



# ComEd EE Potential Study: Approach & Forecast

June 12, 2013

# Agenda



- 1. Introductions**
- 2. Study objectives & definitions**
- 3. Approach**
- 4. Forecasts**

# Study objectives

## 1. Satisfy legislative requirements

- What is achievable without the spending cap?
- Provide with program filing
- Others

## 2. Provide useful information to ComEd

- Six year forecast (2013-2018)
- Residential, Commercial & Industrial
- Electric measures
- Bottom-up approach

# Levels of EE potential estimated in this study

## Study time horizon: 2013 to 2018

- **Economic:** Estimates of potential if existing equipment is replaced with the most technically-efficient, cost-effective options.
- **Maximum Achievable:** Estimates of cost-effective program potential absent budget constraints. Incentives are set to 100% of incremental cost.
- **Program Achievable:** Estimates of cost-effective program potential assuming budget constraints. Incentives are consistent with existing program budgets, and are generally between 25% and 75% of incremental cost.

# Bottom-up approach: major steps

## 1. Define the eligible stock:

- Residential, Commercial & Industrial buildings
- Which buildings have which end-uses? What is currently installed? How many are installed? What fraction are efficient? How old is it?
- ComEd customer data
- ComEd baseline study (Opinion Dynamics, 2013): penetration & saturation data
- ICF industrial databases

## 2. Define comprehensive set of measures and test them for cost-effectiveness

- IL TRM
- Additional measures

## 3. Estimate economic potential

## 4. Estimate achievable potential (program & maximum)

# Uncertainty



- **Potential studies are forecasts**
- **All forecasts have forecast error, or uncertainty**
- **Some strategies to help reduce uncertainty**
  - Using the best information available at the time
  - Including multiple perspectives in developing the forecast
  - Using a bottom-up approach

# 1. Define eligible stock



Segmentation Level	Segments
Sector	Residential, Commercial, Industrial
Building type/Subsectors	<ul style="list-style-type: none"><li>•Residential (SF, MF)</li><li>•Commercial (Offices, schools, etc.)</li><li>•Industrial (Electronics, Fabricated Metal, etc)</li></ul>
Plant Size	<ul style="list-style-type: none"><li>•Industrial (Small &amp; Med &lt;400 kW, Large &gt;400kW)</li></ul>
Building Vintage	Existing & new construction
End-use	Lighting, HVAC, Refrigeration, Hot Water, Appliances, Motors, Industrial Processing, etc.
Equipment type	Examples: <ul style="list-style-type: none"><li>•Residential: Standard bulbs</li><li>•Commercial: Linear florescent lighting</li><li>•Industrial: Machine Drives</li></ul>
Technologies	<ul style="list-style-type: none"><li>•Residential standard bulbs: Incandescent, CFL, LED</li><li>•Commercial linear florescent lighting: T12, T8/T5</li><li>•Industrial machine drives: Efficient and baseline pumps, fans, motors</li></ul>

# Eligible stock example: Residential standard CFLs



	<b>Variable</b>	<b>Value</b>	<b>Source/Calc.</b>
a	# Residential Customers	3,456,945	ComEd
b	# Bulbs per Home	57	Opinion Dynamics
c	% Applicability (% homes with standard light bulbs)	100%	Opinion Dynamics
d	CFL socket saturation	36%	Opinion Dynamics
e	Not yet adopted rate	64%	1-d
f	Total eligible stock (sockets)	126,178,493	a*b*c*e



## 2. Define measures

### 1. Residential & Commercial

- All measures in IL TRM (version 1). Including iterations by:
  - Decision type (Retrofit, Early Retirement, Time-of-Sale, New Construction, etc.)
  - Building type (e.g., SF, MF)
  - Baseline (e.g., to account for EISA 2007)
- Additional measures
  - Non-prescriptive measures (RCx, custom, Advanced New Commercial Buildings, Data Center, Home Energy Report, others)
  - Others based on gap analysis, (e.g., A-Line LEDs)

### 2. Industrial

- Heating, cooling, machine drives, compressor systems, process, HVAC, lighting
  - Non-TRM
  - Specified for each industrial subsector in the analysis

# Number of measures evaluated & included



Sector	# Measure types evaluated	Total # measures evaluated (including iterations)*	# with TRC≥1	Total # Included in Economic Potential	Total # Included in Achievable Potential
Residential	53	1,197	427	266	556
Commercial	69	1,392	818	344	868
Industrial	70	1,190	842	842	842
<b>Total</b>	<b>192</b>	<b>3,779</b>	<b>2,087</b>	<b>1,452</b>	<b>2,266</b>

\* Building type, wattage, ROB, retrofit, etc.

# Important codes & standards

- **EISA 2007**
  - *Primary impacts:* Standard light bulbs
    - ~30% improvement in baseline efficiency
- **IECC 2012**
  - *Primary impacts:* New construction & major renovation
    - ~15% improvement in baseline efficiency over IECC 2009
- **DOE Lamp & Ballast Rules (EPAct 2005)**
  - *Primary impacts:* Linear florescent lighting
    - Magnetic to electronic ballasts
    - ~20% improvement in baseline efficiency

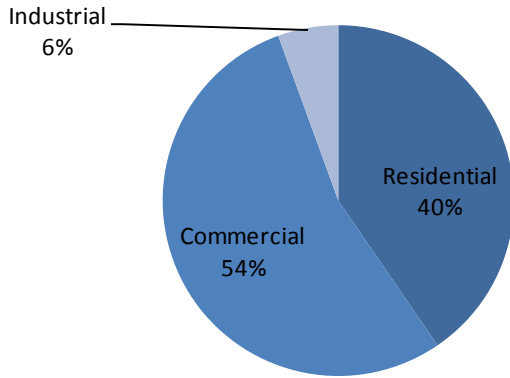
### 3. Estimate economic potential: approach summary

1. Developed eligible stock (Opinion Dynamics baseline data, ICF databases).
2. Developed measures (IL TRM, evaluation reports, ICF databases) and tested for cost-effectiveness using DSMore.
3. The most technically efficient cost-effective options were applied to the current eligible stock. For example, if two cost-effective measures were available for the same application, the most technically efficient measure was applied.
4. All retrofit measures are installed in 2013, as well as replace-on-burnout and new construction measures.
5. Replace-on-burnout and new construction measures installed 2014-2018.

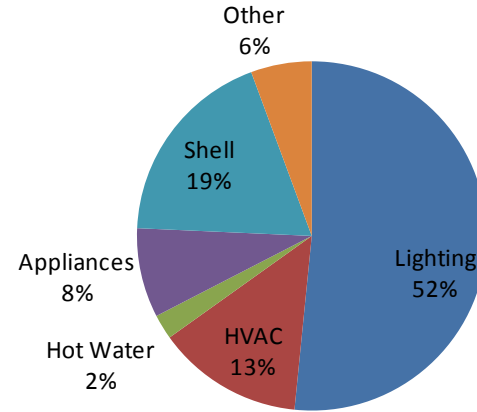
# Economic potential, 2013



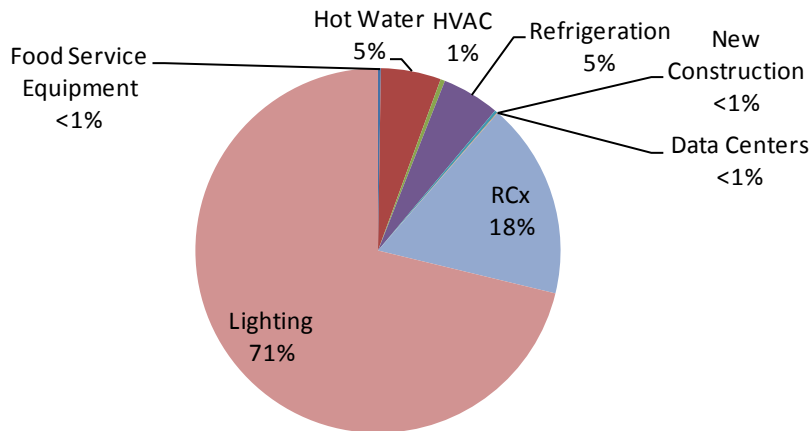
**ComEd Total**  
(27,610 GWh, 32% of Load in 2013)



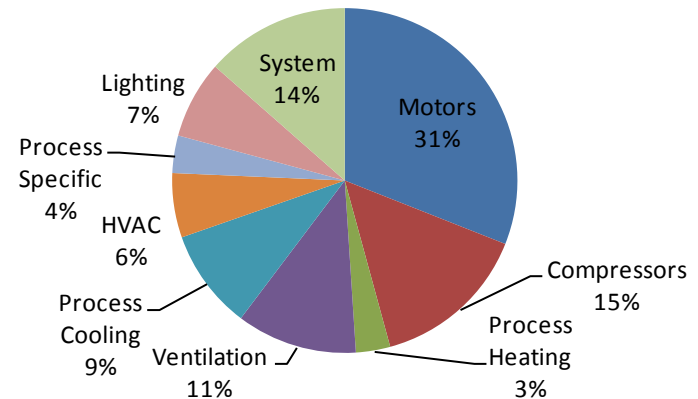
**Residential**  
(11,167 GWh, 41% of Residential Load in 2013)



**Commercial**  
(14,905 GWh, 28% of Commercial Load in 2013)



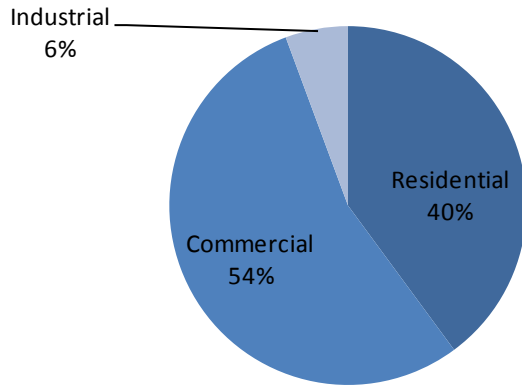
**Industrial**  
(1,537 GWh, 25% of Industrial Load in 2013)



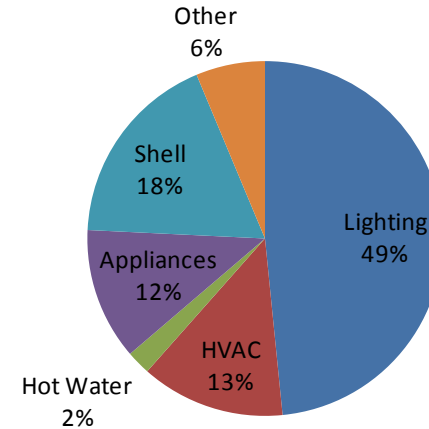
# Cumulative economic potential, 2018



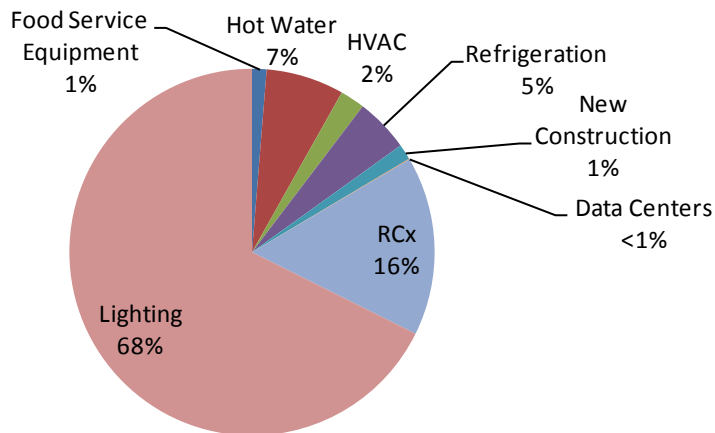
**ComEd Total**  
(30,009 GWh, 32% of Load in 2018)



