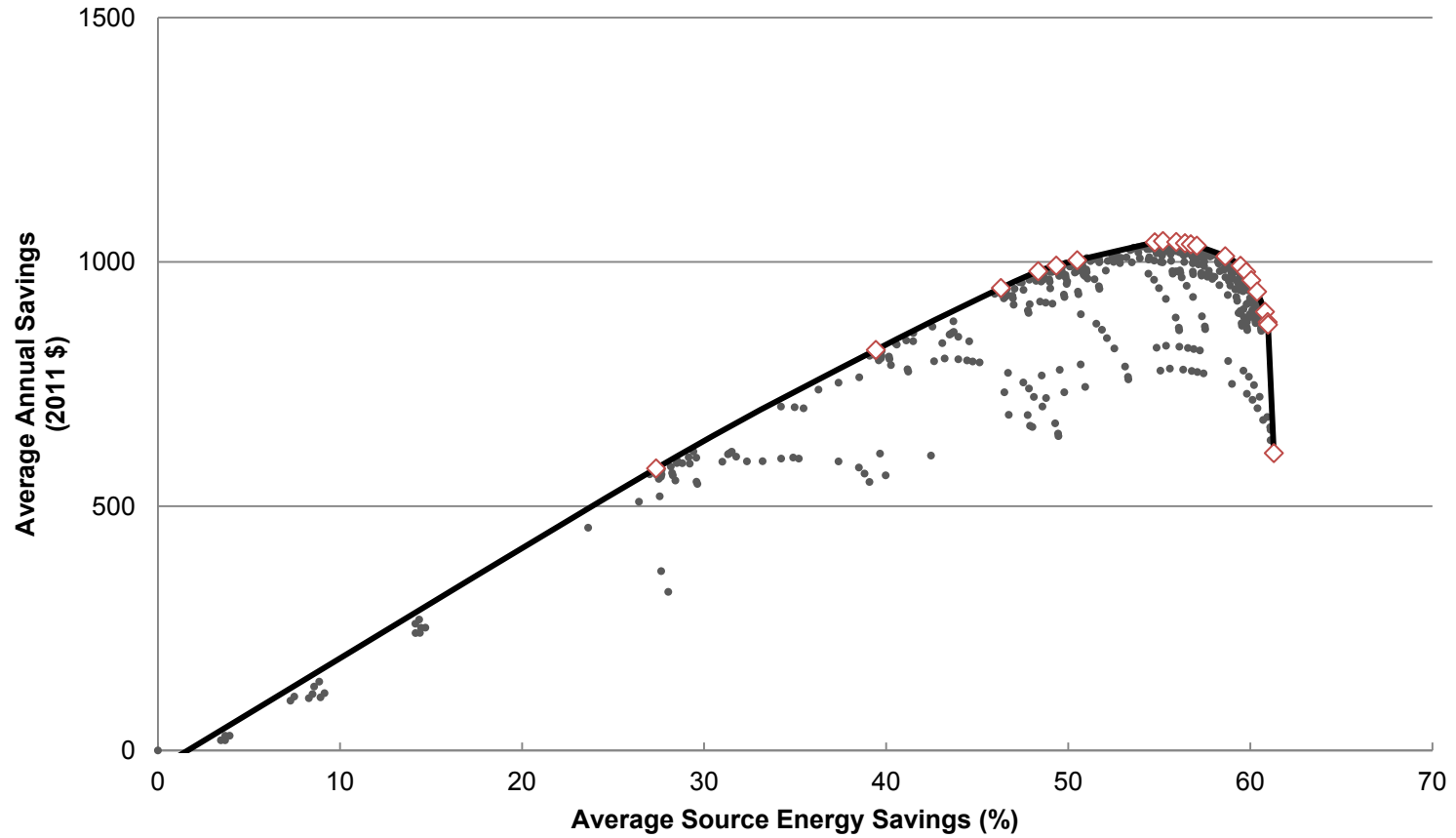


◇ - Denotes an optimal retrofit package and is included in summary table above.

Cincinnati, Ohio (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Crawlspace Wall: Insulate to R-20 Rigid	Infiltration: 40% Reduction	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	268	X		X																			
27	577	X	X																				
30	600	X	X	X		X																	
39	820	X	X	X																			
46	947	X	X	X	X																		
48	981	X	X	X	X	X																	
49	993	X		X	X	X	X																
50	1004	X		X	X	X	X	X															
55	1040	X		X	X	X	X	X	X														
55	1043	X		X	X	X	X	X	X	X													
56	1041	X		X		X		X	X	X	X												
56	1038	X		X		X		X	X	X		X											
57	1036	X		X		X		X	X	X		X	X										
57	1033	X		X		X		X	X	X		X	X	X									
59	1012	X		X				X	X	X					X								
59	992	X		X				X				X	X	X	X	X							
60	980	X		X				X				X	X	X	X	X	X						
60	963	X		X				X				X	X	X	X	X	X						
60	939	X		X		X		X				X	X	X	X	X	X	X					
61	898	X		X				X				X	X	X	X	X	X		X				
61	877	X		X				X				X	X	X	X	X	X		X		X		
61	872	X		X				X				X	X	X	X	X	X				X	X	
61	609	X		X				X				X	X	X	X	X	X				X	X	X

### Cincinnati, Ohio (All Electric)

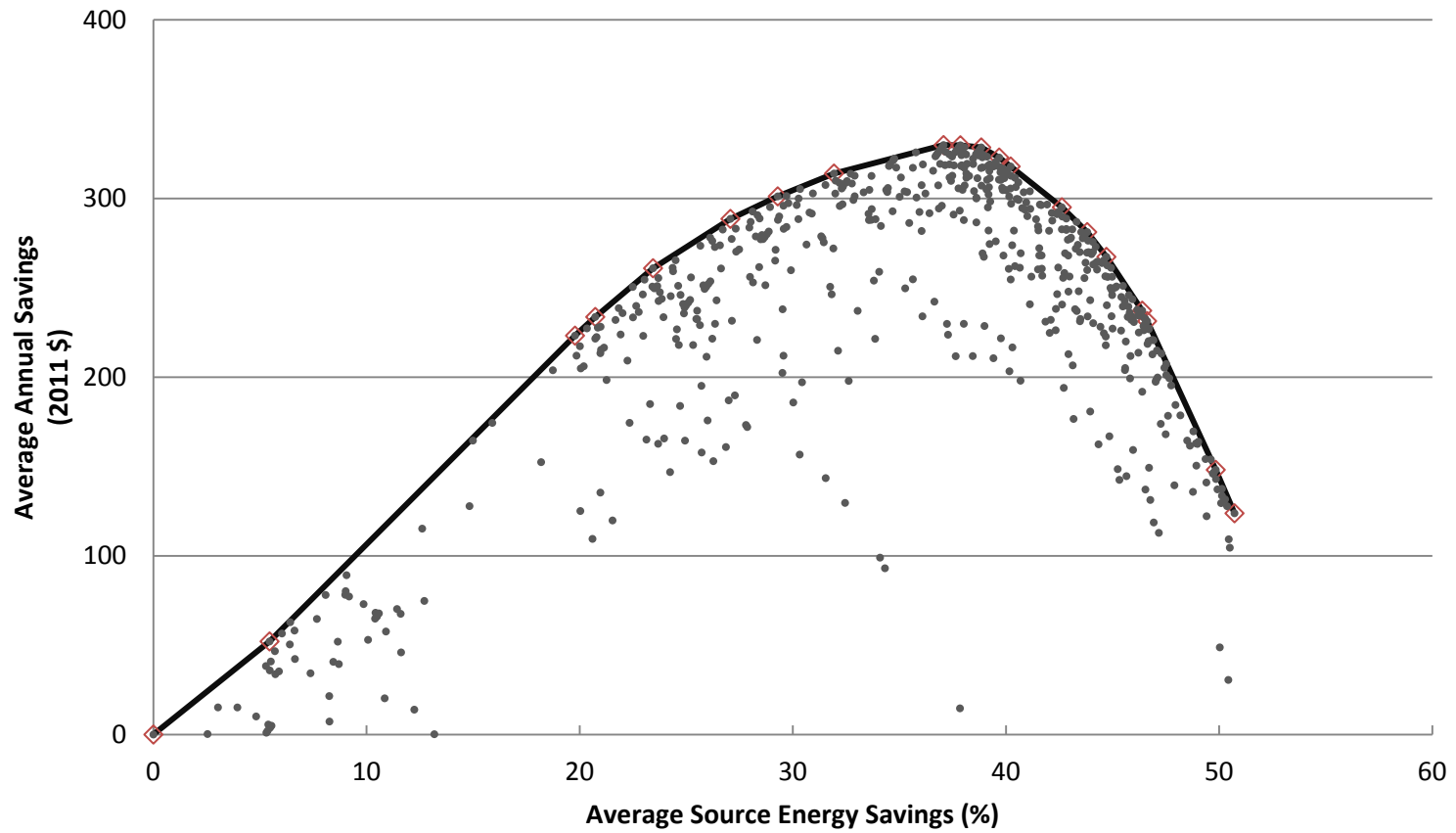


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Connecticut (Mixed Fuel)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels																
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas Hot water heater. Replace with Gas Tankless, Condensing	Air Sealing: 40% Reduction in Air Leakage	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane
5	52	X	X															
20	223	X	X	X														
21	234	X	X	X														
23	261	X	X	X	X													
27	289	X	X	X	X	X												
29	301	X	X	X	X	X	X											
32	314	X	X	X	X	X	X	X										
37	330	X	X	X	X	X	X	X	X									
38	330	X		X	X	X	X	X	X	X								
39	329	X		X	X	X	X	X	X	X	X							
40	323	X		X	X		X	X	X	X	X	X						
40	318	X		X	X		X	X	X	X	X	X						
43	295	X		X	X	X	X	X	X	X			X					
44	281	X		X	X		X	X	X	X			X	X				
45	267	X		X	X		X	X	X	X			X	X	X			
46	237	X		X	X		X	X	X	X			X	X	X	X		
47	231	X		X	X		X	X	X	X			X	X	X	X	X	
50	148	X		X	X		X	X	X				X	X	X	X	X	X
51	124	X		X	X		X	X					X	X	X	X	X	X

### Connecticut (Mixed Fuel)

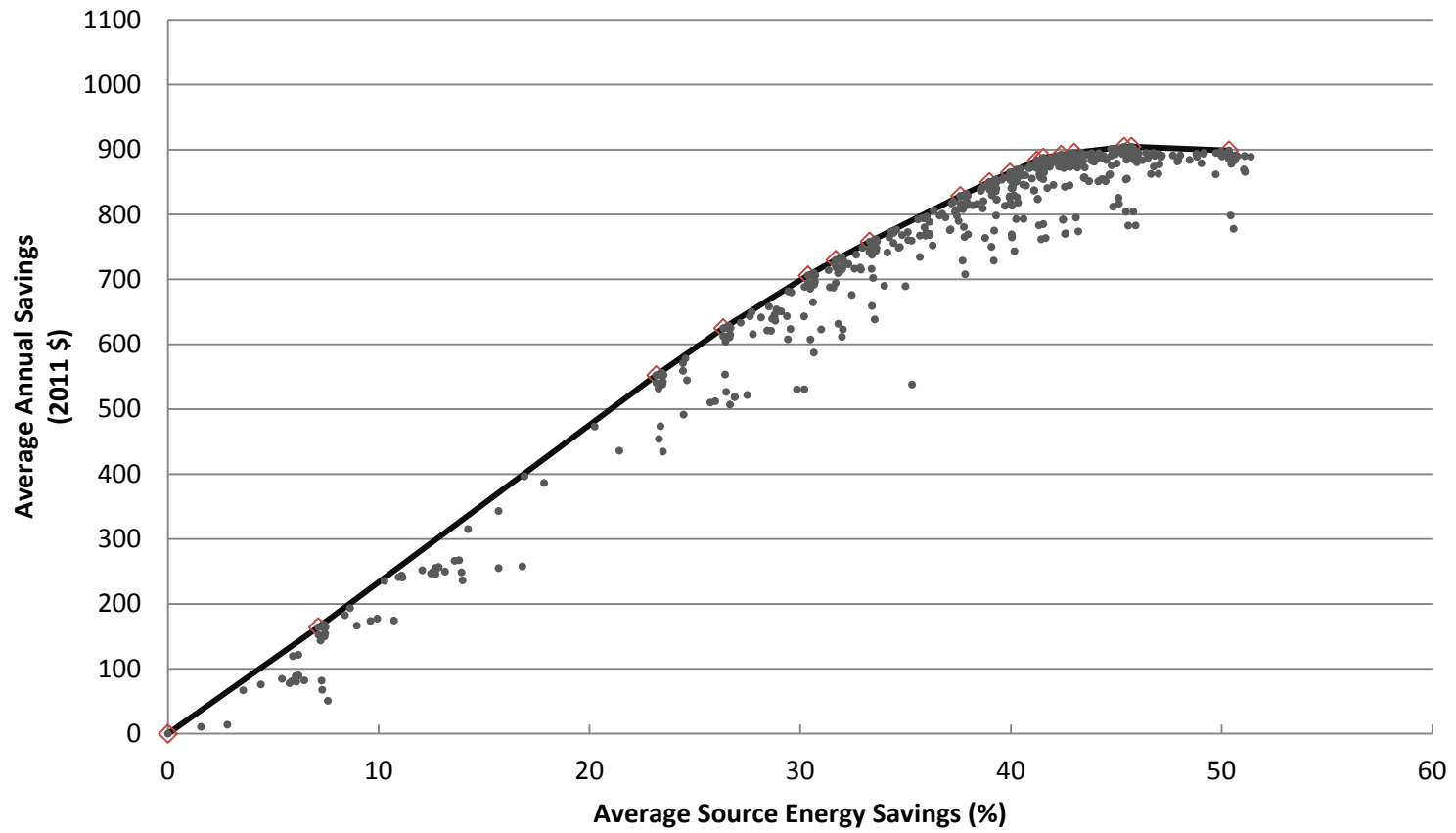


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Connecticut (All Electric)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels														
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, high SHGC	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	164	X	X													
15	358	X	X	X												
23	552	X	X	X												
26	625	X	X	X	X											
30	706	X	X	X	X	X										
32	730	X		X	X	X	X									
33	758	X	X	X	X	X		X								
38	828	X		X	X	X	X		X							
39	850	X	X	X	X	X		X		X						
40	865	X		X	X	X	X	X	X							
42	887	X		X	X	X	X	X	X		X					
42	892	X		X	X		X	X		X	X	X				
43	895	X		X	X		X	X		X	X		X			
45	904	X		X	X		X	X		X	X		X	X		
46	905	X		X	X		X	X		X	X		X	X	X	
50	899	X		X	X			X	X		X		X	X	X	X

### Connecticut (All Electric)



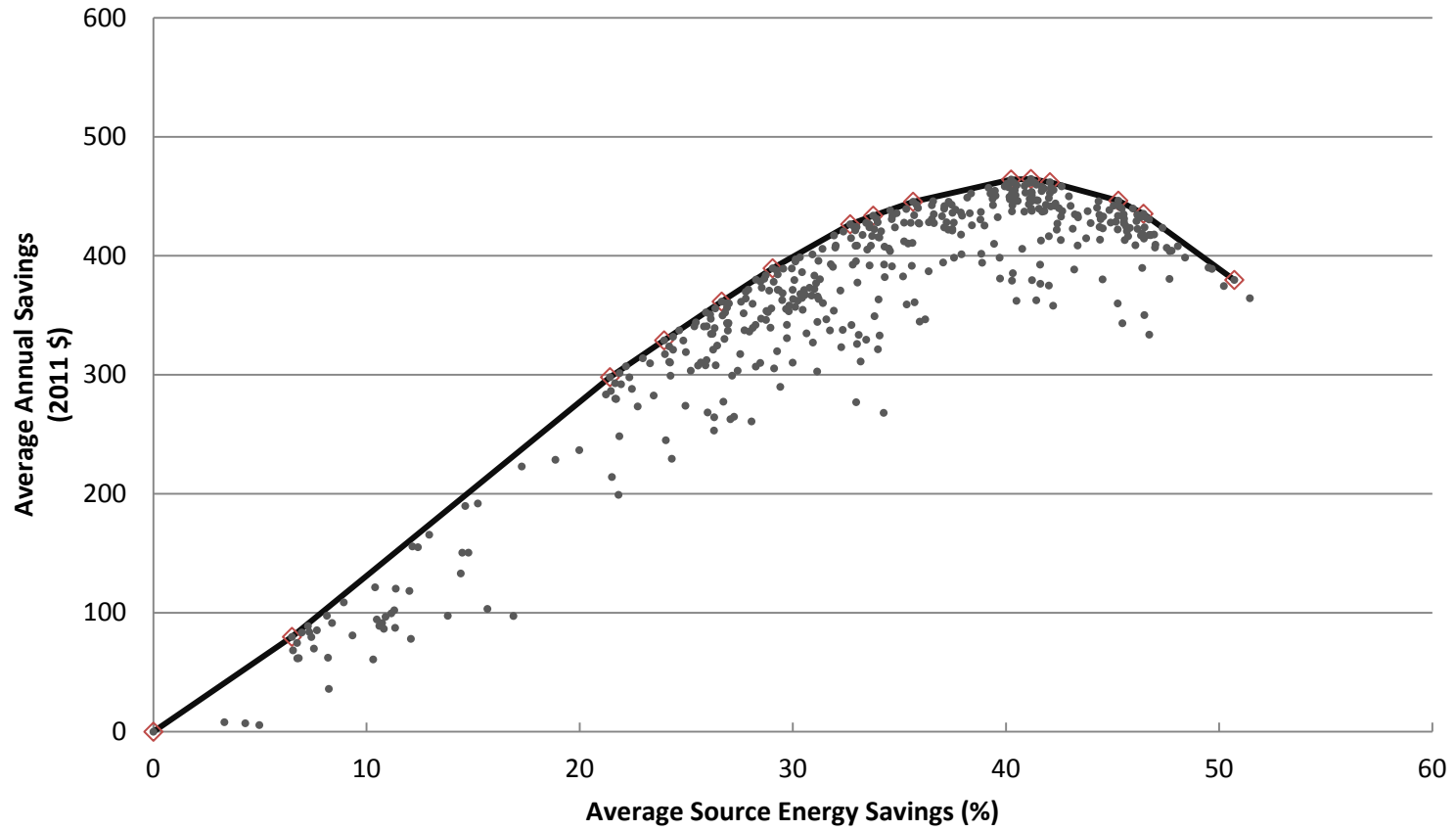
◇ - Denotes an optimal retrofit package and is included in summary table above.



### Eagle County, Colorado (Mixed Fuel)

		<table border="1" style="width: 100%; text-align: center;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #6aa84f; color: white;">15%</td></tr> <tr><td style="background-color: #800000; color: white;">30%</td></tr> </table>														Energy Savings Levels		15%	30%
Energy Savings Levels																			
15%																			
30%																			
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ducts: Insulate to R-6	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Furnace: Replace with AFUE 92.5%, Gas	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height				
7	80	X	X																
15	205	X	X	X															
21	298	X	X	X															
24	329	X	X	X	X														
29	389	X	X	X	X	X													
33	426	X	X	X	X	X	X												
34	434	X		X	X	X	X	X											
36	445	X		X	X	X	X	X	X										
40	464	X		X	X	X	X	X	X	X									
41	465	X		X	X	X	X	X	X	X	X								
42	462	X		X	X	X		X	X	X	X	X							
45	446	X		X	X	X	X	X	X	X	X		X						
46	435	X		X	X	X		X	X	X	X		X	X					
51	380	X		X	X	X			X	X	X		X	X	X				

### Eagle County, Colorado (Mixed Fuel)

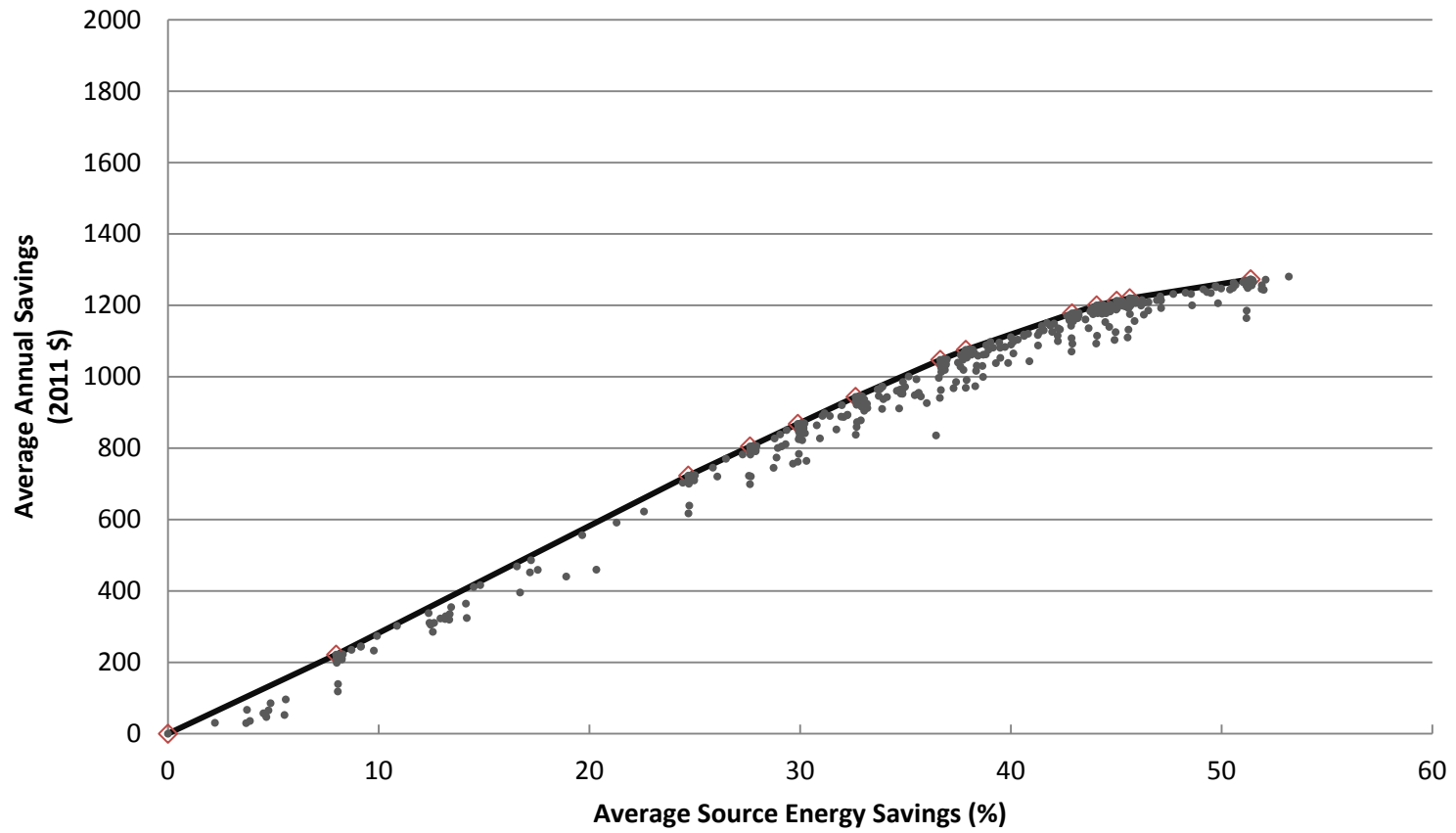


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Eagle County, Colorado (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>											
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ducts: Insulate to R-6	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height
8	221	X	X										
15	428	X	X	X									
25	723	X	X	X									
28	805	X	X	X	X								
30	868	X	X	X	X	X							
37	1047	X	X	X	X	X	X						
38	1075	X		X	X	X	X	X					
43	1178	X		X	X	X	X	X	X				
44	1200	X		X	X	X	X	X	X	X			
45	1213	X		X	X	X		X	X	X	X		
46	1220	X		X	X	X		X	X	X		X	
51	1273	X		X	X	X			X	X		X	X

### Eagle County, Colorado (All Electric)

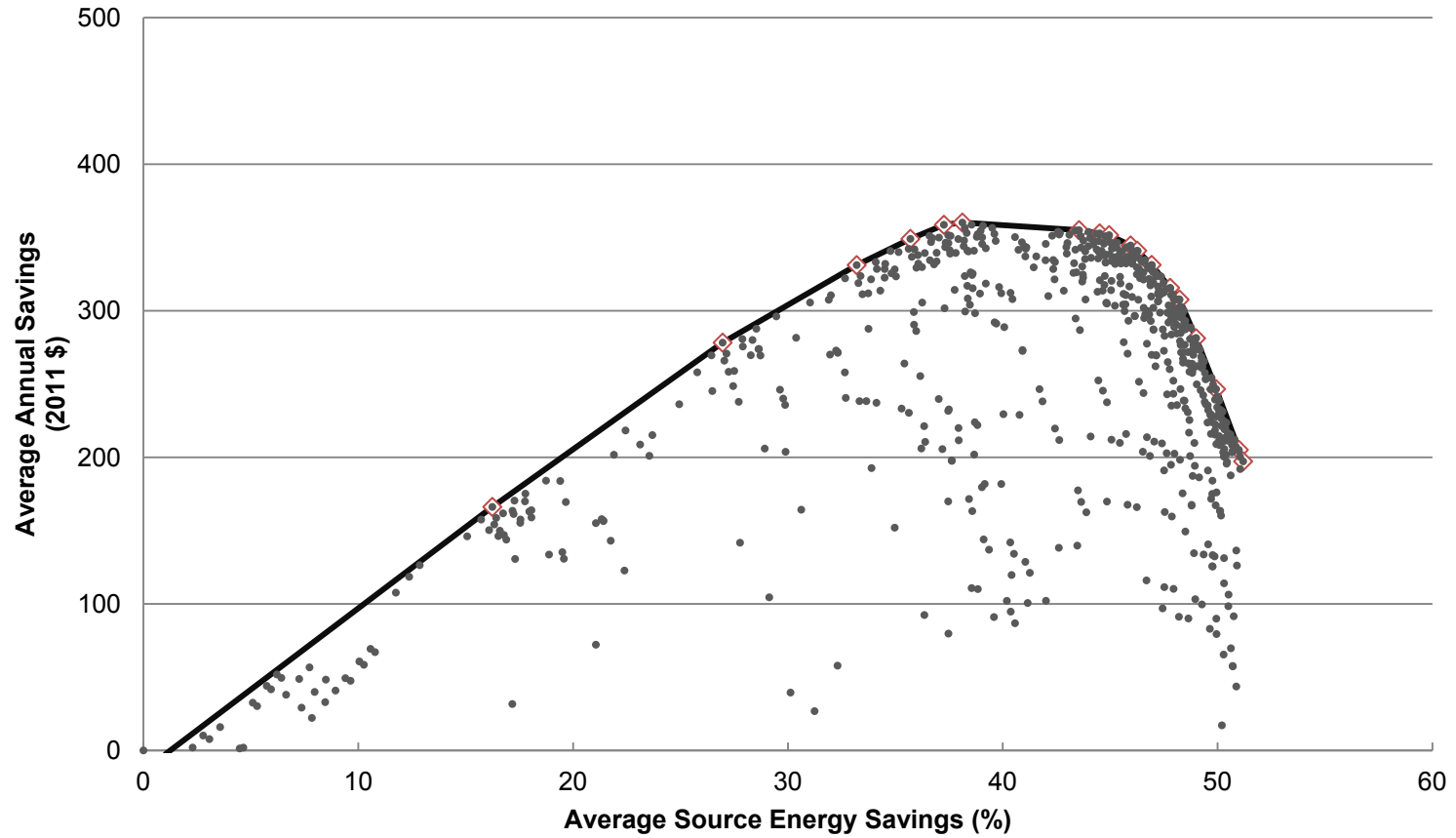


◇ - Denotes an optimal retrofit package and is included in summary table above.

Greensboro, North Carolina (Mixed Fuel)

		Energy Savings Levels																				
		15%																				
		30%																				
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Water Heater: Install Gas Tankless (0.82 EF)	Infiltration: 20% Reduction	Crawlspace Wall: Insulate with R-10	Windows: Replace with Double Pane, Low-e, standard SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate with R-15	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-60	Windows: Replace with Double Pane, Low-e, low SHGC	Crawlspace Wall: Insulate with R-20	Refrigerator: Replace with ENERGY STAR	Windows: Replace with Quad Pane	Infiltration: 40% Reduction	Hot Water Pipes: Insulate from Uninsulated to R-2	
16	166	X	X																			
30	296	X	X	X																		
33	331	X	X	X	X																	
36	349	X	X	X	X	X																
37	359	X	X	X	X	X	X															
38	360	X		X	X	X	X	X														
44	355	X		X	X	X	X	X	X													
45	353	X		X	X	X	X	X	X	X												
45	352	X		X	X	X	X		X	X	X											
46	345	X		X	X	X	X	X	X	X	X											
46	341	X		X	X	X	X		X	X	X	X										
47	331	X		X		X	X		X	X	X	X	X									
48	316	X		X		X	X		X	X	X	X	X	X								
48	308	X		X		X	X			X	X	X		X	X	X						
49	281	X		X		X	X			X		X		X	X	X	X	X				
50	247	X		X		X	X			X		X		X	X		X	X	X			
51	205	X		X		X	X			X	X	X		X	X		X	X	X	X	X	X
51	197	X		X		X	X			X		X		X	X		X	X	X	X	X	X

### Greensboro, North Carolina (Mixed Fuel)

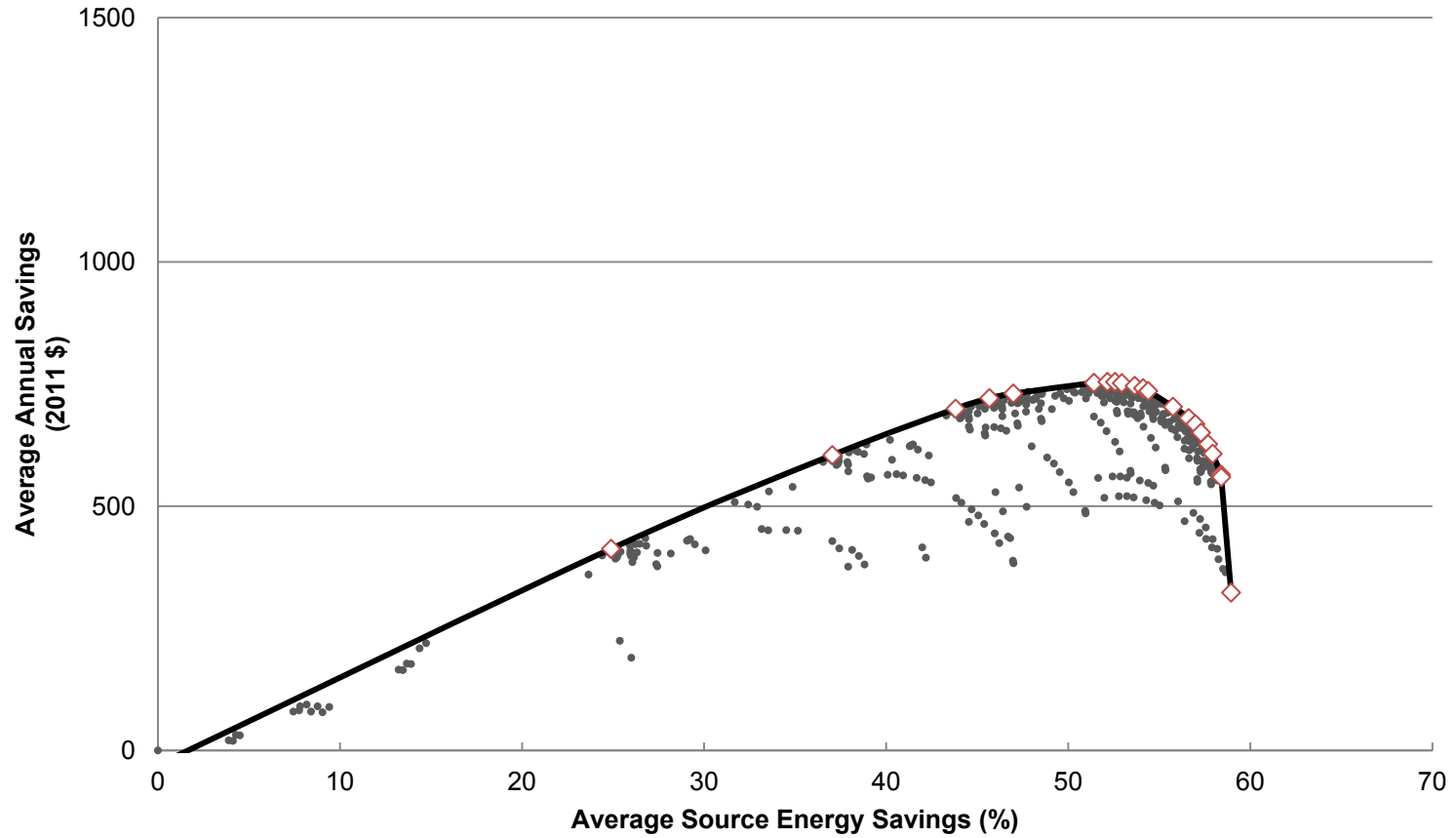


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Greensboro, North Carolina (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="width: 50%; height: 20px;">15%</td> <td style="width: 50%; height: 20px;">30%</td> </tr> </table>																	Energy Savings Levels		15%	30%	
Energy Savings Levels																							
15%	30%																						
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate to R-10 Rigid	Crawlspace Wall: Insulate to R-15 Rigid	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Crawlspace Wall: Insulate to R-20 Rigid	Infiltration: 40% Reduction	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-6	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	220	X		X																			
25	413	X	X																				
31	508	X	X	X																			
44	700	X	X	X	X																		
46	721	X	X	X	X	X																	
47	731	X	X	X	X	X	X																
51	753	X	X	X	X	X	X	X															
52	754	X		X	X	X	X	X	X														
53	754	X		X	X	X	X	X		X													
53	752	X		X	X	X	X	X		X	X												
54	746	X		X		X	X	X		X	X	X											
54	741	X		X		X	X	X		X	X		X										
54	736	X		X		X	X	X			X		X	X									
56	703	X		X			X	X			X		X	X	X								
57	680	X		X			X				X		X	X	X	X							
57	668	X		X			X				X		X	X	X	X	X						
57	651	X		X			X				X		X	X	X	X	X						
58	627	X		X		X	X				X		X	X	X	X	X	X					
58	607	X		X		X	X				X		X	X	X	X	X	X	X				
58	565	X		X			X				X		X	X	X	X	X	X	X	X	X		
58	559	X		X			X				X		X	X	X	X	X	X	X	X	X	X	
59	323	X		X			X				X		X	X	X	X	X	X	X	X	X	X	X

### Greensboro, North Carolina (All Electric)



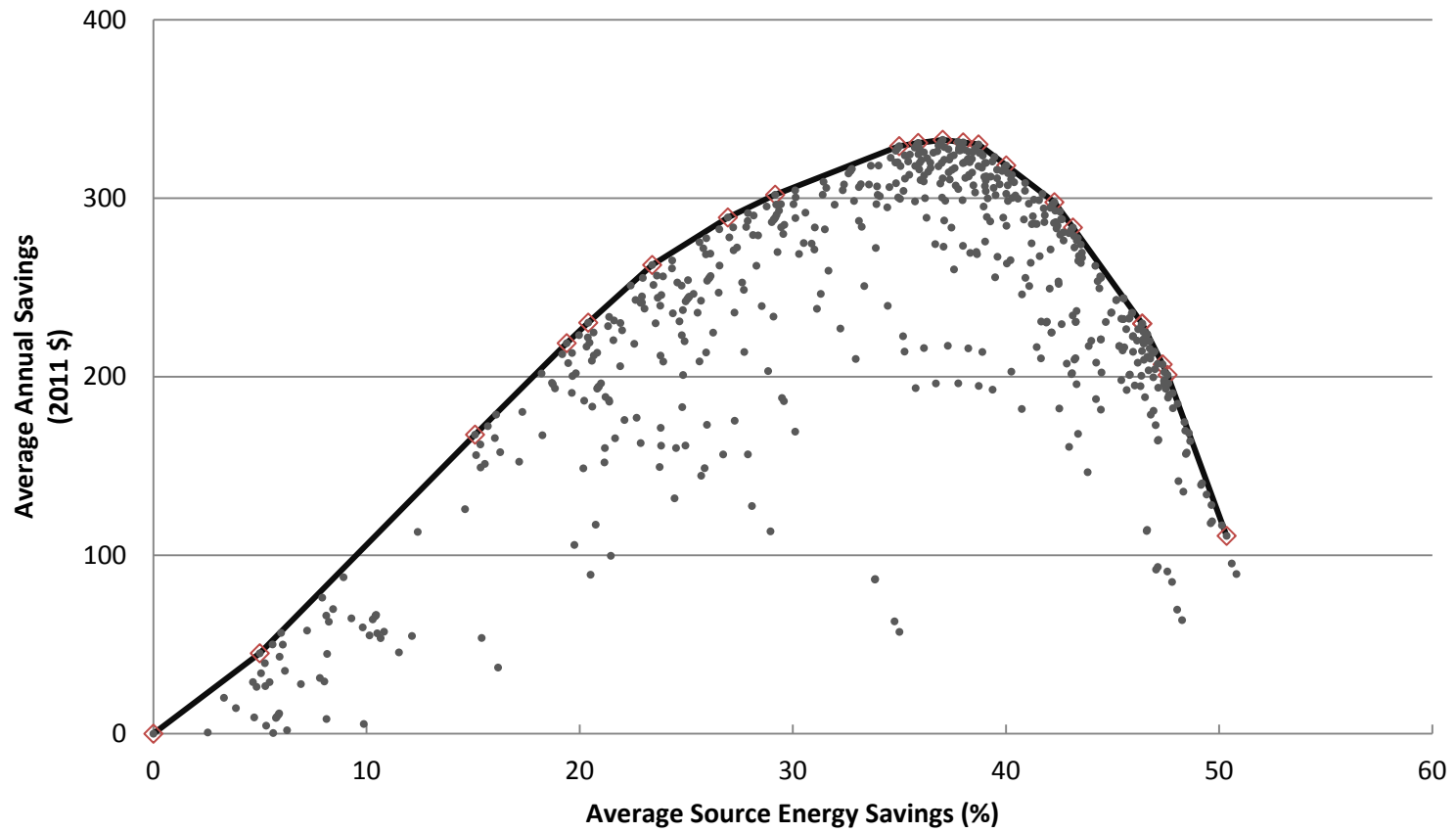
◇ - Denotes an optimal retrofit package and is included in summary table above.



