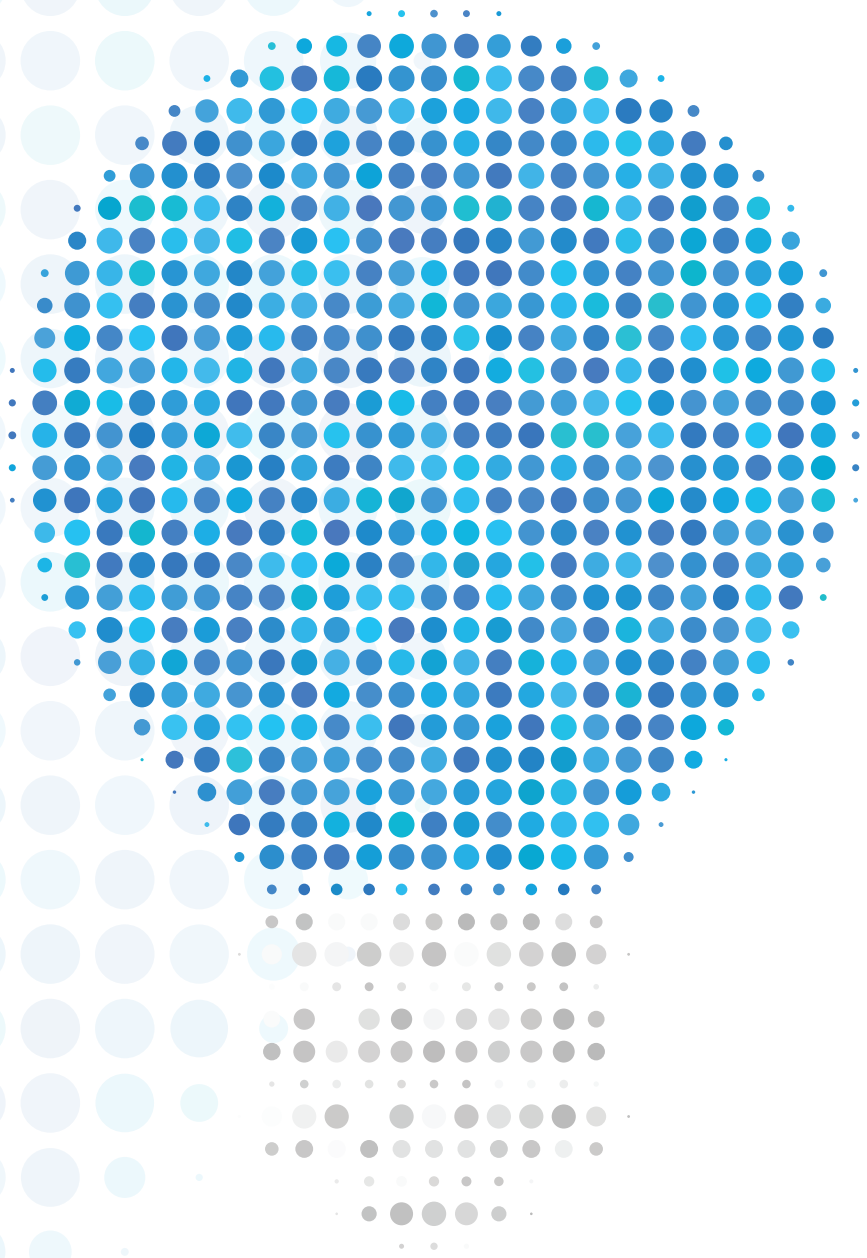


# DSM

Demand Side Management  
2021 Annual Report



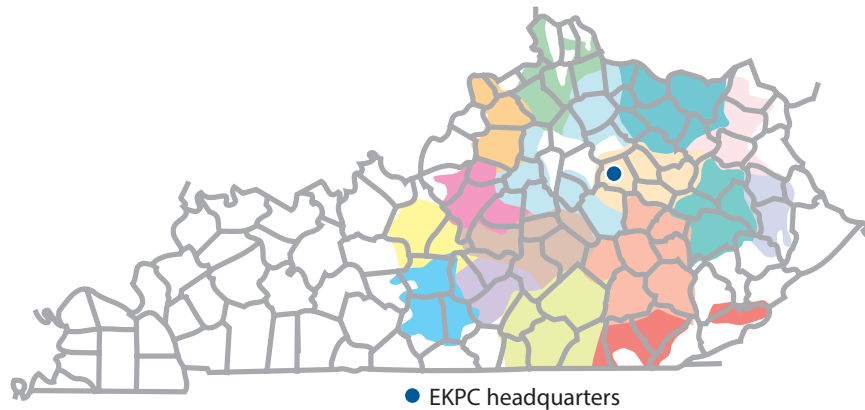
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# Who We Are

Located in the heart of the Bluegrass state, East Kentucky Power Cooperative is a not-for-profit generation and transmission (G&T) electric utility with headquarters in Winchester, Ky. Our cooperative has a vital mission: to safely generate and deliver affordable, reliable, sustainable electric power to 16 owner-member cooperatives serving more than one million Kentuckians.

Together, with our 16 owner-members, we're known as Kentucky's Touchstone Energy Cooperatives. The member co-ops distribute energy to over 554,000 Kentucky homes, farms, businesses and industries across 87 counties. We're leaders in energy efficiency and environmental stewardship. And we're committed to providing power to improve the lives of people in Kentucky.



## Sixteen distribution cooperatives, which are called the member systems, own EKPC. The 16 co-ops include:

- Big Sandy RECC
- Blue Grass Energy Cooperative
- Clark Energy Cooperative
- Cumberland Valley Electric
- Farmers RECC
- Fleming-Mason Energy Cooperative
- Grayson RECC
- Inter-County Energy
- Jackson Energy Cooperative
- Licking Valley RECC
- Nolin RECC
- Owen Electric Cooperative
- Salt River Electric Cooperative
- Shelby Energy Cooperative
- South Kentucky RECC
- Taylor County RECC

### East Kentucky Power Generation

<b>Coal</b>	<b>Generation</b>	<b>Natural Gas</b>	<b>Generation</b>	<b>Landfill</b>	<b>Generation</b>
Spurlock	1,346 net MW	Smith	Summer	Bavarian	4.6 net MW
Cooper	341 net MW	Combustion	753 net MW	Laurel Ridge	3.0 net MW
<b>Total</b>	<b>1,687 net MW</b>	Turbine	Winter	Green Valley	2.3 net MW
		Units	989 net MW	Hardin	2.3 net MW
		Bluegrass	Summer	Pendleton	3.0 net MW