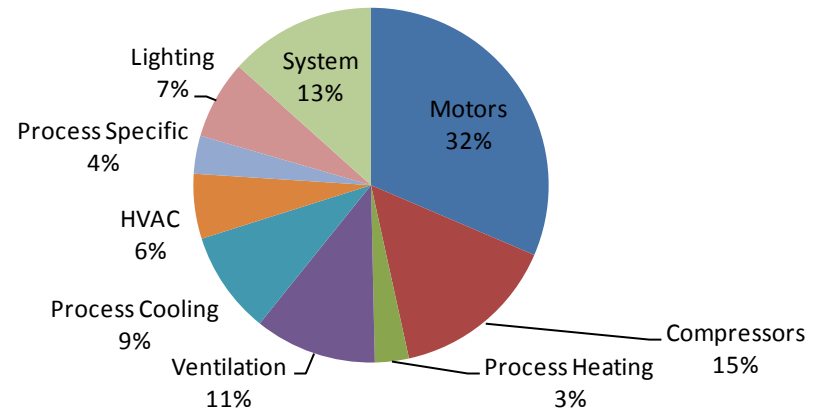
**Residential**  
(11,978 GWh, 41% of Residential Load in 2018)



**Commercial**  
(16,339 GWh, 28% of Commercial Load in 2018)



**Industrial**  
(1,692 GWh, 25% of Industrial Load in 2018)



## 4. Estimate achievable potential: approach summary



1. **Review data:** Opinion Dynamics baseline data, ComEd program tracking data, ComEd program evaluations, ICF databases, customer and trade ally survey data.
2. **Achievable potential workshops:** Assessed costs, savings, market barriers, and potential of measures and programs
3. **ICF program manager review** against current experience in their programs.
4. **ComEd implementation contractor review.**
5. **Benchmarking** performance in other jurisdictions.

# Achievable potential example: Appliance Recycling

- **Refrigerator Recycling**
- **Freezer Recycling**
- **Room AC Recycling**
- **Historical Measures?: Yes (since PY1)**
- **Key Data Sources**
  - Opinion Dynamics Residential Baseline Data (appliance saturation and vintage)
  - ComEd program evaluations (measure savings, participation, NTG)
  - ComEd program tracking data (participation)
  - ComEd program managers
  - ICF program managers
  - ARCA & JACO
  - Other utility program data (benchmarking)



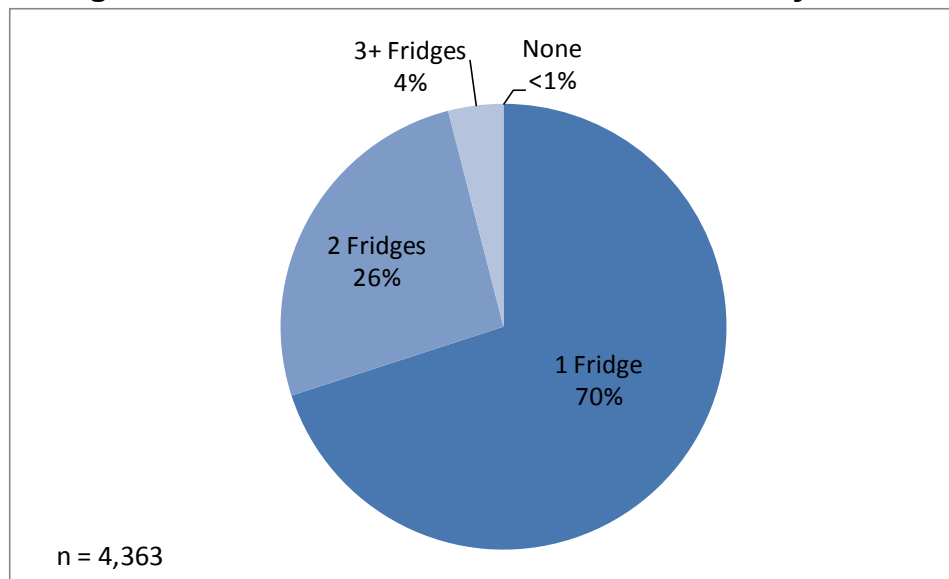
# Achievable potential example: Appliance Recycling



## Step 1

Assess eligible stock (example shown is for refrigerators)

**Refrigerator Saturation in ComEd's Service Territory**



Note: Major appliances consume 18% of residential electricity.

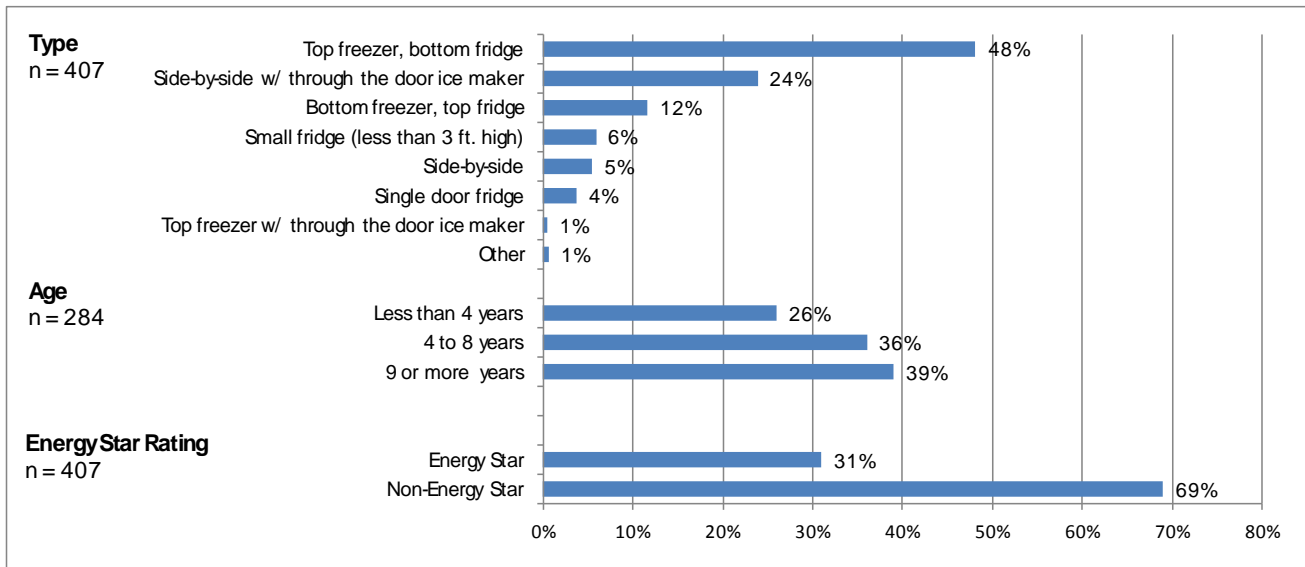
Source:

- ComEd Residential Saturation/End-Use, Market Penetration & Behavioral Study, Opinion Dynamics Corporation, 2013.

# Achievable potential example: Appliance Recycling



## Key Refrigerator Characteristics



Source:

- ComEd Residential Saturation/End-Use, Market Penetration & Behavioral Study, Opinion Dynamics Corporation, 2013.

# Achievable potential example: Appliance Recycling



	<b>Variable</b>	<b>Value</b>	<b>Source/Calc.</b>
a	Efficient Measure Name	Refrigerator Recycling	IL TRM
b	# Residential Customers	3,456,945	ComEd
c	Average # fridges per home	1.3	Opinion Dynamics
d	% Applicability (% of homes that have a fridge)	100%	Opinion Dynamics
e	% Annual replacement eligibility	100%	=100% for Early Retirement & Retrofit measures
f	Total eligible stock (# fridges)	4,494,029	$b*c*d*e$
g	% of fridges 20+ years old	15%	Opinion Dynamics
h	# of fridges 20+ years old	674,104	$b*c*d*e*g$
i	# of secondary fridges	1,348,209	$(c-1)*f$

# Achievable potential example: Appliance Recycling



## Step 2

Develop measures

- **Refrigerator Recycling**
  - **Savings (gross):**
    - 82 to 1,524 kWh per year (Avg.= 760 kWh)
    - 0.06 to 0.22 kW per year
    - Depends on vintage, configuration
  - **Cost:** \$105 per unit
  - **Lifetime:** 8 years
  - **Decision Type:** Early Retirement

# Achievable potential example: Appliance Recycling (Measure Cost-Effectiveness)

Measure	Iterations*	Minimum Measure TRC	Maximum Measure TRC
Freezer Recycling	12	1.38	4.31
Refrigerator Recycling**	28	0.44	4.75
Room Air Conditioner Recycling	2	0.87	0.88

\*Variations for appliance configuration, age, etc.

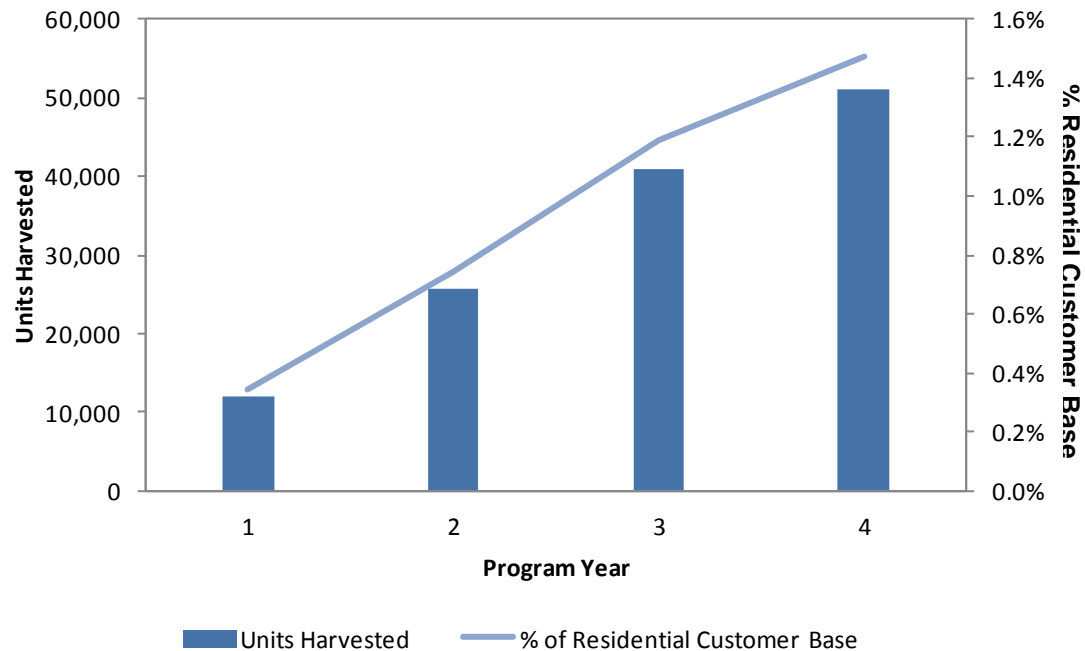
\*\*Only 1 refrigerator type was not cost-effective.