### Indianapolis, Indiana (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>																	
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Hot Water Heater: Replace with Gas Tankless, Condensing	Furnace: Replace with AFUE 92.5%, Gas	Windows: Replace with Double Pane, Low-e, std SHGC	Windows: Replace with Quadruple Pane	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
5	45	X	X																
15	168	X		X															
19	219	X	X	X															
23	263	X	X	X	X														
27	289	X	X	X	X	X													
29	302	X	X	X	X	X	X												
35	329	X	X	X	X	X	X	X											
36	331	X		X	X	X	X	X	X										
37	333	X	X	X	X	X	X	X		X									
38	331	X	X	X	X	X	X	X		X	X								
39	330	X		X	X	X	X	X	X	X	X								
40	318	X		X	X		X	X	X	X	X	X							
42	298	X		X	X		X	X	X	X	X	X	X						
43	284	X		X	X		X	X	X	X	X	X	X	X					
46	230	X		X	X		X	X	X	X	X	X	X	X	X				
46	230	X		X	X		X		X	X	X	X	X	X	X	X			
47	207	X		X	X		X		X	X	X	X	X	X	X	X	X		
48	201	X		X	X		X		X	X	X	X	X	X	X		X	X	
50	111	X		X	X		X			X	X	X	X	X	X		X	X	X

### Indianapolis, Indiana (Mixed Fuel)

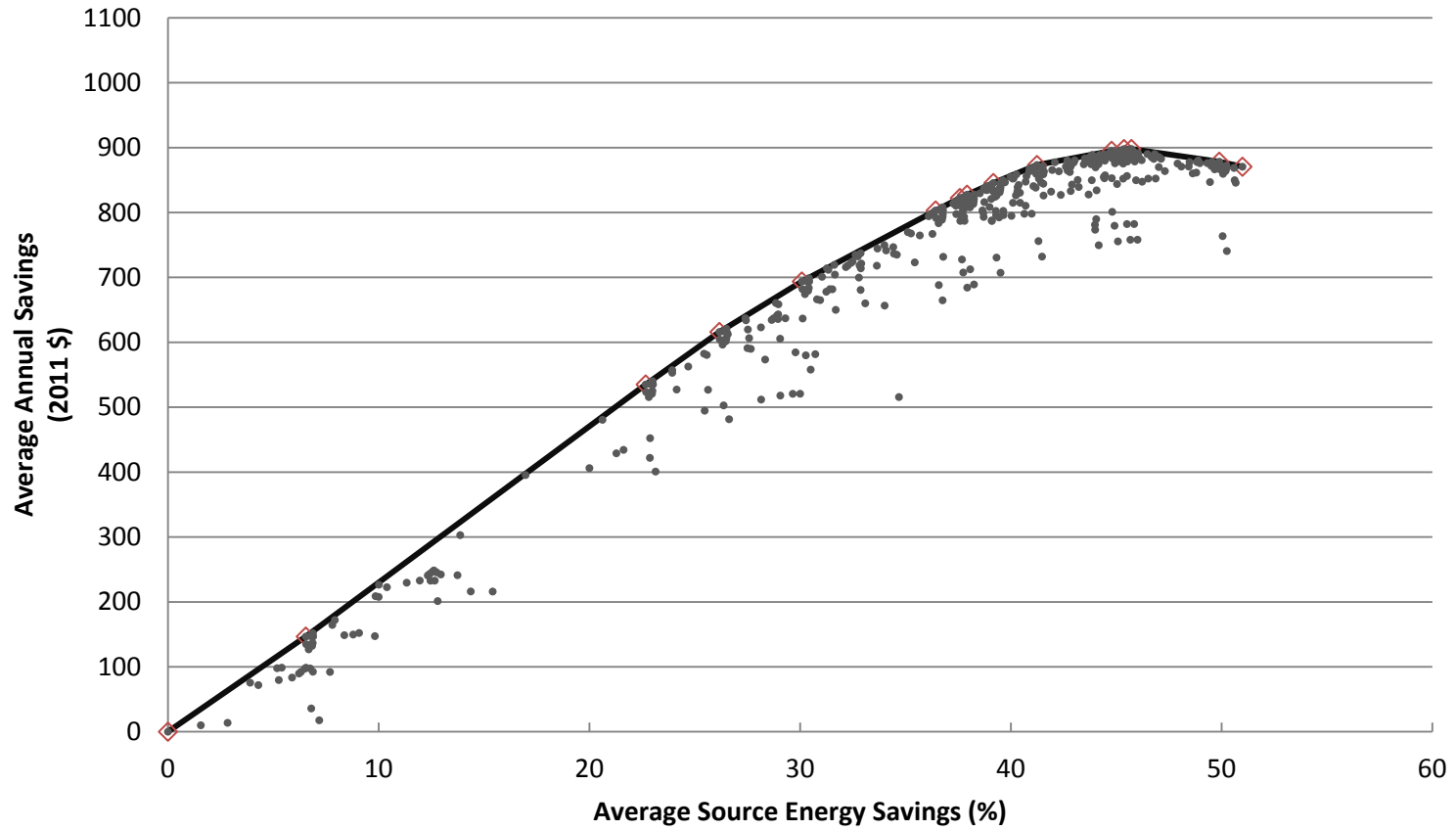


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## Indianapolis, Indiana (All Electric)

		<table border="1" style="margin: auto;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #6aa84f; color: white;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%
Energy Savings Levels																			
15%	30%																		
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ducts: Insulate to R-6	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane			
7	147	X	X																
15	341	X		X															
23	535	X	X	X															
26	616	X	X	X	X														
30	694	X	X	X	X	X													
36	803	X	X	X	X	X	X												
38	822	X		X	X	X	X	X											
38	827	X		X	X	X	X	X											
39	845	X		X	X	X	X	X	X										
41	873	X		X	X	X	X	X	X	X									
45	895	X		X	X		X	X	X	X	X								
45	898	X		X	X		X	X	X	X		X	X						
46	898	X		X	X		X	X	X	X		X	X	X					
50	878	X		X	X		X		X	X		X	X	X	X				
51	871	X		X	X				X	X		X	X	X	X	X			

### Indianapolis, Indiana (All Electric)

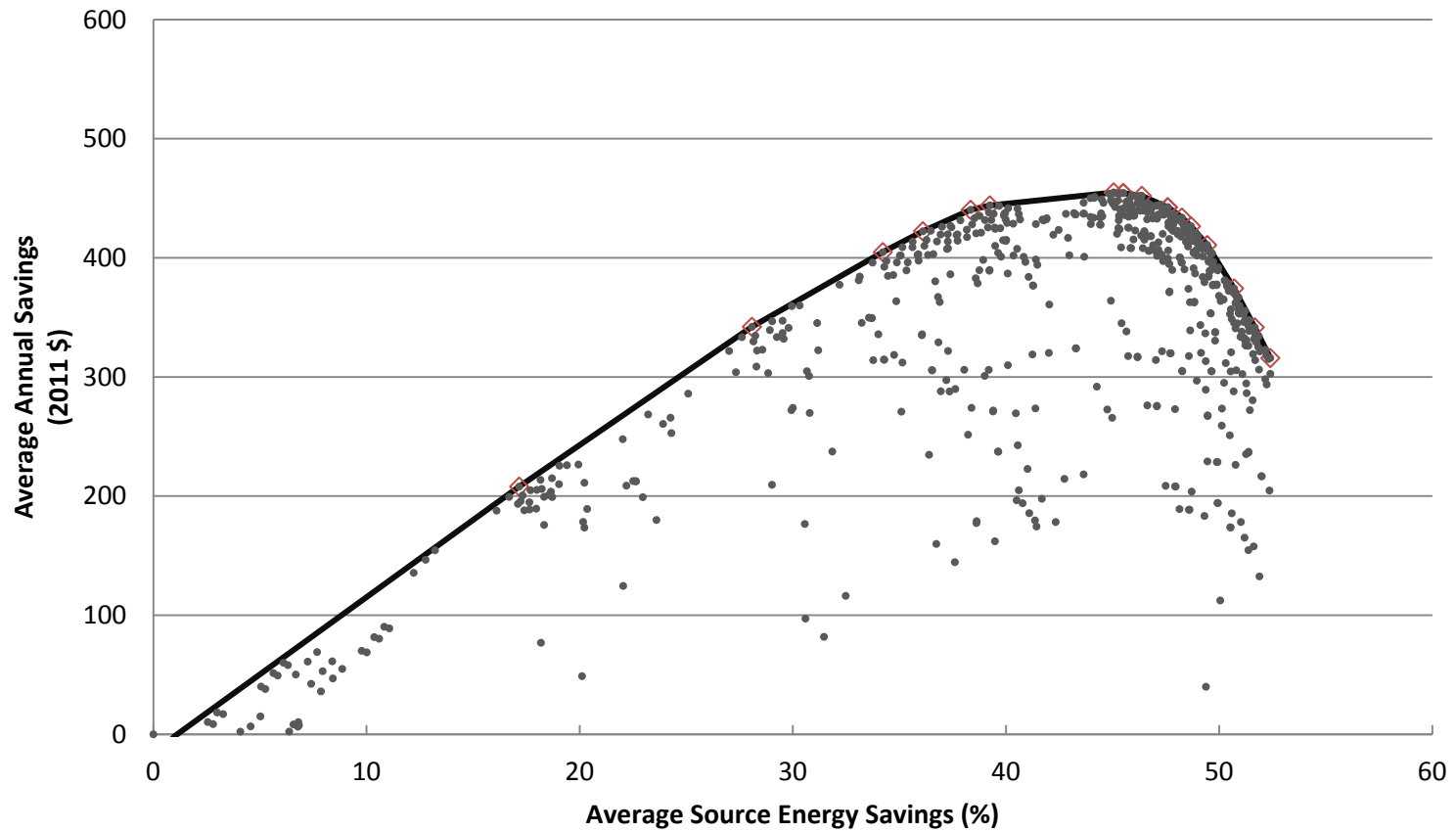


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Kansas City, Missouri (Mixed Fuel)

		<b>Energy Savings Levels</b>																			
		15%																			
		30%																			
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Windows: Replace with Double Pane, Low-e, standard SHGC	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, low SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Windows: Replace with Quad Pane	Crawlspace Wall: Insulate with R-20	Refrigerator: Replace with ENERGY STAR	
15	188	X	X																		
30	341	X	X	X																	
34	405	X	X	X	X																
36	422	X	X	X	X	X															
38	440	X	X	X	X	X	X														
39	444	X		X	X	X	X	X													
45	455	X		X	X	X	X	X	X												
45	454	X		X	X	X	X		X	X											
46	454	X		X	X	X	X			X	X										
46	452	X		X	X	X	X			X	X										
48	443	X		X	X	X	X		X	X											
48	442	X		X	X	X	X			X	X										
48	434	X		X		X	X		X	X				X							
49	426	X		X		X	X			X	X				X						
49	411	X		X		X	X			X	X				X	X					
51	374	X		X		X	X		X	X					X	X	X				
52	342	X		X		X	X			X					X	X	X	X			
52	316	X		X		X	X								X	X	X	X	X	X	X

### Kansas City, Missouri (Mixed Fuel)

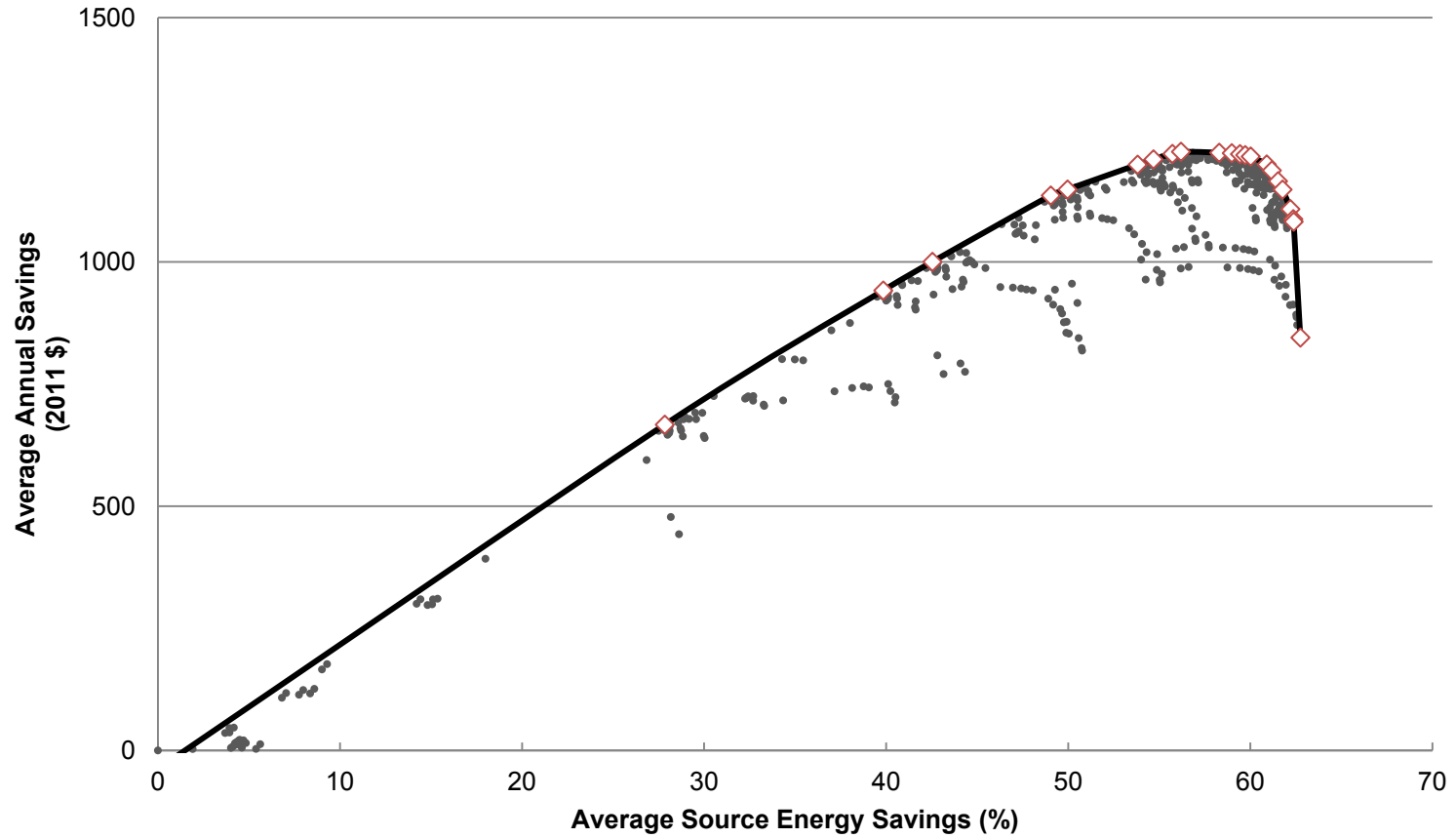


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### Kansas City, Missouri (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-19 to R-38	Crawlspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-15 Rigid	Infiltration: 40% Reduction	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	311	X		X																			
18	392	X	X																				
30	643	X	X	X																			
43	1000	X	X	X	X																		
49	1136	X	X	X	X	X																	
50	1148	X		X	X	X	X																
54	1199	X	X	X	X	X		X															
55	1210	X		X	X	X	X	X															
56	1221	X		X	X	X	X	X	X														
56	1226	X		X	X	X		X	X	X													
58	1224	X		X		X		X	X	X	X												
59	1223	X		X				X	X	X	X	X											
59	1221	X		X				X	X	X	X												
60	1219	X		X				X	X	X	X												
60	1216	X		X				X	X		X												
61	1200	X		X				X	X		X												
61	1187	X		X				X	X		X												
62	1165	X		X	X			X	X		X												
62	1148	X		X	X			X	X		X												
62	1108	X		X				X	X		X												
62	1088	X		X				X	X		X									X		X	
62	1082	X		X				X	X		X										X	X	
63	845	X		X				X	X		X										X	X	X

### Kansas City, Missouri (All Electric)



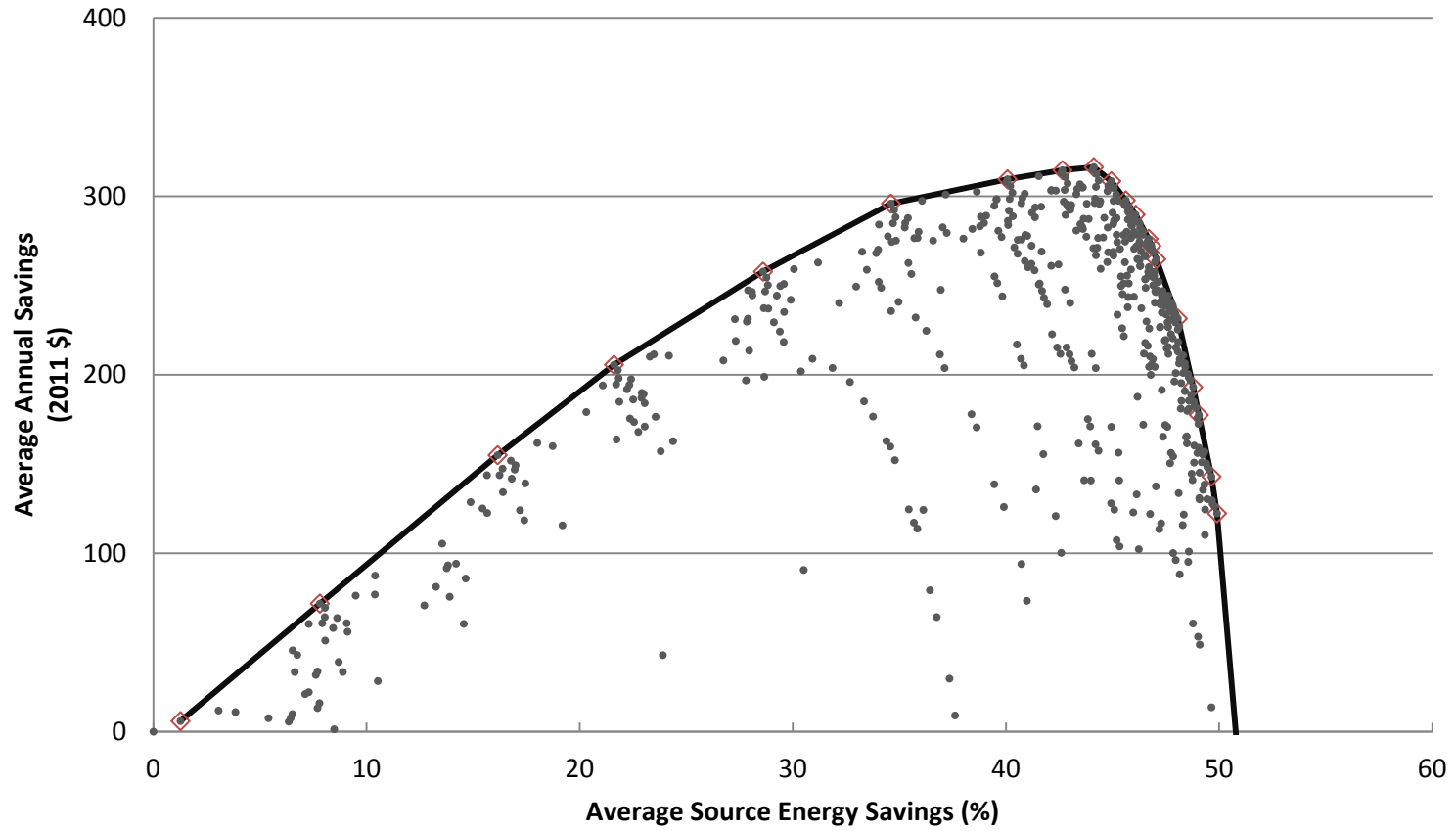
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### Las Vegas, Nevada (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <span style="background-color: #6aa84f; color: white; padding: 2px 5px;">15%</span>  <span style="background-color: #800000; color: white; padding: 2px 5px;">30%</span> </div>																			
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	R13	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-19 to R-38	Windows: Replace with Double Pane, Low-e, low SHGC	Water Heater: Install Gas Tankless (0.82 EF)	Clothes Washer: Replace with ENERGY STAR	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Hot Water Piping: Insulate to R-2	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Windows: Replace with Quadruple Pane	Ducts: Seal and Insulate to R-8	Infiltration: 40% Reduction	Windows: Replace with Quadruple Pane	Air Conditioner: Replace with SEER 15	
1	6	X																			
8	72	X	X																		
16	155	X	X	X																	
22	206	X	X	X																	
30	258	X	X	X	X														X		
35	296	X		X	X	X														X	
40	310	X		X	X	X	X													X	
43	315	X		X	X	X	X	X												X	
44	316	X		X	X	X	X	X												X	
45	308	X		X	X	X	X	X	X											X	
46	298	X		X	X		X	X	X	X										X	
46	290	X		X	X		X	X	X		X									X	
47	276	X		X	X		X	X	X		X	X								X	
47	272	X		X			X	X	X		X	X	X				X	X		X	
47	265	X		X			X	X	X		X	X	X	X			X	X		X	
48	232	X		X	X		X	X	X		X	X		X	X					X	
49	193	X		X				X	X		X	X	X	X	X	X	X	X	X	X	X
49	177	X		X			X	X	X		X	X	X	X	X		X	X		X	
50	143	X		X				X	X		X	X	X	X	X	X	X	X	X	X	X
50	122	X		X				X	X		X	X	X	X	X	X	X	X	X	X	X
53	-277	X		X				X	X		X	X	X	X	X	X	X	X	X	X	X

### Las Vegas, Nevada (Mixed Fuel)

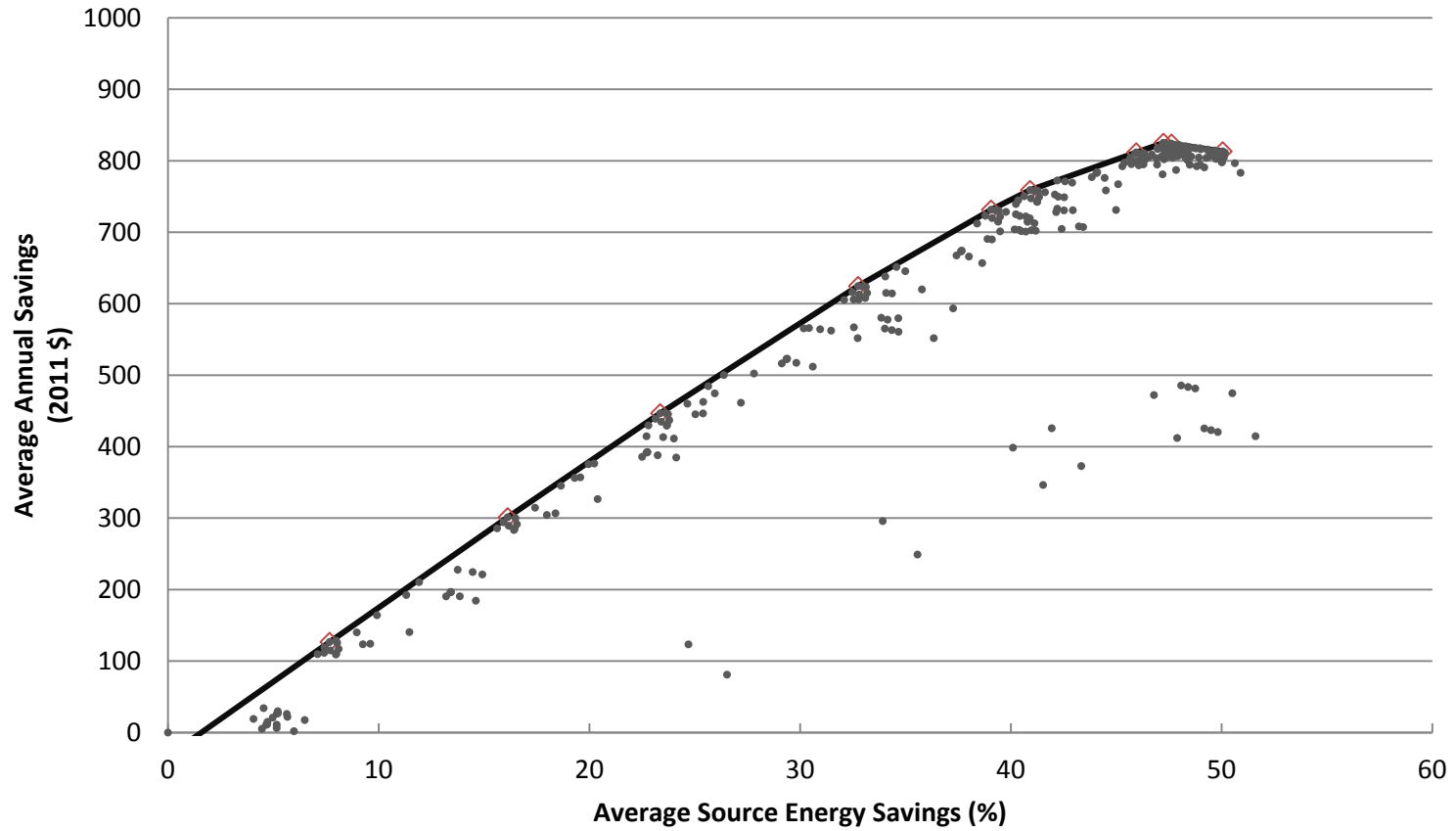


◇ - Denotes an optimal retrofit package and is included in summary table above.

## Las Vegas, Nevada (All Electric)

		<table border="1"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td>15%</td> <td></td> </tr> <tr> <td>30%</td> <td></td> </tr> </table>							Energy Savings Levels		15%		30%	
Energy Savings Levels														
15%														
30%														
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Windows: Replace with Double Pane, Low-e, Standard SHGC, Argon						
8	127	X												
16	301	X		X										
23	447	X	X	X										
30	565	X	X	X		X								
33	625	X		X	X									
39	732	X		X	X	X								
41	759	X		X	X	X	X							
46	812	X		X	X	X	X	X						
47	825	X		X	X	X	X	X						

### Las Vegas, Nevada (All Electric)

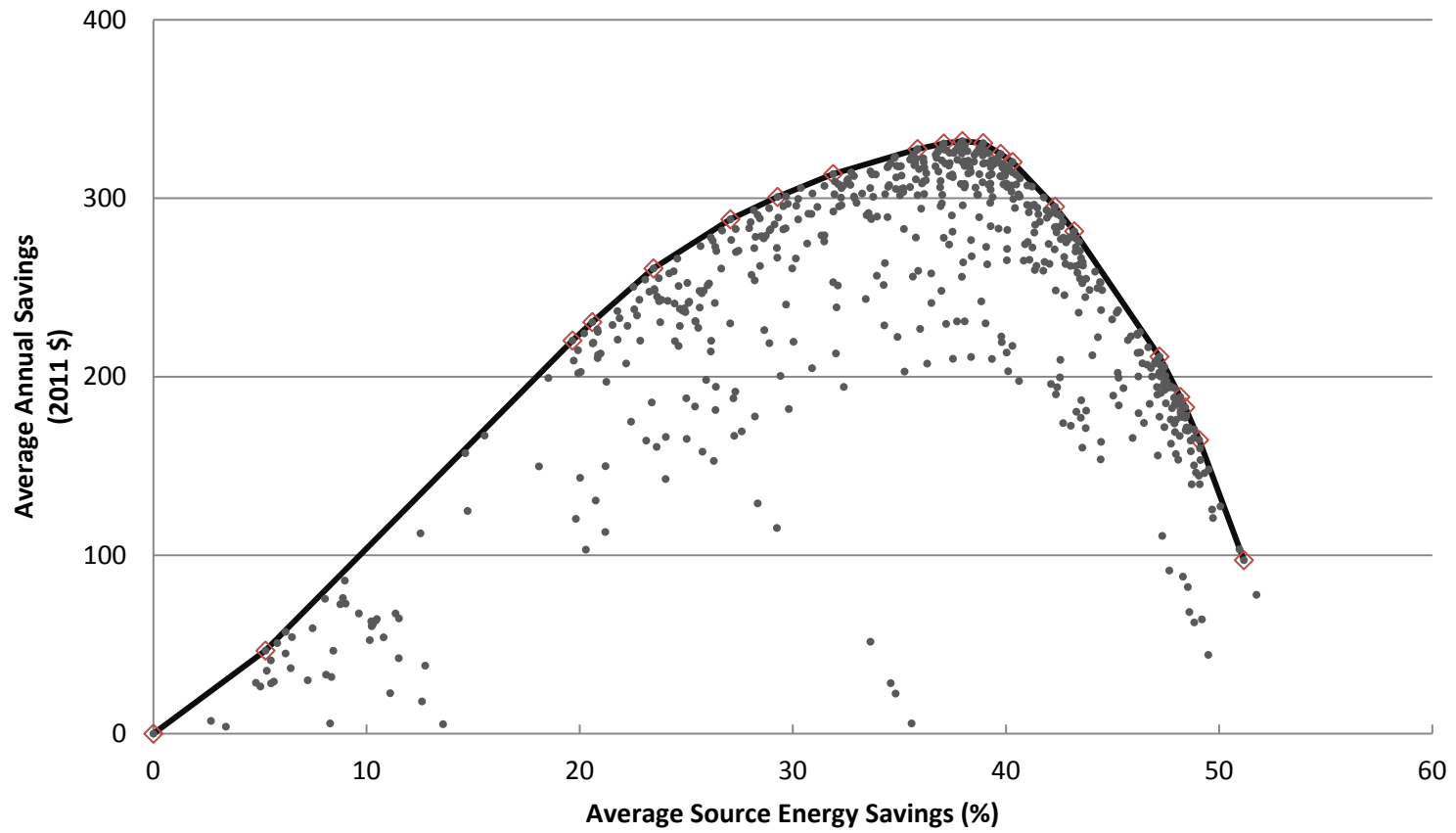


◇ - Denotes an optimal retrofit package and is included in summary table above.

**Lowell, Massachusetts (Mixed Fuel)**

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																		
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Ducts: Insulate to R-6	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Hot Water Heater: Replace with Gas Tankless, Condensing	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-20 Rigid, 8 feet height	Furnace: Replace with AFUE 92.5%, Gas
5	47	X	X																	
20	220	X	X	X																
23	261	X	X	X	X															
27	288	X	X	X	X	X														
29	301	X	X	X	X	X	X													
32	314	X	X	X	X	X	X	X												
36	328	X		X	X	X	X		X	X										
37	331	X	X	X	X	X	X	X		X										
38	332	X		X	X	X	X	X	X	X										
39	331	X		X	X	X	X	X	X	X	X									
40	325	X		X	X		X	X	X	X	X	X								
40	320	X		X	X		X	X	X	X	X		X							
42	295	X		X	X		X	X	X	X	X		X	X						
43	282	X		X	X		X	X	X	X	X		X	X	X					
47	211	X		X	X		X	X		X			X	X	X	X				
48	189	X		X	X		X	X					X	X	X	X	X			
48	183	X		X	X		X	X					X	X	X	X	X	X		
49	165	X		X	X		X	X					X	X	X		X	X	X	
51	97	X		X	X		X	X					X	X	X	X	X	X		X

### Lowell, Massachusetts (Mixed Fuel)

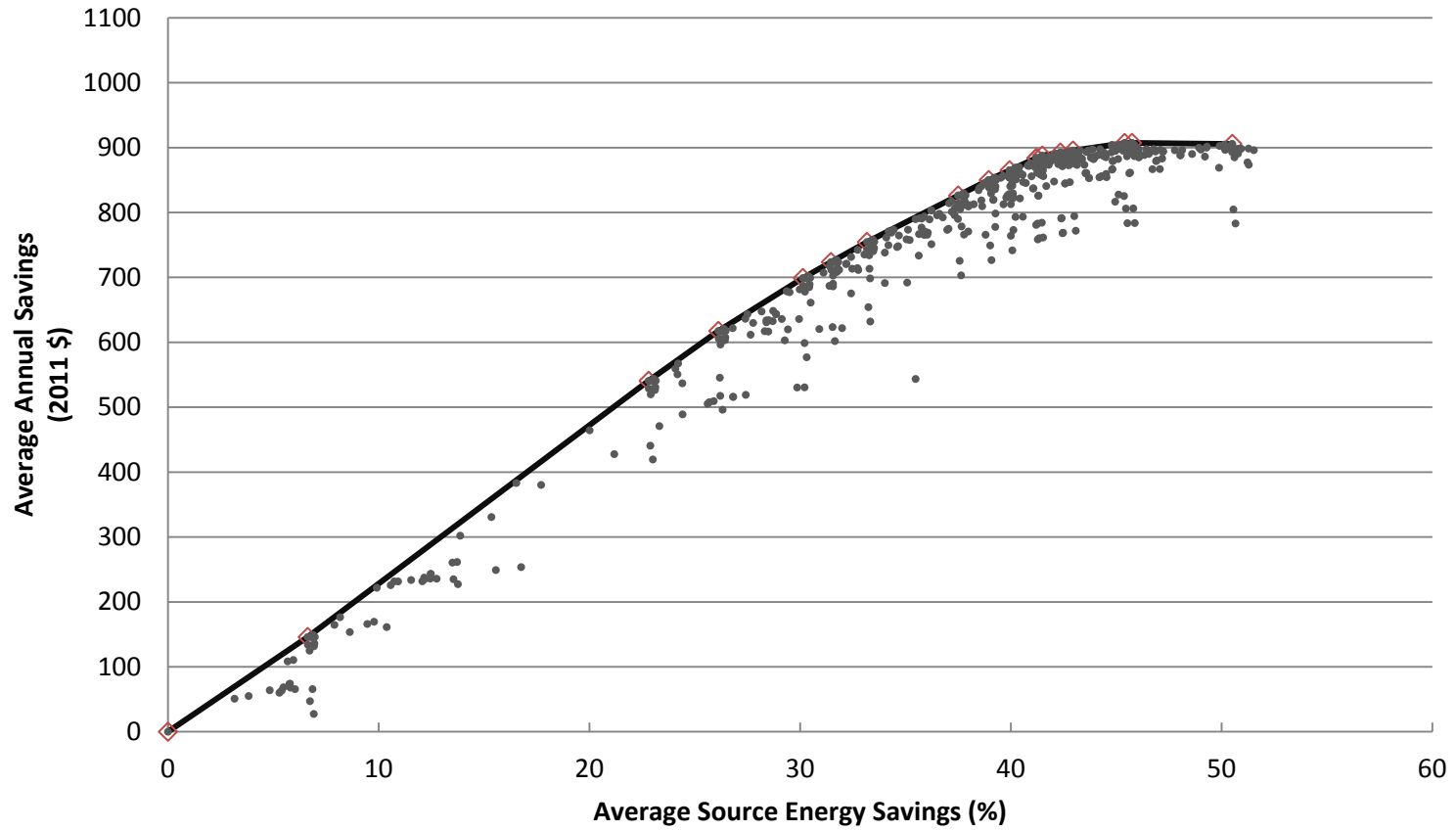


◇ - Denotes an optimal retrofit package and is included in summary table above.