<b>Hydro</b>	<b>Generation</b>	Combustion	501 net MW	Glasgow*	0.9 net MW
Southeastern	170 MW	Turbine	Winter	<b>Total Landfill</b>	<b>16.1 net MW</b>
Power Adm.		Units	567 net MW		
(SEPA)		<b>Total Natural Gas Summer</b>	<b>1,254 net MW</b>	<b>Solar Generation</b>	
		<b>Total Natural Gas Winter</b>	<b>1,556 net MW</b>	Cooperative Solar	8.5 net MW

\* Under an existing agreement, a third party receives the output of Glasgow in a 10-year power purchase agreement.

# Button-Up Weatherization:

Since the early 1990s, EKPC and its owner-member cooperatives have offered this program to improve a home's energy efficiency, comfort, and reduce energy use. This program offers incentives to members who air seal the shell of their home with the end goal of reducing heat loss in the home. Any member who resides in a site-built or manufactured home that is at least two years old and uses electricity as their primary source of heat is eligible.

## Button-Up Weatherization with Air Sealing:

*The Button-Up encourages members to air seal the envelope of their home. Air sealing is one of the most cost effective ways to improve the efficiency of a home. A blower door test is required before and after air sealing is completed to demonstrate the impact in kW demand reduction, and an incentive is paid based on that reduction. An additional incentive is paid for increased ceiling insulation.*

**In 2021, 29 Button-Up rebates were provided to members, resulting in a lifetime savings of 1,225 MWh and 2,449,873 pounds of carbon dioxide emissions.**



# ENERGY STAR™ Manufactured Home:

The ENERGY STAR™ Manufactured Home Program began in 2014. End use members who purchase and install an ENERGY STAR™ Manufactured Home are eligible for a rebate. ENERGY STAR™ Manufactured Homes are certified by a third-party administrator, Systems Building Research Alliance (SBRA) in order to ensure quality control.