# Achievable potential example: Appliance Recycling



## Step 3

Assess historical participation, savings, costs, and NTG



# Achievable potential example: Appliance Recycling

## Step 4

Achievable potential workshop

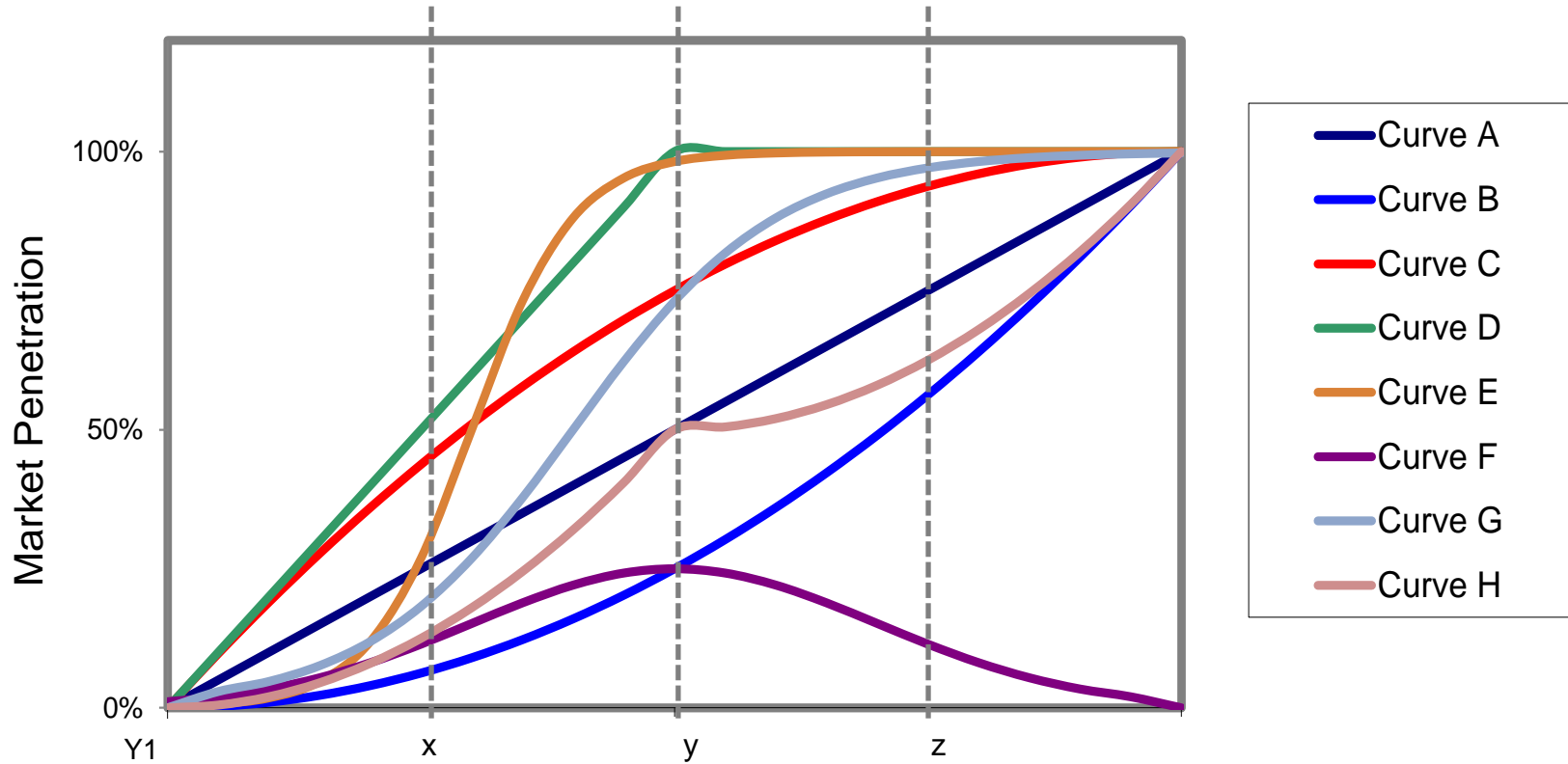
### Market Barriers

1. Limited eligible stock
2. Cost-effectiveness
3. Customer awareness of bill savings

### Possible Solutions

1. Retail, small comm. expansion
2. Focus on older units
3. Adapt marketing tactics

# Market Adoption Curves





# Achievable potential example: Appliance Recycling

## Step 5

### Program benchmarking

Administrator	State	Year	Savings Source/Type	ACEEE 2012 EE State Scorecard Ranking	Spending (\$Millions)	MWh Savings (net)	\$ per 1st yr kWh	Savings as % of Residential Sales
Alliant Energy - Iowa (Interstate P&L)	IA	2011	Report/Actual	11	\$1.6	14,014	\$0.11	0.33%
Arizona Public Service	AZ	2011	Report/Actual	12	\$1.3	14,168	\$0.09	0.11%
ComEd	IL	PY4	Report/Actual	14	\$8.2	72,302	\$0.11	0.26%
Con Edison	NY	2011	Report/Actual	3	\$1.8	6,349	\$0.28	0.04%
DTE Energy	MI	2011	Report/Actual	12	\$2.9	35,109	\$0.08	0.22%
PECO	PA	2011	Report/Actual	20	\$3.0	25,908	\$0.12	0.19%
Southern California Edison (SCE)	CA	2011	Report/Actual	2	\$12.1	45,982	\$0.26	0.16%
Xcel Energy - Minnesota	MN	2011	Report/Actual	9	\$0.7	3,717	\$0.18	0.04%

# Achievable potential example: Appliance Recycling (Program v. Max achievable)

## Step 6

### Calculate savings

	Historical Harvest (Actual)				Forecast Harvest->					
	2008/2009	2009/2010	2010/2011	2011/2012	2013	2014	2015	2016	2017	2018
	PY1	PY2	PY3	PY4						
Program Achievable	11,978	25,735	41,024	51,050	43,582	43,571	40,284	40,284	40,284	40,284
% of Residential Customer Base	0.3%	0.7%	1.2%	1.5%	1.3%	1.3%	1.2%	1.2%	1.2%	1.2%
Max. Achievable	11,978	25,735	41,024	51,050	44,930	43,582	41,791	41,791	41,791	41,791
% of Residential Customer Base	0.3%	0.7%	1.2%	1.5%	1.3%	1.3%	1.2%	1.2%	1.2%	1.2%

### Notes:

- Program incentive \$40 (weighted average of standard and bonus incentive)
- Maximum incentive \$50 (current bonus incentive level)
- Fridge NTG 0.73
- Freezer NTG 0.72
- Room AC NTG 0.82

# Achievable potential example: VFD on Fan (Food and Beverage subsector)



## Step 1

Segment energy consumption into industrial sub-sectors

**All industry**



<b>Sub-sectors</b>	<b>Total MWh</b>	<b>MWh % of Total</b>
Food and beverage	1,042,886	17%
Rubber and plastics	954,024	16%
Fabricated metal	919,054	15%
Industrial machinery and transportation	859,770	14%
Electronics and instrumentation	673,434	11%
Paper	365,797	6%
Other	1,166,280	19%
<b>Total</b>	<b>5,981,245</b>	<b>100%</b>

**Data source:**

ComEd rate usage, 2011

# Achievable potential example: VFD on Fan (Food and Beverage sub-sector)

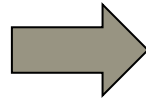


## Step 2

Develop sub-sector energy use profiles

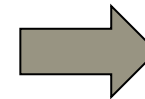
**Total Food and Beverage Electricity Consumption (base year)**

1,042,886



**Generic Plant End-use Profile (%)**

End-Use	Percent
Indirect Heating	1%
Direct Heating	2%
Cooling & Refrigeration	29%
Pumps	17%
Fans/Blowers	7%
Other Motors	18%
Compressors	14%
Process Specific	1%
HVAC	8%
Lighting	3%
<b>Total</b>	<b>100%</b>



**Sub-sector Electricity Use by End-use**

End-Use	MWh
Indirect Heating	10,429
Direct Heating	20,858
Cooling & Refrigeration	305,565
Pumps	177,291
Fans/Blowers	73,002
Other Motors	187,719
Compressors	146,004
Process Specific	6,257
HVAC	83,431
Lighting	32,329
<b>Total</b>	<b>1,042,886</b>

**Data sources:**

- Total sub-sector consumption: ComEd
- Other: ICF benchmarking database

# Achievable potential example: VFD on Fan (Food and Beverage sub-sector)



## Step 3

Establish end-use and measure parameters

### Premium efficiency fan control with VFD

- **End-use size:** 50 to 100 hp
- **Measure cost:** \$13,350
- **Savings:** 20% of base case consumption
- **Measure life:** 10 years
- **Decision type:** retrofit

**Data source:**

Published reports

# Achievable potential example: VFD on Fan (Food and Beverage sub-sector)



## Step 4

Perform measure cost-effectiveness test

Sub-sector	Measure	TRC
Food and Beverage	Premium efficiency fan control with VFD	2.6

**Data source:**

DSMore

# Achievable potential example: VFD on Fan (Food and Beverage sub-sector)



## Step 5

Determine measure implementation through study period

**Current market saturation: 19%**

**Measure adoption through study period:**

### Annual Market Penetration Forecast (as percentage of eligible stock)

	2013	2014	2015	2016	2017	2018
Program Achievable Potential	1%	2%	5%	8%	13%	19%
Maximum Achievable Potential	1%	3%	6%	11%	17%	25%

### Notes:

Base year market penetration rates were determined using the ICF industrial benchmarking database from past projects; when possible, these were adjusted based on baseline data from the Opinion Dynamics baseline analysis.

Forecasted market penetration rates were determined during an “Achievable Potential” workshop, in which market barriers were considered to estimate achievable percentages by 2018 under program and maximum scenarios, and the adoption curve through the study period.