Lowell, Massachusetts (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>														
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, high SHGC	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	146	X	X													
15	343	X		X												
23	541	X	X	X												
26	618	X	X	X	X											
30	699	X	X	X	X	X										
31	724	X		X	X	X	X									
33	755	X	X	X	X	X		X								
38	826	X		X	X	X	X		X							
39	850	X	X	X	X	X		X		X						
40	865	X		X	X	X	X	X	X							
41	884	X		X	X	X	X	X	X							
41	884	X		X	X	X	X	X		X	X					
41	888	X		X	X	X	X	X	X		X					
42	892	X		X	X		X	X		X	X	X				
43	895	X		X	X		X	X		X	X		X			
45	907	X		X	X		X	X		X	X		X	X		
46	907	X		X	X		X	X		X	X		X	X	X	
51	906	X		X	X			X	X	X		X	X	X	X	X

### Lowell, Massachusetts (All Electric)



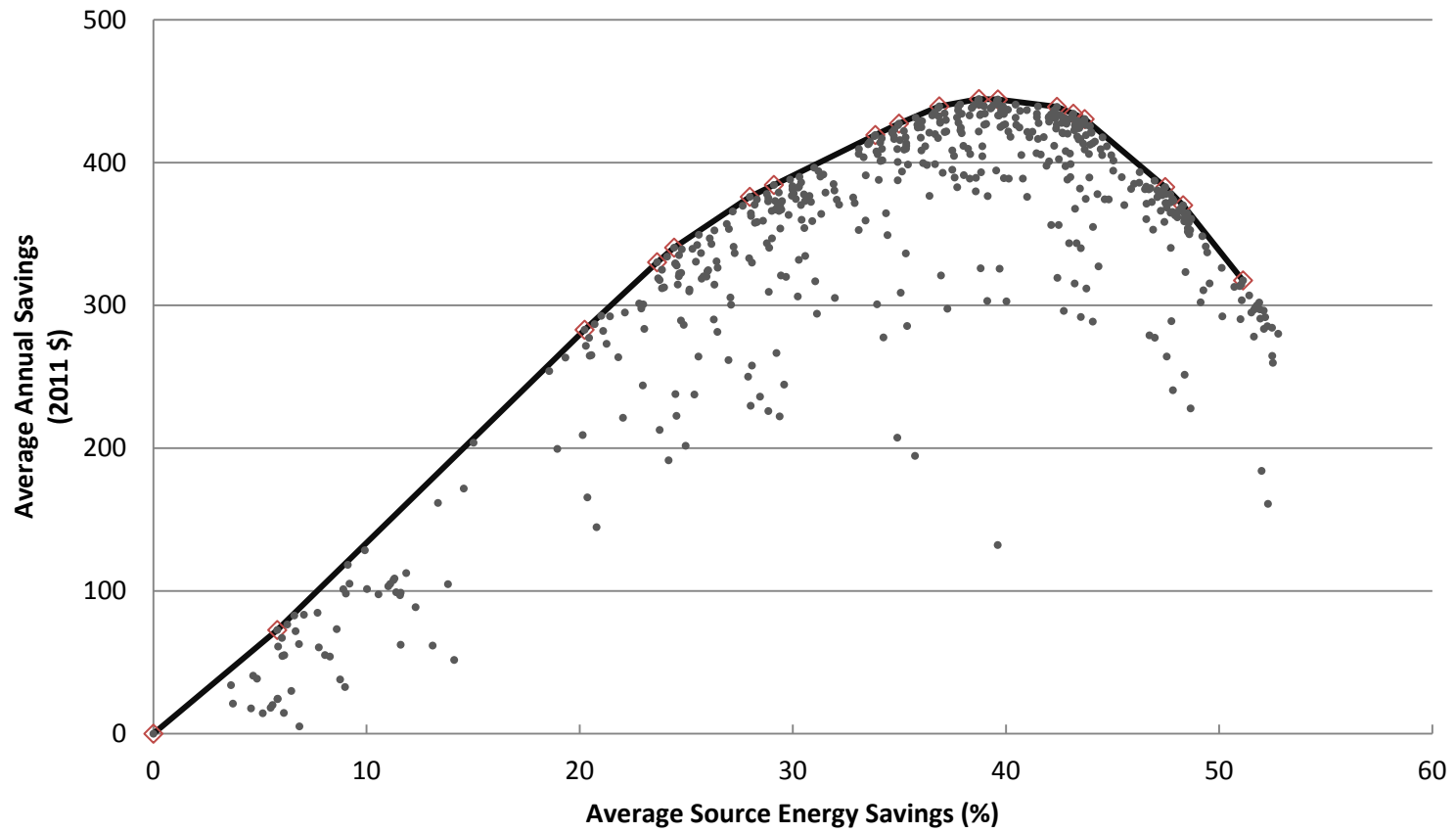
◇ - Denotes an optimal retrofit package and is included in summary table above.



**Madison, Wisconsin (Mixed Fuel)**

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>															
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, high SHGC	Hot Water Heater: Replace with Gas Tankless	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Basement Wall: Insulate to R-15 Rigid, 8 feet height
6	73	X	X														
20	283	X	X	X													
24	330	X	X	X	X												
28	376	X	X	X	X	X											
29	384	X		X	X	X	X										
34	419	X	X	X	X	X		X									
35	427	X		X	X	X	X	X									
37	439	X		X	X	X	X	X	X								
39	444	X		X	X	X	X	X	X	X							
40	444	X		X	X	X	X	X	X	X	X						
42	439	X		X	X	X	X	X	X	X	X	X					
43	434	X		X	X		X	X	X	X	X	X	X				
44	430	X		X	X		X	X	X	X	X	X		X			
47	383	X		X	X		X	X	X	X	X	X		X	X		
48	370	X		X	X		X	X	X	X	X	X		X	X	X	
51	317	X		X				X	X		X	X		X	X	X	X

### Madison, Wisconsin - Mixed Fuel

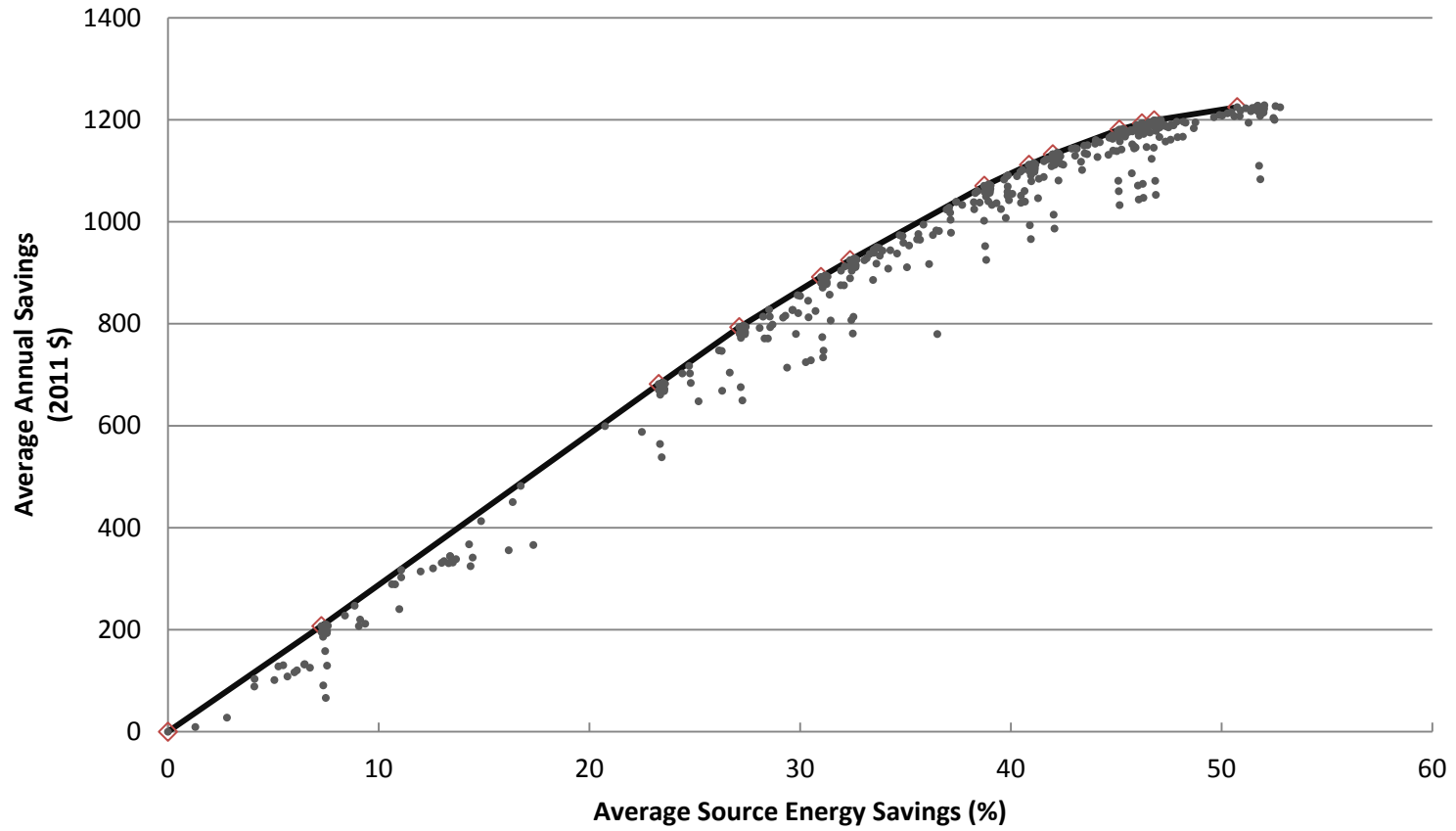


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Madison, Wisconsin (All Electric)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels													
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, high SHGC	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Lighting: Replace 60% of Bulbs with CFL	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	207	X	X												
15	444	X	X		X										
23	682	X	X	X											
27	793	X	X	X	X										
31	892	X	X	X	X	X									
32	925	X		X	X	X	X								
39	1071	X		X	X	X	X	X							
41	1112	X		X	X	X	X	X	X						
42	1132	X		X	X	X	X	X	X	X					
45	1181	X		X	X	X	X	X	X	X	X				
46	1193	X		X	X	X		X	X	X	X	X			
47	1199	X		X	X		X	X	X	X	X	X	X	X	
51	1225	X		X				X		X	X	X	X	X	X

### Madison, Wisconsin (All Electric)

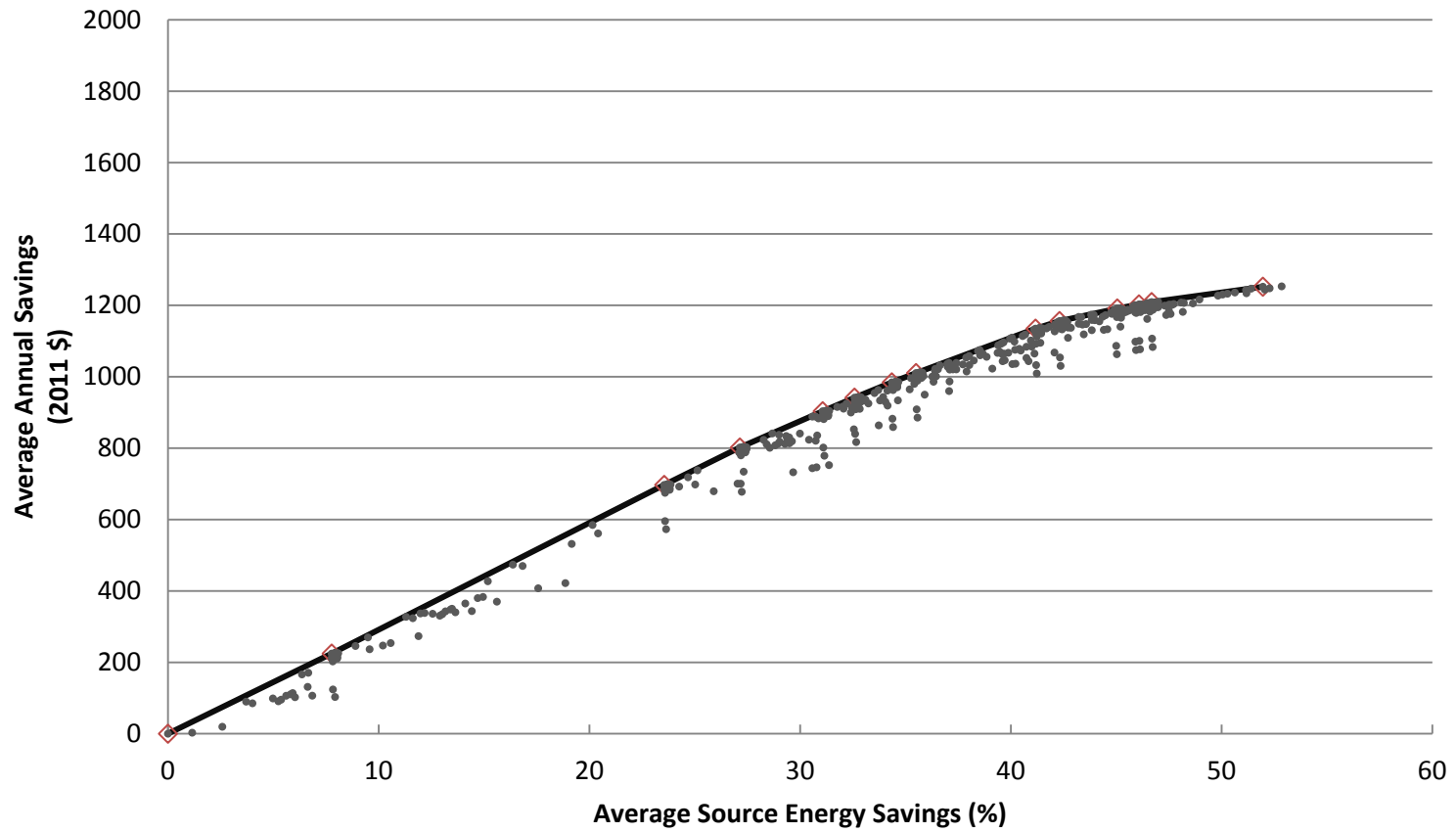


◇ - Denotes an optimal retrofit package and is included in summary table above.

**Maine (Mixed Fuel)**

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="width: 50%; background-color: #92d050;">15%</td> <td style="width: 50%; background-color: #a52a2a;">30%</td> </tr> </table>													Energy Savings Levels		15%	30%
Energy Savings Levels																		
15%	30%																	
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height				
8	224	X	X															
15	431	X		X														
24	697	X	X	X														
27	802	X	X	X	X													
31	903	X	X	X	X	X												
33	941	X		X	X	X	X											
34	984	X	X	X	X	X		X										
36	1010	X		X	X	X	X	X										
41	1135	X		X	X	X	X	X	X									
42	1156	X		X	X	X	X	X	X	X								
45	1191	X		X	X	X	X	X	X	X	X							
46	1203	X		X	X		X	X	X	X	X	X						
47	1209	X		X	X		X	X	X	X	X		X					
52	1252	X		X	X			X	X	X	X		X	X				

### Maine (Mixed Fuel)

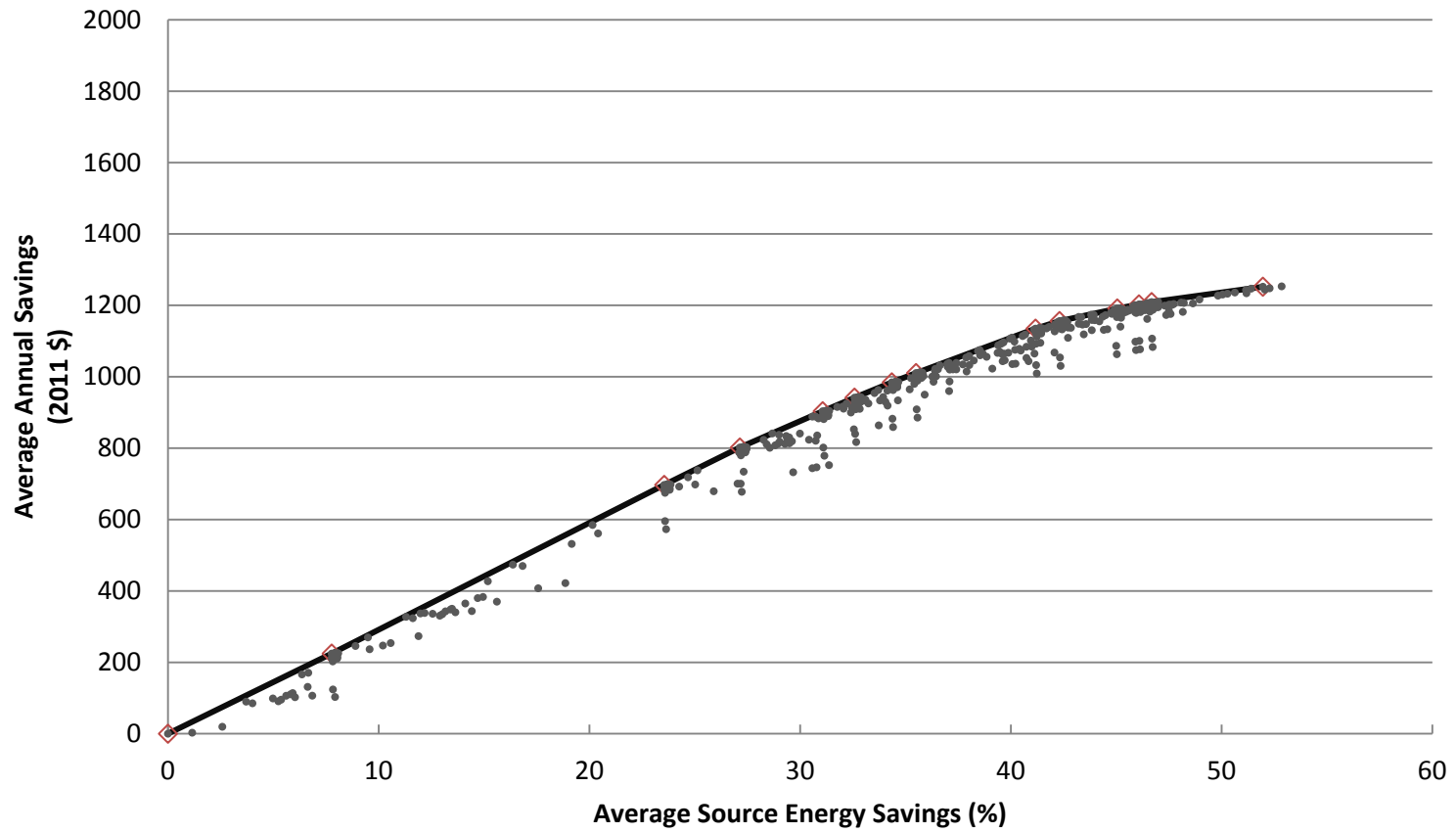


◇ - Denotes an optimal retrofit package and is included in summary table above.

**Maine (All Electric)**

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>												
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height
8	224	X	X											
15	431	X		X										
24	697	X	X	X										
27	802	X	X	X	X									
31	903	X	X	X	X	X								
33	941	X		X	X	X	X							
34	984	X	X	X	X	X		X						
36	1010	X		X	X	X	X	X						
41	1135	X		X	X	X	X	X	X					
42	1156	X		X	X	X	X	X	X	X				
45	1191	X		X	X	X	X	X	X	X	X			
46	1203	X		X	X		X	X	X	X	X	X		
47	1209	X		X	X		X	X	X	X	X		X	
52	1252	X		X	X			X	X	X	X		X	X

### Maine (All Electric)



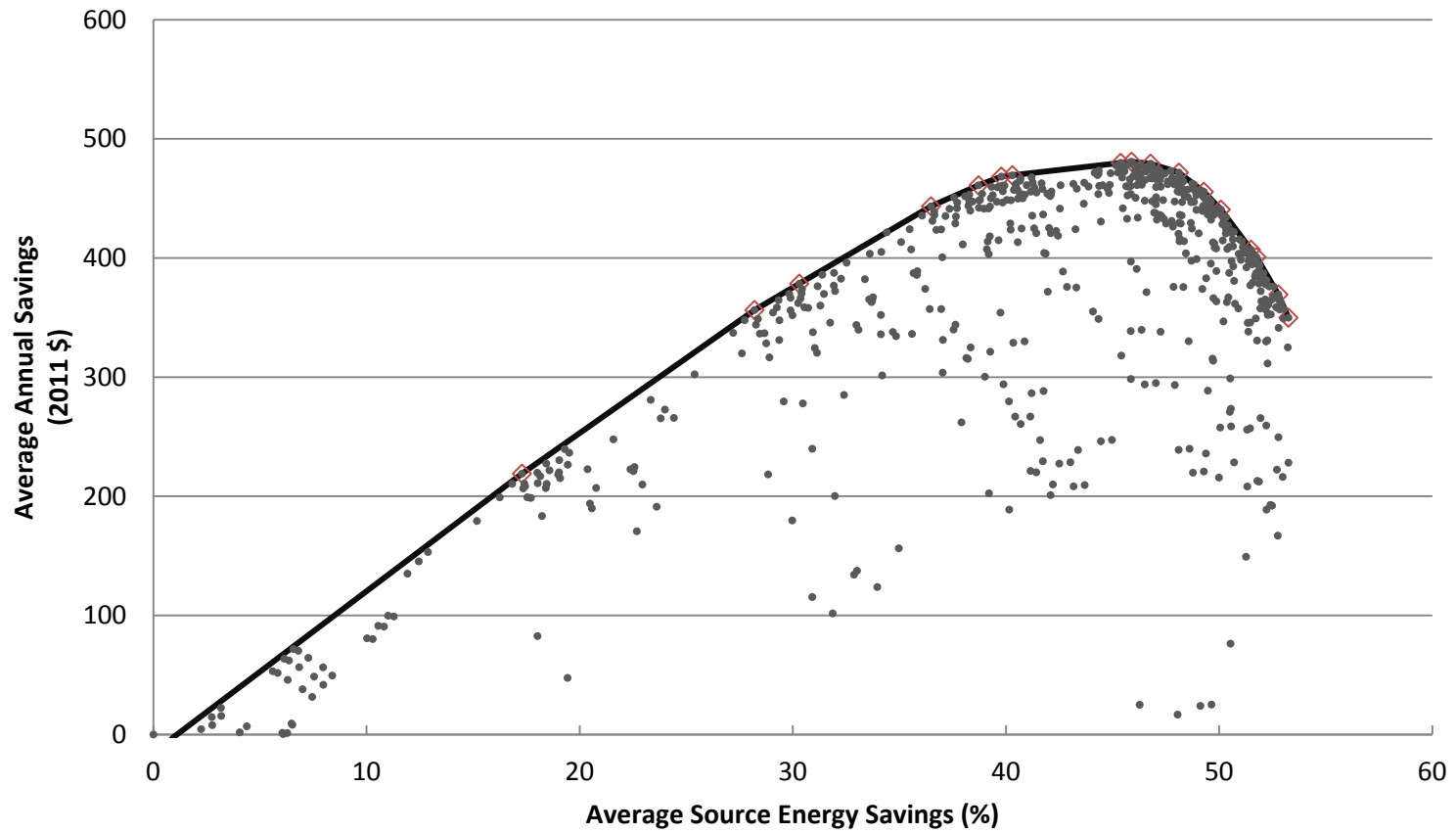
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### Maryland (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>		Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-11 to R-38	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-60	Windows: Replace with Double Pane, Low-e, standard SHGC	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Crawlspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)																				
15	179	X	X																		
28	356	X	X	X																	
30	378	X	X	X	X																
36	443	X	X	X	X	X															
39	461	X	X	X	X	X	X														
40	468	X		X	X	X	X	X	X												
40	469	X		X	X	X	X	X		X											
45	480	X		X	X	X	X	X	X		X										
46	481	X		X	X	X	X	X		X	X										
47	479	X		X	X	X	X	X		X	X	X									
48	472	X		X	X	X	X	X		X	X	X	X								
49	456	X		X	X			X		X		X	X	X	X						
50	441	X		X	X			X		X		X	X	X	X	X					
51	407	X		X	X			X		X		X	X	X	X	X	X				
52	401	X		X	X			X				X	X	X	X	X	X	X			
53	369	X		X	X			X				X	X	X		X	X	X	X	X	
53	350	X		X	X			X				X	X	X		X	X	X	X	X	X

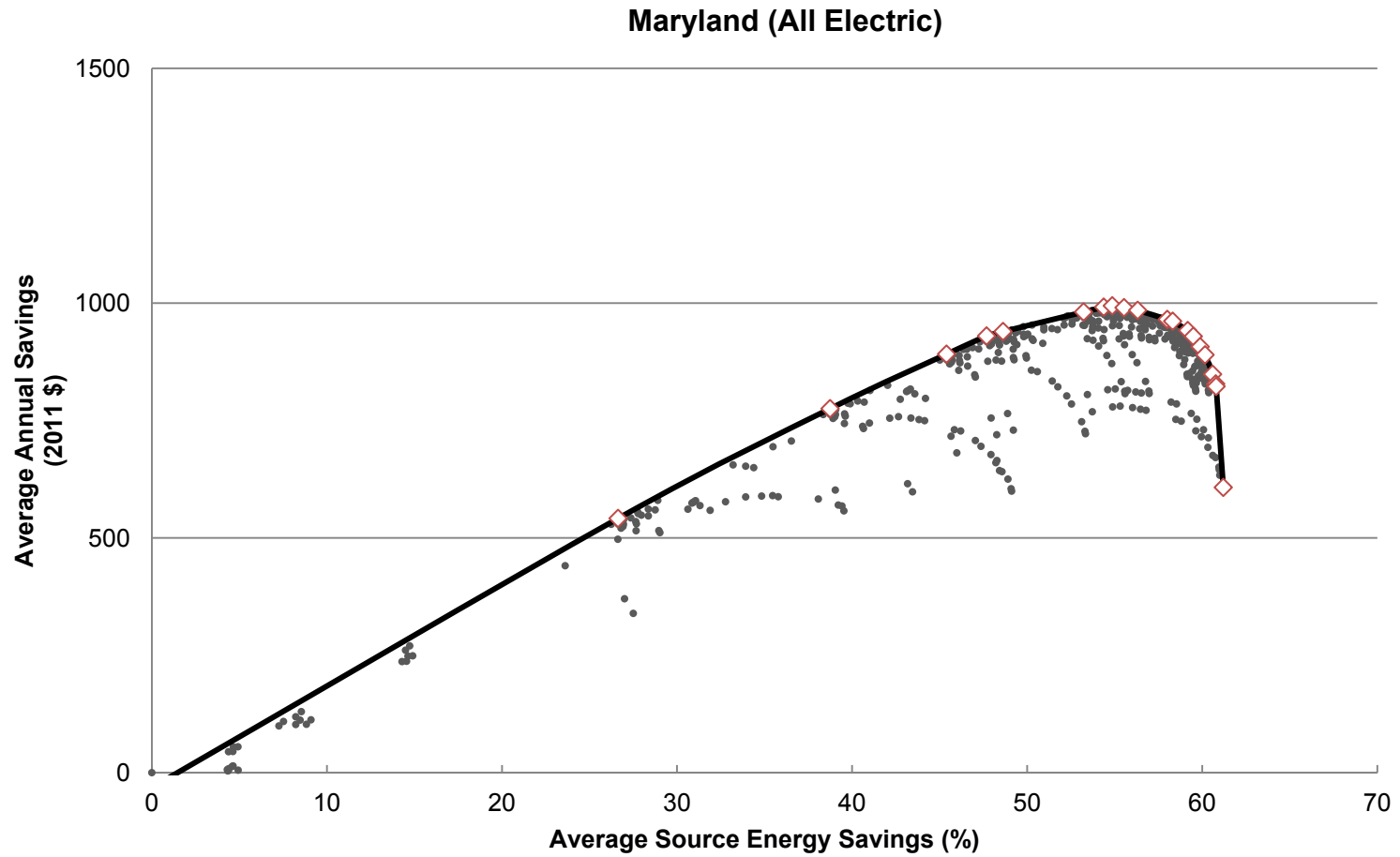
### Maryland (Mixed Fuel)



◇ - Denotes an optimal retrofit package and is included in summary table above.

### Maryland (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%				
Energy Savings Levels																							
15%	30%																						
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Infiltration: 40% Reduction	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	270	X		X																			
27	542	X	X																				
30	580	X	X		X																		
39	775	X	X	X																			
45	891	X	X	X	X																		
48	930	X	X	X	X	X																	
49	940	X		X	X	X	X																
53	981	X		X	X	X	X	X															
54	992	X		X	X	X	X	X	X														
55	994	X		X	X	X		X	X	X													
56	990	X		X		X		X	X	X	X												
56	985	X		X		X		X	X	X		X	X										
58	965	X		X				X	X	X		X	X	X									
58	962	X		X				X	X			X	X	X	X								
59	942	X		X					X			X	X	X	X	X							
59	929	X		X					X			X	X	X	X	X	X						
60	907	X		X		X			X			X	X	X	X	X	X	X					
60	890	X		X		X			X			X	X	X	X	X	X	X					
61	849	X		X					X			X	X	X	X	X	X		X				
61	828	X		X					X			X	X	X	X	X	X		X		X		
61	823	X		X					X			X	X	X	X	X	X				X	X	
61	608	X		X					X			X	X	X	X	X	X				X	X	X

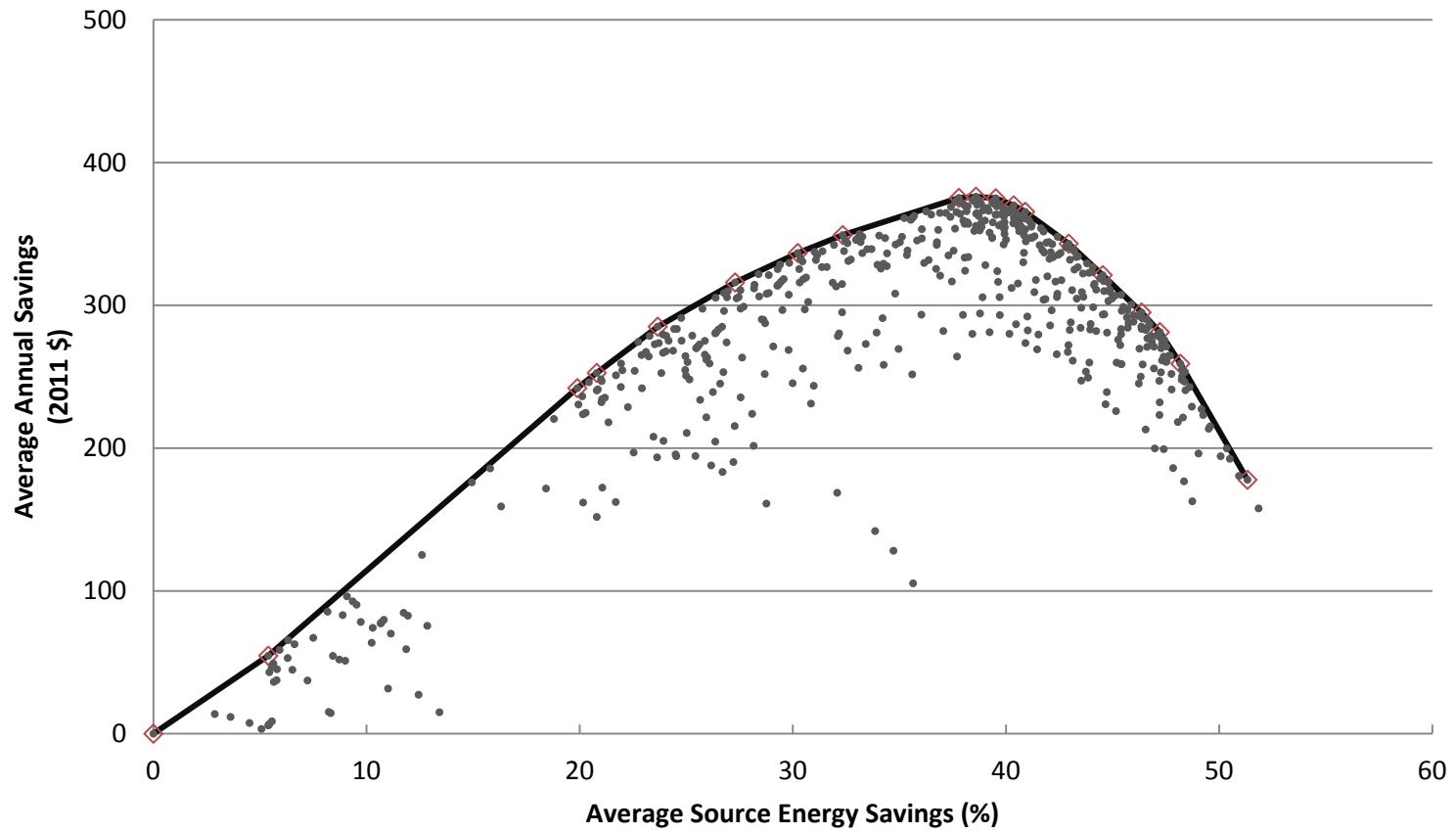


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Michigan (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Ducts: Insulate to R-6	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Windows: Replace with Quadruple Pane	Basement Wall: Insulate to R-15 Rigid, 8 feet height
5	55	X	X															
20	242	X	X	X														
24	285	X	X	X	X													
27	316	X	X	X	X	X												
30	337	X	X	X	X	X	X											
32	349	X	X	X	X	X	X	X										
38	375	X	X	X	X	X	X	X	X									
39	376	X		X	X	X	X	X	X	X								
40	375	X		X	X	X	X	X	X	X	X							
40	370	X		X	X		X	X	X	X	X	X						
41	366	X		X	X		X	X	X	X	X		X					
43	343	X		X	X		X	X	X	X	X		X	X				
45	321	X		X	X		X	X	X	X	X		X		X			
46	295	X		X	X		X	X	X	X	X		X	X	X			
47	281	X		X	X		X	X	X	X	X		X	X	X	X		
48	259	X		X	X		X	X	X	X	X		X	X	X	X	X	
51	178	X		X	X		X	X			X		X	X	X	X	X	X

### Michigan (Mixed Fuel)

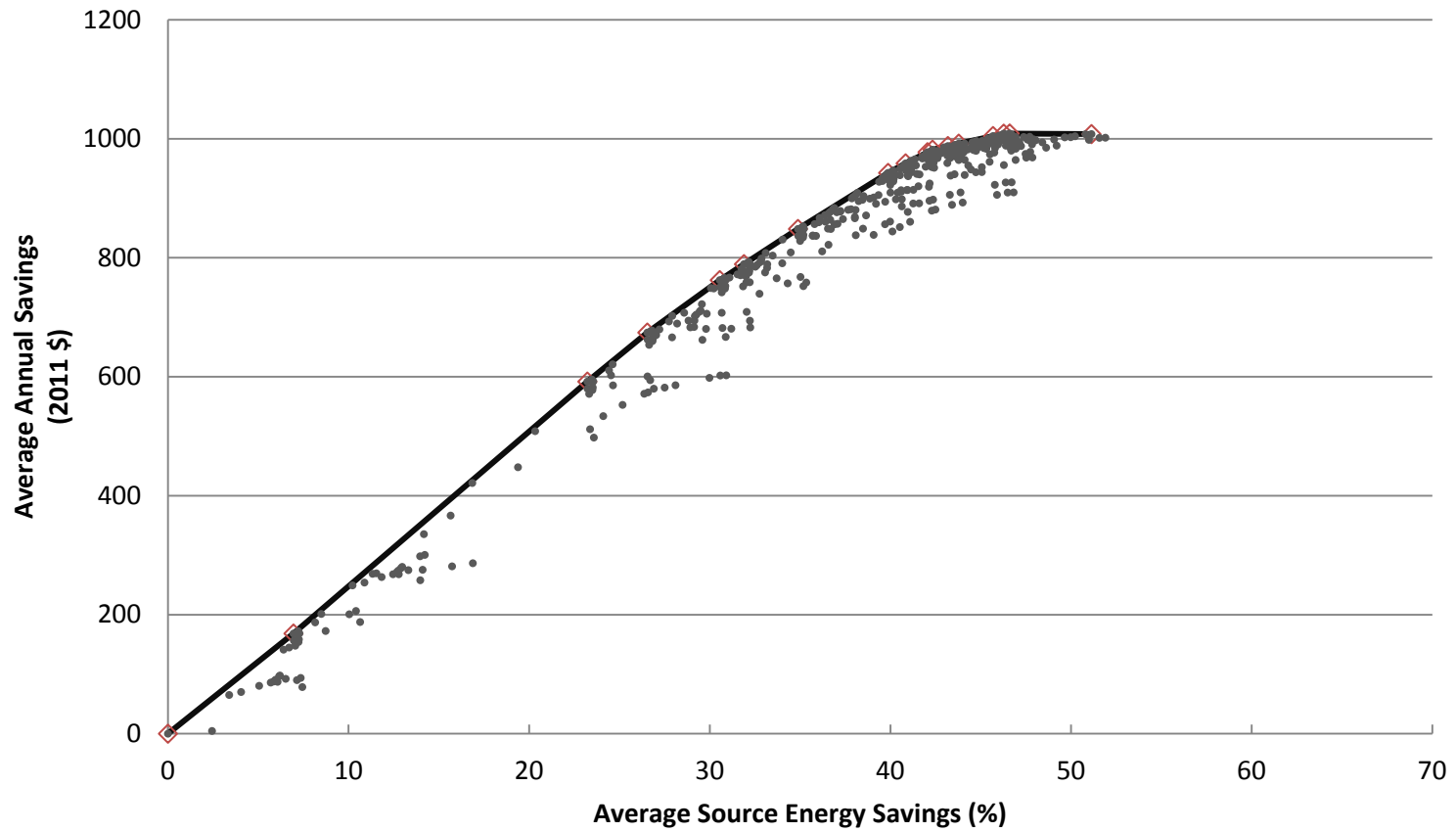


◇ - Denotes an optimal retrofit package and is included in summary table above.