An ENERGY STAR™ certified manufactured home is a home that has been designed, produced and installed by the home manufacturer to meet ENERGY STAR™ requirements for energy efficiency. These manufactured homes feature efficient heating and cooling equipment, water heaters, properly installed insulation, high-performance windows, tight construction and sealed ducts.

This program is available to all end-use members who qualify.

**In 2021, 6 rebates were provided to members, resulting in a lifetime savings of 365 MWh and 730,800 pounds of carbon dioxide emissions.**



# Touchstone Energy Home:

Since 2003, EKPC and its owner-member cooperatives have offered this program to increase energy efficiency in new-home construction. This program is designed to encourage new homes to be built to higher standards for thermal integrity and equipment efficiency, as well as to choose a geothermal or an air-source heat pump, rather than less efficient forms of heating and cooling. Homes built to Touchstone Energy Home standards typically use 30 percent less energy than the same home built to typical construction standards. Plans are submitted before the home is built, a pre-drywall inspection is made, and a blower door test is administered after the home is built to verify that the home meets the standard.

This program is targeted towards the residential new construction market and members who are constructing new site-built homes.

**In 2021, 304 Touchstone Energy Home rebates were provided to members, resulting in a lifetime savings of 19,286 MWh and 38,571,520 pounds of carbon dioxide emissions.**

EKPC's owner-members have also used this program to partner with Kentucky's affordable housing builders. Relationships with these organizations have led to improved efficiency in affordable housing and lower monthly energy costs for recipients of these homes.



# Heat Pump Retrofit:

For decades, EKPC and its owner-member cooperatives have offered this program to lower the cost of heating homes and increase comfort. This program provides incentives for members to replace their existing resistance heat source with a high-efficiency heat pump through two levels of rebates.

Level 1 offers a rebate for a 14 SEER/8.2 HSPF heat pump. Level 2 offers a rebate for a 15 SEER/8.5 HSPF heat pump or higher heat pump. Popularity of mini-split ductless heat pumps has risen in recent years. The retrofit program also offers a special incentive for mini-split systems. The existing heating system must be two years or older to qualify for incentives unless the heat pump is being installed in a new manufactured home. New manufactured homeowners who install a heat pump qualify based on the levels above.

The program is targeted to members who currently use a resistance heat source. Incentives are offered when the homeowner's primary source of heat is an electric resistance furnace, ceiling cable heat, or baseboard heat in both site-built and manufactured homes.

**In 2021, 288 Heat Pump Retrofit rebates were provided to members, resulting in a lifetime savings of 42,236 MWh and 87,471,360 pounds of carbon dioxide emissions.**



# Direct Load Control:

Since 2008, EKPC and its owner-member cooperatives have offered this program to manage peak usage. This program offers incentives to members who enroll central air-conditioners. Switches are installed and, during periods of high demand, the utility briefly cycles the appliance off in order to reduce system peaks and save on costs for peak power. Although EKPC's system typically peaks in winter, member's heating appliances are not interrupted to lower peak. Member comfort and safety are top priority.

This program is targeted to any member with central air-conditioning or heat pump. Beginning in 2019, EKPC also began offering a thermostat program that includes a qualifying Wi-Fi enabled thermostat so that end use members could enroll their smart thermostats in direct load control events. Enrollees in this program help lower energy demand during EKPC's system peaks.





## Residential Lighting:

Since 2003, EKPC and its owner-member cooperatives have provided more than one million compact fluorescent lights (CFL) and light-emitting diodes (LED) bulbs to members.

**In 2021, cooperatives provided 86,012 LEDs to its members. Each member who participated in a free, online energy audit called Virtual Energy Assessment received an LED, along with Annual Meeting attendees. These LEDs are expected to result in a lifetime savings of 16,514 MWh and 33,028,608 pounds of carbon dioxide emissions.**



## CARES:

The Community Assistance Resources for Energy Savings (CARES) program began in early 2015, and provides an incentive to enhance the weatherization and energy efficiency services provided to the end-use members by the Kentucky Community Action Agencies (CAA) network. EKPC and its owner-members provide an incentive to the CAA implementing the project on behalf of the end-use member.