# Achievable potential example: VFD on Fan (Food and Beverage sub-sector)



## Step 6

Calculate savings

### Net Incremental kWh Savings Forecast

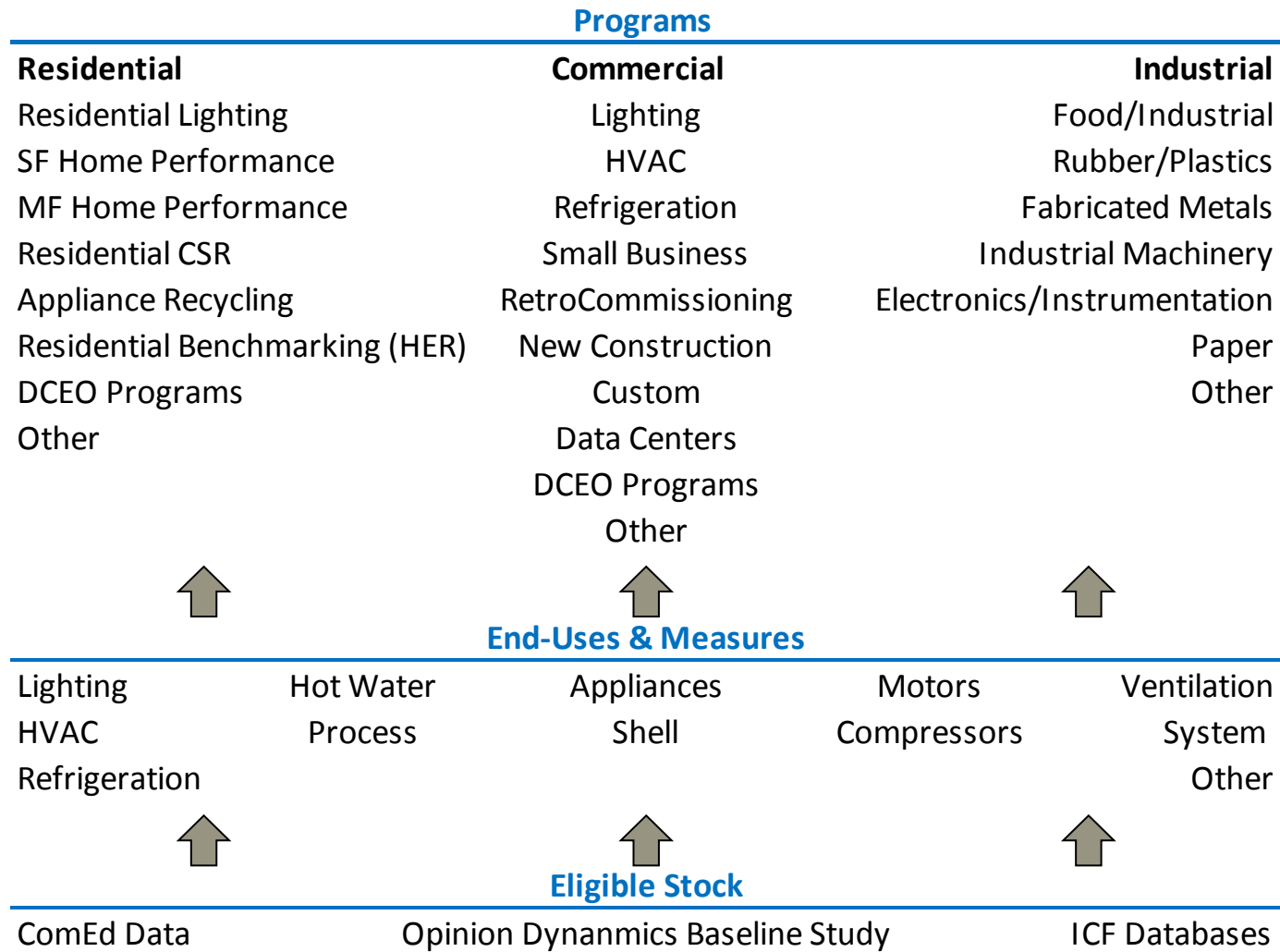
	2013	2014	2015	2016	2017	2018
Program achievable	14,089	86,496	164,911	242,971	308,193	454,075
Maximum achievable	25,670	122,441	227,258	331,225	416,481	607,014

#### Notes:

Savings are calculated based on measure parameters and energy consumption summarized in preceding slides.



# Achievable potential: bottom-up process summary



# Achievable potential summary



Cumulative Savings Forecast - GWh						
Scenario	2013	2014	2015	2016	2017	2018
Maximum achievable potential	1,122	2,453	3,767	5,430	7,104	8,693
Program achievable potential	824	1,649	2,294	3,043	3,778	4,387

Cumulative Savings Forecast - % of load						
Scenario	2013	2014	2015	2016	2017	2018
Maximum achievable potential	1%	3%	4%	6%	8%	10%
Program achievable potential	1%	2%	3%	3%	4%	5%

Incremental Savings Forecast - GWh						
Scenario	2013	2014	2015	2016	2017	2018
Maximum achievable potential	1,122	1,438	1,602	1,865	1,956	2,111
Program achievable potential	766	868	827	846	828	846

Incremental Savings Forecast - % of load						
Scenario	2013	2014	2015	2016	2017	2018
Maximum achievable potential	1.3%	1.7%	1.8%	2.1%	2.1%	2.4%
Program achievable potential	0.9%	1.0%	0.9%	1.0%	0.9%	1.0%
Statutory target	1.4%	1.8%	2.0%	2.0%	2.0%	2.0%

Program Costs (Millions, Real 2013\$)						
Scenario	2013	2014	2015	2016	2017	2018
Maximum achievable potential	\$ 265	\$ 349	\$ 426	\$ 487	\$ 488	\$ 527
Program achievable potential	\$ 125	\$ 137	\$ 139	\$ 146	\$ 152	\$ 157

# Portfolio Benchmarking



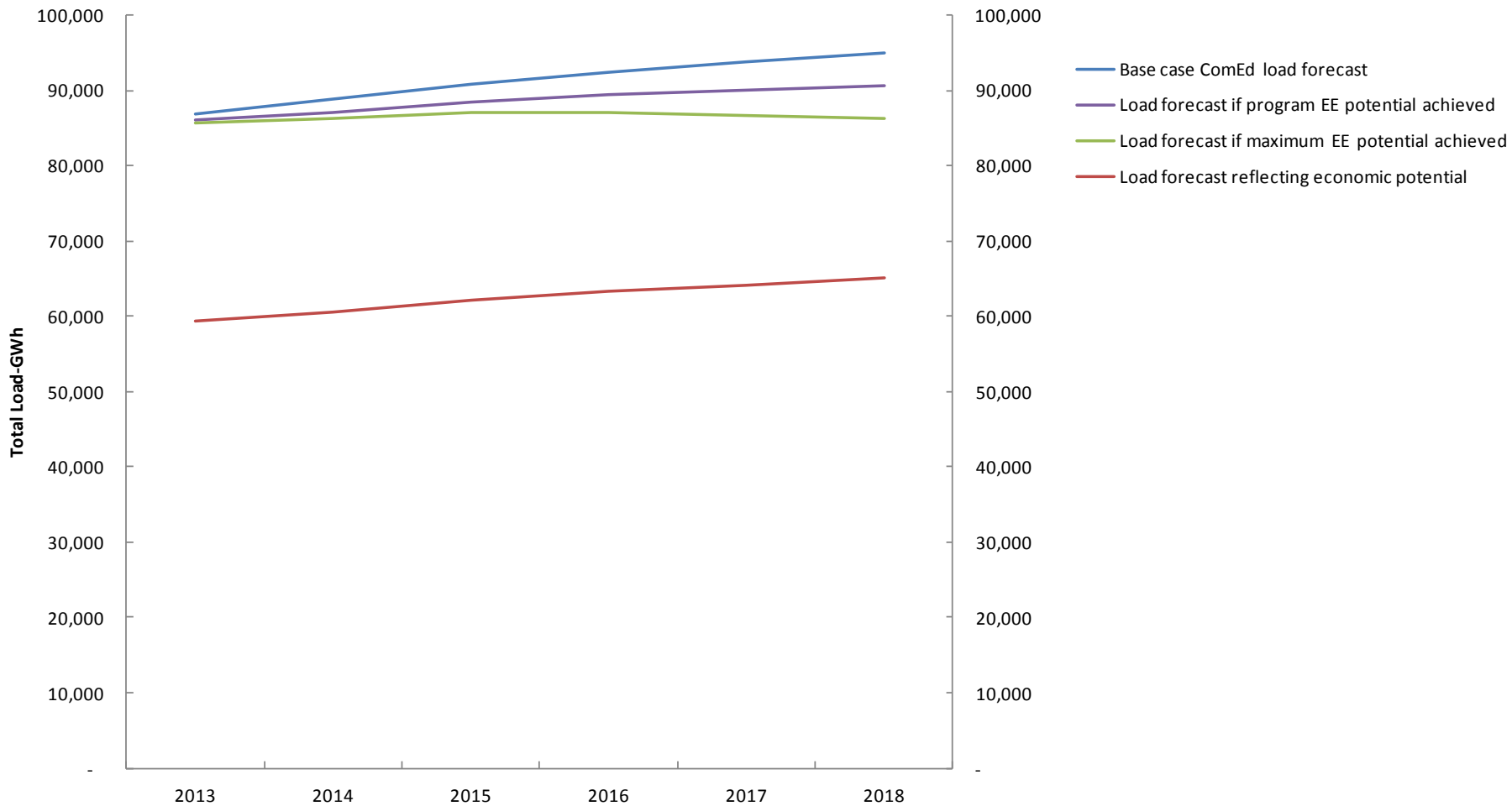
Administrator	State	Year	Savings Source/Type	ACEEE 2012 EE Scorecard Ranking	Spending (\$Millions)	MWh Savings (Net)	\$ per 1st yr kWh	Savings as % of Sales
Con Edison	NY	2011	Report/Actual	3	\$119	429,596	\$0.28	0.8%
Connecticut Light & Power	CT	2010	Report/Actual	6	\$154	591,102	\$0.26	1.2%
DTE Energy	MI	2011	Report/Actual	12	\$55	471,960	\$0.12	1.0%
Efficiency Vermont	VT	2011	Report/Actual	5	\$32	101,283	\$0.32	1.8%
National Grid	MA	2011	Report/Actual	1	\$110	369,938	\$0.30	1.7%
NSTAR	MA	2010	Report/Actual	1	\$149	362,029	\$0.41	1.7%
PECO	PA	2011	Report/Actual	20	\$60	356,422	\$0.17	0.9%
Southern California Edison	CA	2011	Report/Actual	2	\$335	1,086,743	\$0.31	1.3%
Xcel Energy - Minnesota	MN	2011	Report/Actual	9	\$88	419,386	\$0.21	1.3%
ComEd - PY6 Plan	IL	PY6 Plan	Plan/Forecast	14	\$163	774,596	\$0.21	0.9%
ComEd Potential Study Program Achievable	IL	2018	Potential Study/Forecast	14	\$157	845,659	\$0.19	0.9%
ComEd Potential Study Max Achievable	IL	2018	Potential Study/Forecast	14	\$527	2,111,000	\$0.25	2.4%