Michigan (All Electric)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels													
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Air Sealing: 40% Reduction in Air Leakage	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	168	X	X												
15	380	X		X											
23	592	X	X	X											
27	674	X	X	X	X										
31	762	X	X	X	X	X									
32	789	X		X	X	X	X								
35	848	X		X	X	X	X	X							
40	943	X	X	X	X	X		X	X						
41	959	X		X	X	X	X	X	X						
42	977	X		X	X	X	X	X	X	X					
42	982	X		X	X	X	X	X	X	X					
43	988	X		X	X		X	X	X	X	X				
44	992	X		X	X		X	X	X	X		X			
46	1005	X		X	X		X	X	X	X	X		X		
46	1009	X		X	X		X	X	X	X		X	X		
47	1009	X		X	X		X	X	X	X		X	X	X	
51	1008	X		X	X			X	X	X		X	X	X	X

### Michigan (All Electric)

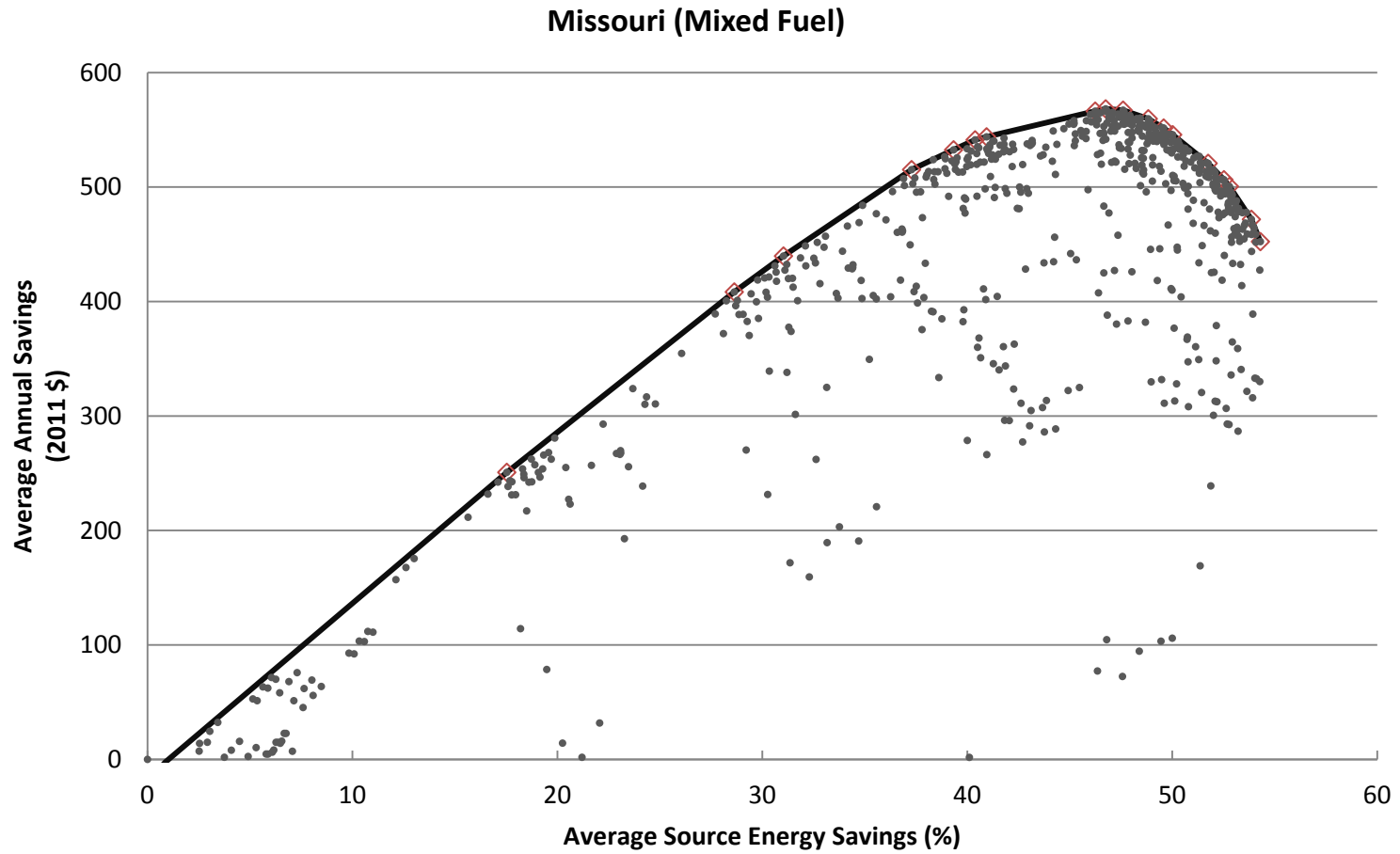


◇ - Denotes an optimal retrofit package and is included in summary table above.



### Missouri (Mixed Fuel)

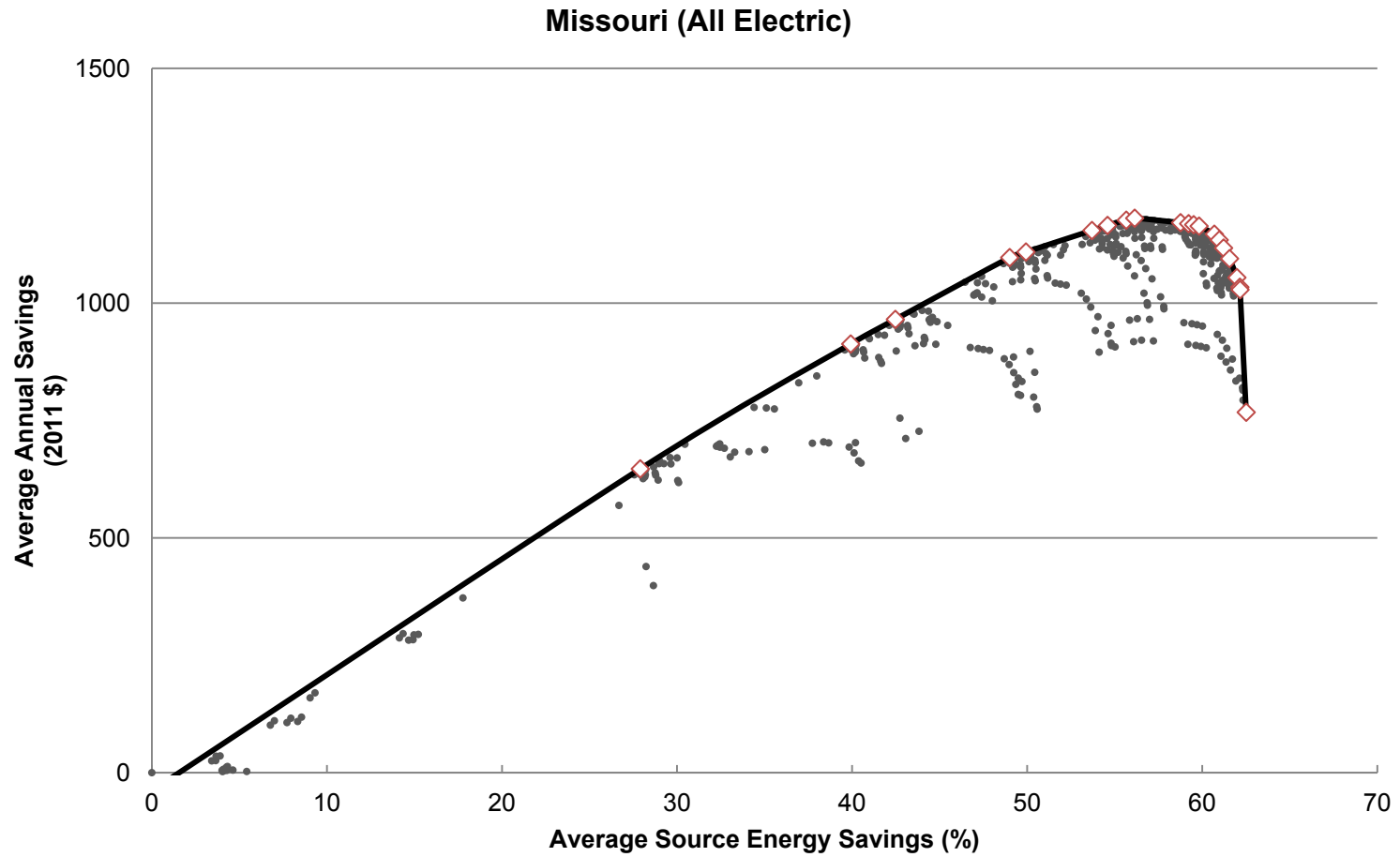
		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>																			
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-11 to R-38	Water Heater: Install Gas Tankless (0.82 EF)	Crawspace Wall: Insulate with R-10	Crawspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Windows: Replace with Double Pane, Low-e, standard SHGC	Ceiling: Insulate from R-11 to R-60	Infiltration: 40% Reduction	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Crawspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	
16	211	X	X																		
29	408	X	X	X																	
31	440	X	X	X	X																
37	515	X	X	X	X	X															
39	533	X	X	X	X	X	X														
40	541	X		X	X	X	X	X													
41	544	X		X	X	X	X		X												
46	566	X		X	X	X	X	X		X											
47	568	X		X	X	X	X		X	X											
48	567	X		X	X	X	X		X	X	X										
49	560	X		X	X	X	X		X	X	X	X									
50	552	X		X	X		X		X		X	X	X	X							
50	546	X		X	X		X		X		X	X		X	X						
52	521	X		X	X		X		X		X	X		X	X	X					
53	506	X		X	X		X		X		X	X		X	X	X	X				
53	501	X		X	X		X				X	X		X	X	X	X	X			
54	472	X		X	X		X				X	X			X	X	X	X	X		
54	452	X		X	X		X				X	X			X	X	X	X	X	X	X



◇ - Denotes an optimal retrofit package and is included in summary table above.

### Missouri (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #92d050;">15%</td></tr> <tr><td style="background-color: #800000; color: white;">30%</td></tr> </table>														Energy Savings Levels		15%	30%				
Energy Savings Levels																							
15%																							
30%																							
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-19 to R-38	Crawlspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Infiltration: 40% Reduction	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	294	X		X																			
28	647	X	X																				
30	658	X	X	X																			
42	965	X	X	X	X																		
49	1097	X	X	X	X	X																	
50	1109	X		X	X	X	X																
54	1155	X	X	X	X	X		X															
55	1166	X		X	X	X	X	X															
56	1177	X		X	X	X	X	X	X														
56	1181	X		X	X	X		X	X	X													
59	1171	X		X				X	X	X	X	X											
59	1169	X		X				X	X	X		X											
60	1167	X		X				X	X	X			X										
60	1164	X		X				X	X			X	X	X	X								
61	1147	X		X					X			X	X	X	X	X							
61	1134	X		X					X			X	X	X	X	X	X						
61	1117	X		X					X			X	X	X	X	X	X						
62	1095	X		X	X				X			X	X	X	X	X	X	X					
62	1054	X		X					X			X	X	X	X	X	X		X				
62	1034	X		X					X			X	X	X	X	X	X		X		X		
62	1029	X		X					X			X	X	X	X	X	X				X	X	
63	768	X		X					X			X	X	X	X	X	X				X	X	X

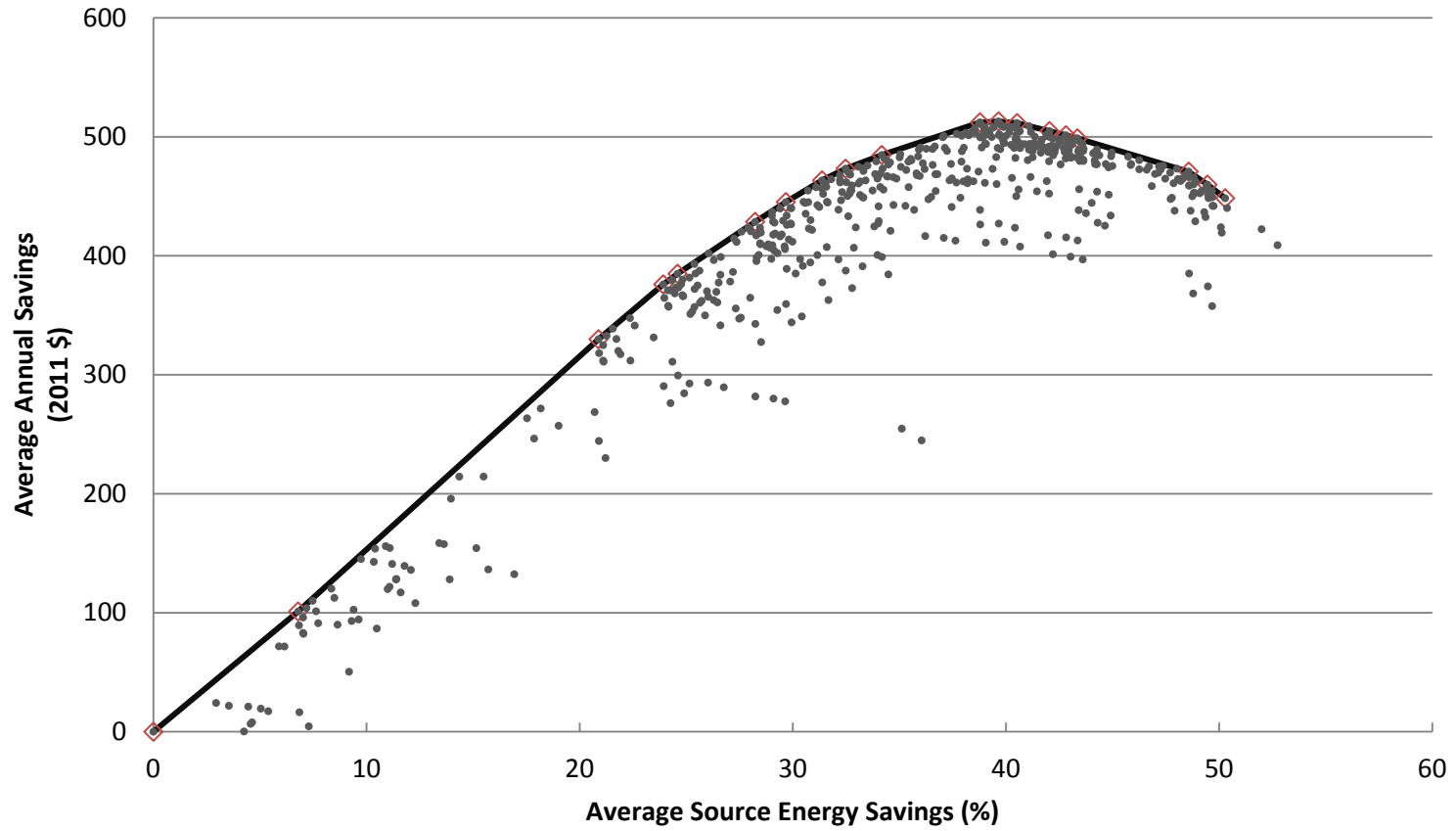


◇ - Denotes an optimal retrofit package and is included in summary table above.

### New Hampshire (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>															
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Basement Wall: Insulate to R-20 Rigid, 8 feet height	Hot Water Heater: Replace with Gas Tankless, Condensing
7	101	X	X														
15	232	X	X	X													
21	330	X	X	X													
24	376	X	X	X	X												
28	429	X	X	X	X	X											
30	445	X		X	X	X	X										
31	463	X	X	X	X	X		X									
32	473	X		X	X	X	X	X									
34	485	X		X	X	X	X	X	X								
39	512	X		X	X	X	X	X	X	X							
40	513	X		X	X	X	X	X	X	X	X						
41	512	X		X	X		X	X	X	X	X	X					
42	505	X		X	X	X	X	X	X	X	X	X	X				
43	501	X		X	X		X	X	X	X	X	X	X				
43	499	X		X	X		X	X	X	X	X	X	X	X			
49	471	X		X	X			X	X	X	X		X	X	X		
49	460	X		X	X			X	X	X	X		X	X		X	
50	448	X		X	X			X	X	X	X		X	X		X	X

### New Hampshire (Mixed Fuel)

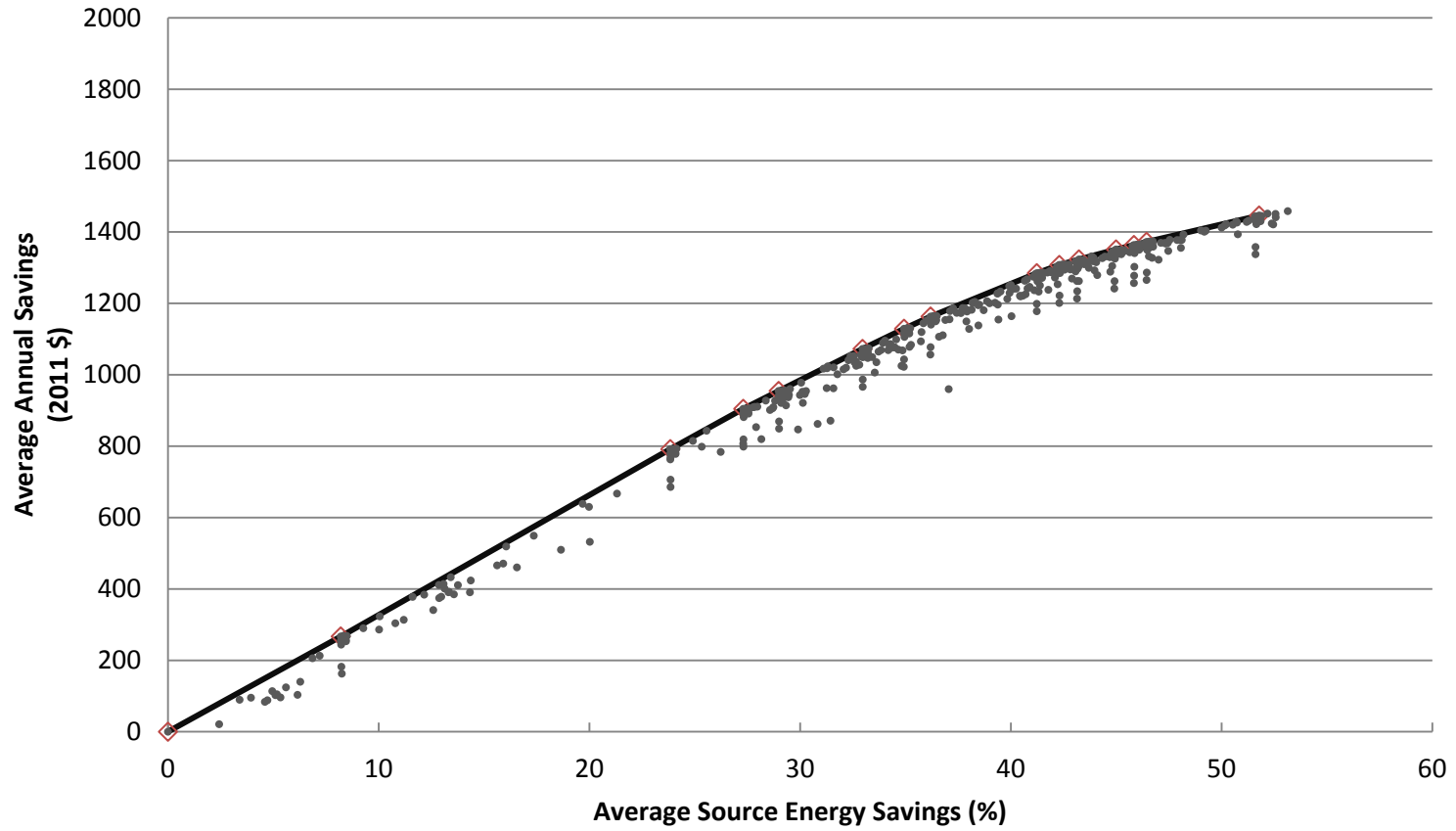


◇ - Denotes an optimal retrofit package and is included in summary table above.

### New Hampshire (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>												
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ceiling: Insulate to R-38	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height
8	267	X	X											
15	497	X		X										
24	792	X	X	X										
27	905	X	X	X	X									
29	955	X		X	X	X								
33	1072	X		X	X	X	X							
35	1129	X	X	X	X		X	X						
36	1163	X		X	X	X	X	X						
41	1285	X		X	X	X	X	X	X					
42	1308	X		X	X	X	X	X	X	X				
43	1323	X		X	X	X		X	X	X	X			
45	1351	X		X	X	X	X	X	X	X		X		
46	1364	X		X	X	X		X	X	X	X	X		
46	1372	X		X	X	X		X	X	X		X	X	
52	1446	X		X	X			X	X	X	X	X		X

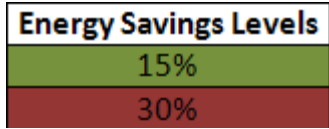
### New Hampshire (All Electric)



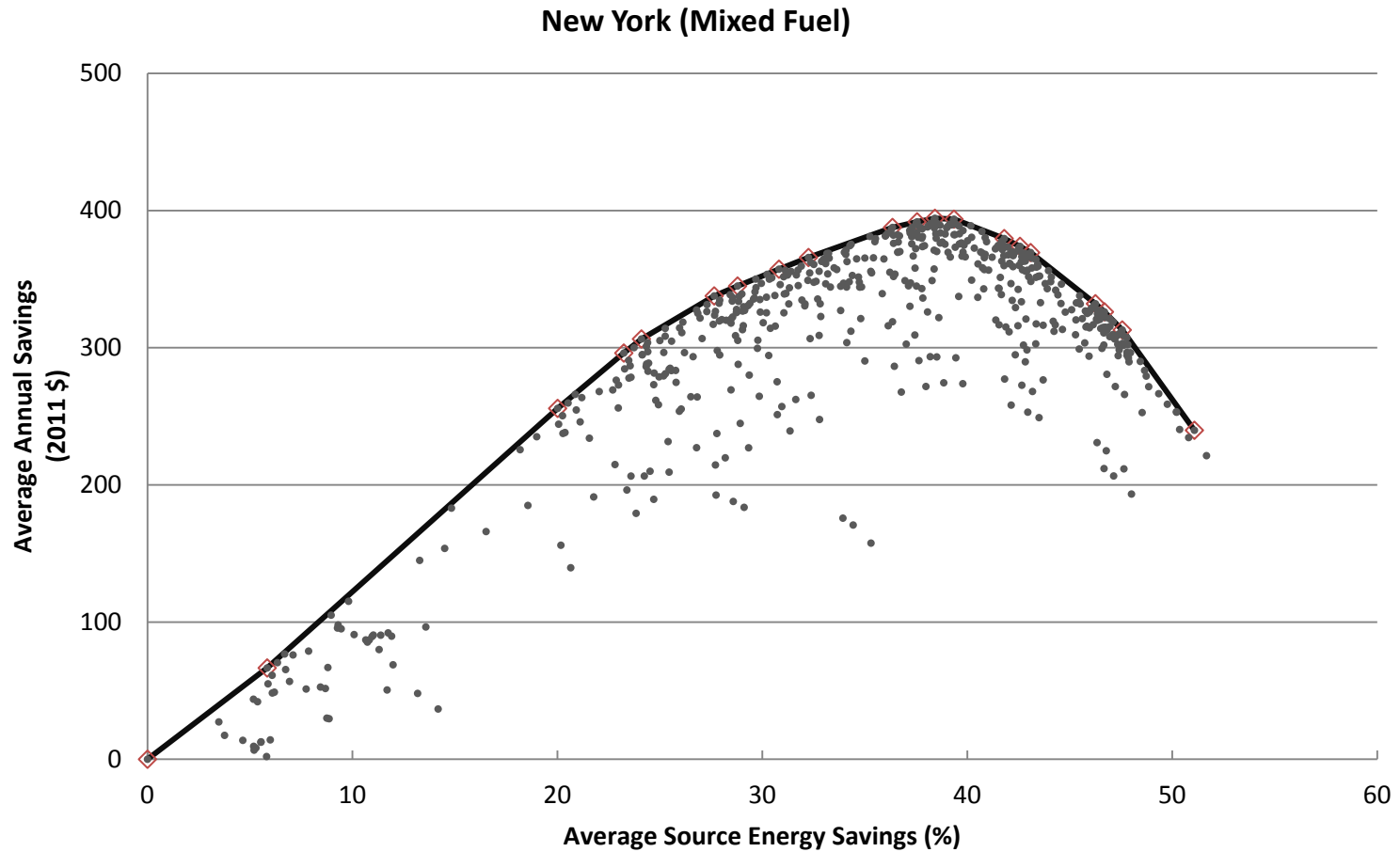
◇ - Denotes an optimal retrofit package and is included in summary table above.



### New York (Mixed Fuel)



Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Hot Water Heater: Replace with Gas Tankless	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Basement Wall: Insulate to R-15 Rigid, 8 feet height
6	67	X	X														
20	256	X	X	X													
23	296	X	X	X	X												
24	306	X	X	X	X												
28	338	X	X	X	X	X											
29	345	X		X	X	X	X										
31	357	X		X	X	X	X	X									
32	366	X	X	X	X	X		X	X								
36	388	X		X	X	X	X	X		X							
38	392	X	X	X	X	X		X	X	X							
38	394	X		X	X	X	X	X	X	X							
39	394	X		X	X	X	X	X	X	X	X						
42	380	X		X	X	X	X	X	X	X	X	X					
43	374	X		X	X		X	X	X	X	X	X	X				
43	369	X		X	X		X	X	X	X	X	X		X			
46	332	X		X	X		X	X	X	X	X	X	X		X		
47	326	X		X	X		X	X	X	X	X	X		X	X		
48	313	X		X	X		X	X	X	X	X	X		X	X	X	
51	240	X		X	X			X	X	X	X	X		X	X	X	X

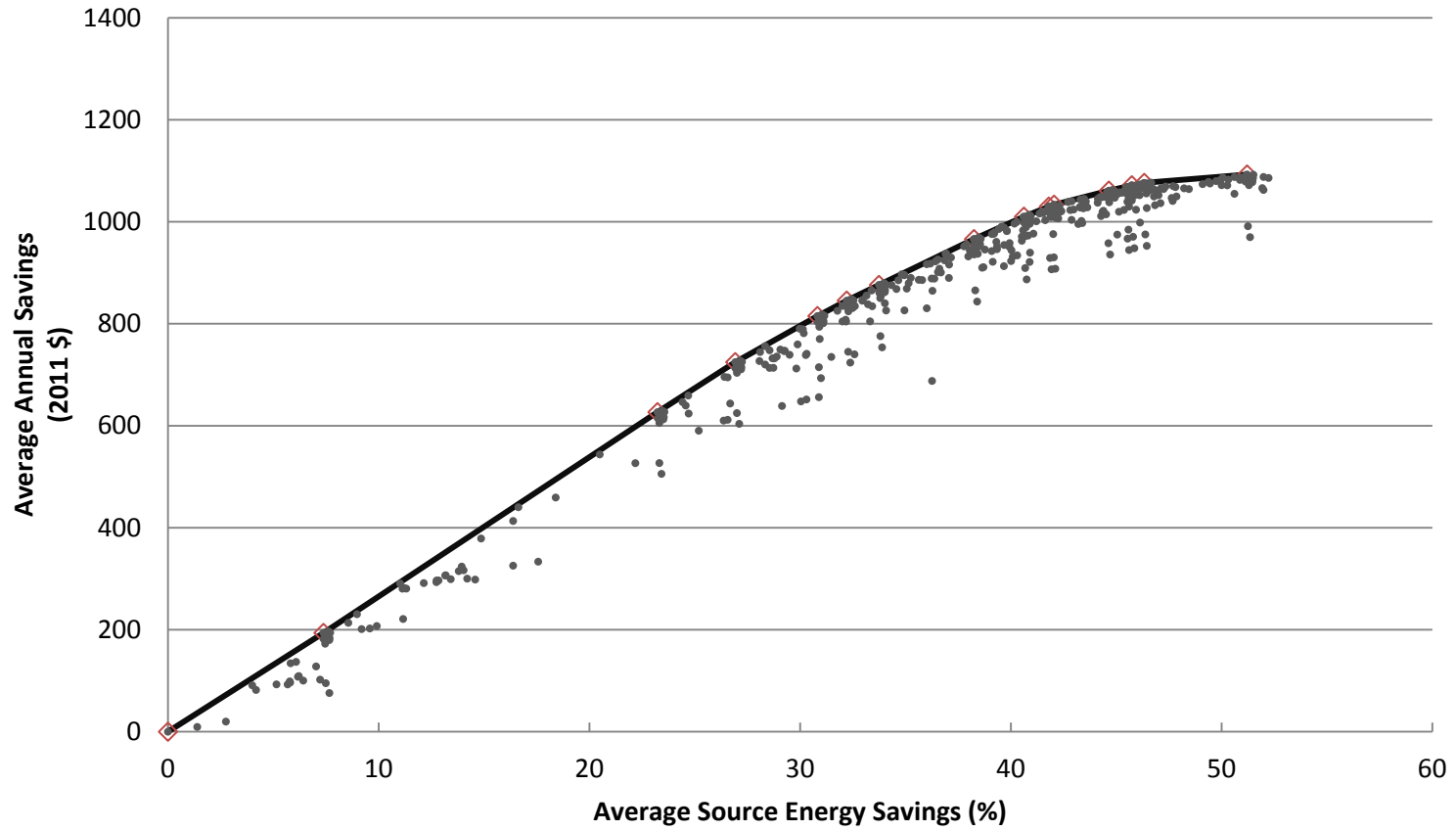


◇ - Denotes an optimal retrofit package and is included in summary table above.

## New York (All Electric)

Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Energy Savings Levels													
		Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ducts: Insulate to R-6	Windows: Replace with Double Pane, Low-e, std SHGC	Clothes Washer: Replace with EnergyStar	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Double Pane, Low-e, high SHGC
7	194	X	X												
15	411	X		X											
23	627	X	X	X											
27	725	X	X	X	X										
31	815	X	X	X	X	X									
32	845	X		X	X	X	X								
34	876	X	X	X	X	X		X							
38	966	X		X	X	X	X		X						
41	1010	X		X	X	X	X	X	X						
42	1030	X		X	X	X	X	X	X	X					
45	1061	X		X	X	X	X	X	X	X	X				
46	1072	X		X	X			X	X	X	X	X			
46	1076	X		X	X			X	X	X		X			
51	1093	X		X	X			X		X	X	X	X	X	X

### New York (All Electric)

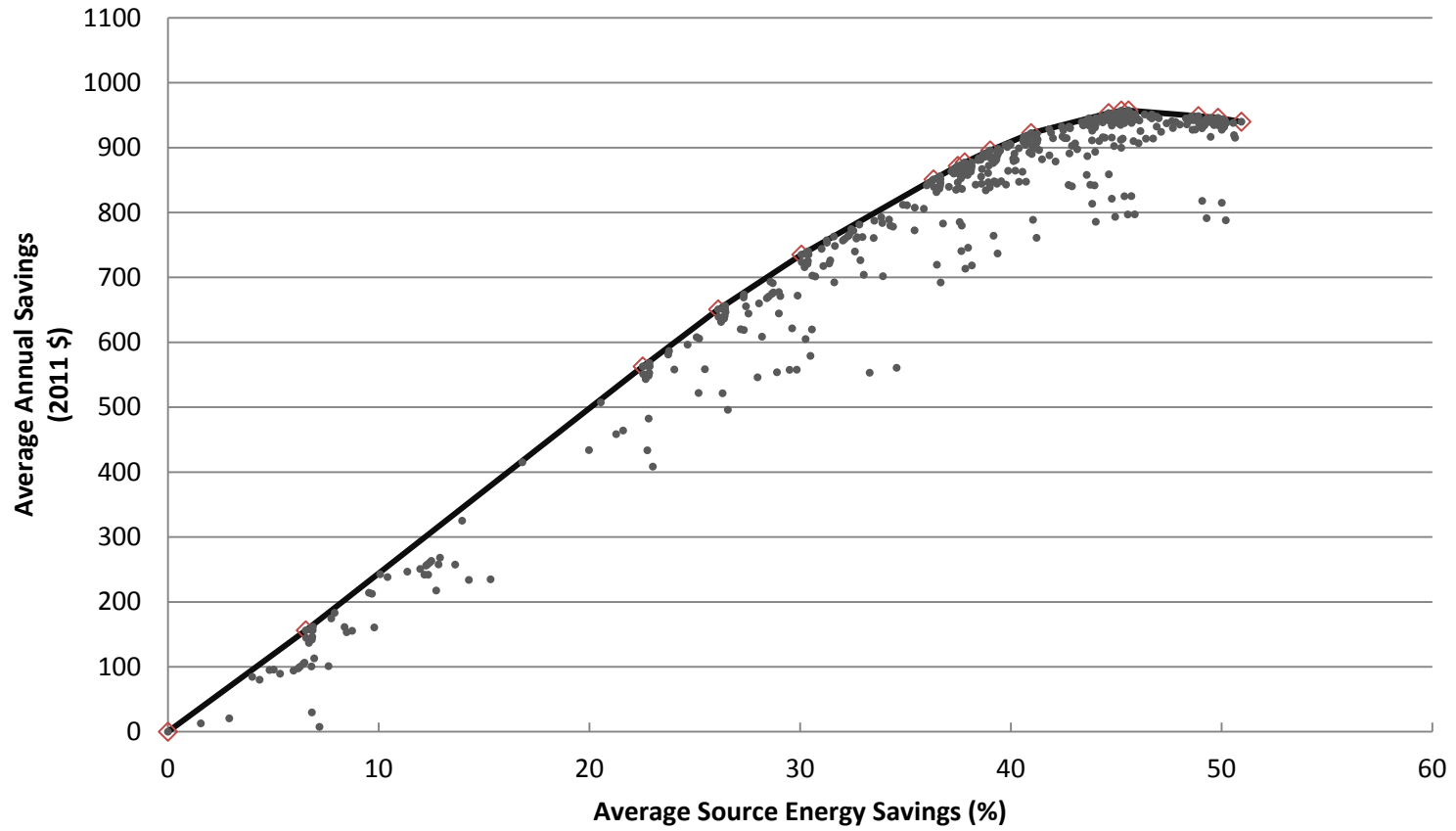


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Omaha, Nebraska (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; padding: 2px; text-align: center;">30%</div> </div>														
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ducts: Insulate to R-6	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane
7	156	X	X													
15	360	X		X												
23	563	X	X	X												
26	651	X	X	X	X											
30	735	X	X	X	X	X										
36	851	X	X	X	X	X	X									
37	872	X		X	X	X	X	X								
38	877	X		X	X	X	X	X								
39	896	X		X	X	X	X	X	X							
41	922	X		X	X	X	X	X	X	X						
45	953	X		X	X		X	X	X	X	X					
45	957	X		X	X		X	X	X	X		X	X			
46	957	X		X	X		X	X	X	X		X	X	X		
49	949	X		X			X		X			X	X	X	X	
50	946	X		X	X		X		X	X		X	X	X	X	
51	940	X		X	X				X	X		X	X	X	X	X