This program is available to end-use members who qualify for weatherization and energy-efficiency services through their local CAA in all service territories of participating cooperatives. The maximum incentive possible per household is \$2,000.

**In 2021, 61 CARES incentives were provided, resulting in a lifetime savings of 4,329 MWh and 8,657,730 pounds of carbon dioxide emissions.**



# Impact Measures:

## System summary of 2021 DSM program savings

### DSM program totals (totals for installed energy-efficiency measures and total DLC participation for 2021)

All programs	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Lifetime energy savings (MWh)	Cost of demand saved (\$/kW)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
All DSM Programs	118,198	5,511	26.159	7.694	3,712,282	81,969	\$59	0.027	163,938,215

### Button-Up Weatherization

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
Button-Up	29	82	0.019	0.063	\$23,560	15	1,225	\$0.02	2,449,873

### CARES

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
CARES	61	289	0.044	0.088	\$154,915	15	4,329	\$0.04	8,657,730

\* Includes \$835,972 program administration and promotional expenses.



## Energy Audits

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
Online	34	16	0.000	0.000	\$133,000	5	78	\$1.70	156,900

## ENERGY STAR® Manufactured Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
ES Manufactured Home	6	24	0.003	0.006	\$12,840	15	365	\$0.04	730,800

## Heat Pump Retrofit

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
Heat Pump	288	2,112	0.099	0.000	\$493,017	20	42,236	\$0.01	84,471,360

## Residential Lighting

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
LEDs	86,012	1,806	0.206	0.344	\$77,659	8	14,450	\$0.01	28,900,032

## Touchstone Energy Home

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Measure life (years)	Lifetime energy savings (MWh)	Cost of energy saved (\$/kWh)	Lifetime CO2 savings (lbs)
TSE Home Prescriptive	39	124	0.028	0.102	\$56,550	20	2,474	\$0.02	4,948,320
TSE Home Performance	265	841	0.188	0.692	\$384,250	20	16,812	\$0.02	33,623,200

## Direct Load Control Cumulative

Residential program	Participation	Annual Energy Savings (MWh)	Summer Demand Savings (MW)	Winter Demand Savings (MW)	2021 program costs	Cost of Demand saved (\$/KW)
DLC Air Conditioner	16,054	80	16.054	0.000	\$681,671.00	\$42.46
DLC Water Heater	12,307	123	4.554	6.400	\$499,734.00	\$109.75
Thermostats	3,103	16	4.965	0.000	\$338,228.00	\$68.13
Totals	31,464	218.855	25.572	6.400	\$1,519,633.00	\$59.42

# 2021 Basic Program Assumptions <sup>1</sup>

## Measure: Button-Up Weatherization with Air Sealing

Annual kWh Saved:	2,205
Winter Demand Savings:	1.71
Summer Demand Savings:	0.52
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC: <sup>2</sup>	1.45

## Measure: Heat Pump SEER 14

From Electric Furnace to ENERGY STAR  
SEER 14, HSPF 8.2

Annual kWh Saved:	7,533
Winter Demand Savings:	0
Summer Demand Savings:	0.32
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: <sup>2</sup>	1.55

## Measure: Heat Pump SEER 15

From Electric Furnace to ENERGY STAR  
SEER 15, HSPF 8.5

Annual kWh Saved:	7,978
Winter Demand Savings:	0
Summer Demand Savings:	0.45
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC: <sup>2</sup>	1.55

## Measure: Touchstone Energy Home

Prescriptive and Performance – Encourages new homes to be built to a standard of at least SEER 15, HSPF 8.5; HERS Rating of 75 and below

Annual kWh Saved:	3,172
Winter Demand Savings:	2.61
Summer Demand Savings:	0.71
Lifetime of Savings:	20 years
Installation Rate:	100%
TRC:	1.60