# Total TRC Benefits, Costs & Cost-effectiveness, 2013-2018



Sector	Program Achievable			Max Achievable		
	Benefits (\$Millions)	Costs (\$Millions)	TRC	Benefits (\$Millions)	Costs (\$Millions)	TRC
Residential	\$356	\$247	1.4	\$1,762	\$960	1.8
Commercial	\$963	\$394	2.5	\$2,213	\$900	2.5
Industrial	\$155	\$37	4.2	\$335	\$69	4.8
<b>Total</b>	<b>\$1,474</b>	<b>\$678</b>	<b>2.2</b>	<b>\$4,310</b>	<b>\$1,930</b>	<b>2.2</b>

# Alternative load forecasts



# Appendix



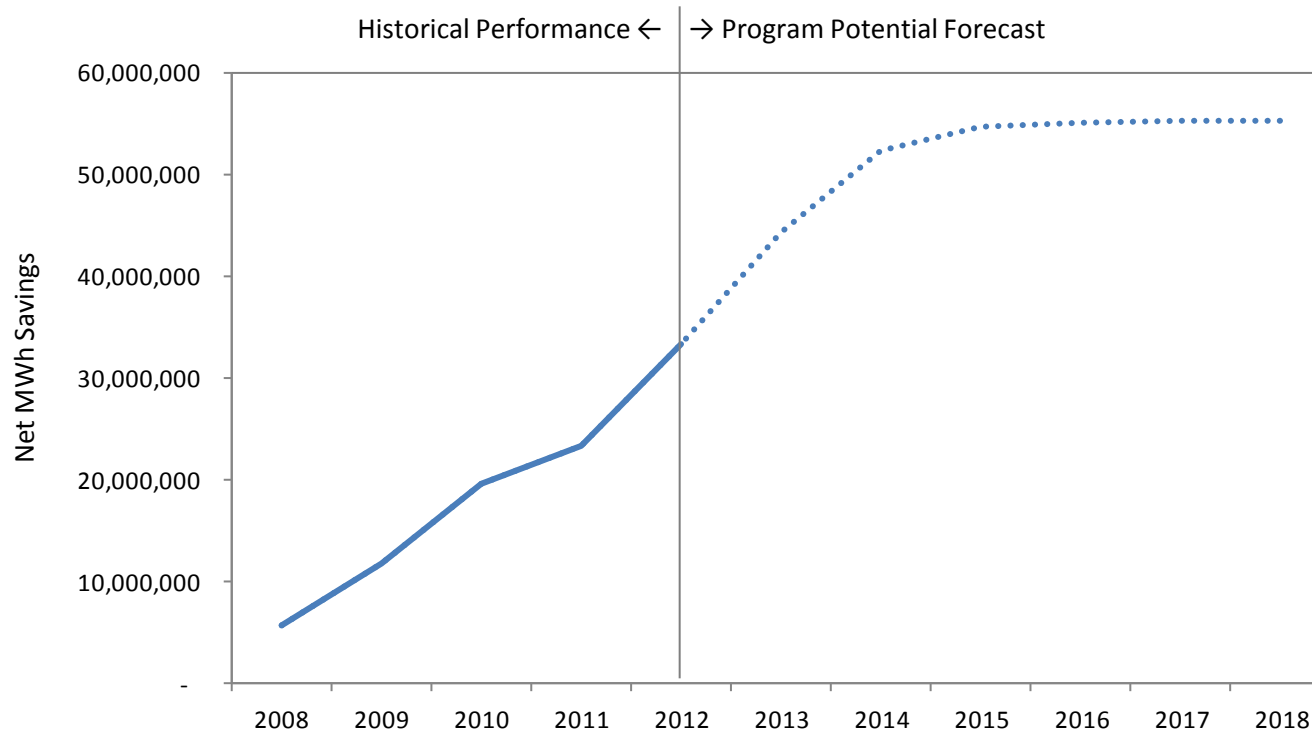
# Achievable potential example: Commercial Lighting (Permanent Delamping & Retrofit)

- **Measure characteristics**

- **Description:** Permanently delamp\* & Retrofit existing T12 or T8 systems with HPT8, Reduced-Wattage T8 or T5/T5HO lamps and qualifying ballasts.
- **Cost:** \$27.50 per fixture
- **Average annual savings per fixture:** 250 kWh
- **Lifetime:** 11 years
- **Decision Type:** Retrofit/Early Retirement
- **Average Measure TRC:** 3.27

\*Luminaries must be permanently delamped through the use of UL/CSA-listed retrofit kits designed for this purpose

# Achievable potential example: Commercial Lighting (Permanent Delamping & Retrofit)

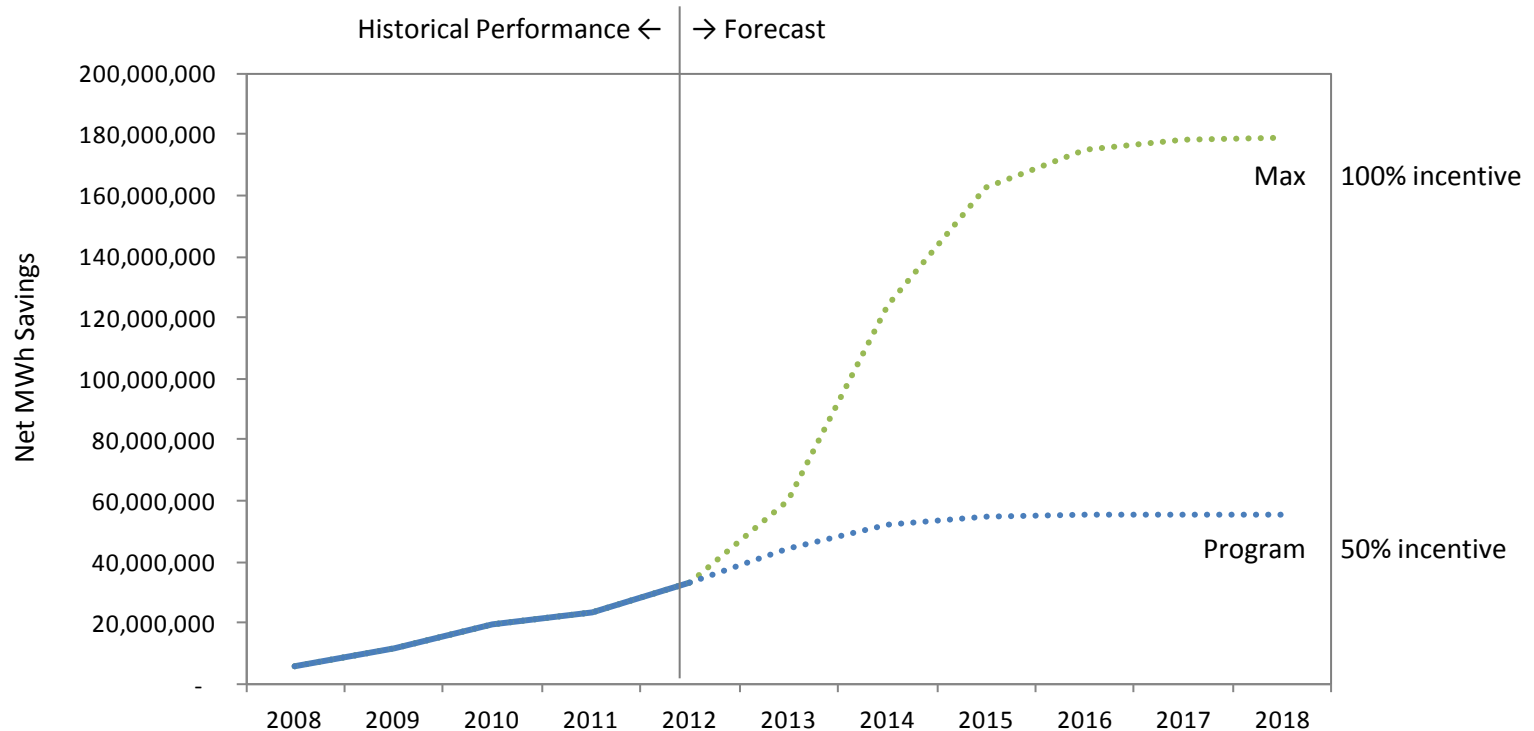


## Sources:

- ICF analysis of ComEd program tracking data
- ICF forecast



# Achievable potential example: Commercial Lighting (Permanent Delamping & Retrofit)



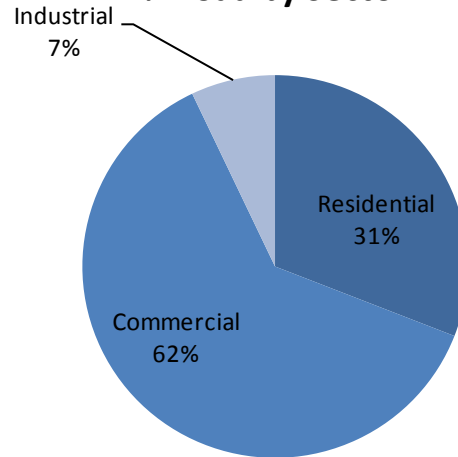
## Sources:

- ICF analysis of ComEd program tracking data
- ICF forecast

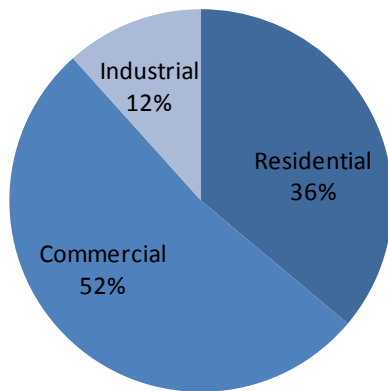
# Distribution of load and savings, by sector & scenario



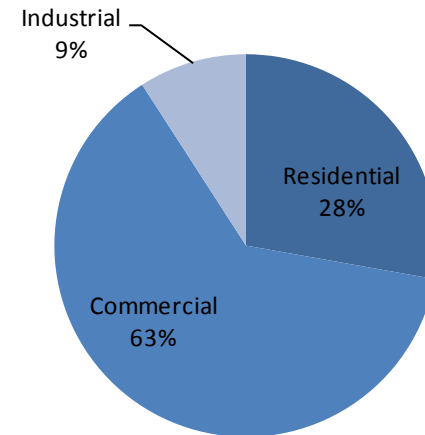
**% Load by Sector**



**% Program Cumulative Savings by Sector, 2018**



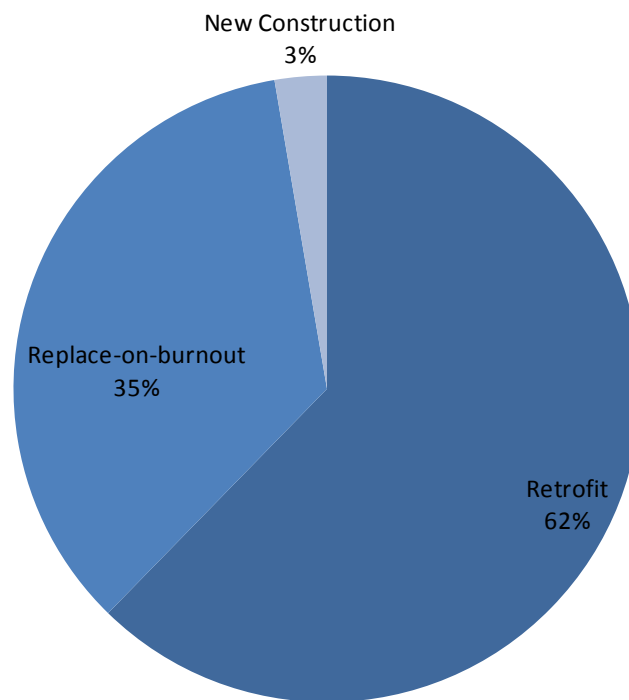
**% Max Cumulative Savings by Sector, 2018**