### Omaha, Nebraska (Mixed Fuel)

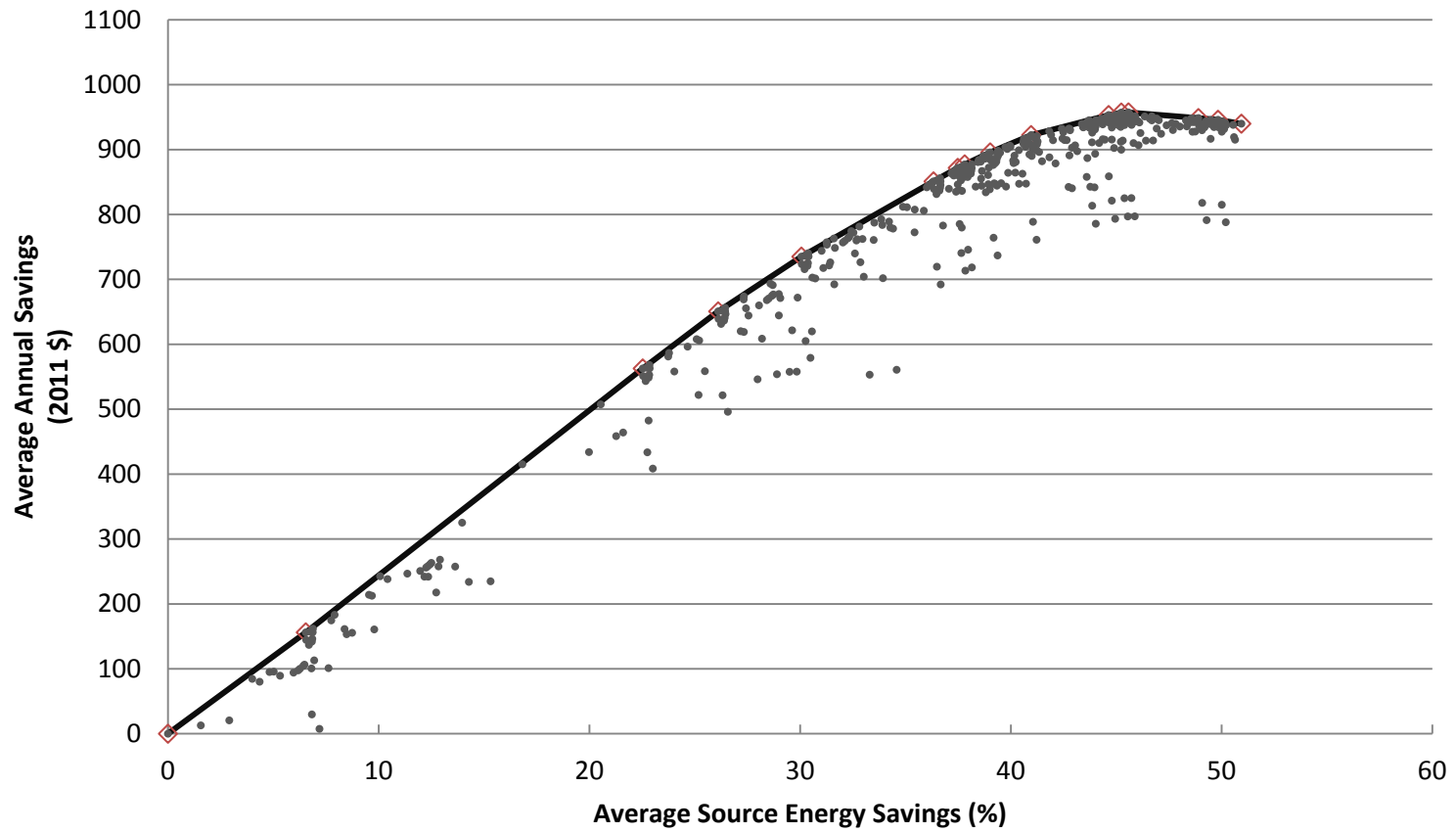


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Omaha, Nebraska (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #a52a2a;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%
Energy Savings Levels																			
15%	30%																		
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ceiling: Insulate to R-38	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ducts: Insulate to R-6	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane			
7	156	X	X																
15	360	X		X															
23	563	X	X	X															
26	651	X	X	X	X														
30	735	X	X	X	X	X													
36	851	X	X	X	X	X	X												
37	872	X		X	X	X	X	X											
38	877	X		X	X	X	X	X											
39	896	X		X	X	X	X	X	X										
41	922	X		X	X	X	X	X	X	X									
45	953	X		X	X		X	X	X	X	X								
45	957	X		X	X		X	X	X	X		X	X						
46	957	X		X	X		X	X	X	X		X	X	X					
49	949	X		X			X		X			X	X	X	X				
50	946	X		X	X		X		X	X		X	X	X	X				
51	940	X		X	X				X	X		X	X	X	X	X			

### Omaha, Nebraska (All Electric)



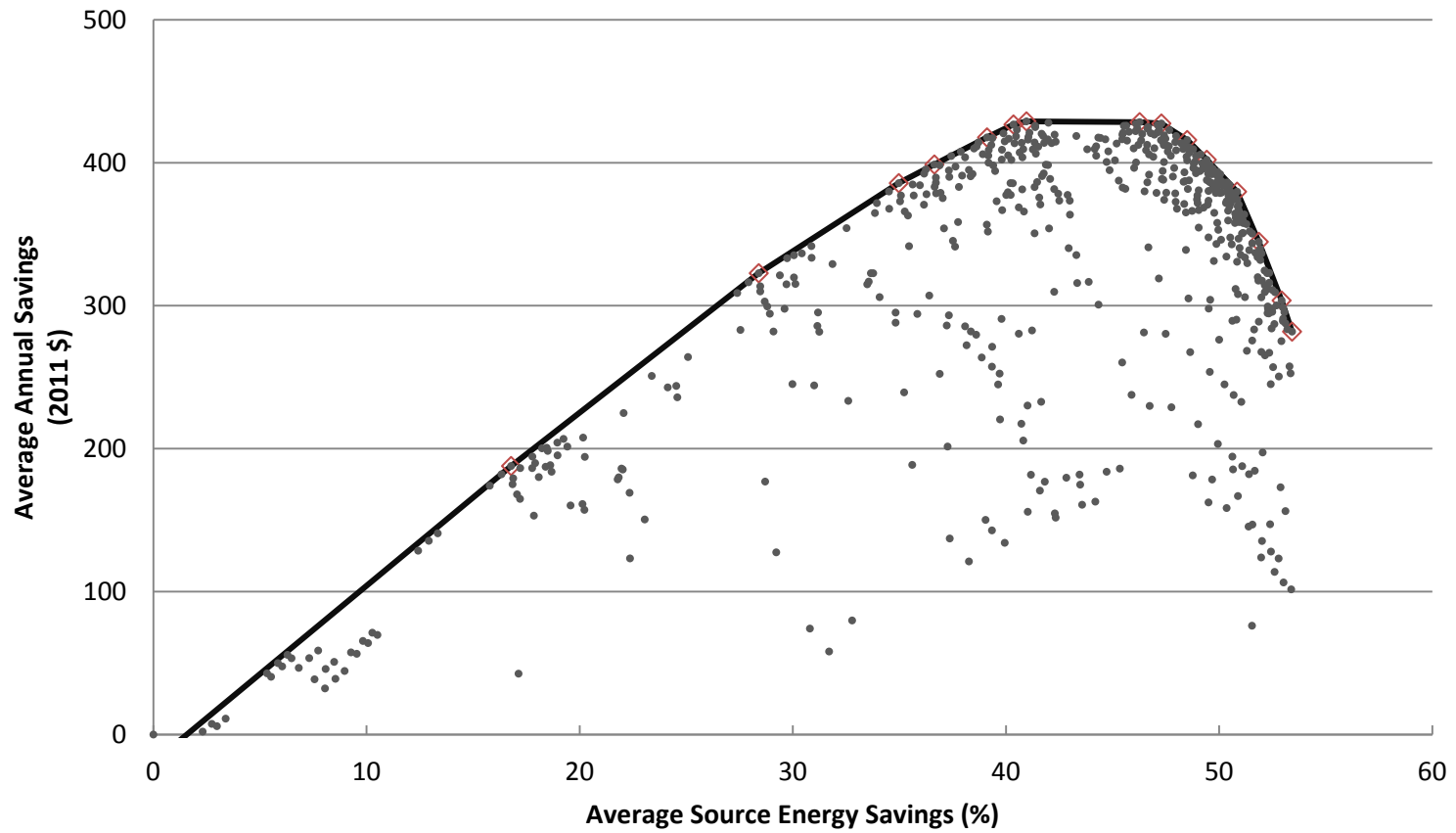
◇ - Denotes an optimal retrofit package and is included in summary table above.



### Oregon (Mixed Fuel)

		<table border="1" style="margin: auto;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #8ebf42;">15%</td></tr> <tr><td style="background-color: #800000;">30%</td></tr> </table>															Energy Savings Levels		15%	30%
Energy Savings Levels																				
15%																				
30%																				
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-60	Crawlspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Infiltration: 40% Reduction	Refrigerator: Replace with ENERGY STAR		
16	174	X	X																	
28	323	X	X	X																
30	315	X	X	X	X															
37	399	X	X	X	X	X														
39	418	X	X	X	X	X	X													
40	427	X		X	X	X	X	X												
41	429	X		X	X	X	X		X											
46	428	X		X	X	X	X		X	X										
47	427	X		X	X	X	X		X	X	X									
49	416	X		X	X	X	X		X	X	X	X								
49	402	X		X	X	X	X		X	X	X	X	X							
51	380	X		X		X	X			X	X	X	X	X	X					
52	345	X		X		X	X				X	X	X	X	X	X				
53	304	X		X		X	X				X	X	X	X	X	X	X			
53	282	X		X		X	X				X	X	X	X	X	X	X	X		

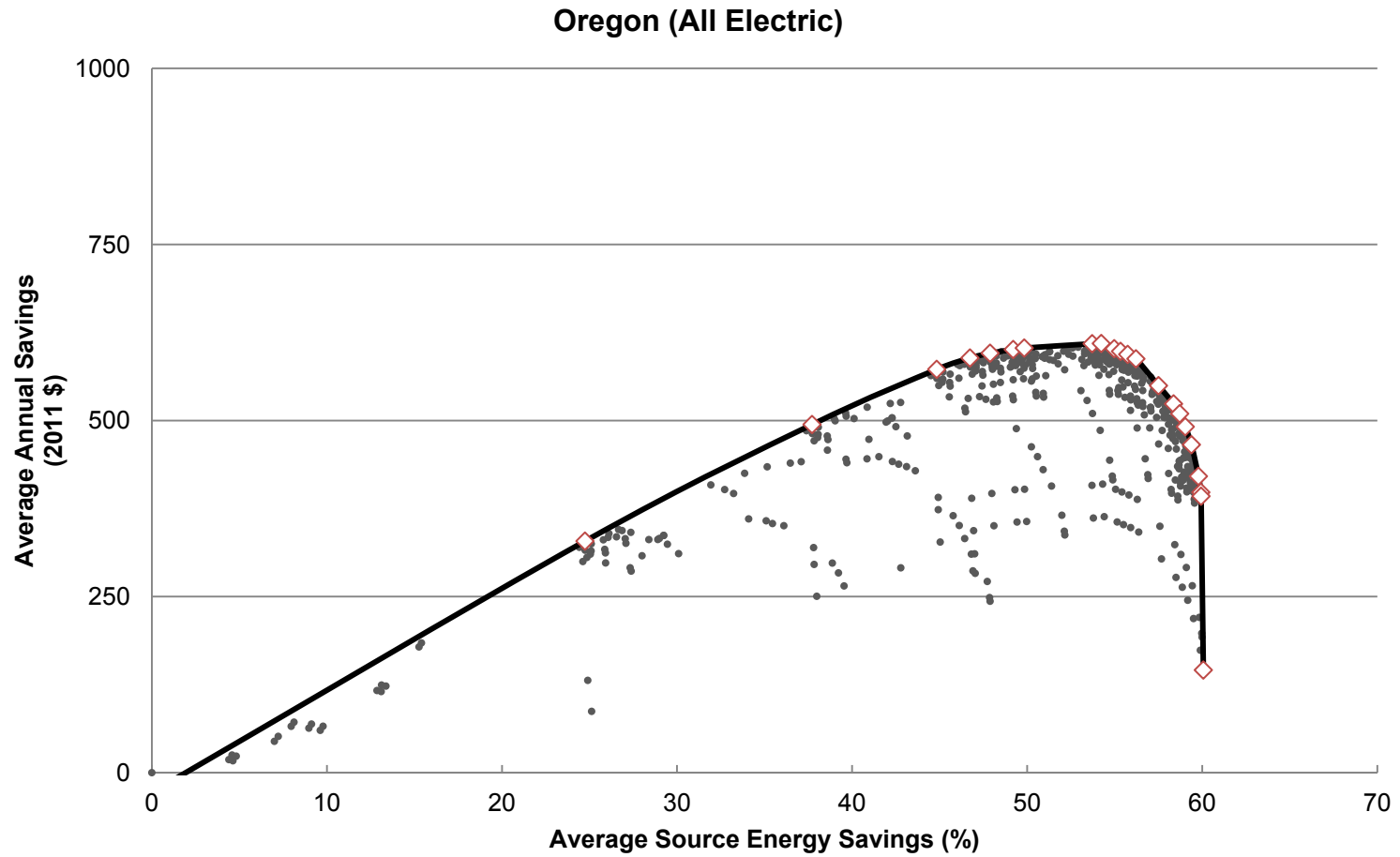
### Oregon (Mixed Fuel)



◇ - Denotes an optimal retrofit package and is included in summary table above.

### Oregon (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-15 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Ceiling: Insulate from R-19 to R-49	Hot Water Piping: Insulate to R-2	Crawlspace Wall: Insulate to R-20 Rigid	Ceiling: Insulate from R-19 to R-60	Infiltration: 40% Reduction	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	184	X		X																			
25	329	X	X																				
31	408	X	X		X																		
38	494	X	X	X																			
45	573	X	X	X	X																		
47	589	X	X	X	X	X																	
48	596	X		X	X	X	X																
49	601	X		X	X	X	X	X															
50	603	X		X	X	X	X	X	X														
54	609	X		X	X	X	X	X	X	X													
54	609	X		X	X	X	X	X	X	X													
55	602	X		X	X	X	X	X	X	X	X												
55	598	X		X	X	X	X	X	X	X	X	X											
56	594	X		X	X	X	X	X	X	X	X	X											
56	588	X		X	X	X	X	X	X	X	X	X	X										
58	550	X		X	X	X	X	X	X	X	X	X	X	X									
58	524	X		X	X	X	X	X	X	X	X	X	X	X	X								
59	510	X		X	X	X	X	X	X	X	X	X	X	X	X	X							
59	491	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X						
59	466	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
60	421	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
60	398	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
60	393	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
60	146	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

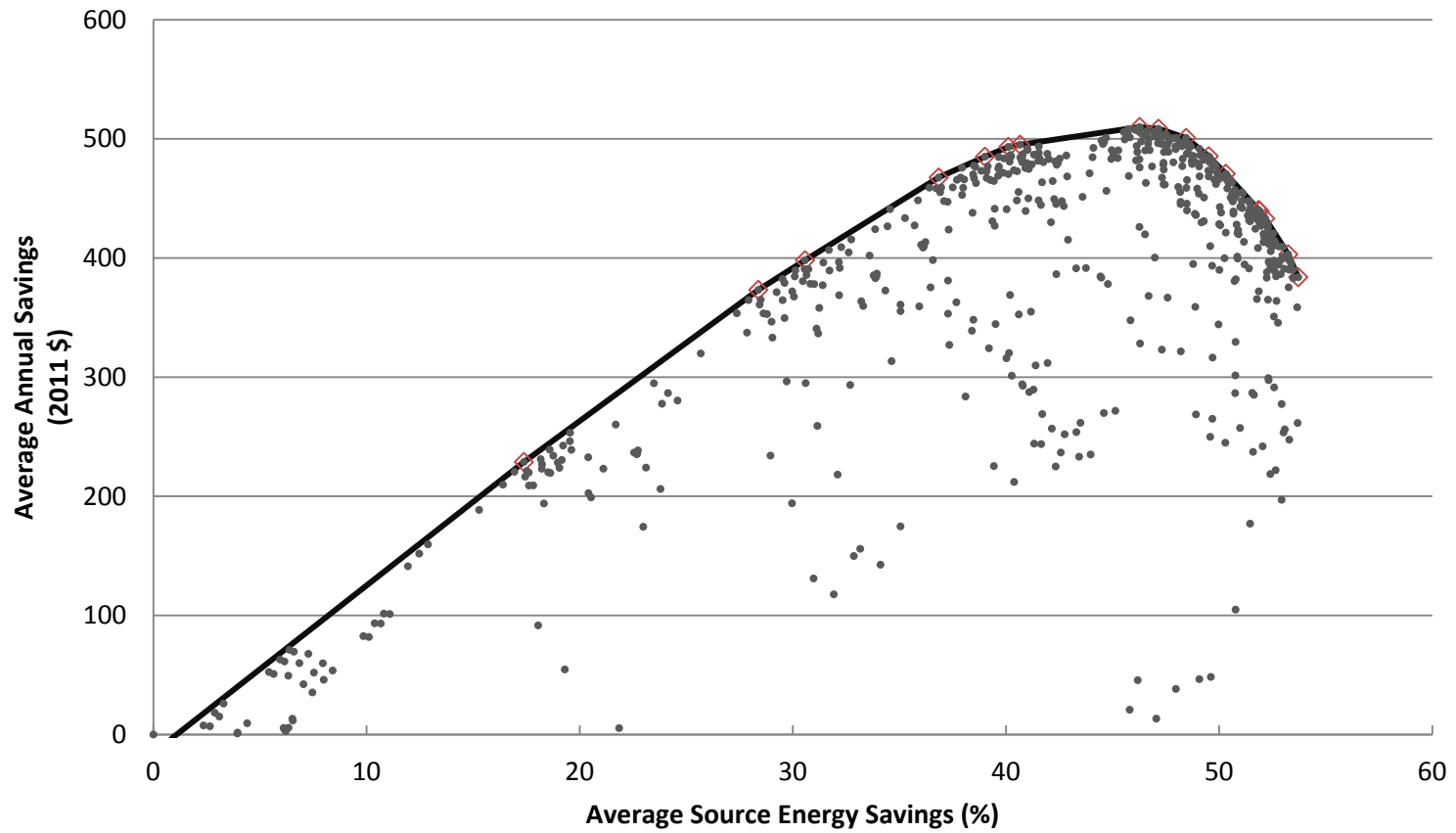


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Philadelphia, Pennsylvania (Mixed Fuel)

		<table border="1" style="margin: auto;"> <tr><td style="text-align: center;"><b>Energy Savings Levels</b></td></tr> <tr><td style="text-align: center;">15%</td></tr> <tr><td style="text-align: center;">30%</td></tr> </table>														<b>Energy Savings Levels</b>	15%	30%		
<b>Energy Savings Levels</b>																				
15%																				
30%																				
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 20% Reduction	Ceiling: Insulate from R-11 to R-38	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Windows: Replace with Double Pane, Low-e, standard SHGC	Crawlspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	
15	189	X	X																	
28	373	X	X	X																
31	398	X	X	X	X															
37	468	X	X	X	X	X														
39	485	X	X	X	X	X	X													
40	493	X		X	X	X	X	X												
41	495	X		X	X	X	X		X											
46	510	X		X	X	X	X		X	X										
47	509	X		X	X	X	X		X	X	X									
48	501	X		X	X	X	X		X	X	X	X								
50	485	X		X	X		X		X	X	X	X	X							
50	471	X		X	X		X		X	X	X	X	X	X						
52	440	X		X	X		X		X	X	X	X	X	X	X					
52	439	X		X	X		X		X		X	X	X	X	X	X				
52	433	X		X	X		X				X	X	X	X	X	X	X			
53	403	X		X	X		X				X	X	X	X	X	X	X	X		
54	384	X		X	X		X				X	X	X	X	X		X	X	X	X

### Philadelphia, Pennsylvania (Mixed Fuel)

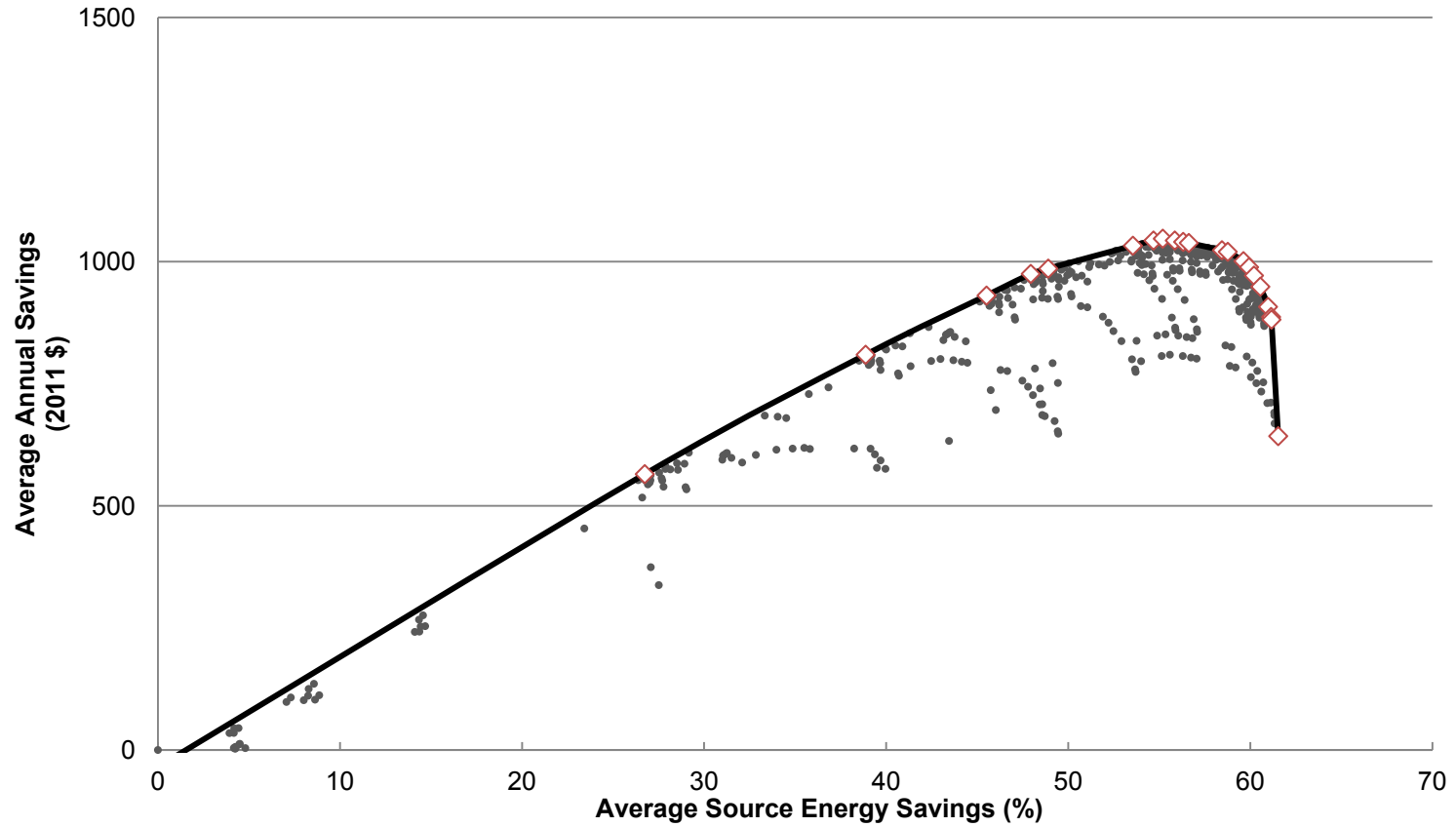


◇ - Denotes an optimal retrofit package and is included in summary table above.

Philadelphia, Pennsylvania (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Crawspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Hot Water Piping: Insulate to R-2	Infiltration: 40% Reduction	Crawspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	254	X		X																			
27	565	X	X																				
30	609	X	X		X																		
39	809	X	X	X																			
46	931	X	X	X	X																		
48	975	X	X	X	X	X																	
49	986	X		X	X	X	X																
54	1033	X		X	X	X	X	X															
55	1043	X		X	X	X	X	X	X														
55	1047	X		X	X	X		X	X	X													
56	1043	X		X		X		X	X	X	X												
56	1040	X		X		X		X	X	X		X											
57	1038	X		X		X		X	X	X		X	X										
58	1023	X		X				X	X	X		X	X	X									
59	1020	X		X				X	X			X	X	X	X								
60	1001	X		X				X	X			X	X	X	X	X							
60	989	X		X				X	X			X	X	X	X	X	X						
60	971	X		X				X	X			X	X	X	X	X	X						
61	949	X		X		X		X	X			X	X	X	X	X	X	X					
61	908	X		X				X	X			X	X	X	X	X	X		X				
61	887	X		X				X	X			X	X	X	X	X	X		X	X			
61	881	X		X				X	X			X	X	X	X	X	X			X	X		
62	643	X		X				X	X			X	X	X	X	X	X			X	X	X	

### Philadelphia, Pennsylvania (All Electric)



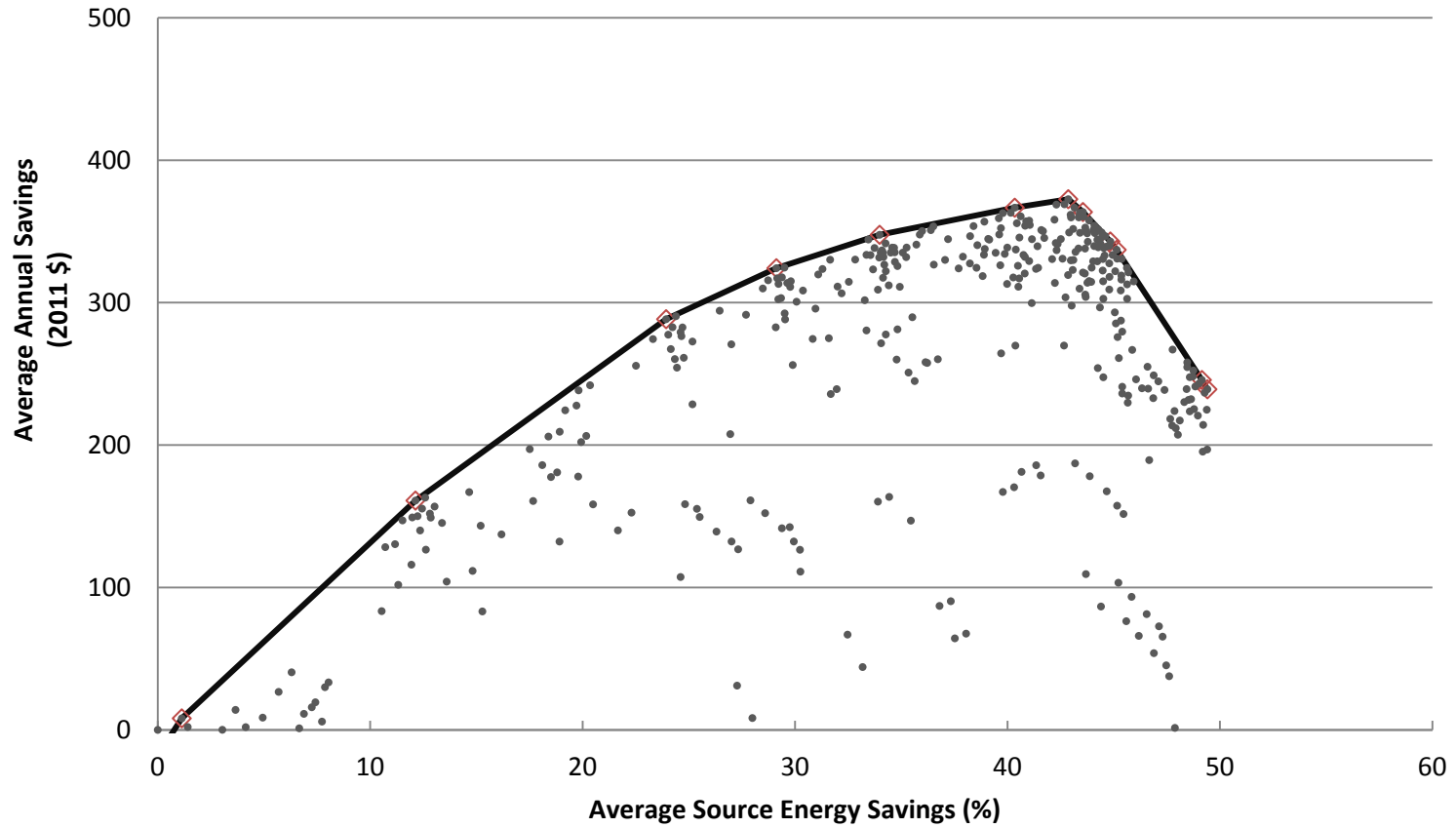
◇ - Denotes an optimal retrofit package and is included in summary table above.



Phoenix, Arizona (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>													
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-11 to R-38	Ducts: Seal and Insulate to R-8	Windows: Replace with Double Pane, Low-e, low SHGC	Water Heater: Install Gas Tankless (0.82 EF)	Clothes Washer: Replace with ENERGY STAR	Infiltration: 40% Reduction	Refrigerator: Replace with ENERGY STAR	Hot Water Pipes: Insulate from Uninsulated to R-2	Air Conditioner: Replace with SEER 16	Hot Water Pipes: Insulate from Uninsulated to R-2
1	8	X													
15	166	X	X								X				
24	288	X	X	X							X				
30	324	X		X	X										
34	348	X		X		X	X								
40	367	X		X		X	X	X							
43	373	X		X		X	X	X	X						
44	364	X		X		X	X	X	X	X					
45	343	X		X		X	X	X	X	X	X	X			
45	337	X		X		X	X	X	X	X	X	X	X		X
49	246	X		X		X	X	X	X	X		X		X	
49	239	X		X		X	X	X	X	X		X	X	X	X

### Phoenix, Arizona (Mixed Fuel)

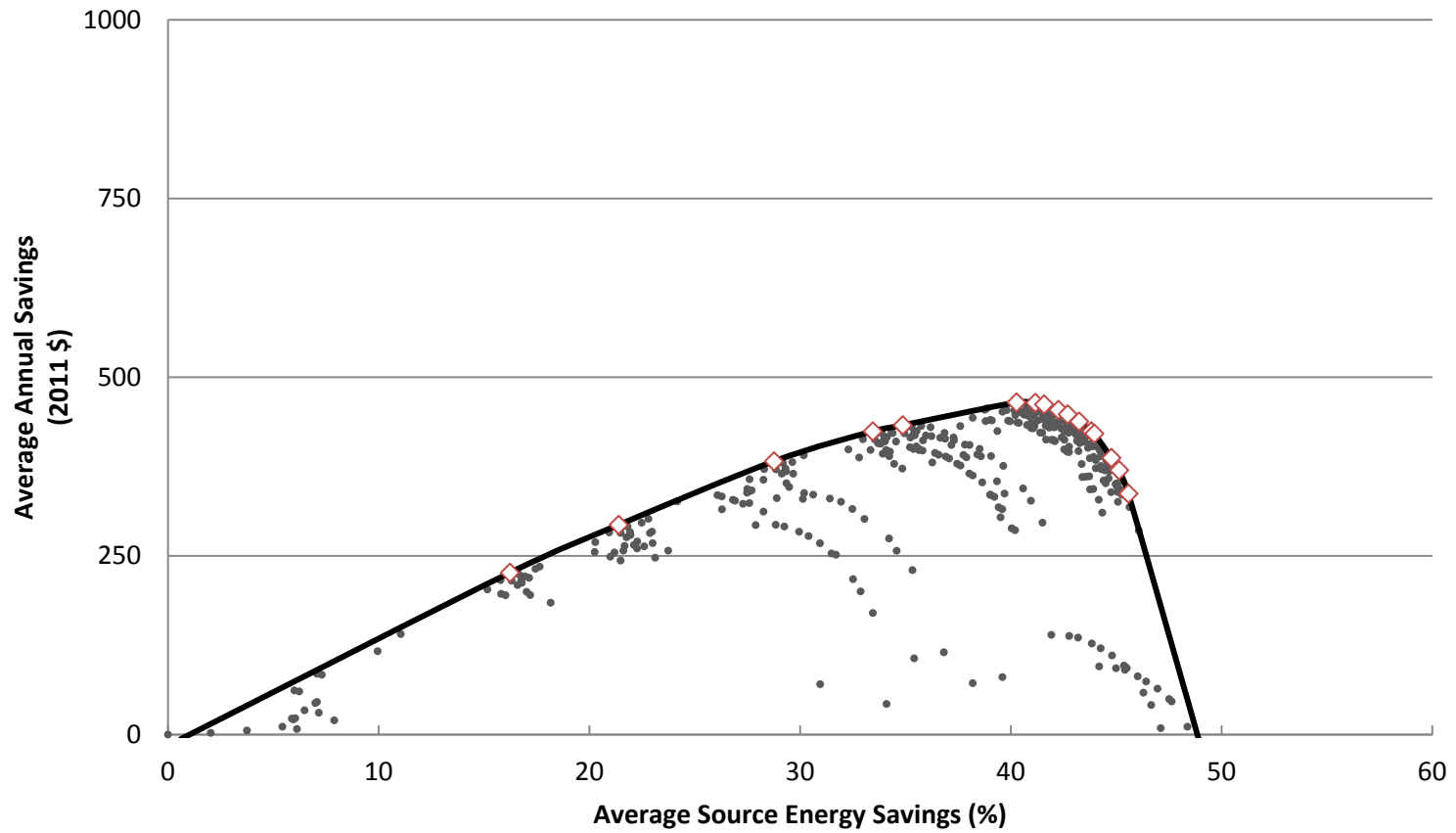


◇ - Denotes an optimal retrofit package and is included in summary table above.

Phoenix, Arizona (All Electric)

Energy Savings Levels																	
		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>15%</p> <p>30%</p> </div> </div>															
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-19 to R-38	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, low SHGC	Infiltration: 20% Reduction	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Water Heater: Install Electric Premium (0.95 EF)	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Windows: Replace with Quadruple Pane
16	226	X	X														
21	293	X	X	X					X								
29	382	X	X		X												
31	391	X	X	X		X											
33	424	X	X		X	X											
35	433	X	X		X	X	X										
40	465	X	X		X	X	X	X									
41	464	X	X		X	X	X	X	X								
42	462	X	X		X	X	X	X	X	X							
42	454	X	X		X		X	X	X	X	X						
43	448	X	X		X		X	X	X	X		X					
43	438	X	X		X		X	X	X	X		X	X				
44	424	X	X		X		X	X	X	X		X	X	X			
44	421	X	X				X	X	X	X		X	X	X	X		
45	387	X	X				X	X	X	X		X	X	X	X	X	
45	370	X	X				X	X	X	X		X	X	X	X	X	
46	337	X	X				X		X	X		X	X	X	X	X	X

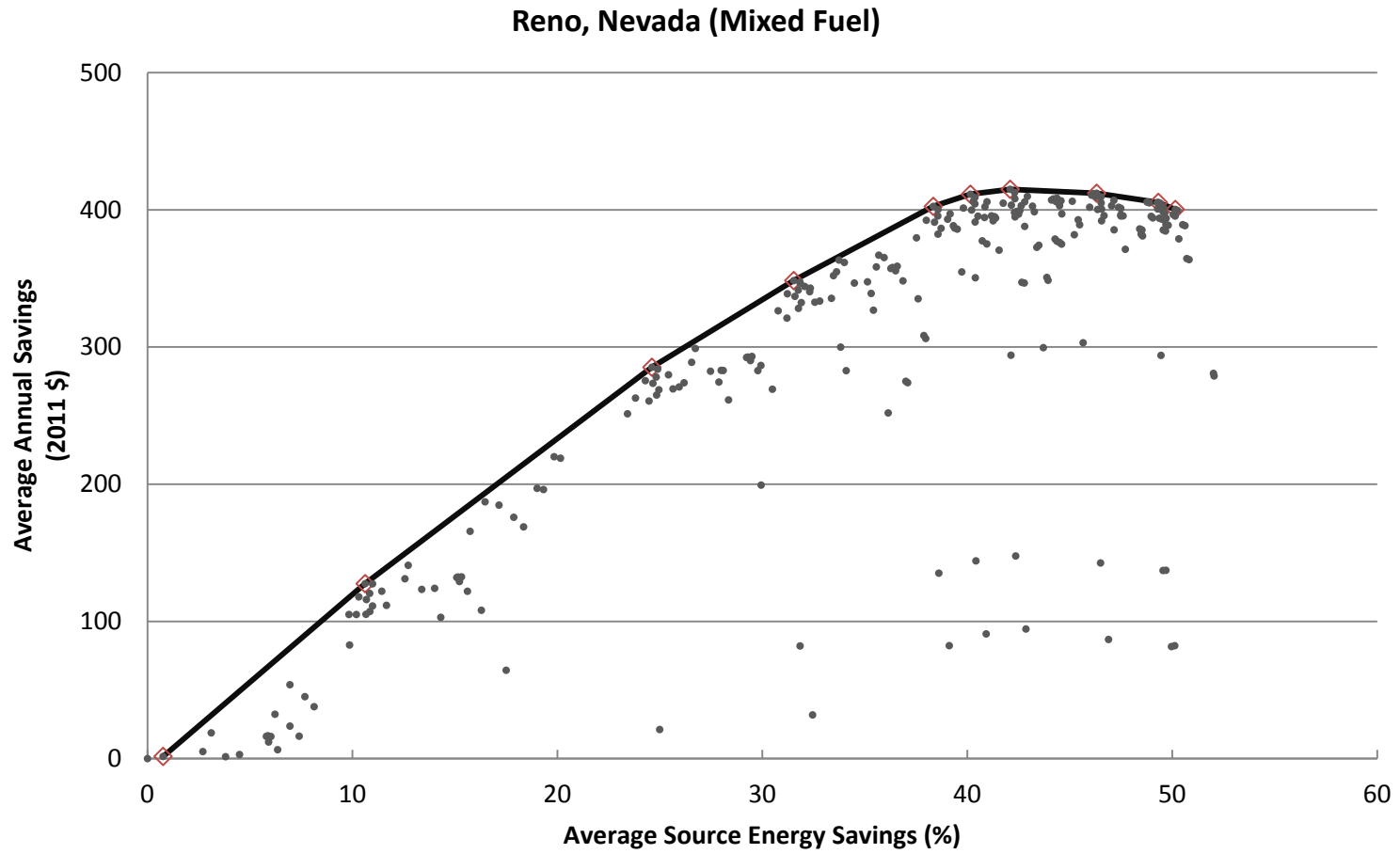
### Phoenix, Arizona (All Electric)



◇ - Denotes an optimal retrofit package and is included in summary table above.