## Measure: LEDs

Annual kWh Saved:	24
Winter Demand Savings:	0.0040
Summer Demand Savings:	0.0024
Lifetime of Savings:	8 years
Installation Rate:	80%
TRC:	2.78

## Measure: Wi-fi Enabled Thermostat

Annual kWh Saved:	36
Winter Demand Savings:	0.00
Summer Demand Savings:	1.20
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	3.96

## Measure: CARES

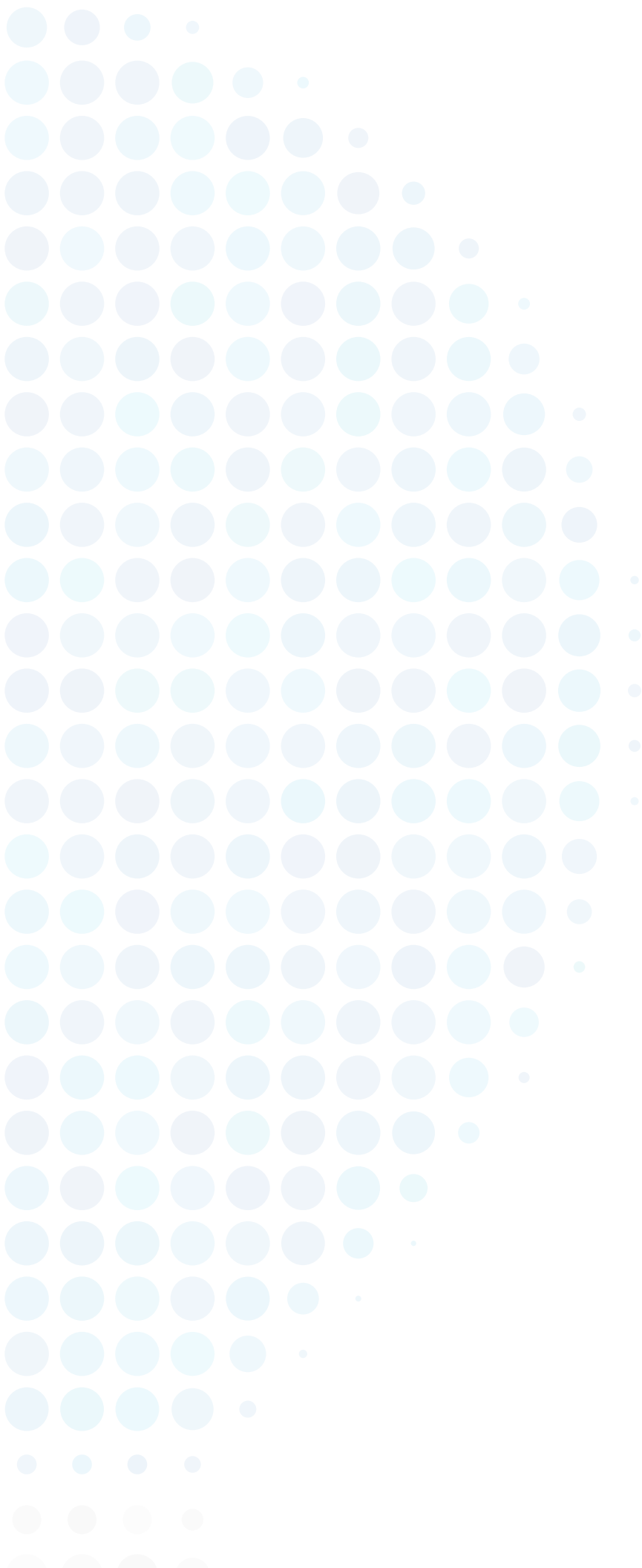
Annual kWh Saved:	4,731
Winter Demand Savings:	1.44
Summer Demand Savings:	0.72
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	0.96

## Measure: ENERGY STAR® Manufactured Home

Annual kWh Saved:	4,060
Winter Demand Savings:	0.93
Summer Demand Savings:	0.47
Lifetime of Savings:	15 years
Installation Rate:	100%
TRC:	1.71

<sup>1</sup> Savings numbers are "ex ante" or as planned gross savings except where noted.

<sup>2</sup> Total Resource Cost (TRC) is an overall program benefits/costs analysts ratio.



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