# Savings distribution by decision type



## Distribution of Cumulative Program Achievable MWh Savings, 2018



# Residential incremental net MWh estimates by program



## Program Achievable

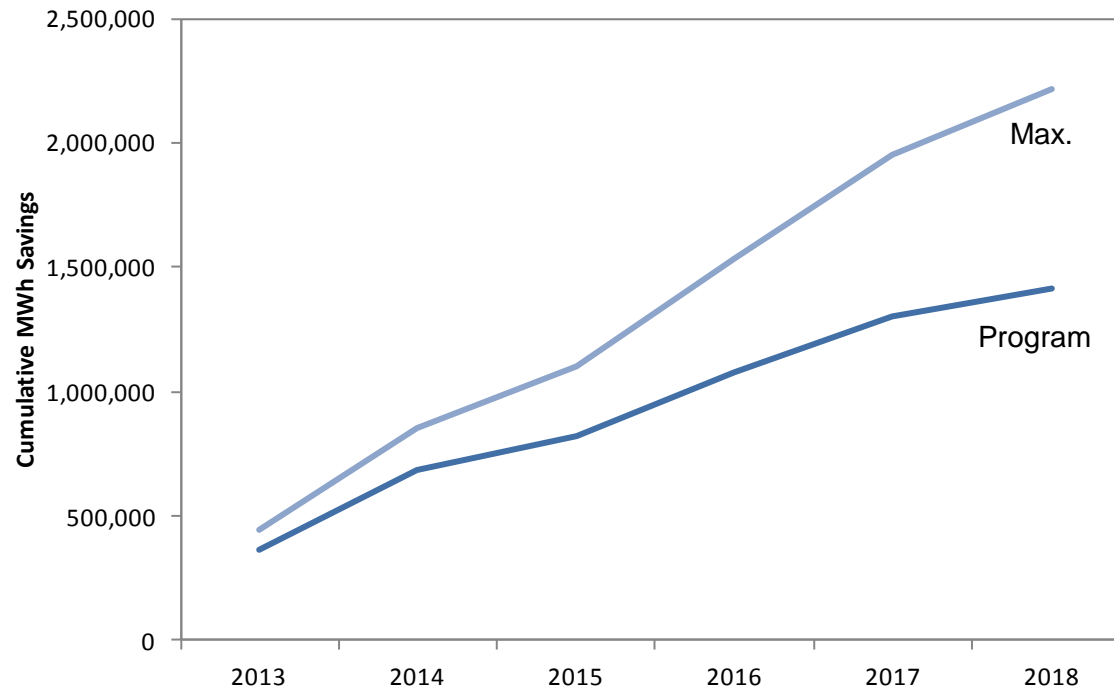
### Incremental Net Electricity Savings - MWh

Program Name	2013	2014	2015	2016	2017	2018
Residential Lighting	223,643	265,506	230,550	213,660	199,573	197,927
SF Home Performance	1,901	2,383	2,284	3,015	4,112	4,568
MF Home Performance	16,191	14,220	9,671	7,485	5,197	2,915
Residential CSR	2,501	2,666	2,842	3,030	3,230	3,326
Other	457	791	1,080	1,248	1,324	1,354
Appliance Recycling	22,452	22,265	21,550	21,868	22,036	22,108
Residential Benchmarking (HER)	82,410	85,988	100,929	121,826	121,826	121,826
DCEO Programs	13,170	13,599	11,111	11,473	11,847	12,233
<b>Total Residential Portfolio</b>	<b>362,726</b>	<b>407,417</b>	<b>380,018</b>	<b>383,604</b>	<b>369,144</b>	<b>366,258</b>

## Maximum Achievable

Residential Lighting	263,835	308,374	275,833	263,998	259,456	271,614
SF Home Performance	5,984	11,879	31,816	42,421	53,026	63,631
MF Home Performance	34,268	30,562	20,976	16,751	12,175	7,612
Residential CSR	3,505	5,125	6,076	6,571	6,774	6,852
Other	3,288	6,651	10,665	13,709	15,316	16,007
Appliance Recycling	23,248	23,031	22,679	23,101	23,324	23,420
Residential Benchmarking (HER)	82,410	85,988	100,929	185,690	231,335	246,216
DCEO Programs	26,339	27,197	22,222	22,946	23,694	24,465
<b>Total Residential Portfolio</b>	<b>442,878</b>	<b>498,806</b>	<b>491,196</b>	<b>575,186</b>	<b>625,101</b>	<b>659,818</b>

# Residential cumulative net MWh savings estimates



# Commercial incremental net MWh estimates by program

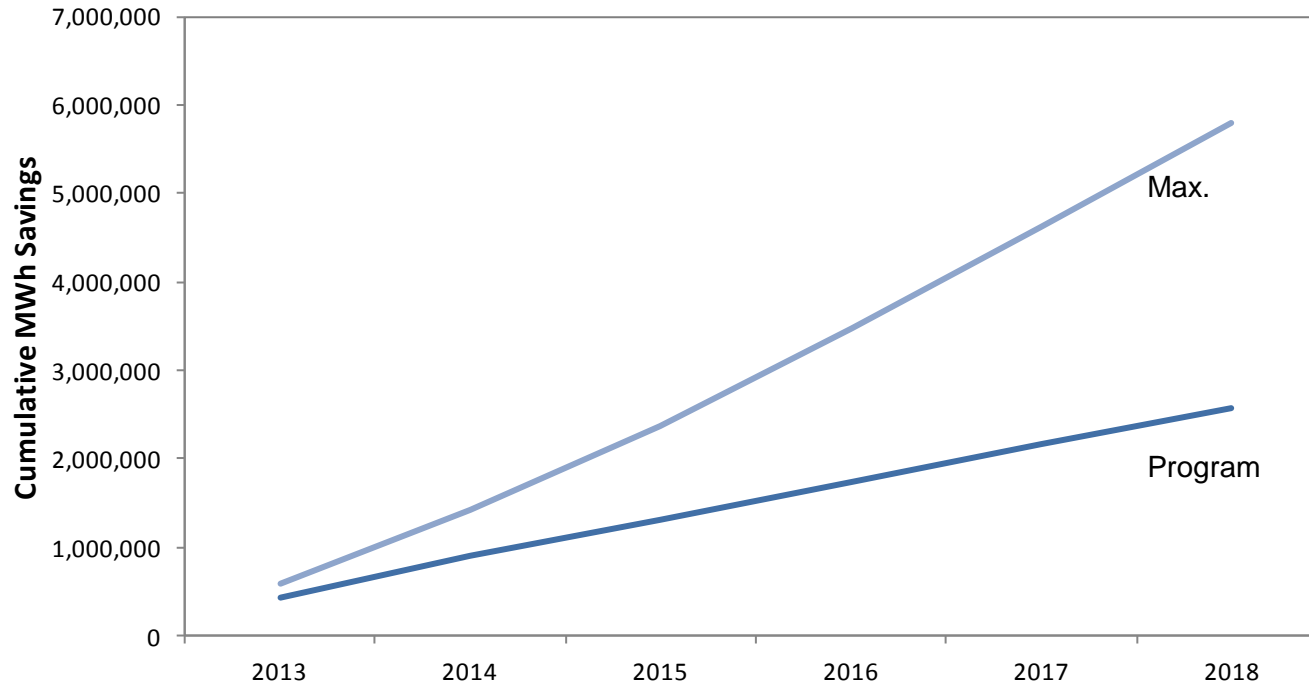


Program Achievable	Incremental Electricity Savings - MWh					
Program Name	2013	2014	2015	2016	2017	2018
Lighting	153,913	188,307	211,577	220,527	222,711	221,478
HVAC	13,185	14,180	13,612	13,069	12,551	12,058
Refrigeration	7,109	10,528	13,139	14,574	15,207	15,458
Small Business	73,695	73,695	15,561	18,611	21,661	24,710
RetroCommissioning	35,676	37,315	38,954	40,593	42,232	42,232
New Construction	13,012	14,871	16,995	14,752	14,752	14,752
Commercial Custom	32,980	33,475	33,978	34,489	35,009	35,538
Data Centers	6,761	6,964	7,172	7,388	7,609	7,837
Other	271	471	709	890	985	1,026
DCEO Commercial Programs	95,760	98,722	101,683	104,734	107,876	111,112
<b>Total Commercial Portfolio</b>	<b>432,362</b>	<b>478,526</b>	<b>453,381</b>	<b>469,626</b>	<b>480,593</b>	<b>486,202</b>

## Maximum Achievable

Lighting	195,612	361,258	512,659	601,263	641,550	654,895
HVAC	15,735	16,839	16,220	15,624	15,055	14,513
Refrigeration	13,812	23,871	32,609	37,683	39,971	40,884
Small Business	73,695	81,065	94,539	111,373	130,630	143,692
RetroCommissioning	53,514	61,570	70,117	79,156	88,686	95,021
New Construction	15,704	16,826	19,069	15,704	15,704	15,704
Commercial Custom	65,961	73,645	81,547	89,672	98,026	106,613
Data Centers	7,437	7,660	7,890	8,126	8,370	8,621
Other	302	533	808	1,017	1,128	1,175
DCEO Commercial Programs	153,216	197,443	162,693	209,468	172,601	222,224
<b>Total Commercial Portfolio</b>	<b>594,987</b>	<b>840,710</b>	<b>998,150</b>	<b>1,169,086</b>	<b>1,211,720</b>	<b>1,303,344</b>