Reno, Nevada (Mixed Fuel)

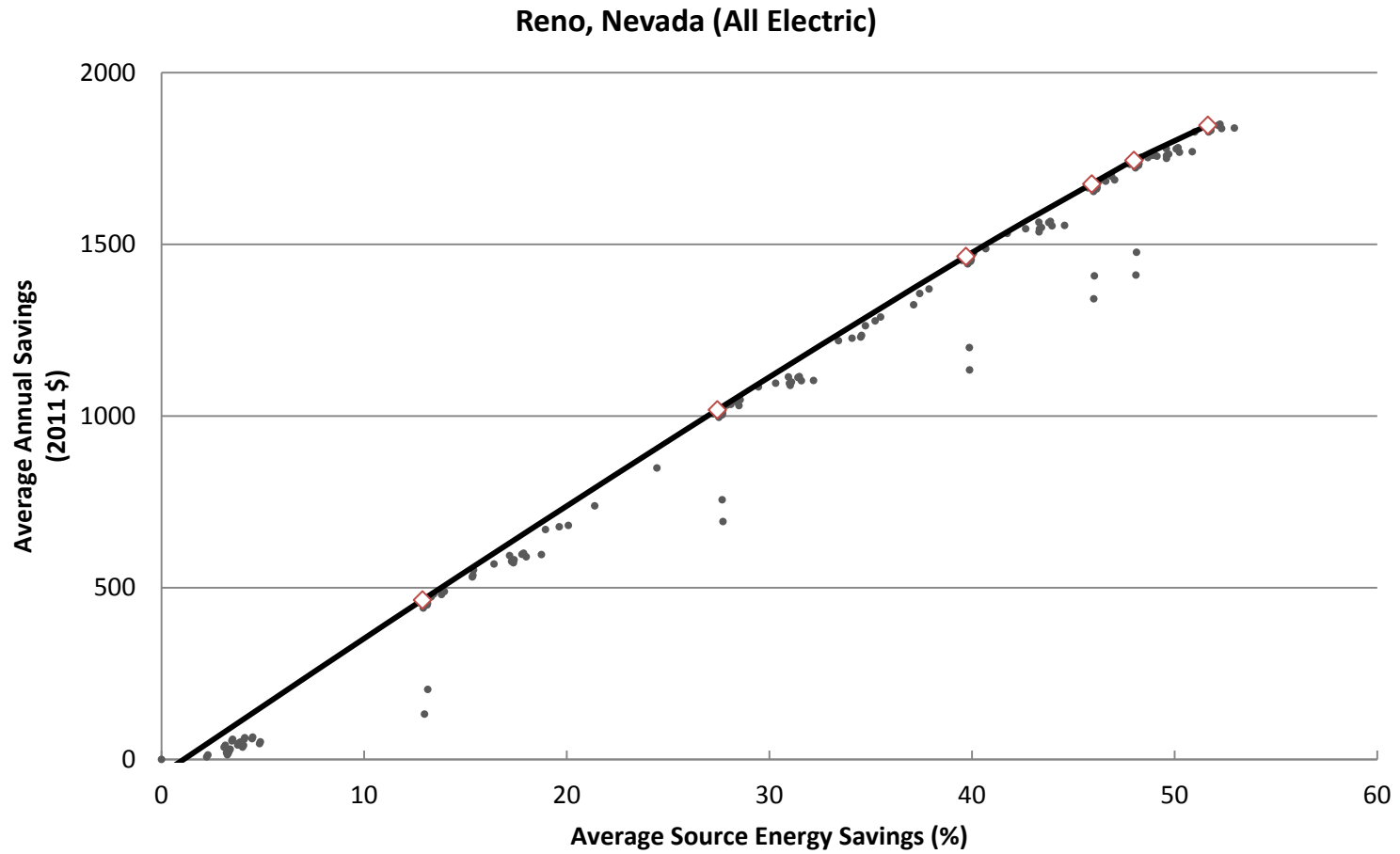
		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>										
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Ducts: Seal and Insulate to R-6	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Windows: Replace with Double Pane, Low-e, high SHGC	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Windows: Replace with Double Pane, Low-e, standard SHGC, Argon Fill	Clothes Washer: Replace with ENERGY STAR
1	2	X										
16	187	X		X								
25	285	X	X	X			X					
31	339	X	X	X	X		X					
38	403	X		X	X	X						
40	411	X		X	X	X	X					
42	415	X		X	X	X	X	X				
46	412	X		X	X	X	X	X	X			
49	405	X		X	X	X	X	X		X	X	
50	400	X		X	X	X	X	X		X	X	X



◇ - Denotes an optimal retrofit package and is included in summary table above.

**Reno, Nevada (All Electric)**

		<table border="1"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td>15%</td> <td></td> </tr> <tr> <td>30%</td> <td></td> </tr> </table>							Energy Savings Levels		15%		30%	
Energy Savings Levels														
15%														
30%														
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)						
13	464	X	X				X							
15	551	X			X									
27	1018	X		X										
31	1098	X		X		X								
40	1465	X		X	X									
46	1676	X		X	X	X								
48	1744	X		X	X	X	X							
52	1847	X		X	X	X	X	X						



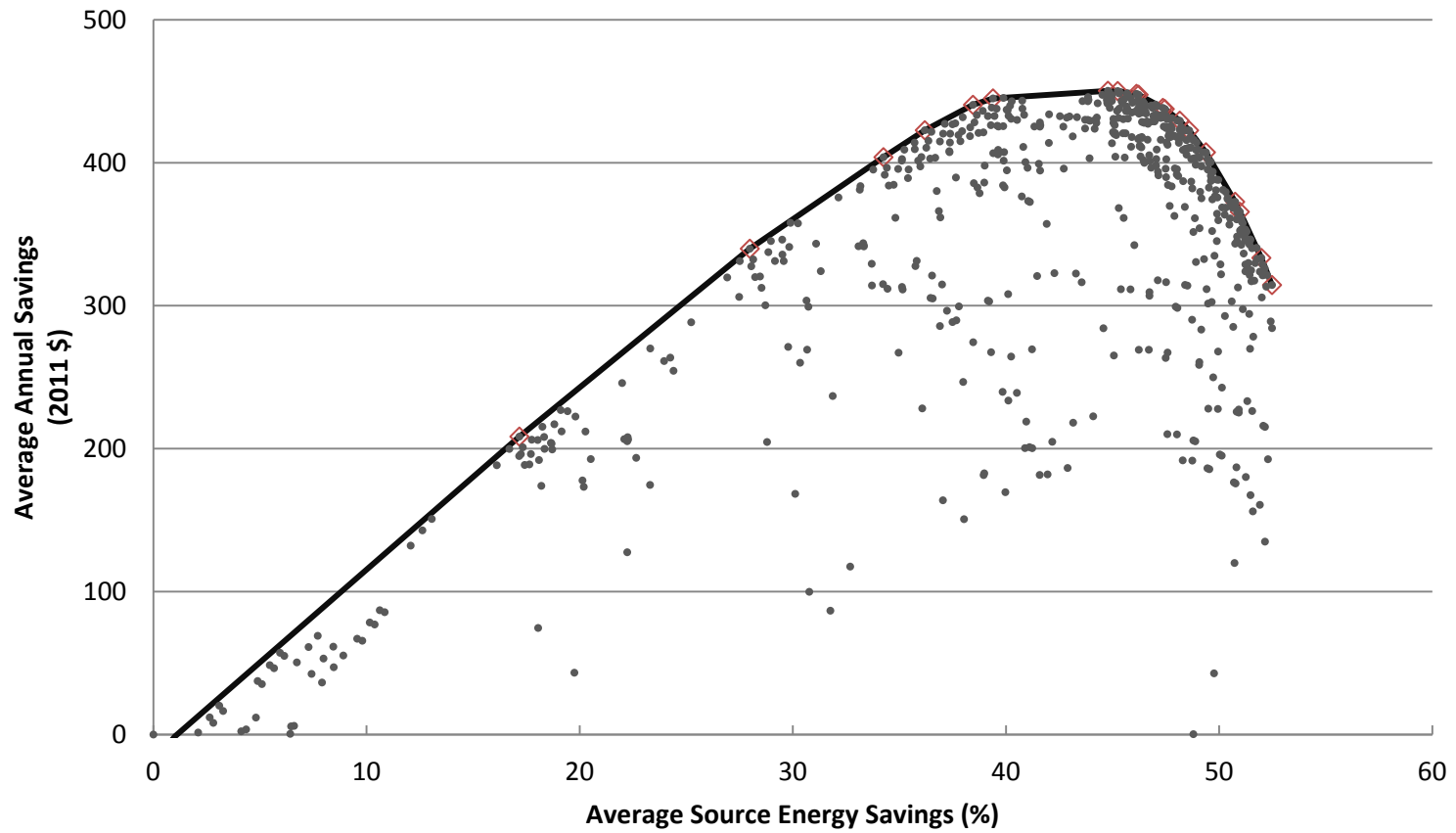
◇ - Denotes an optimal retrofit package and is included in summary table above.



Riley County, Kansas (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>																			
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate with R-15	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, standard SHGC	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Crawlspace Wall: Insulate with R-20	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR	
16	188	X	X																		
30	356	X	X	X																	
34	404	X	X	X	X																
36	423	X	X	X	X	X															
38	440	X	X	X	X	X	X														
39	445	X		X	X	X	X	X													
45	450	X		X	X	X	X	X	X												
45	450	X		X	X	X	X		X	X											
46	448	X		X	X	X	X		X	X	X										
46	448	X		X	X	X	X			X	X	X									
47	438	X		X	X	X	X		X	X	X		X								
47	438	X		X	X	X	X			X	X	X	X								
48	429	X		X		X	X			X	X	X	X	X							
49	423	X		X		X	X			X	X	X	X								
49	407	X		X		X	X			X	X	X	X		X	X					
51	373	X		X		X	X			X	X	X	X		X	X	X				
51	366	X		X		X	X				X	X	X		X	X	X	X			
52	333	X		X		X	X				X		X		X	X	X	X	X	X	
52	314	X		X		X	X				X		X		X	X	X	X	X	X	X

### Riley County, Kansas (Mixed Fuel)

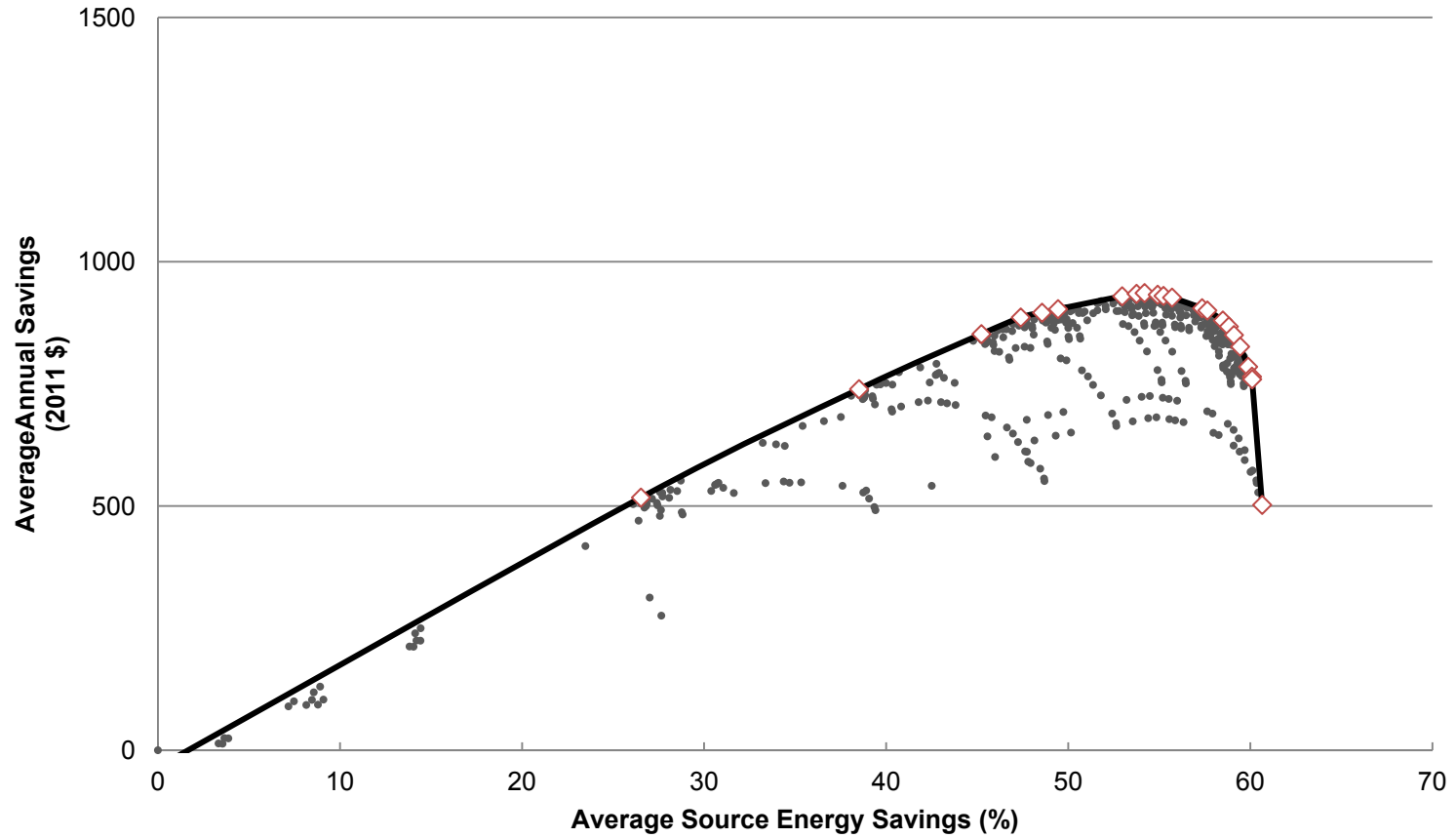


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Riley County, Kansas (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-10 Rigid	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-60	Infiltration: 40% Reduction	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	250	X		X																			
27	517	X	X																				
31	629	X	X			X																	
39	739	X	X	X																			
45	852	X	X	X	X																		
47	886	X	X	X	X	X																	
49	896	X	X	X	X	X	X																
49	903	X		X	X	X	X	X															
53	929	X	X	X	X	X	X	X	X														
54	934	X		X	X	X	X	X	X														
54	936	X	X	X	X	X	X	X	X	X													
55	932	X		X		X	X	X	X	X	X												
55	930	X		X		X	X	X	X	X	X	X											
56	927	X		X		X	X	X	X	X	X	X											
57	905	X		X			X	X	X	X													
58	900	X		X			X	X	X	X						X							
58	880	X		X			X	X	X	X						X							
59	867	X		X			X	X	X	X						X							
59	850	X		X			X	X	X	X						X							
59	826	X		X		X	X	X	X	X	X					X							
60	765	X		X			X	X	X	X	X					X					X		
60	759	X		X			X	X	X	X	X					X					X	X	
61	502	X		X			X	X	X	X	X					X					X	X	X

### Riley County, Kansas (All Electric)

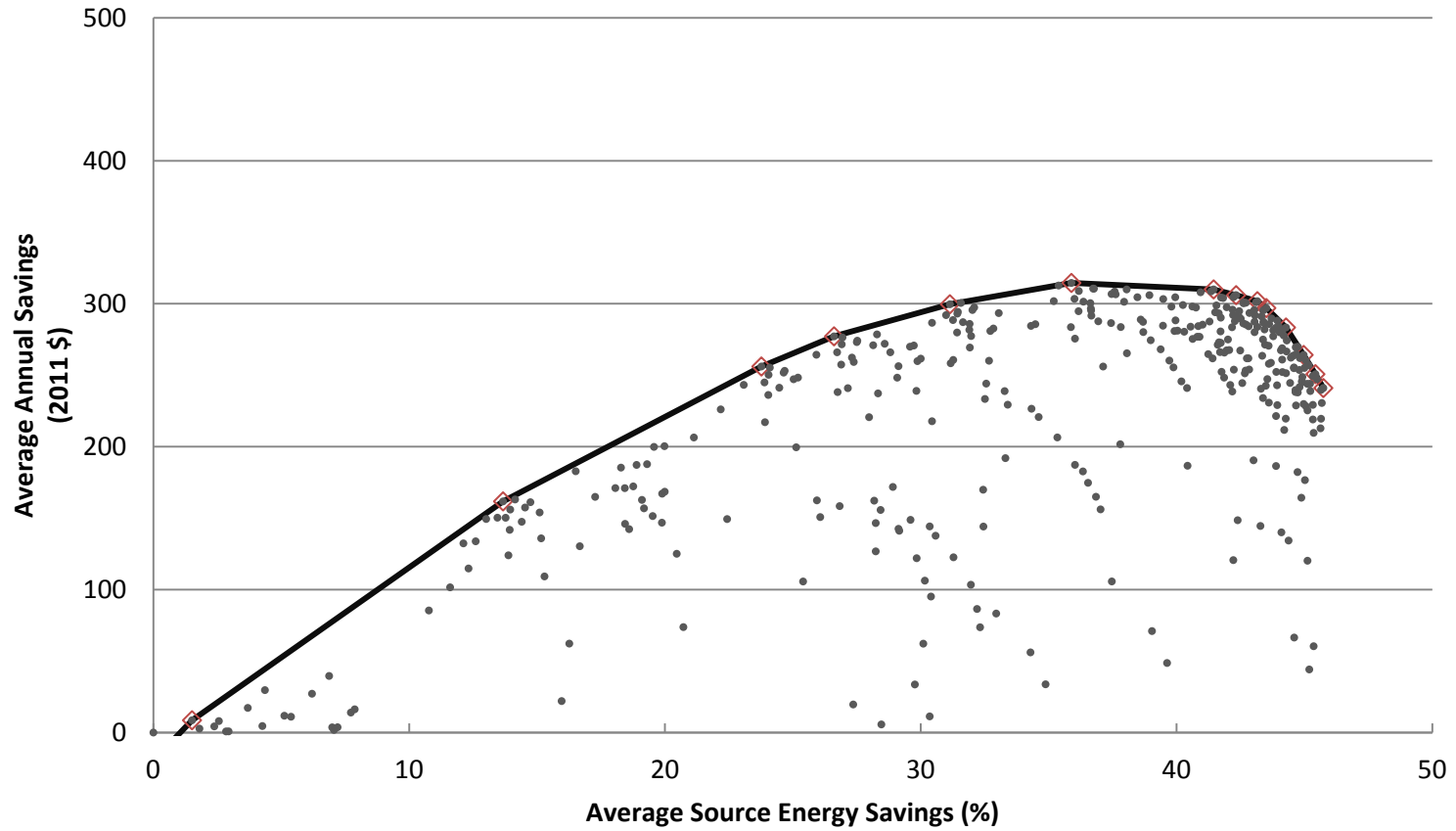


◇ - Denotes an optimal retrofit package and is included in summary table above.

San Antonio, Texas (Mixed Fuel)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="width: 50%; background-color: #92d050;">15%</td> <td style="width: 50%; background-color: #a52a2a;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%
Energy Savings Levels																			
15%	30%																		
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Water Heater: Install Gas Tankless (0.82 EF)	Ceiling: Insulate from R-11 to R-38	Ducts: Seal and Insulate to R-8	Windows: Replace with Double Pane, Low-e, low SHGC	Clothes Washer: Replace with ENERGY STAR	Infiltration: 20% Reduction	Hot Water Pipes: Insulate from Uninsulated to R-2	Refrigerator: Replace with ENERGY STAR	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60				
2	9	X																	
15	162	X	X							X									
24	256	X	X	X						X									
27	277	X	X	X	X					X									
31	300	X	X	X	X	X				X									
36	315	X		X	X	X	X												
41	310	X		X	X	X	X	X											
42	306	X		X	X	X	X	X	X										
43	302	X		X	X	X	X	X	X	X									
44	297	X		X	X	X	X	X	X	X	X								
44	283	X		X	X	X	X	X	X	X	X	X							
45	264	X		X	X	X	X	X	X	X	X	X	X						
45	251	X		X	X	X	X	X	X	X	X	X	X	X					
46	241	X		X	X		X	X	X	X	X	X	X	X	X				

### San Antonio, Texas (Mixed Fuel)

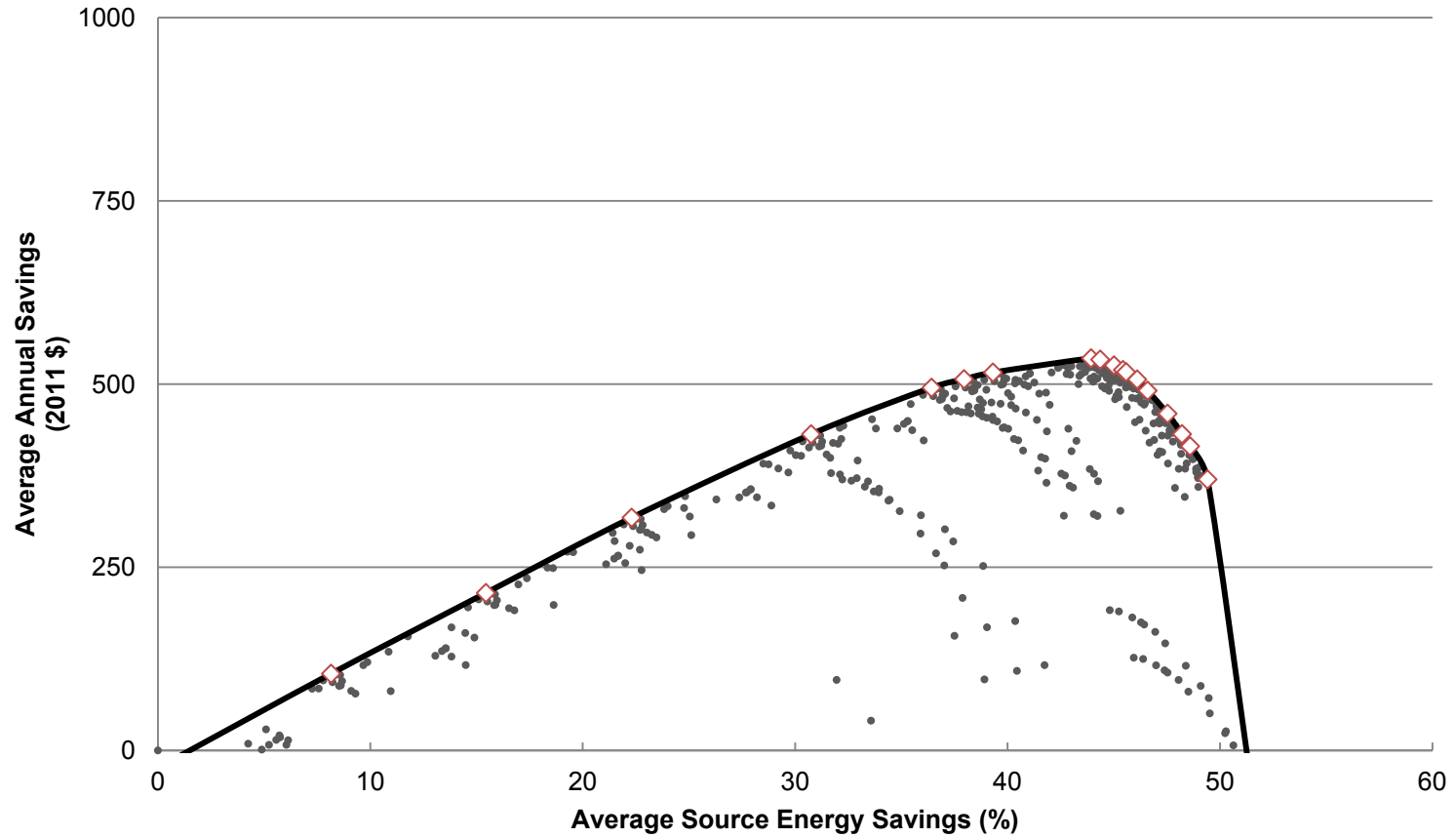


◇ - Denotes an optimal retrofit package and is included in summary table above.

### San Antonio, Texas (All Electric)

		<table border="1"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td>15%</td></tr> <tr><td>30%</td></tr> </table>		Energy Savings Levels		15%	30%	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Exterior Walls: Drill and Fill from Uninsulated to R-13	Infiltration: 40% Reduction	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-19 to R-38	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, low SHGC	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Ducts: Seal and Insulate to R-8	Water Heater: Install Electric Premium (0.95 EF)	Refrigerator: Replace with ENERGY STAR	Slab: Insulate Slab Edge with R-10 Rigid (2 ft)	Windows: Replace with Quadruple Pane	Air Conditioner: Replace with SEER 15
Energy Savings Levels																								
15%																								
30%																								
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)																							
8	105	X	X																					
15	215	X		X																				
22	318	X	X	X																				
31	431	X		X	X																			
36	495	X		X	X	X	X																	
38	507	X		X	X	X	X	X																
44	535	X		X	X	X	X	X	X															
44	533	X		X	X	X	X	X	X	X														
45	526	X		X	X	X		X	X	X	X													
45	519	X		X	X	X		X	X	X		X												
46	516	X		X	X			X	X	X		X	X											
46	506	X		X	X			X	X	X		X	X	X										
47	491	X		X	X			X	X	X		X	X	X	X									
48	460	X		X	X			X	X	X		X	X	X	X	X								
48	432	X		X	X			X		X		X	X	X	X	X	X							
51	-38	X		X	X			X		X		X	X	X	X	X	X	X	X					

### San Antonio, Texas (All Electric)



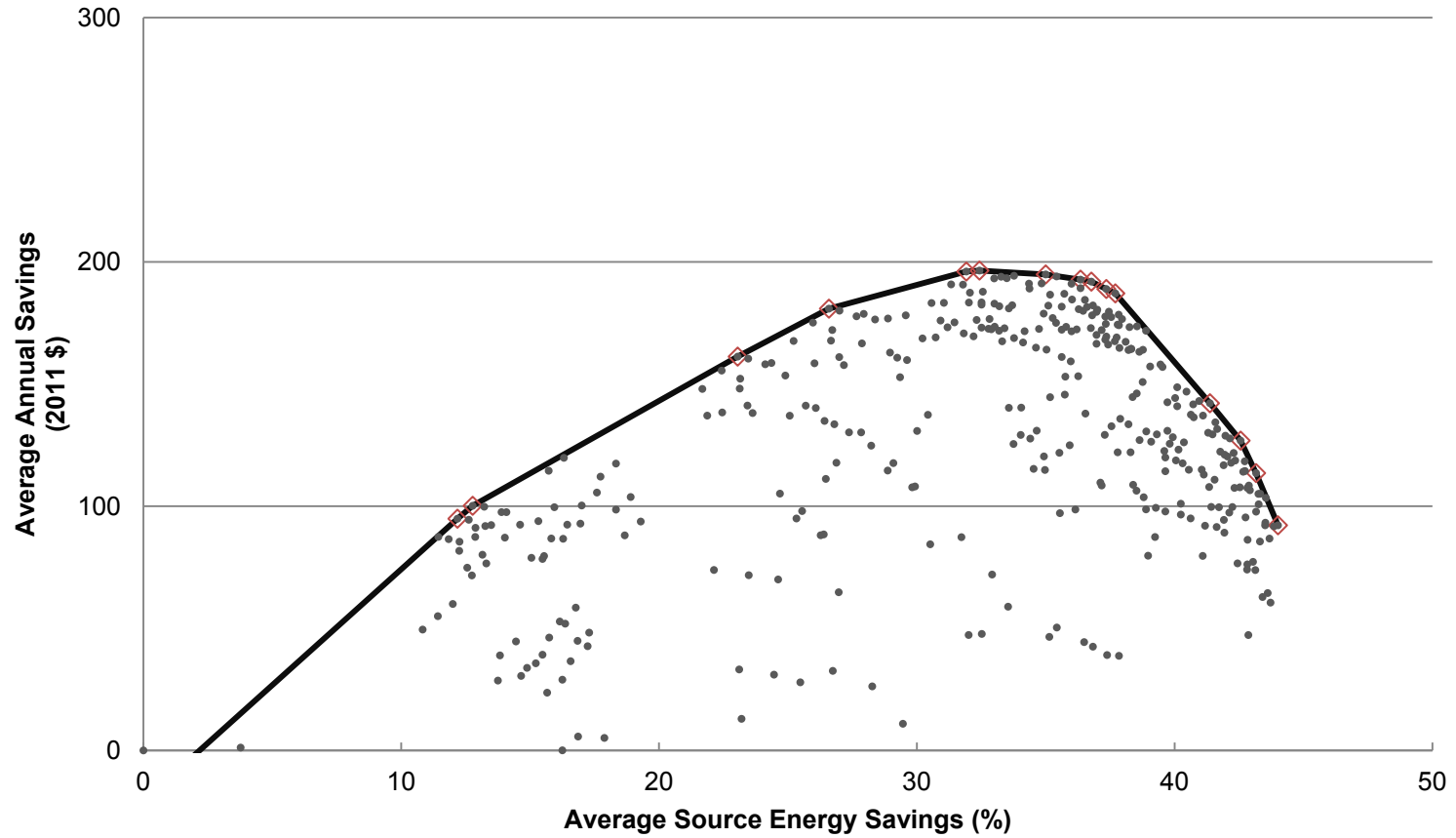
◇ - Denotes an optimal retrofit package and is included in summary table above.



Santa Barbara County, California (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #8ebf42; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>												
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Ducts: Insulate to R-6	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Water Heater: Install Gas Tankless (0.82 EF)	Ceiling: Insulate from R-11 to R-38	Ducts: Insulate to R-8	Slab: Insulate Slab Edge with R-5 Rigid (2 ft)	Clothes Washer: Replace with ENERGY STAR	Infiltration: 20% Reduction	Windows: Replace with Double Pane, Low-e, very high SHGC	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-49	Ducts: Seal and Insulate to R-8
12	95	X								X				
16	115	X	X							X				
23	161	X	X	X						X				
27	181	X	X	X	X					X				
31	191	X	X	X	X	X				X				
32	196		X	X	X	X	X			X				
35	195	X	X	X	X	X		X		X				
36	193	X	X	X	X	X		X	X	X				
37	192		X	X	X	X	X	X	X	X				
37	189	X	X	X	X	X		X	X	X				
38	187		X	X	X	X	X	X	X	X				
41	142		X	X	X	X	X	X	X	X	X			
43	127		X	X	X	X	X	X	X	X	X	X		
43	114		X	X	X		X	X	X	X	X	X	X	
44	92		X	X	X	X		X	X	X	X	X		X

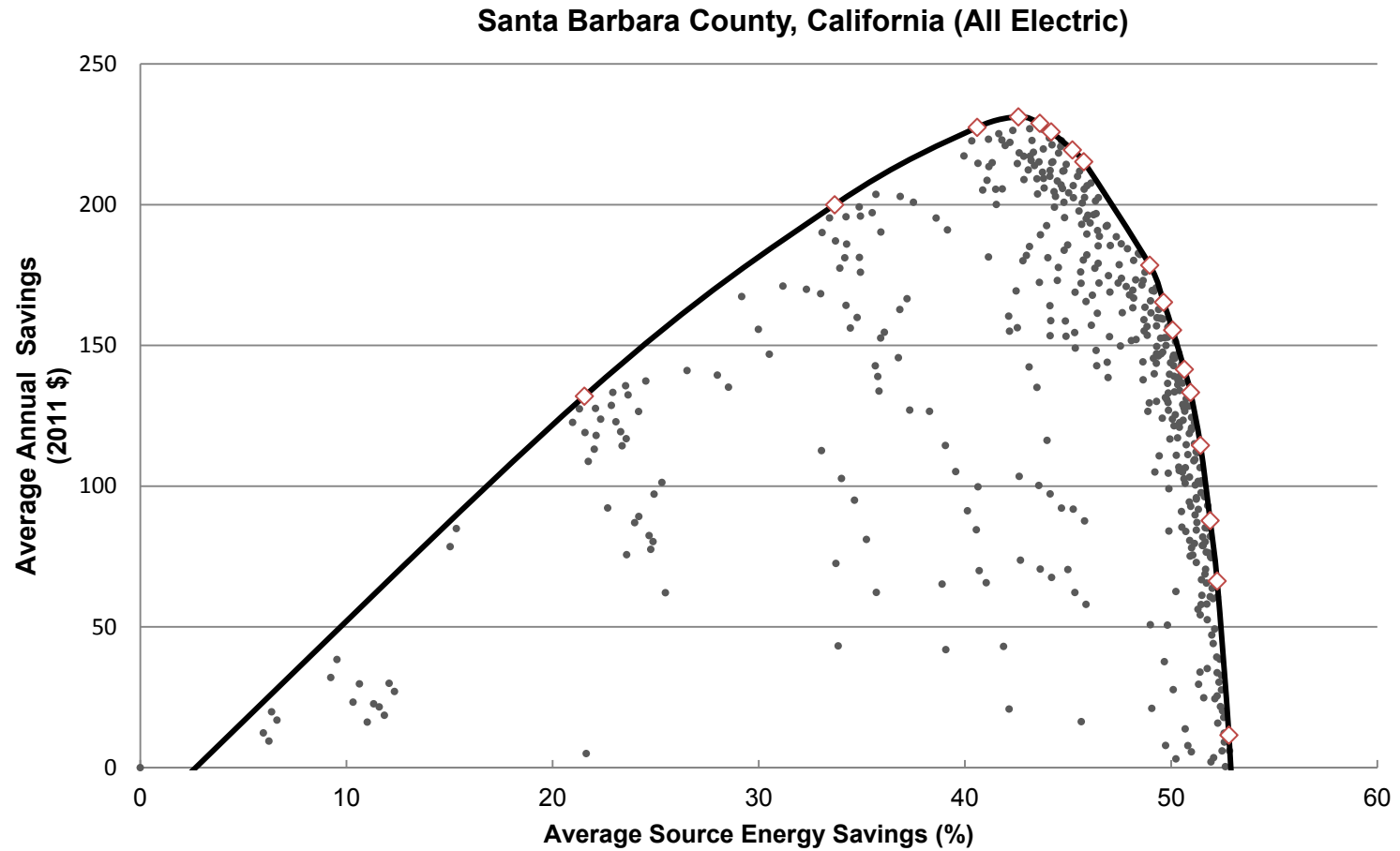
### Santa Barbara County, California (Mixed Fuel)



◇ - Denotes an optimal retrofit package and is included in summary table above.