# Commercial cumulative net MWh savings estimates



# Industrial incremental net MWh estimates by end-use



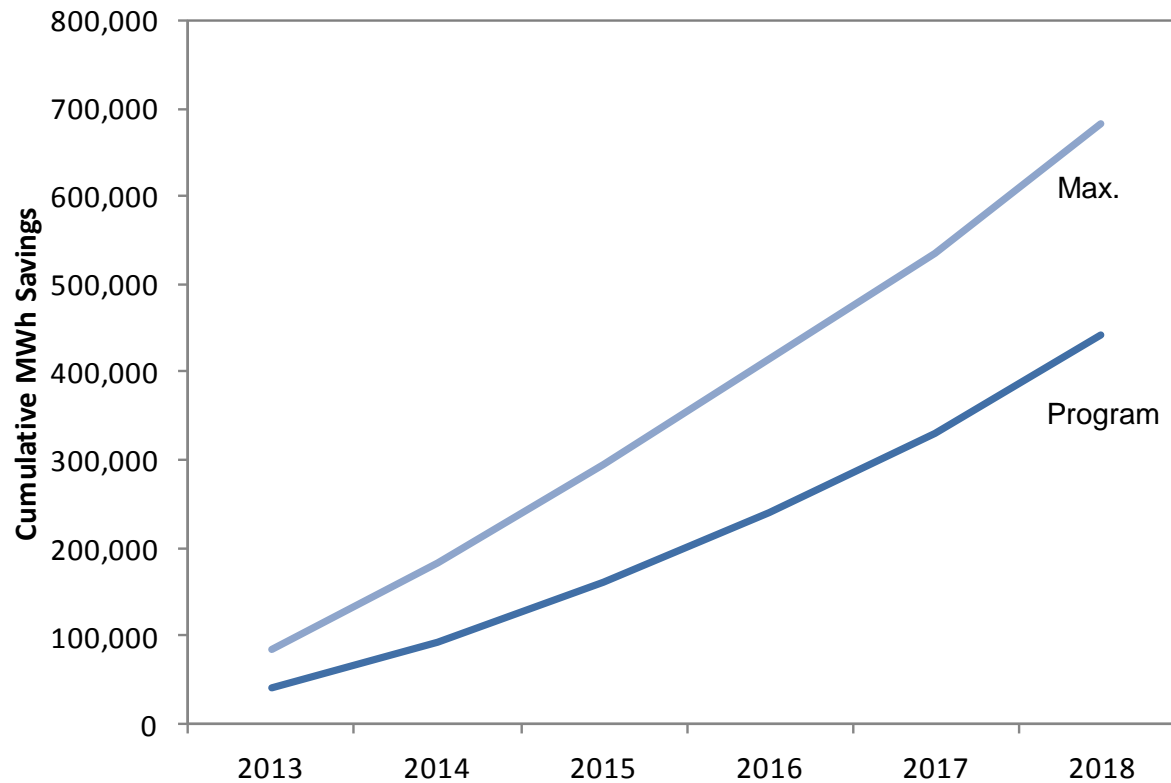
Program Achievable		Incremental Net Electricity Savings - MWh				
End Use	2013	2014	2015	2016	2017	2018
Motors	6,237	10,639	15,546	20,165	24,401	33,027
Compressors	11,334	11,957	12,713	12,867	13,965	14,219
Process Heating	924	1,656	2,483	3,255	3,517	5,866
Ventilation	81	1,109	2,289	3,459	4,466	6,750
Process Cooling	1,503	3,151	4,958	6,691	8,197	11,391
HVAC	5,445	5,704	6,014	6,032	6,444	6,464
Process Specific	315	1,197	2,170	3,124	3,875	5,583
Lighting	13,744	13,829	13,883	13,004	11,421	10,698
System	841	3,892	7,200	10,478	13,155	19,145
<b>Total Industrial Portfolio</b>	<b>40,422</b>	<b>53,136</b>	<b>67,255</b>	<b>79,077</b>	<b>89,441</b>	<b>113,143</b>

## Maximum Achievable

Motors	15,585	21,022	26,893	31,673	33,989	45,010
Compressors	27,006	25,712	24,154	20,627	14,957	13,095
Process Heating	2,206	2,939	3,725	4,359	4,709	6,228
Ventilation	334	2,019	3,857	5,680	7,180	10,575
Process Cooling	3,578	5,667	7,911	9,918	11,220	15,336
HVAC	11,397	10,787	10,052	8,483	6,005	5,068
Process Specific	405	1,561	2,810	4,044	5,017	7,220
Lighting	21,776	20,646	19,285	16,337	11,501	9,743
System	2,083	7,750	13,889	19,947	24,763	35,563
<b>Total Industrial Portfolio</b>	<b>84,369</b>	<b>98,102</b>	<b>112,576</b>	<b>121,067</b>	<b>119,341</b>	<b>147,838</b>



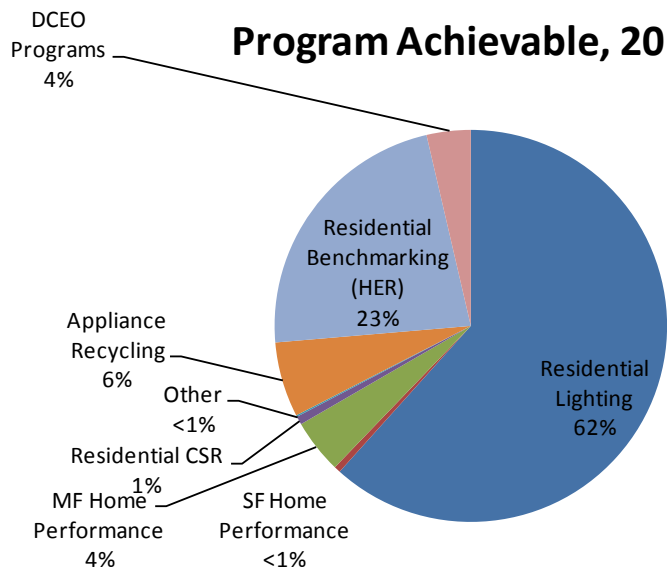
# Industrial cumulative net MWh savings estimates



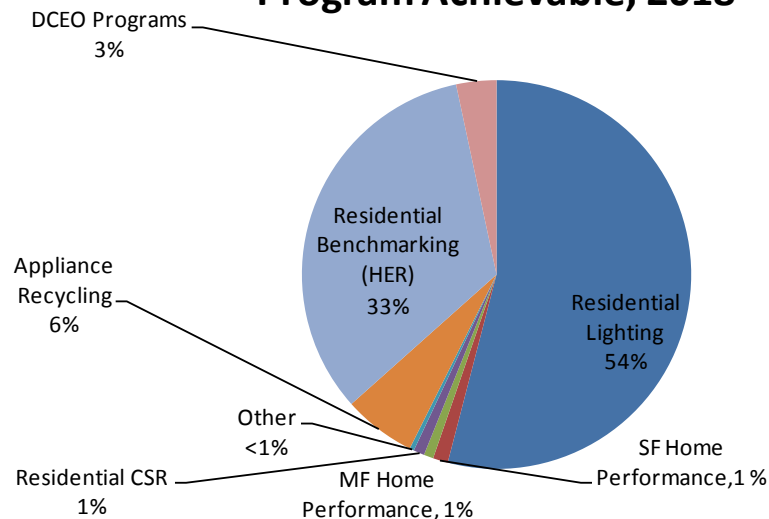
# Distribution of residential incremental MWh savings, by program



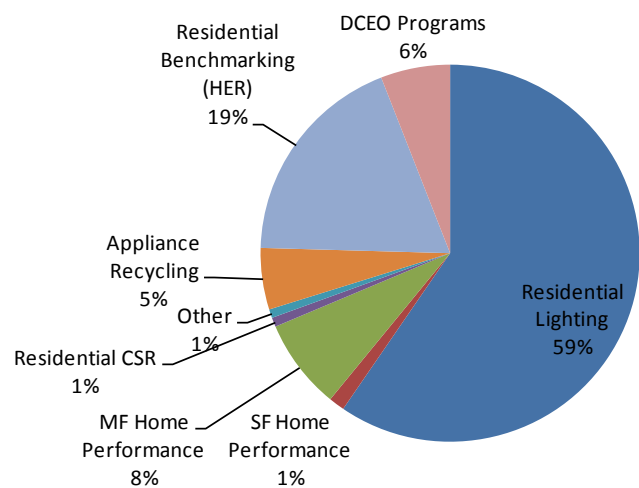
**Program Achievable, 2013**



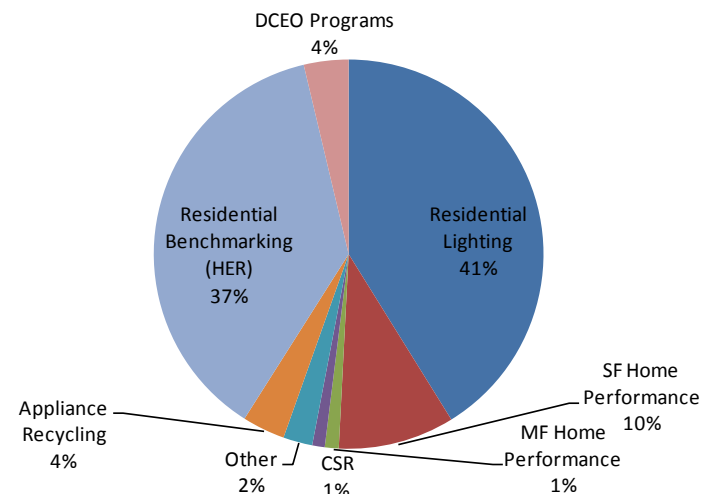
**Program Achievable, 2018**



**Maximum Achievable, 2013**



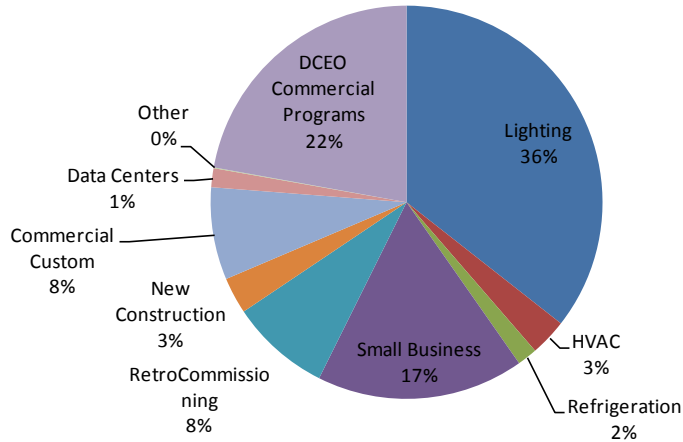
**Maximum Achievable, 2018**



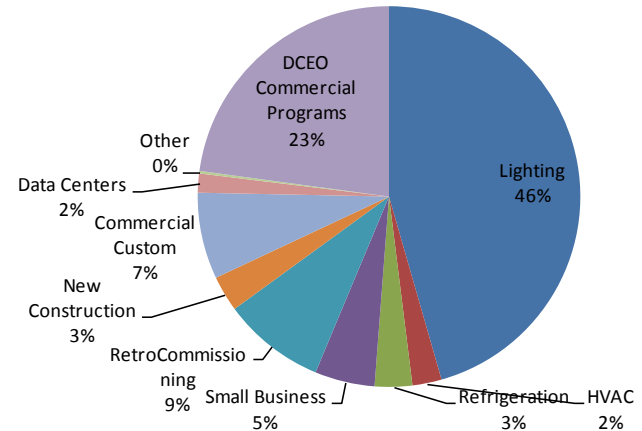
# Distribution of commercial incremental MWh savings, by program