Santa Barbara County, California (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #a52a2a;">30%</td> </tr> </table>													Energy Savings Levels		15%	30%
Energy Savings Levels																		
15%	30%																	
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Clothes Washer: Replace with ENERGY STAR	Crawlspace Wall: Insulate to R-10 Rigid	Crawlspace Wall: Insulate to R-15 Rigid	Infiltration: 20% Reduction	Hot Water Piping: Insulate to R-2	Windows: Replace with Double Pane, Low-e, very high SHGC	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Water Heater: Install Electric Premium (0.95 EF)	Crawlspace Wall: Insulate to R-20 Rigid	Ducts: Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Infiltration: 40% Reduction
15	85	X		X														
22	132	X	X															
31	171	X	X		X													
34	200	X	X	X														
41	227	X	X	X	X													
43	231	X	X	X	X	X												
44	229	X		X	X	X	X											
44	226	X		X	X	X		X										
45	219	X		X	X	X		X	X									
46	215	X		X	X	X		X	X	X								
49	178	X		X	X	X		X	X	X	X							
50	165	X		X		X		X	X	X	X	X						
50	155	X		X		X		X	X	X	X		X					
51	141	X		X		X		X	X	X	X		X	X				
51	133	X		X		X			X	X	X		X	X	X			
51	114	X		X		X			X	X	X		X	X	X			
52	88	X		X		X			X	X	X		X	X	X	X		
52	66	X		X		X			X	X	X		X	X	X	X	X	
53	12	X		X		X			X	X	X		X	X	X	X	X	X

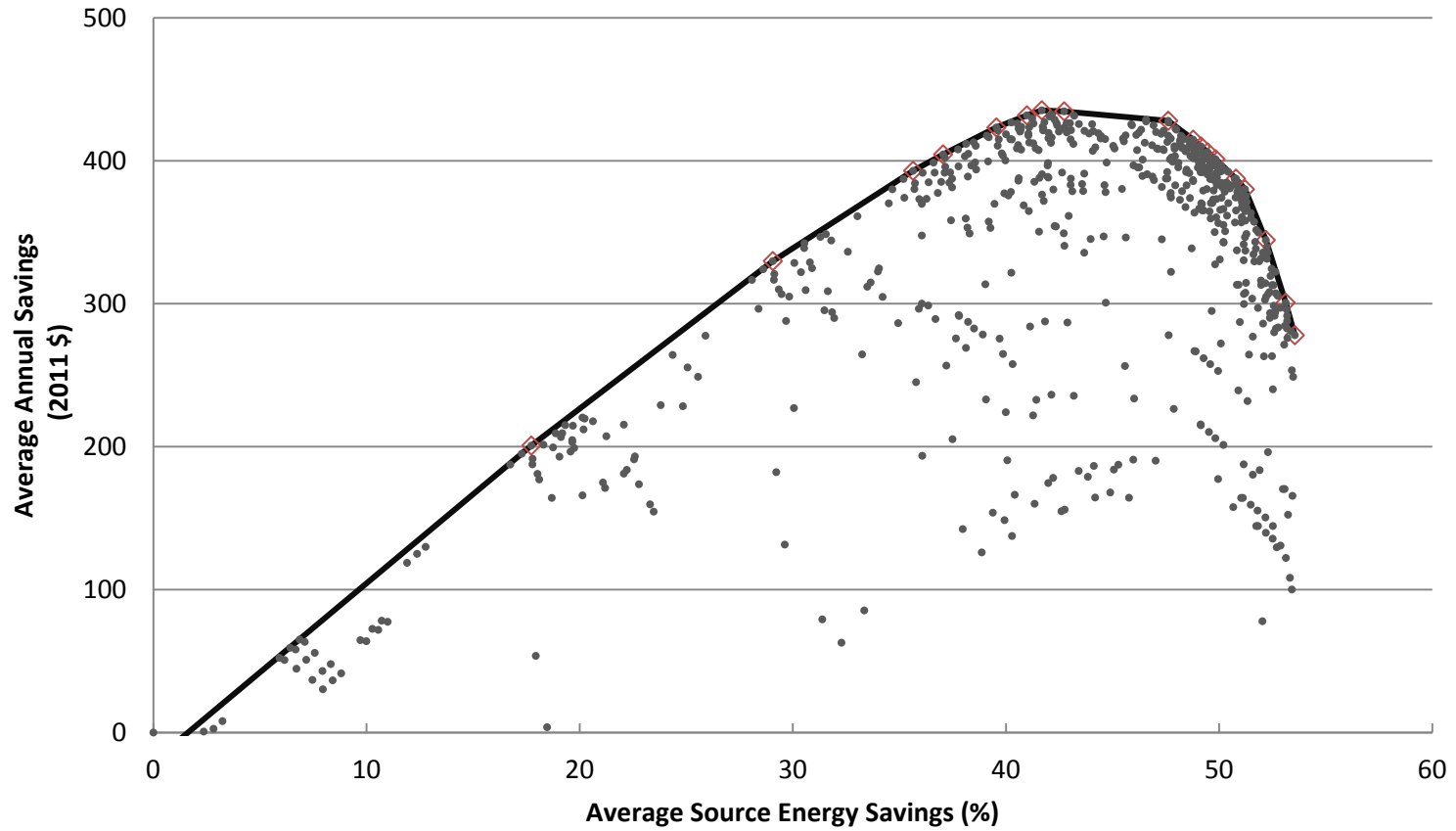


◇ - Denotes an optimal retrofit package and is included in summary table above.

Seattle, Washington (Mixed Fuel)

		<table border="1" style="width: 100%; text-align: center;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #92d050;">15%</td></tr> <tr><td style="background-color: #800000; color: white;">30%</td></tr> </table>																Energy Savings Levels		15%	30%
Energy Savings Levels																					
15%																					
30%																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Crawlspace Wall: Insulate with R-5	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Crawlspace Wall: Insulate with R-10	Water Heater: Install Gas Tankless (0.82 EF)	Infiltration: 20% Reduction	Crawlspace Wall: Insulate with R-15	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, very high SHGC	Windows: Replace with Double Pane, Low-e, high SHGC	Ducts: Insulate to R-6	Crawlspace Wall: Insulate with R-20	Ceiling: Insulate from R-11 to R-49	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-60	Windows: Replace with Quad Pane	Infiltration: 40% Reduction	Refrigerator: Replace with ENERGY STAR	
16	187	X	X																		
30	330	X	X	X																	
36	393	X	X	X	X																
37	404		X	X	X	X															
40	423		X	X	X	X	X														
41	432		X	X	X	X	X	X													
42	435		X	X	X		X	X	X												
43	435		X	X	X		X	X	X	X											
48	428		X	X	X		X	X	X	X	X										
49	415		X	X	X		X	X	X	X			X	X							
49	410		X	X	X		X	X		X			X	X	X						
49	406		X	X			X	X	X	X			X	X		X					
50	401		X	X			X	X		X			X	X	X						
51	387		X	X			X	X		X			X	X	X	X					
51	380		X	X			X	X		X			X	X	X	X	X				
52	345		X	X			X	X		X			X	X		X	X	X			
53	301		X	X			X	X		X			X	X		X	X	X	X		
54	278		X	X			X	X		X			X	X		X	X	X	X	X	X

### Seattle, Washington (Mixed Fuel)

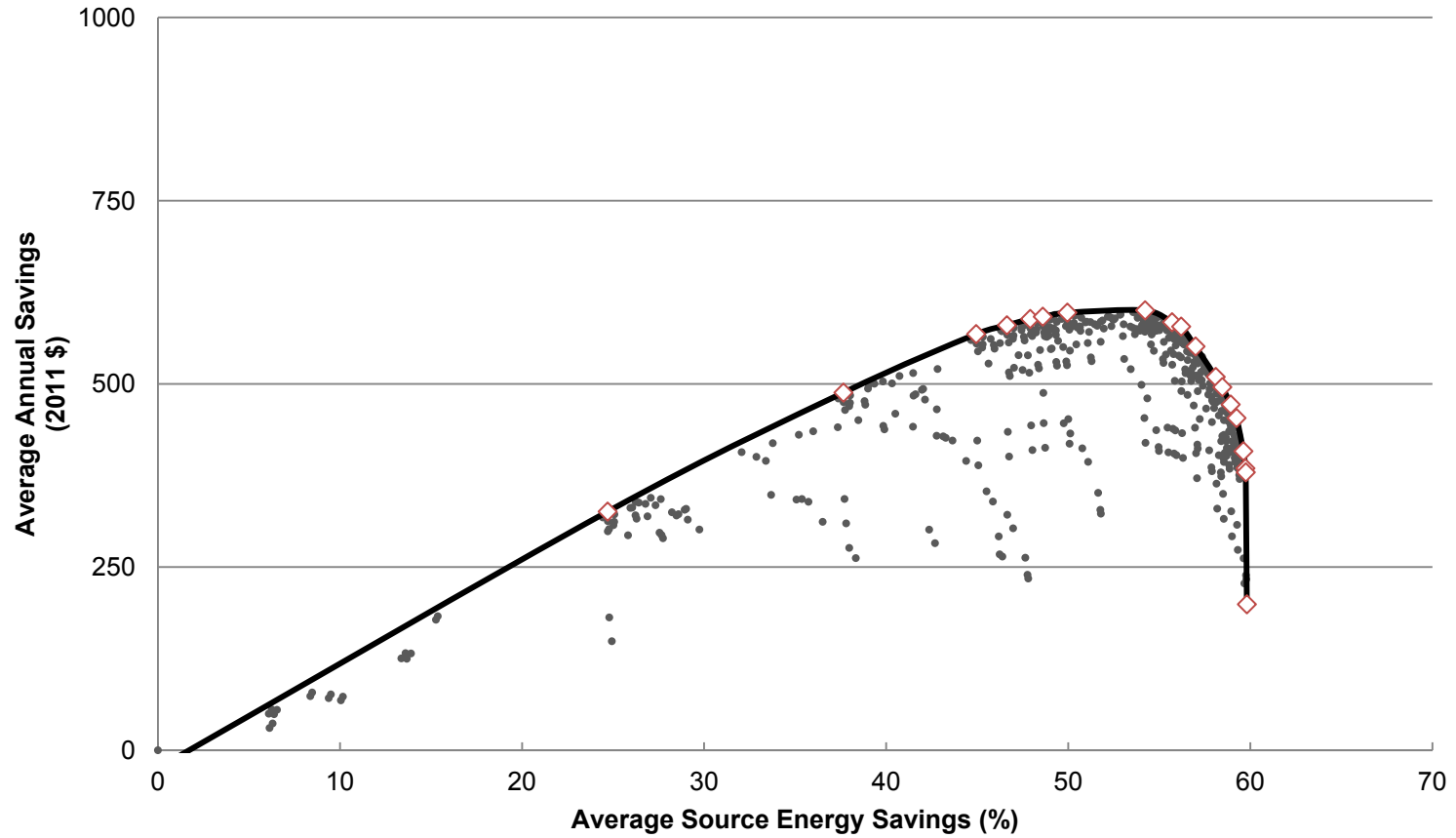


◇ - Denotes an optimal retrofit package and is included in summary table above.

Seattle, Washington (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Crawlspace Wall: Insulate to R-15 Rigid	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, very high SHGC	Ceiling: Insulate from R-19 to R-49	Crawlspace Wall: Insulate to R-20 Rigid	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-60	Windows: Replace with Quadruple Pane	Infiltration: 40% Reduction	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	183	X		X																			
25	326	X	X																				
31	406	X	X		X																		
38	488	X	X	X																			
45	568	X	X	X	X																		
47	580	X	X	X	X	X																	
48	589	X		X	X	X	X																
49	592	X		X	X	X		X															
50	597	X		X	X	X		X	X														
54	600	X		X	X	X		X	X	X													
56	584	X		X		X			X	X	X		X										
56	578	X		X		X			X	X		X	X	X									
57	551	X		X		X			X			X	X	X	X								
58	509	X		X					X			X	X	X	X	X							
58	496	X		X					X			X	X	X	X	X	X						
59	472	X		X		X			X			X	X	X	X	X	X	X					
59	453	X		X		X			X			X	X	X	X	X	X	X					
60	408	X		X					X			X	X	X	X	X	X		X				
60	385	X		X					X			X	X	X	X	X	X		X	X			
60	379	X		X					X			X	X	X	X	X	X			X	X		
60	199	X		X					X			X	X	X	X	X	X			X	X	X	

### Seattle, Washington (All Electric)



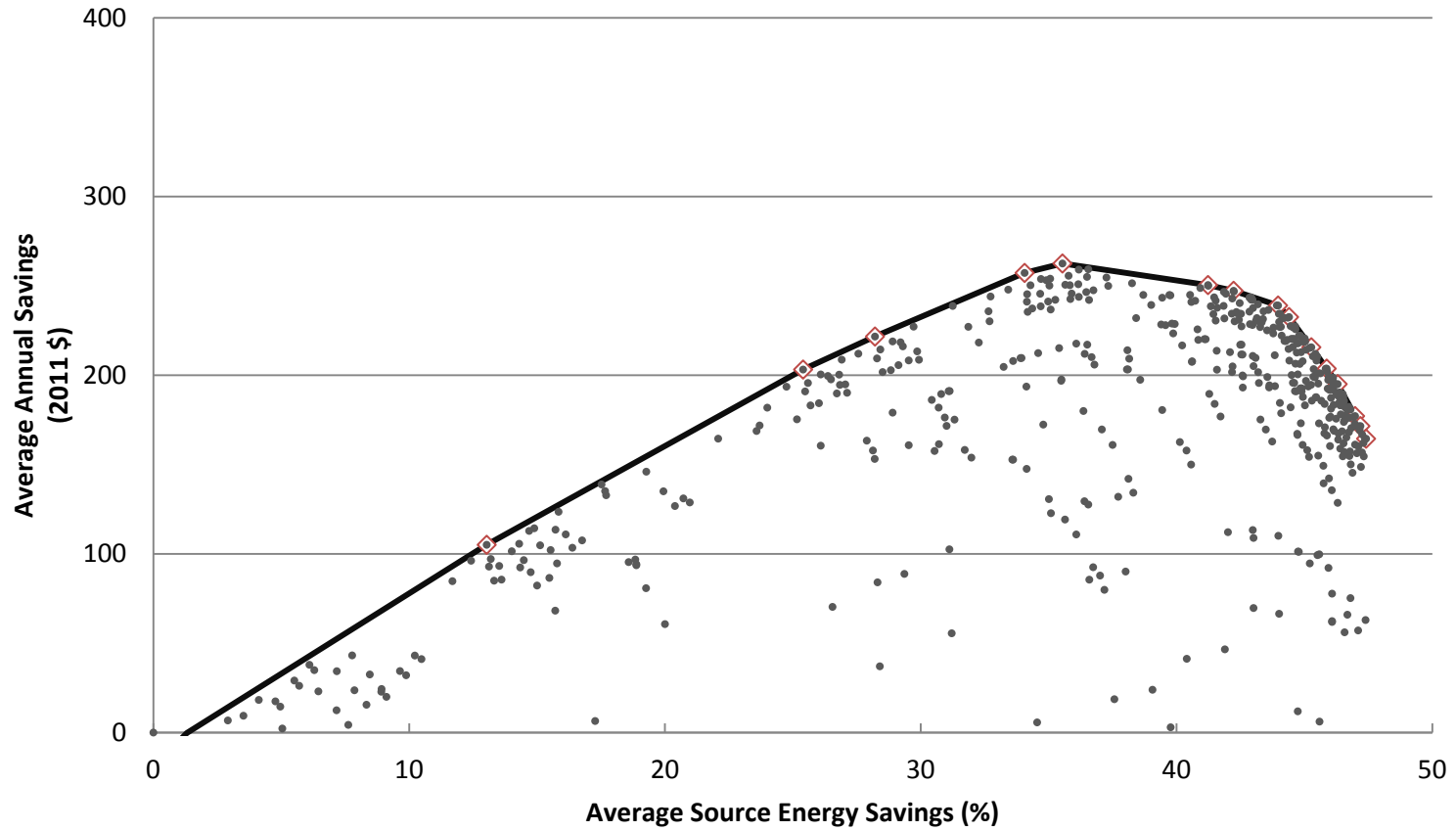
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### Southeast Community Consortium (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Crawlspace Wall: Insulate with R-5	Water Heater: Install Gas Tankless (0.82 EF)	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Windows: Replace with Double Pane, Low-e, standard SHGC	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, low SHGC	Ducts: Insulate to R-6	Crawlspace Wall: Insulate with R-10	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Refrigerator: Replace with ENERGY STAR	Crawlspace Wall: Insulate with R-15	Hot Water Pipes: Insulate from Uninsulated to R-2
16	123	X	X															
25	203	X	X	X														
30	227	X	X	X	X													
34	257	X	X	X	X	X												
36	263	X	X	X	X	X	X											
41	250	X	X	X	X	X	X	X										
42	247	X	X	X	X	X	X	X	X									
44	239	X	X	X	X	X	X		X	X	X							
44	233	X	X		X	X	X		X	X	X	X						
45	216	X	X		X	X	X		X	X	X	X	X					
46	204	X	X		X		X		X	X	X	X	X	X				
46	195	X	X		X		X		X	X	X	X	X		X			
47	177	X	X		X		X		X	X	X	X	X		X	X		
47	172	X	X		X		X		X	X	X		X		X	X	X	
47	164	X	X		X		X		X	X	X		X		X	X	X	X

### Southeast Community Consortium (Mixed Fuel)

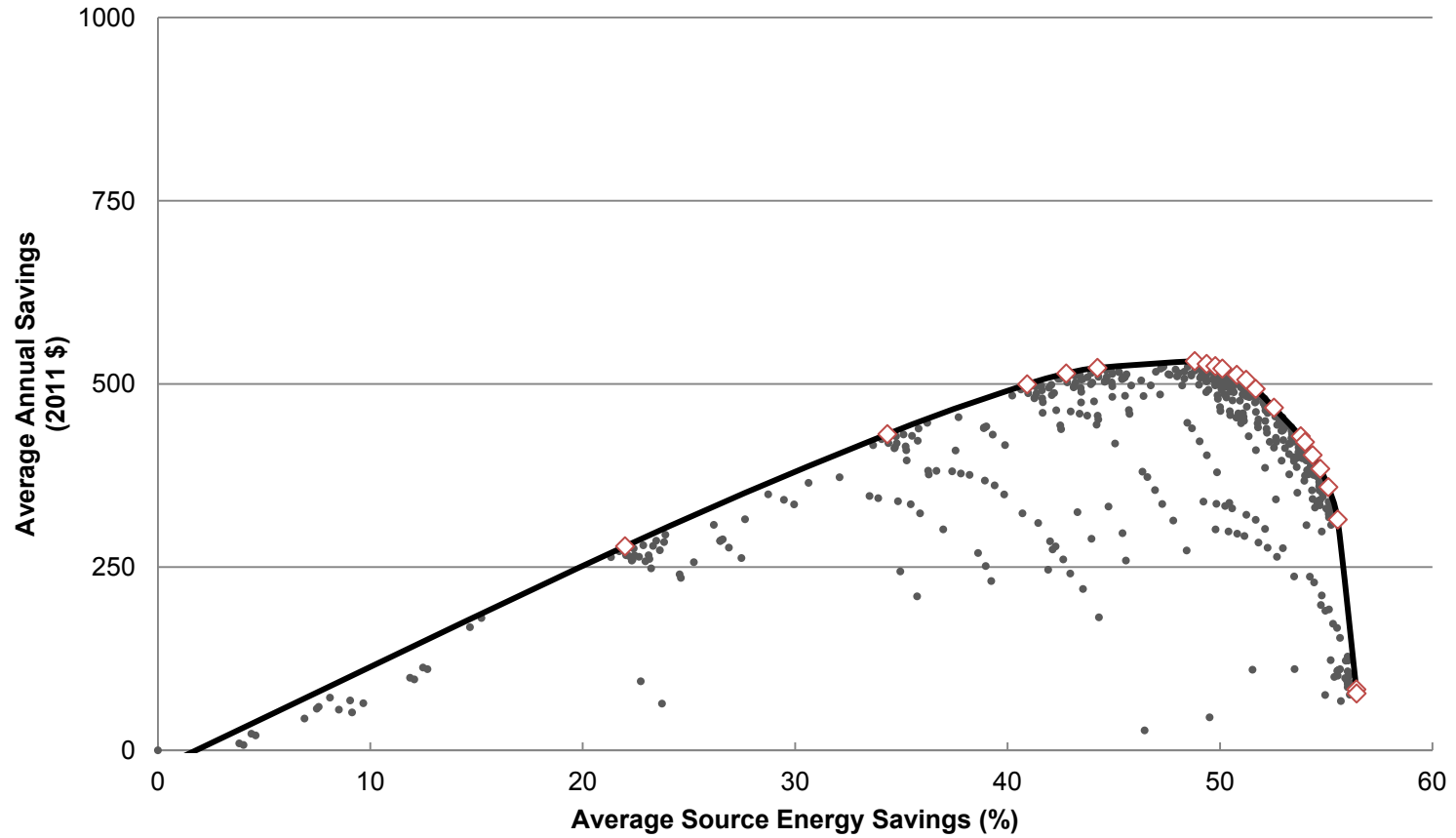


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### Southeast Community Consortium (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>																Energy Savings Levels		15%	30%		
Energy Savings Levels																							
15%	30%																						
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate to R-10 Rigid	Hot Water Piping: Insulate to R-2	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Water Heater: Install Electric Premium (0.95 EF)	Windows: Replace with Quadruple Pane	Infiltration: 40% Reduction	Crawlspace Wall: Insulate to R-20 Rigid	Refrigerator: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Air Conditioner: Replace with SEER 15	Ducts: Seal and Insulate to R-8	
15	181	X		X																			
22	278	X	X																				
30	365	X	X		X																		
34	431	X	X	X																			
41	499	X	X	X	X																		
43	514	X	X	X	X	X																	
44	522	X	X	X	X	X	X																
49	531	X	X	X	X	X	X	X															
49	527	X		X	X	X	X	X	X														
50	524	X		X	X	X	X	X	X	X													
50	521	X		X	X	X	X	X		X	X												
51	512	X		X		X	X	X		X	X	X											
51	506	X		X		X	X	X		X	X		X										
52	493	X		X		X	X	X		X	X		X	X									
53	468	X		X		X	X	X		X	X		X	X	X								
54	429	X		X			X			X	X		X	X	X	X							
54	421	X		X			X			X			X	X	X	X	X						
54	403	X		X			X			X			X	X	X	X	X						
55	384	X		X			X			X			X	X	X	X	X	X					
55	359	X		X		X	X			X			X	X	X	X	X	X	X				
56	315	X		X			X			X			X	X	X	X	X	X	X		X		
56	83	X		X			X			X			X	X	X	X	X	X	X		X	X	
56	78	X		X			X			X			X	X	X	X	X	X	X		X	X	X

### Southeast Community Consortium (All Electric)

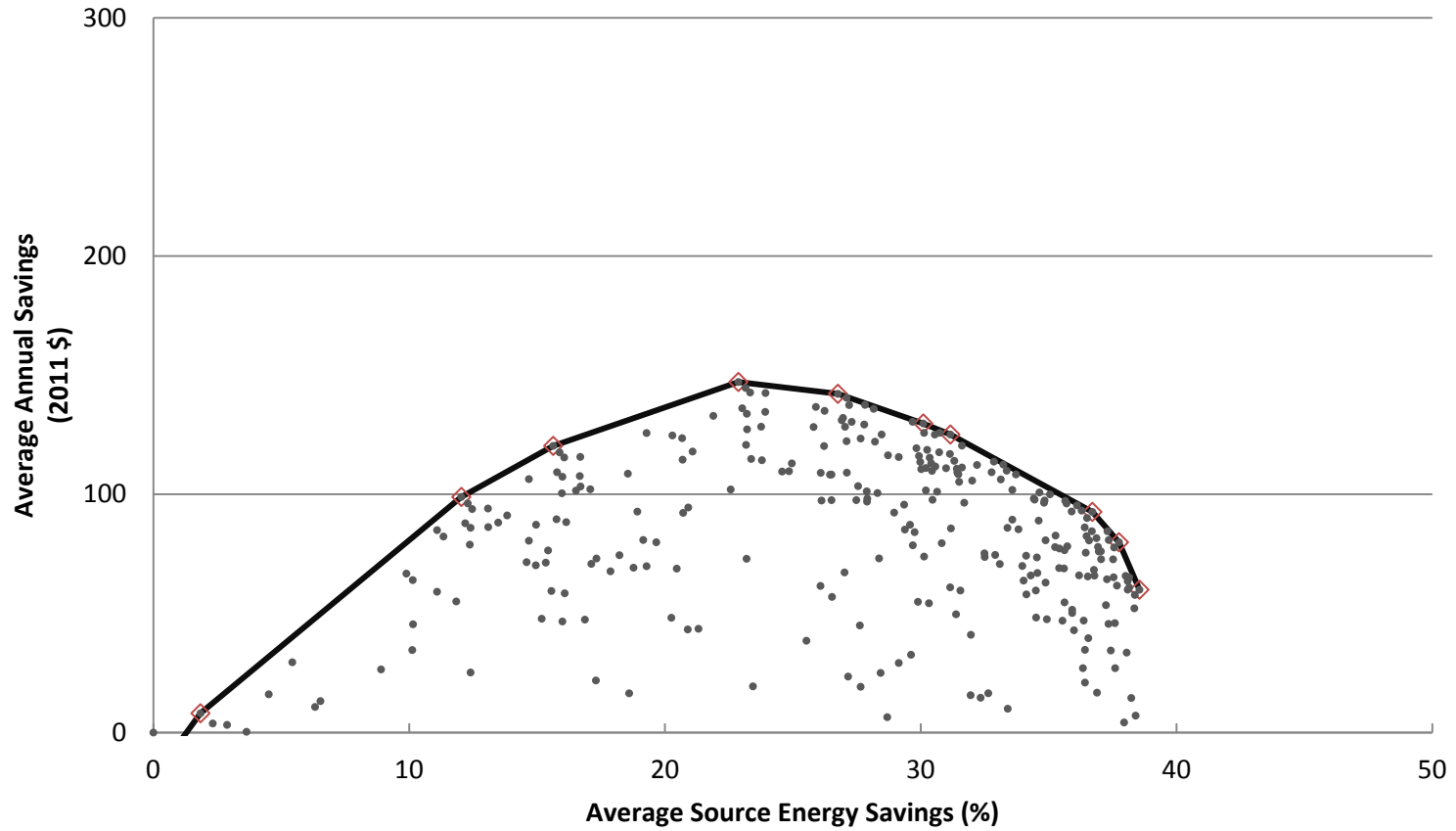


◇ - Denotes an optimal retrofit package and is included in summary table above.

St. Lucie, Florida (Mixed Fuel)

		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #6aa84f; color: white;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>											Energy Savings Levels		15%	30%
Energy Savings Levels																
15%	30%															
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Ducts: Insulate to R-6	Water Heater: Install Gas Tankless (0.82 EF)	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-11 to R-38	Ducts: Seal and Insulate to R-8	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, low SHGC	Hot Water Pipes: Insulate from Uninsulated to R-2	Refrigerator: Replace with ENERGY STAR	Water Heater: Install Gas Tankless Condensing (0.96 EF)			
2	8	X														
12	99	X	X													
16	120	X	X	X												
23	147	X	X	X	X											
27	142	X	X	X	X	X										
30	130	X		X	X		X	X								
31	125	X		X	X		X	X	X							
37	93	X		X	X		X	X	X	X	X					
38	80	X		X	X		X	X	X	X	X	X				
39	60	X		X	X		X	X	X	X	X	X	X			

### St. Lucie, Florida (Mixed Fuel)

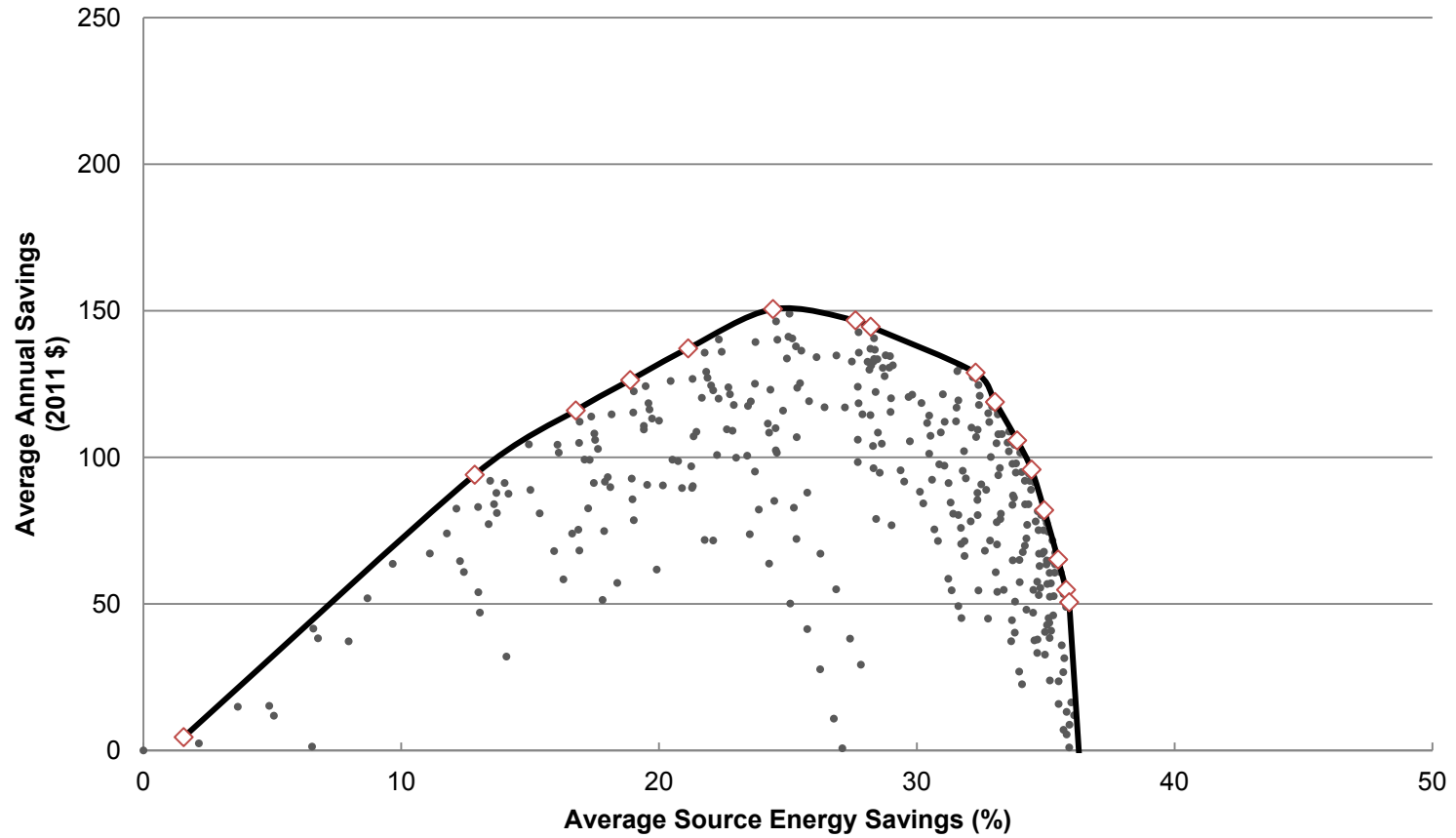


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St. Lucie, Florida (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>													
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ducts: Insulate to R-6	Clothes Washer: Replace with ENERGY STAR	Ducts: Seal to 15 Leakage	Ducts: Seal and Insulate to R-6	Ceiling: Insulate from R-19 to R-38	Hot Water Piping: Insulate to R-2	Windows: Replace with Double Pane, Low-e, low SHGC	Water Heater: Install Electric Premium (0.95 EF)	Refrigerator: Replace with ENERGY STAR	Ceiling: Insulate from R-19 to R-49	Ceiling: Insulate from R-19 to R-60	Ducts: Seal and Insulate to R-8
2	5	X													
15	104	X	X												
17	116	X	X	X											
19	126	X	X	X	X										
21	137	X	X		X	X									
24	151	X	X		X		X								
31	129	X	X		X		X	X							
33	119	X	X		X		X	X	X	X	X				
34	106	X	X		X		X	X	X	X	X	X			
35	82	X	X		X		X		X	X	X	X	X		
36	55	X	X		X		X		X	X	X	X		X	
36	51	X	X		X				X	X	X	X		X	X

### St. Lucie, Florida (All Electric)



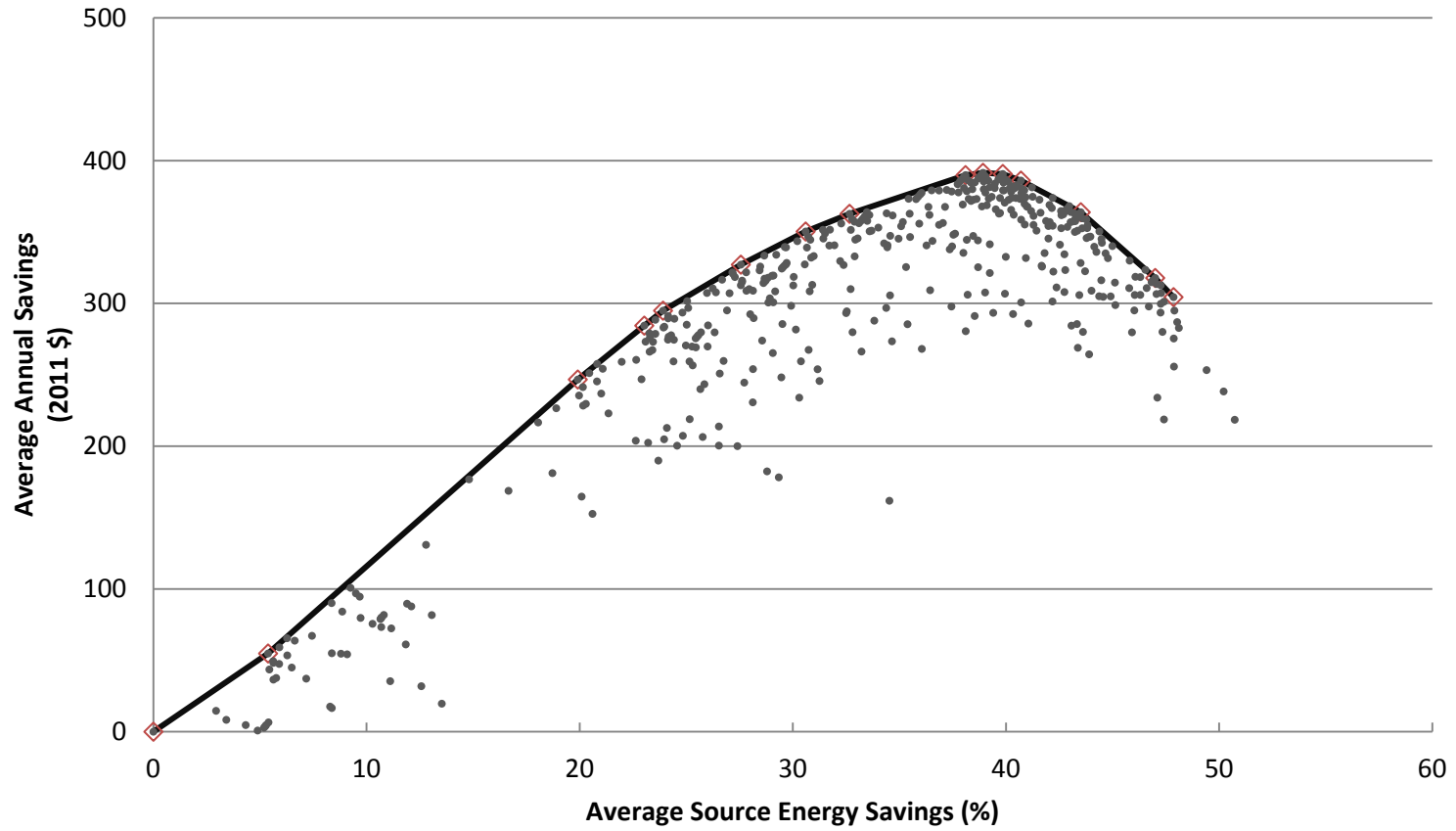
◇ - Denotes an optimal retrofit package and is included in summary table above.



Toledo, Ohio (Mixed Fuel)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="background-color: #92d050;">15%</td> <td style="background-color: #800000; color: white;">30%</td> </tr> </table>															Energy Savings Levels		15%	30%
Energy Savings Levels																				
15%	30%																			
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5	55	X	X																	
20	247	X	X	X																
23	284	X	X	X	X															
28	327	X	X	X	X	X														
31	350	X	X	X	X	X	X													
33	363	X	X	X	X	X	X	X												
38	390	X	X	X	X	X	X	X	X											
39	391	X		X	X	X	X	X	X	X										
40	391	X		X	X	X	X	X	X	X	X									
41	386	X		X	X		X	X	X	X	X	X								
44	364	X		X	X		X	X	X	X	X		X	X						
47	318	X		X	X		X	X	X	X	X		X	X	X					
48	304	X		X	X		X	X	X	X	X		X	X	X	X				

### Toledo, Ohio (Mixed Fuel)

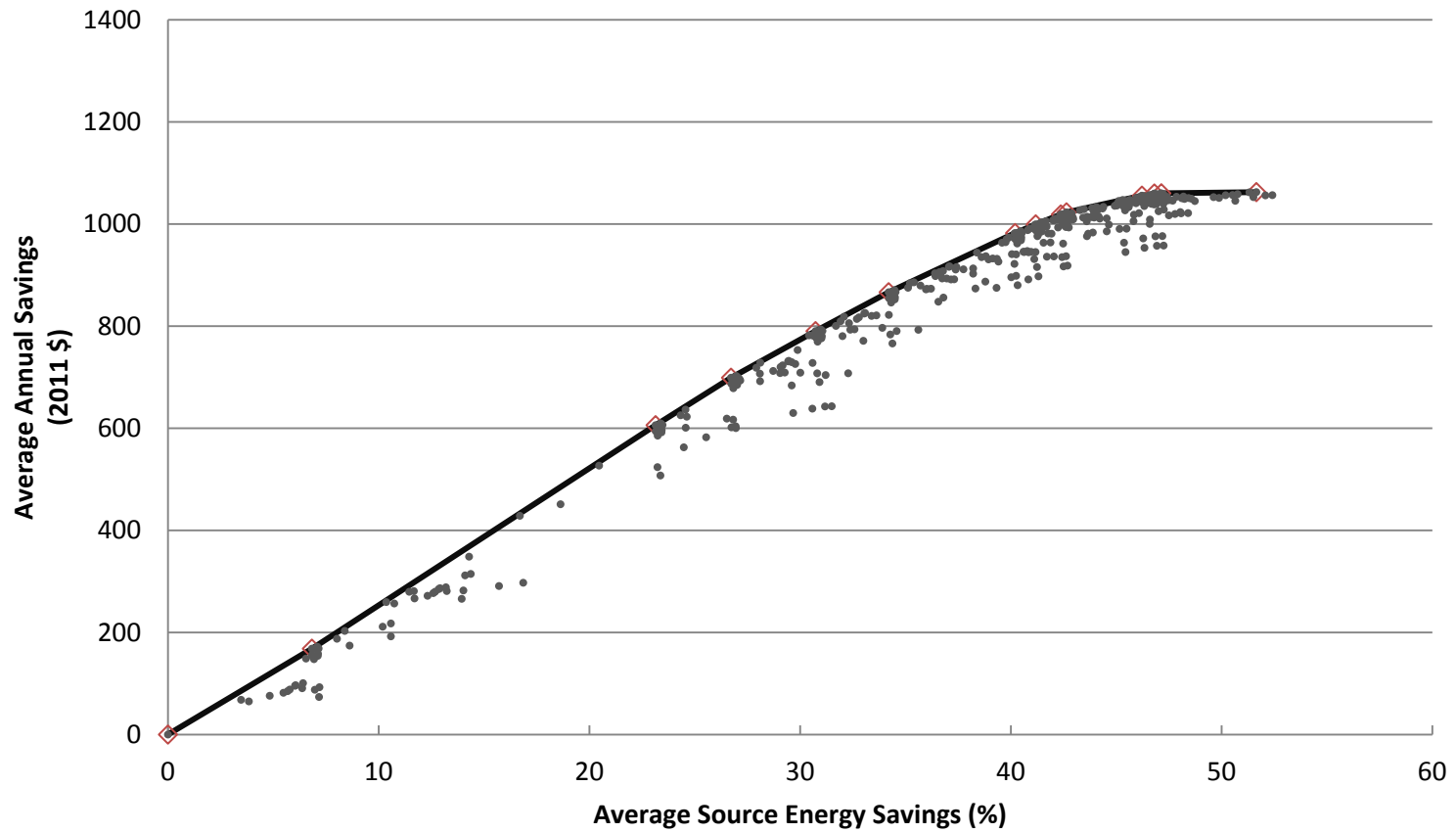


◇ - Denotes an optimal retrofit package and is included in summary table above.