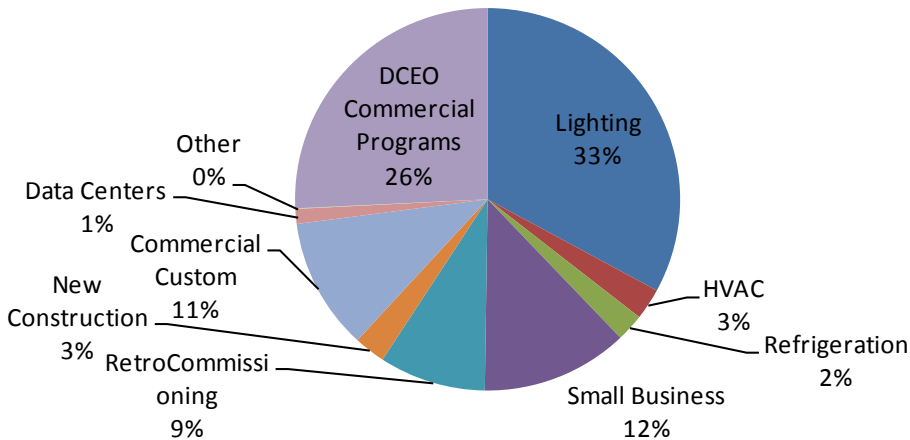
**Program Achievable, 2013**



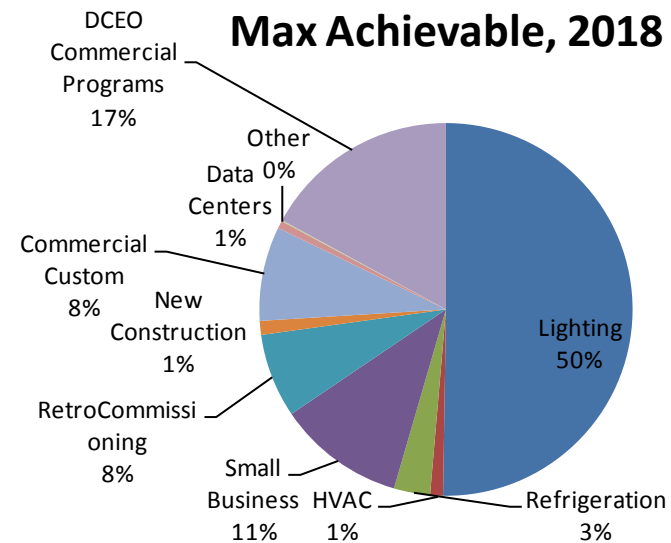
**Program Achievable, 2018**



**Max Achievable, 2013**



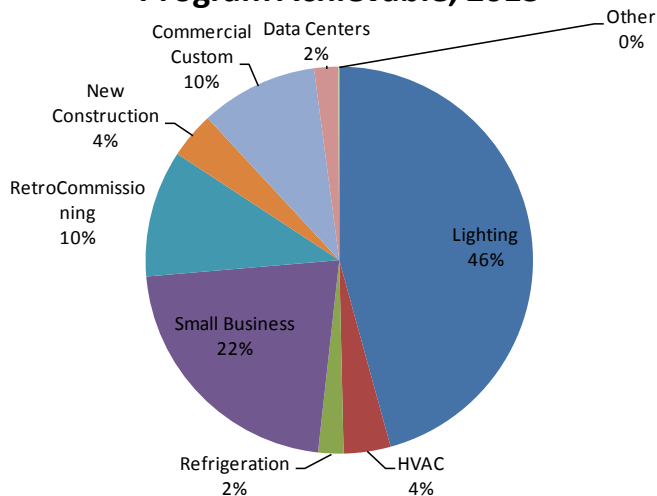
**Max Achievable, 2018**



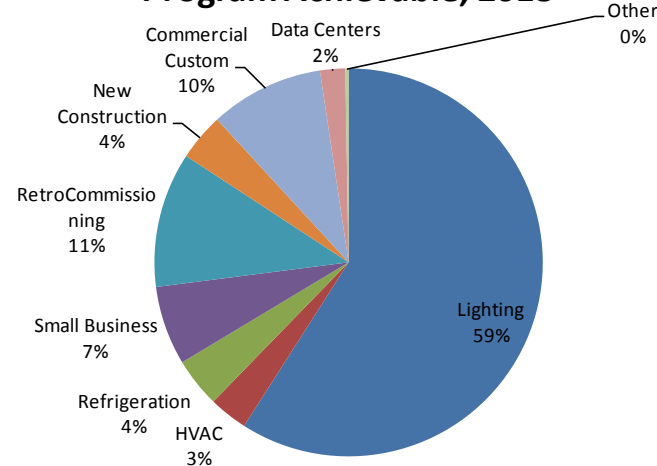
# Distribution of commercial incremental MWh savings (ComEd programs only)



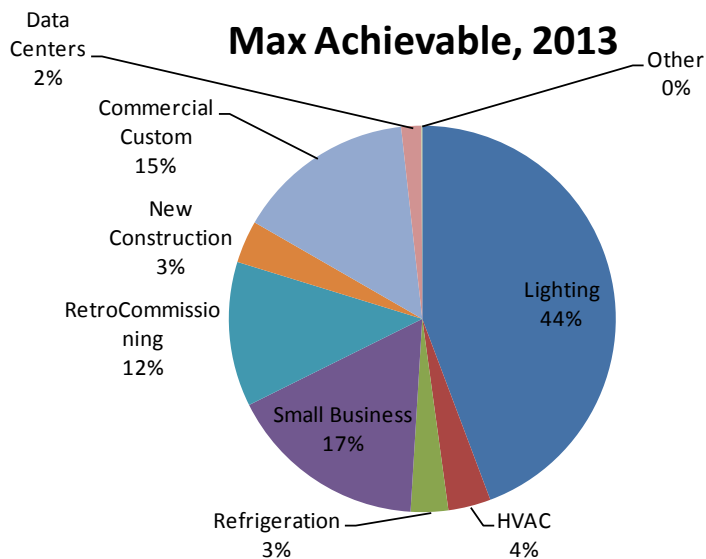
### Program Achievable, 2013



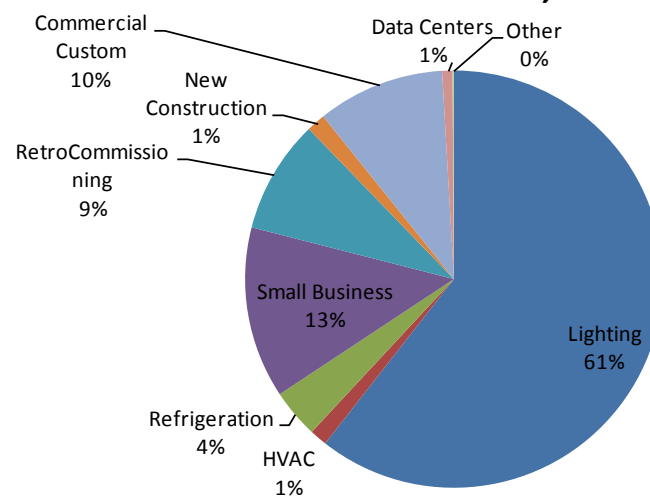
### Program Achievable, 2018



### Max Achievable, 2013



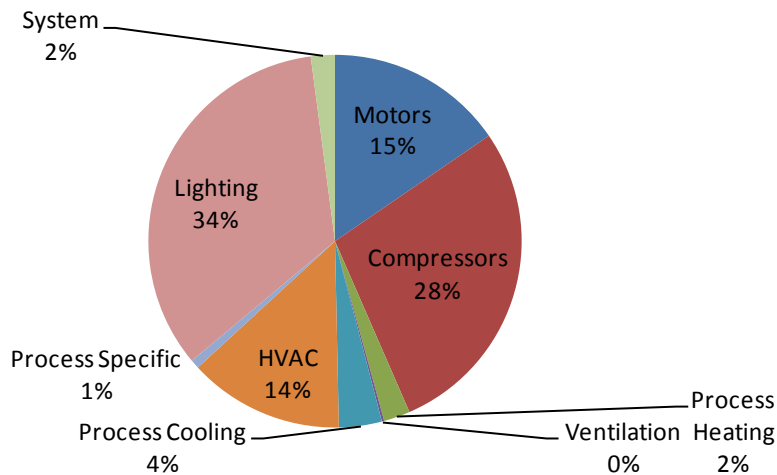
### Max Achievable, 2018



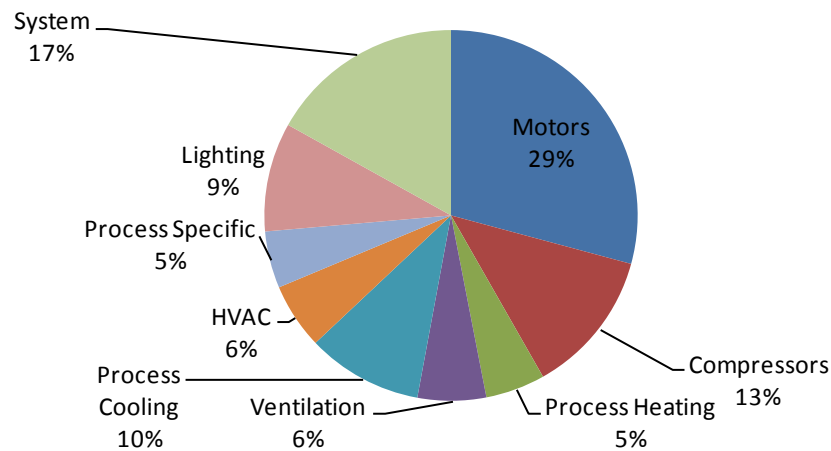
# Distribution of industrial MWh savings, by end use



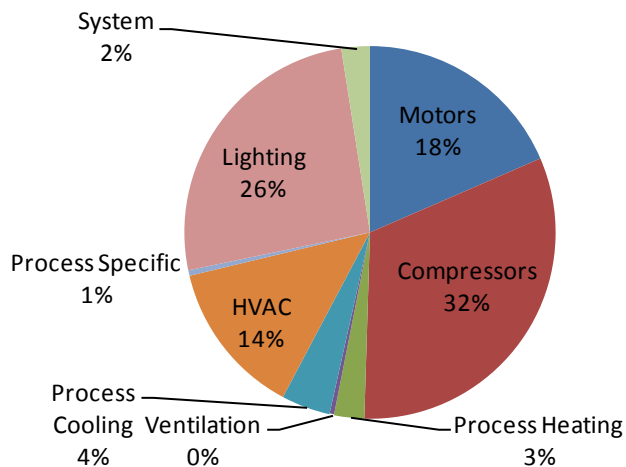
## Program Achievable, 2013



## Program Achievable, 2018



## Max Achievable, 2013



## Max Achievable, 2018