Toledo, Ohio (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr> <th colspan="2">Energy Savings Levels</th> </tr> <tr> <td style="width: 50%; background-color: #92d050;">15%</td> <td style="width: 50%; background-color: #a52a2a;">30%</td> </tr> </table>														Energy Savings Levels		15%	30%
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7	168	X	X																
15	387	X		X															
23	606	X	X	X															
27	699	X	X	X	X														
31	790	X	X	X	X	X													
34	866	X	X	X	X	X	X												
40	982	X	X	X	X	X	X	X											
41	999	X		X	X	X	X	X	X										
42	1019	X		X	X	X	X	X	X	X									
46	1056	X		X	X		X	X	X	X	X	X							
47	1060	X		X	X		X	X	X	X		X	X						
47	1060	X		X	X		X	X	X	X		X	X	X					
52	1062	X		X	X		X	X		X		X	X	X	X				

### Toledo, Ohio (All Electric)

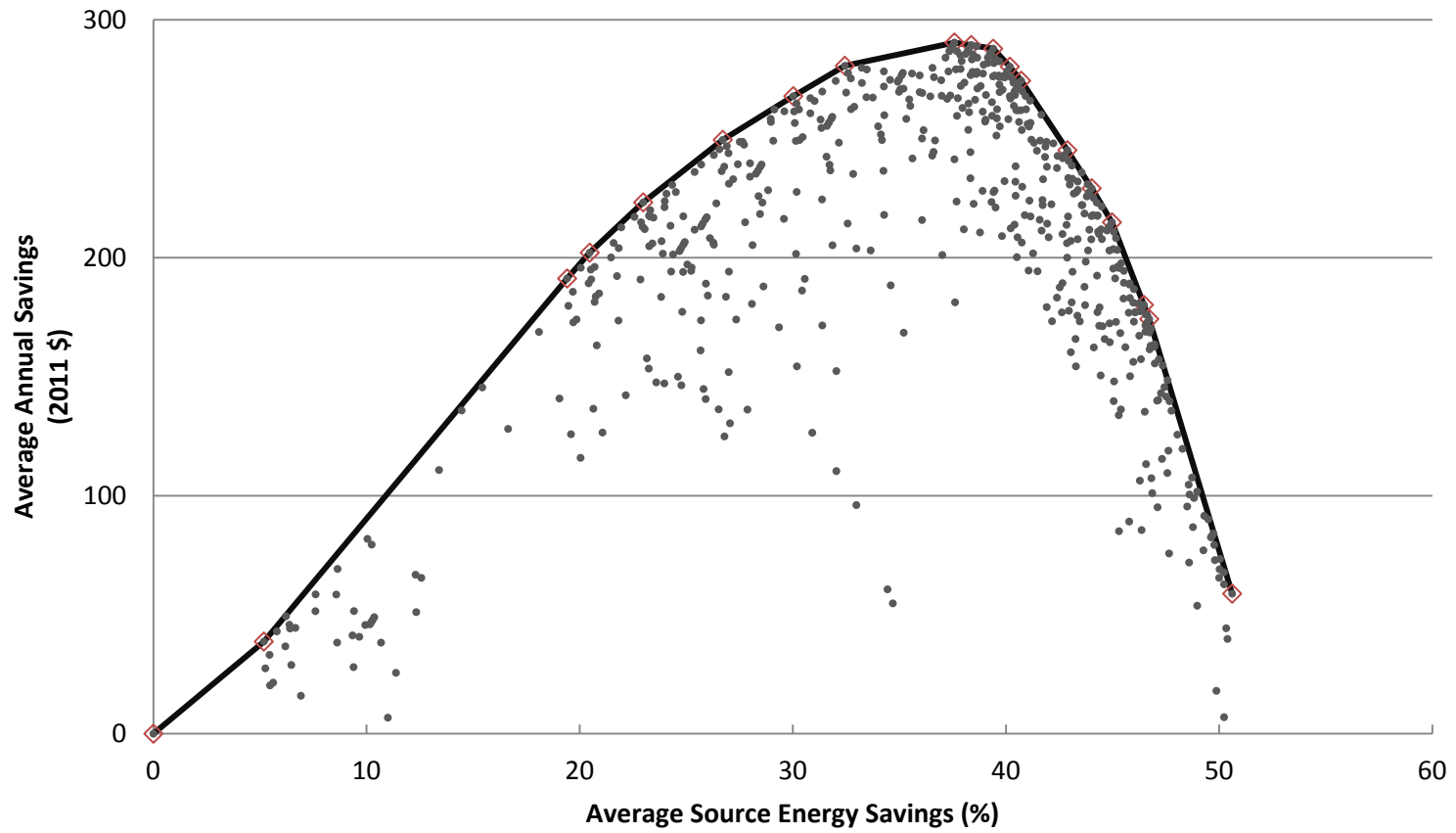


◇ - Denotes an optimal retrofit package and is included in summary table above.

### Uniontown, Pennsylvania (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>																		
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ducts: Insulate to R-6	Ceiling: Insulate to R-38	Hot Water Heater: Replace with Gas Tankless	Windows: Replace with Double Pane, Low-e, high SHGC	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Air Sealing: 40% Reduction in Air Leakage	Hot Water Piping: Insulate with R-2	Basement Wall: Insulate to R-15 Rigid, 8 feet height	Windows: Replace with Quadruple Pane	
5	39	X	X																	
19	191	X	X	X																
23	223	X	X	X	X															
27	250	X	X	X	X	X														
30	268	X	X	X	X	X	X													
32	281	X	X	X	X	X	X	X												
38	290	X	X	X	X	X	X	X	X											
38	289	X		X	X	X	X	X	X	X										
39	288	X		X	X	X	X	X	X	X	X									
40	280	X		X	X	X		X	X	X	X	X								
41	274	X		X	X	X		X	X	X	X	X	X							
43	245	X		X	X	X	X	X	X	X	X			X						
44	229	X		X	X	X		X	X	X	X		X	X						
45	215	X		X	X	X		X	X	X	X		X	X	X					
46	180	X		X	X	X		X	X	X	X		X	X	X	X				
47	174	X		X	X	X		X	X	X	X		X	X	X	X	X			
51	59	X		X	X	X		X			X		X	X	X	X	X	X	X	X

### Uniontown, Pennsylvania (Mixed Fuel)

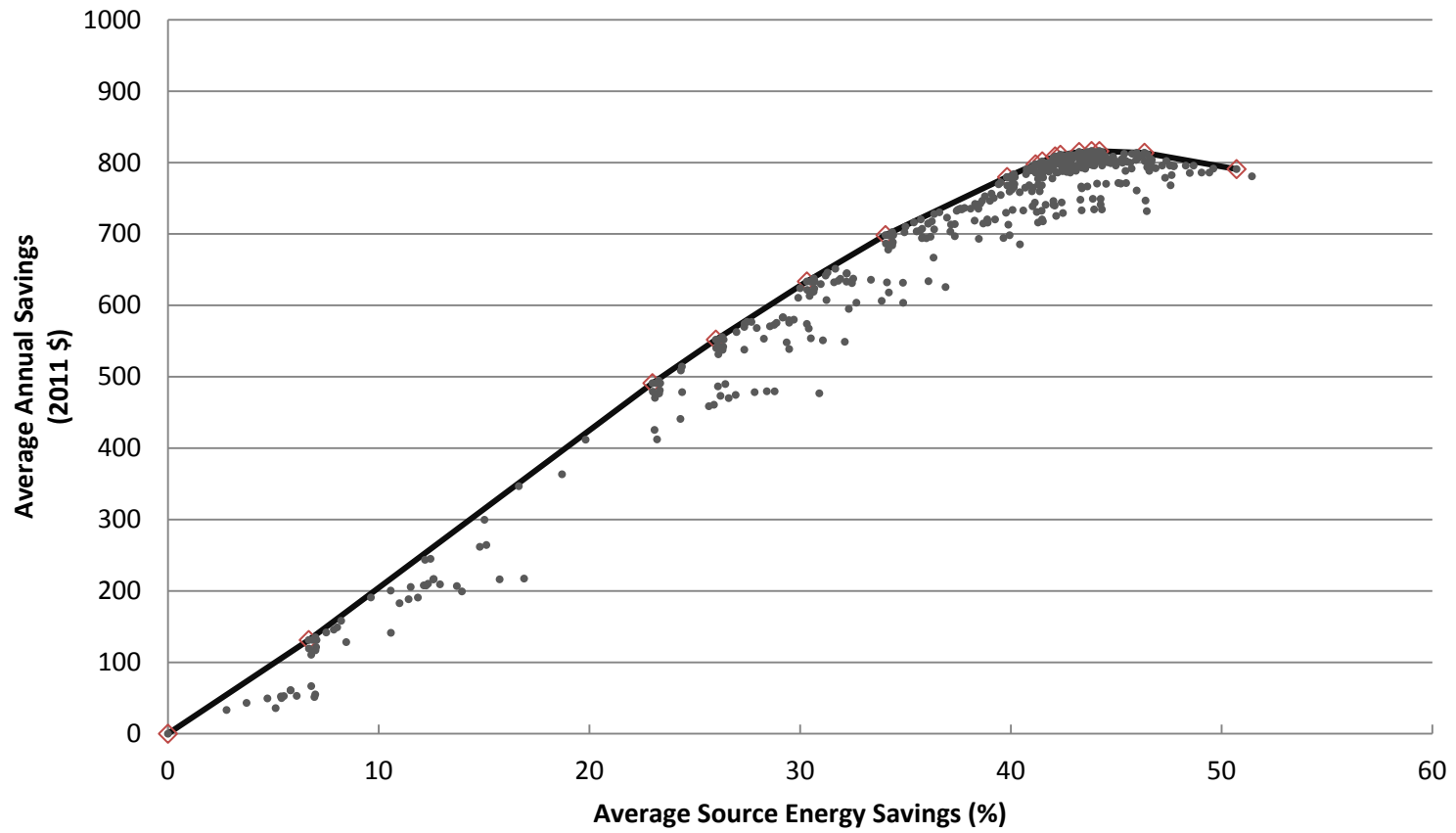


◇ - Denotes an optimal retrofit package and is included in summary table above.

Uniontown, Pennsylvania (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div> <div style="background-color: #a52a2a; color: white; padding: 2px; text-align: center;">30%</div> </div>													
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Ducts: Insulate to R-6	Ceiling: Insulate to R-38	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with EnergyStar	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Ceiling: Insulate to R-49	Ceiling: Insulate to R-60	Hot Water Piping: Insulate with R-2	Air Sealing: 40% Reduction in Air Leakage	Basement Wall: Insulate to R-15 Rigid, 8 feet height
7	131	X	X												
15	311	X		X											
23	491	X	X	X											
26	552	X	X	X	X										
30	633	X	X	X	X	X									
34	698	X	X	X	X	X	X								
40	780	X	X	X	X	X	X	X							
41	798	X	X	X	X	X	X	X	X						
42	809	X		X	X	X	X	X	X	X					
43	815	X		X	X	X		X	X	X	X				
44	816	X		X	X	X		X	X	X		X			
44	816	X		X	X	X		X	X	X		X	X		
46	814	X		X	X	X		X	X	X		X	X	X	
51	791	X		X	X	X		X	X			X	X	X	X

### Uniontown, Pennsylvania (All Electric)

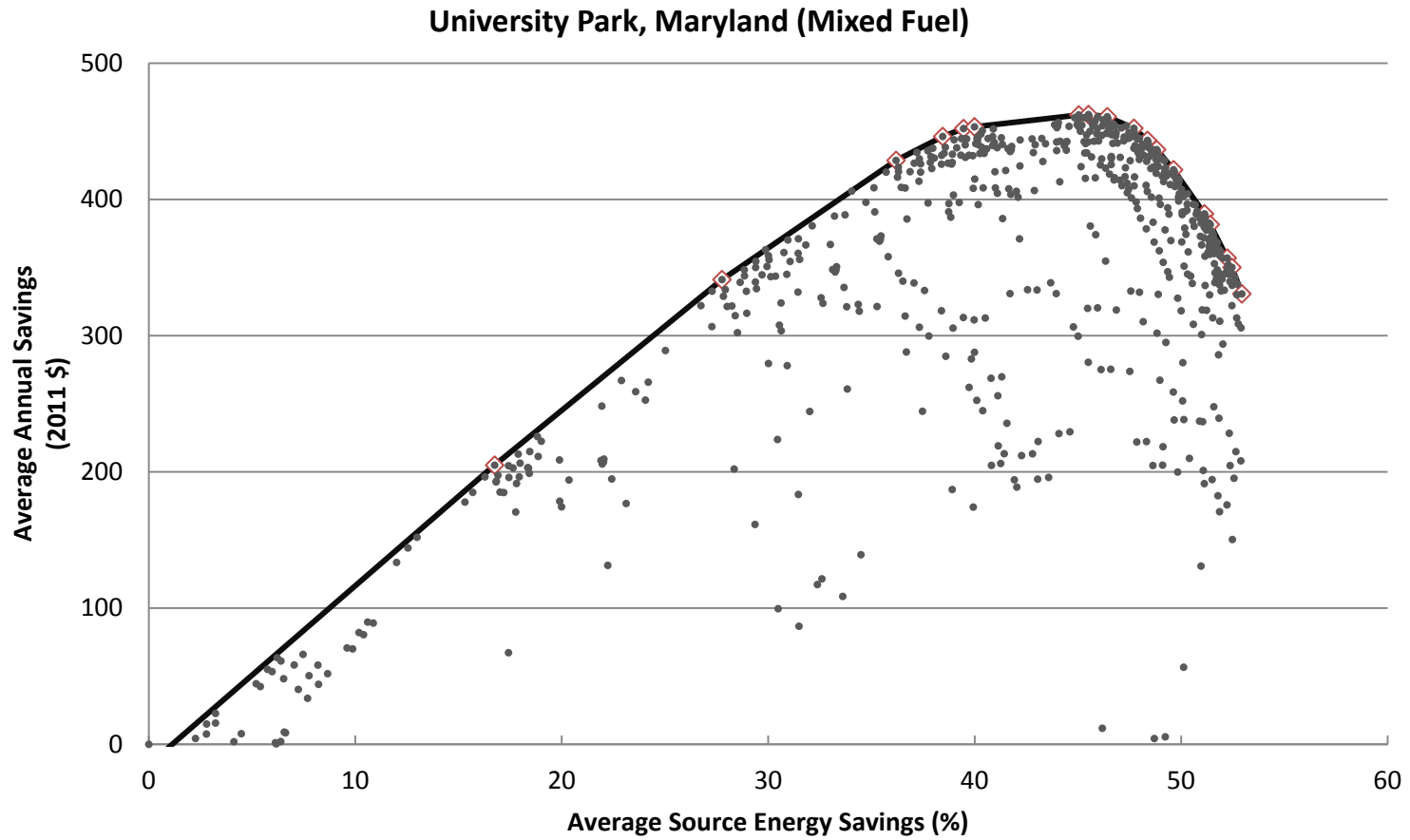


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### University Park, Maryland (Mixed Fuel)

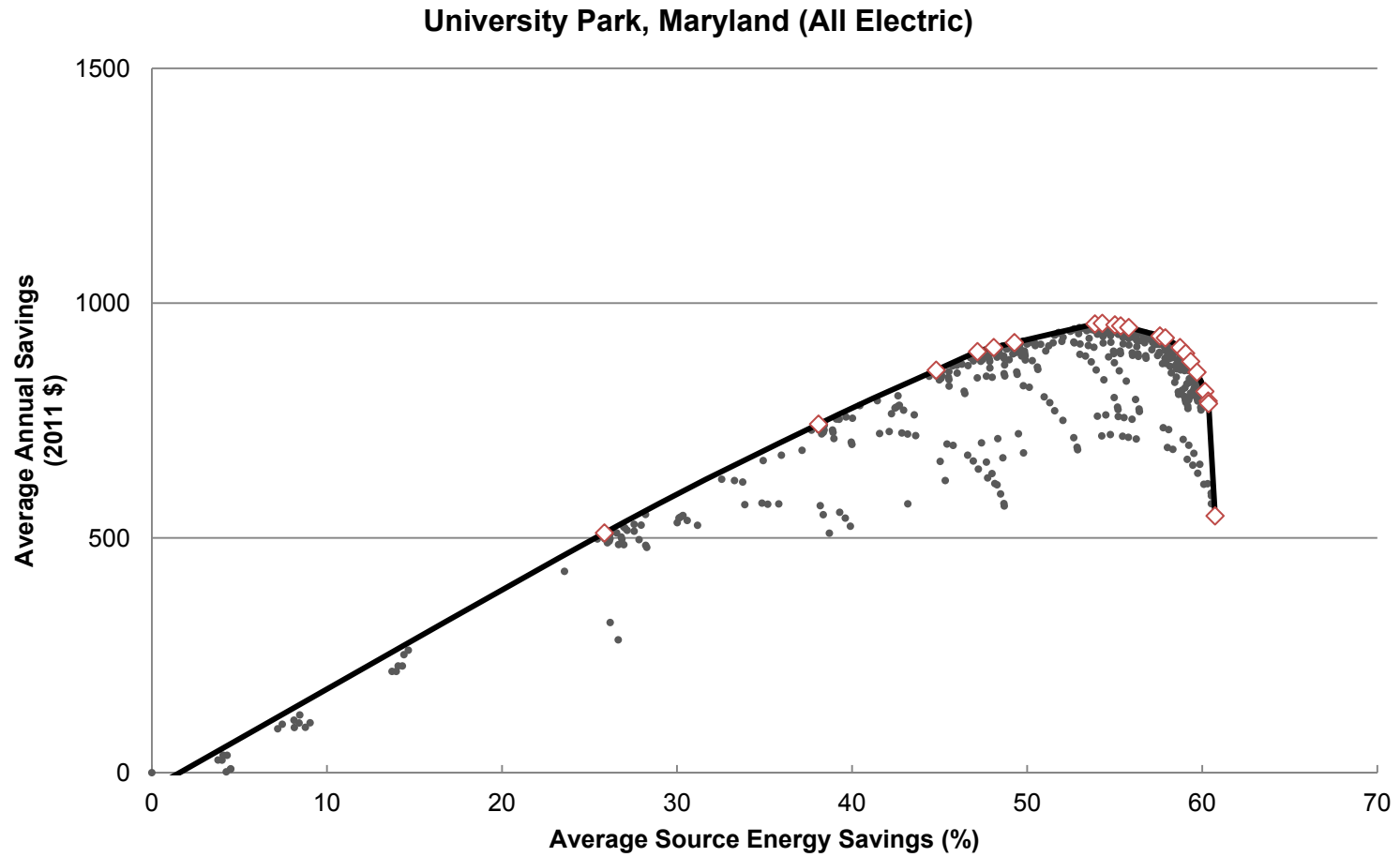
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <span style="background-color: #6aa84f; color: white; padding: 2px;">15%</span>  <span style="background-color: #800000; color: white; padding: 2px;">30%</span> </div>		Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate with R-5	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-11 to R-38	Infiltration: 20% Reduction	Water Heater: Install Gas Tankless (0.82 EF)	Crawlspace Wall: Insulate with R-10	Crawlspace Wall: Insulate with R-15	Windows: Replace with Double Pane, Low-e, high SHGC	Clothes Washer: Replace with ENERGY STAR	Ducts: Insulate to R-6	Ceiling: Insulate from R-11 to R-49	Ceiling: Insulate from R-11 to R-60	Water Heater: Install Gas Tankless Condensing (0.96 EF)	Infiltration: 40% Reduction	Crawlspace Wall: Insulate with R-20	Windows: Replace with Double Pane, Low-e, standard SHGC	Windows: Replace with Quad Pane	Refrigerator: Replace with ENERGY STAR
15	178	X	X																			
30	356	X	X	X																		
36	429	X	X	X	X	X	X															
38	446	X	X	X	X	X	X	X														
39	452	X		X	X	X	X	X	X													
40	453	X		X	X	X	X	X		X												
45	462	X		X	X	X	X	X	X		X											
46	462	X		X	X	X	X	X		X	X											
46	461	X		X	X	X	X	X		X	X	X										
48	452	X		X	X	X	X	X		X	X	X	X									
48	443	X		X		X	X	X		X	X	X	X	X								
49	437	X		X		X	X	X		X	X	X	X	X		X						
50	422	X		X		X	X	X		X	X	X	X	X		X	X					
51	389	X		X		X	X	X		X	X	X	X	X		X	X	X				
51	382	X		X		X	X	X				X	X		X	X	X	X	X	X		
52	357	X		X		X	X	X		X		X	X		X	X	X	X	X		X	
52	350	X		X		X	X	X				X	X		X	X	X	X	X		X	
53	331	X		X		X	X	X				X	X		X	X	X	X	X		X	X



◇ - Denotes an optimal retrofit package and is included in summary table above.

### University Park, Maryland (All Electric)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #92d050; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #a52a2a; padding: 2px; text-align: center;">30%</div> </div>																					
Average Source Energy Savings (%)	Average Annual Savings (2011 \$)	Lighting: Replace 60% of Bulbs with CFL	Crawlspace Wall: Insulate to R-5 Rigid	Exterior Walls: Drill and Fill from Uninsulated to R-13	Ceiling: Insulate from R-19 to R-38	Infiltration: 20% Reduction	Crawlspace Wall: Insulate to R-10 Rigid	Clothes Washer: Replace with ENERGY STAR	Windows: Replace with Double Pane, Low-e, high SHGC	Crawlspace Wall: Insulate to R-15 Rigid	Ceiling: Insulate from R-19 to R-49	Hot Water Piping: Insulate to R-2	Ceiling: Insulate from R-19 to R-60	Infiltration: 40% Reduction	Crawlspace Wall: Insulate to R-20 Rigid	Windows: Replace with Quadruple Pane	Water Heater: Install Electric Premium (0.95 EF)	Ducts: Insulate to R-6	Ducts: Seal and Insulate to R-6	Refrigerator: Replace with ENERGY STAR	Ducts: Seal and Insulate to R-8	Air Conditioner: Replace with SEER 15	
15	261	X		X																			
26	510	X	X																				
31	624	X	X			X																	
38	742	X	X	X																			
45	857	X	X	X	X																		
47	897	X	X	X	X	X																	
48	905	X		X	X	X	X																
49	916	X		X	X	X	X	X															
54	956	X		X	X	X	X	X	X														
54	957	X		X	X	X		X	X	X													
55	954	X		X		X		X	X	X	X												
55	951	X		X		X		X	X	X	X	X											
56	948	X		X		X		X	X	X		X											
58	930	X		X				X	X	X			X										
58	926	X		X				X	X			X	X	X	X								
59	905	X		X				X				X	X	X	X	X							
59	893	X		X				X				X	X	X	X	X	X						
59	876	X		X				X				X	X	X	X	X	X						
60	853	X		X		X		X				X	X	X	X	X	X	X					
60	812	X		X				X				X	X	X	X	X	X		X				
60	791	X		X				X				X	X	X	X	X	X		X	X			
60	786	X		X				X				X	X	X	X	X	X			X	X		
61	547	X		X				X				X	X	X	X	X	X			X	X	X	

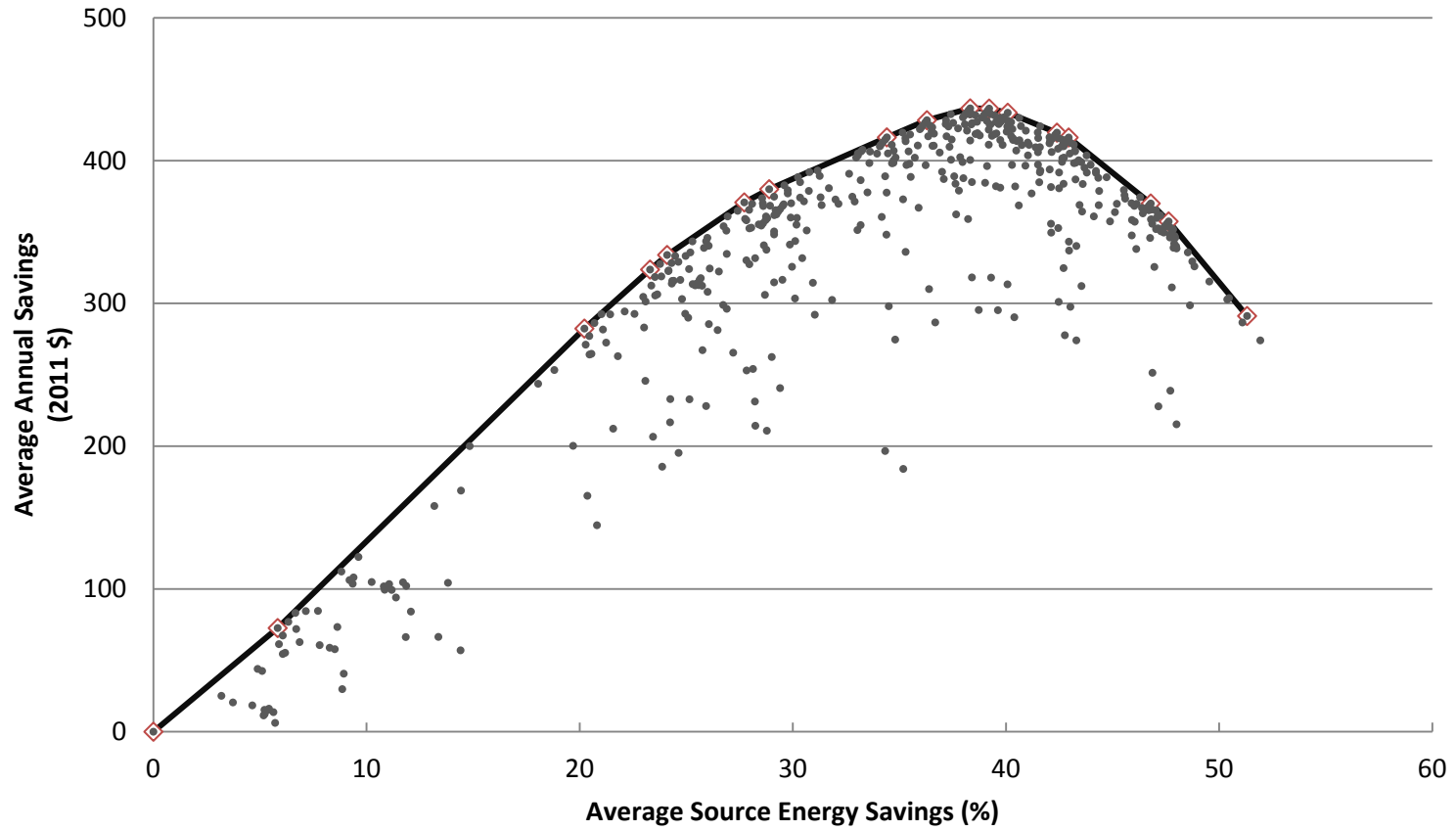


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### West Rutland, Vermont (Mixed Fuel)

		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Energy Savings Levels</b>  <div style="background-color: #6aa84f; color: white; padding: 2px; text-align: center;">15%</div>  <div style="background-color: #800000; color: white; padding: 2px; text-align: center;">30%</div> </div>															
Annual Source Energy Savings (%)	Average Annual Savings (2011 \$)	Basement Wall: Insulate to 4ft R5 Rigid	Exterior Walls: Drill and Fill to R-13	Air Sealing: 20% Reduction in Air Leakage	Lighting: Replace 60% of Bulbs with CFL	Ceiling: Insulate to R-38	Basement Wall: Insulate to R-10 Rigid, 4 feet height	Windows: Replace with Double Pane, Low-e, high SHGC	Hot Water Heater: Replace with Gas Tankless	Ducts: Insulate to R-6	Clothes Washer: Replace with EnergyStar	Ceiling: Insulate to R-49	Air Sealing: 40% Reduction in Air Leakage	Ceiling: Insulate to R-60	Furnace: Replace with AFUE 92.5%, Gas	Hot Water Heater: Replace with Gas Tankless, Condensing	Basement Wall: Insulate to R-15 Rigid, 8 feet height
6	73	X															
20	282	X	X														
23	324	X	X	X													
24	334	X	X	X	X												
28	371	X	X	X	X	X											
29	380		X	X	X	X	X										
34	416		X	X	X	X	X	X									
36	428		X	X	X	X	X	X	X								
38	437		X	X	X	X	X	X	X	X							
39	436		X	X	X	X	X	X	X	X	X						
40	434		X	X	X		X	X	X	X	X	X					
42	420		X	X	X		X	X	X	X	X	X	X				
43	416		X	X	X		X	X	X	X	X		X	X			
47	370		X	X	X		X	X	X	X	X		X	X	X		
48	357		X	X	X		X	X	X	X	X		X	X	X	X	
51	291		X	X	X			X	X	X	X		X	X	X	X	X

### West Rutland, Vermont (Mixed Fuel)

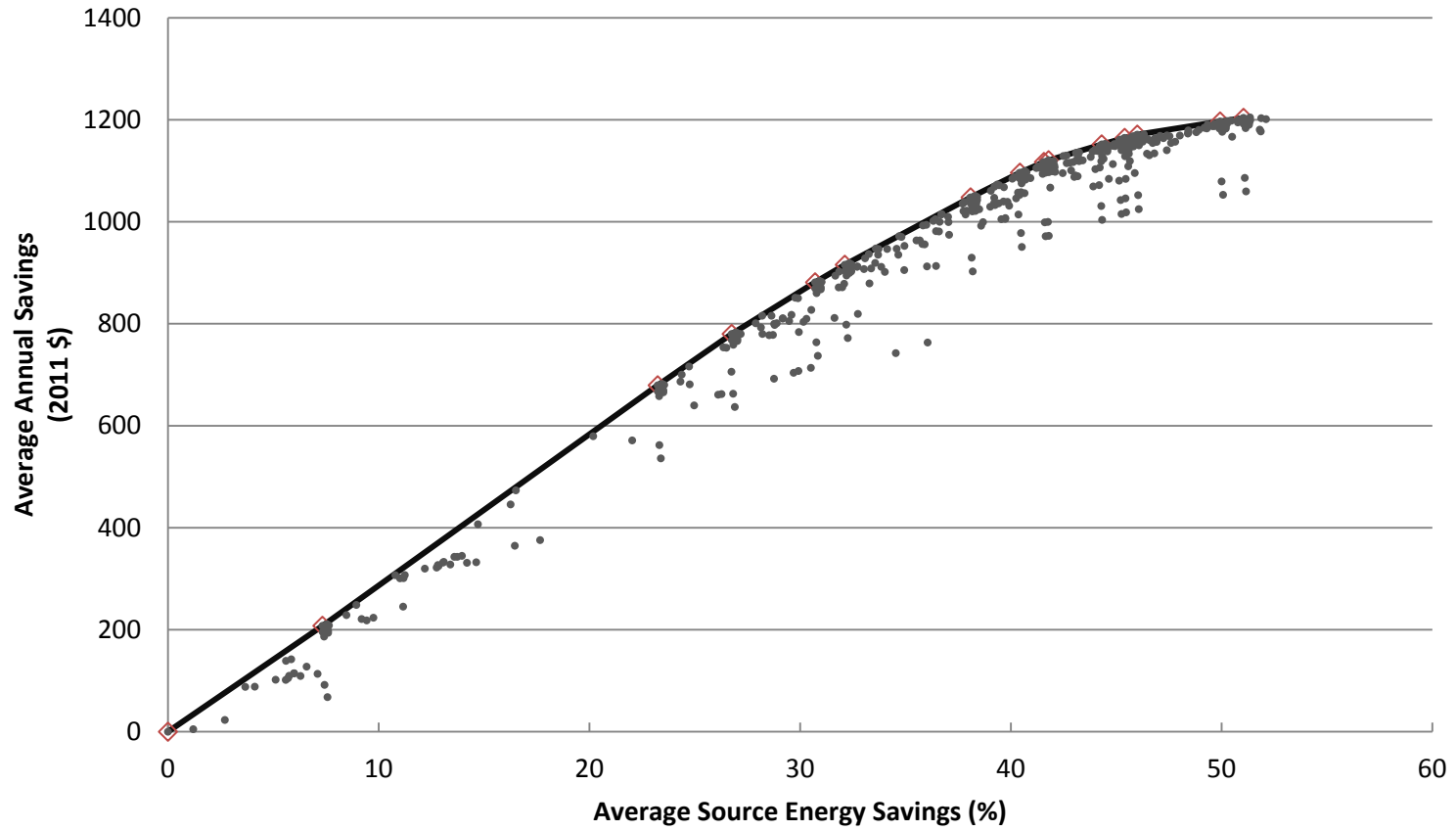


◇ - Denotes an optimal retrofit package and is included in summary table above.

### West Rutland, Vermont (All Electric)

		<table border="1" style="width: 100%; text-align: center;"> <tr><th colspan="2">Energy Savings Levels</th></tr> <tr><td style="background-color: #6aa84f; color: white;">15%</td></tr> <tr><td style="background-color: #800000; color: white;">30%</td></tr> </table>													Energy Savings Levels		15%	30%
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7	208	X	X															
15	444	X	X		X													
23	679	X	X	X														
27	780	X	X	X	X													
31	881	X	X	X	X	X												
32	916	X		X	X	X	X											
38	1048	X		X	X	X	X	X										
40	1096	X		X	X	X	X	X	X									
42	1117	X		X	X	X	X	X	X	X								
42	1121	X		X	X	X	X	X	X	X			X					
44	1152	X		X	X	X	X	X	X	X	X							
45	1165	X		X	X		X	X	X	X	X	X	X					
46	1171	X		X	X		X	X	X	X	X		X	X				
50	1197	X		X				X		X	X		X	X	X			
51	1204	X		X	X			X	X	X	X		X	X	X			

### West Rutland, Vermont (All Electric)



◇ - Denotes an optimal retrofit package and is included in summary table above.



## References

Polly, B.; Gestwick, M.; Bianchi, M.; Anderson, R.; Horowitz, S.; Christensen, C.; Judkoff, R. (2011). "Method for Determining Optimal Residential Energy Efficiency Retrofit Packages" 79 pp.; NREL Report No. TP-5500-50572; DOE/GO-102011-3261.

[http://apps1.eere.energy.gov/buildings/publications/pdfs/building\\_america/optimal\\_retrofit\\_ee.pdf](http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/optimal_retrofit_ee.pdf)

Christensen, C.; Anderson, R.; Horowitz, S.; Courtney, A.; Spencer, J. (2006). "BEopt Software for Building Energy Optimization: Features and Capabilities" 21 pp.; NREL Report No. TP-5500-39929. <http://www.nrel.gov/buildings/pdfs/39929.pdf>

NREL. 2011. National Residential Efficiency Measures Database.  
[www.nrel.gov/ap/retrofits/index.cfm](http://www.nrel.gov/ap/retrofits/index.cfm).

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