Long-Term Demand Side Management Potential in the Entergy Louisiana and Entergy Gulf States Louisiana Service Territories

Summary Presentation

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Contents

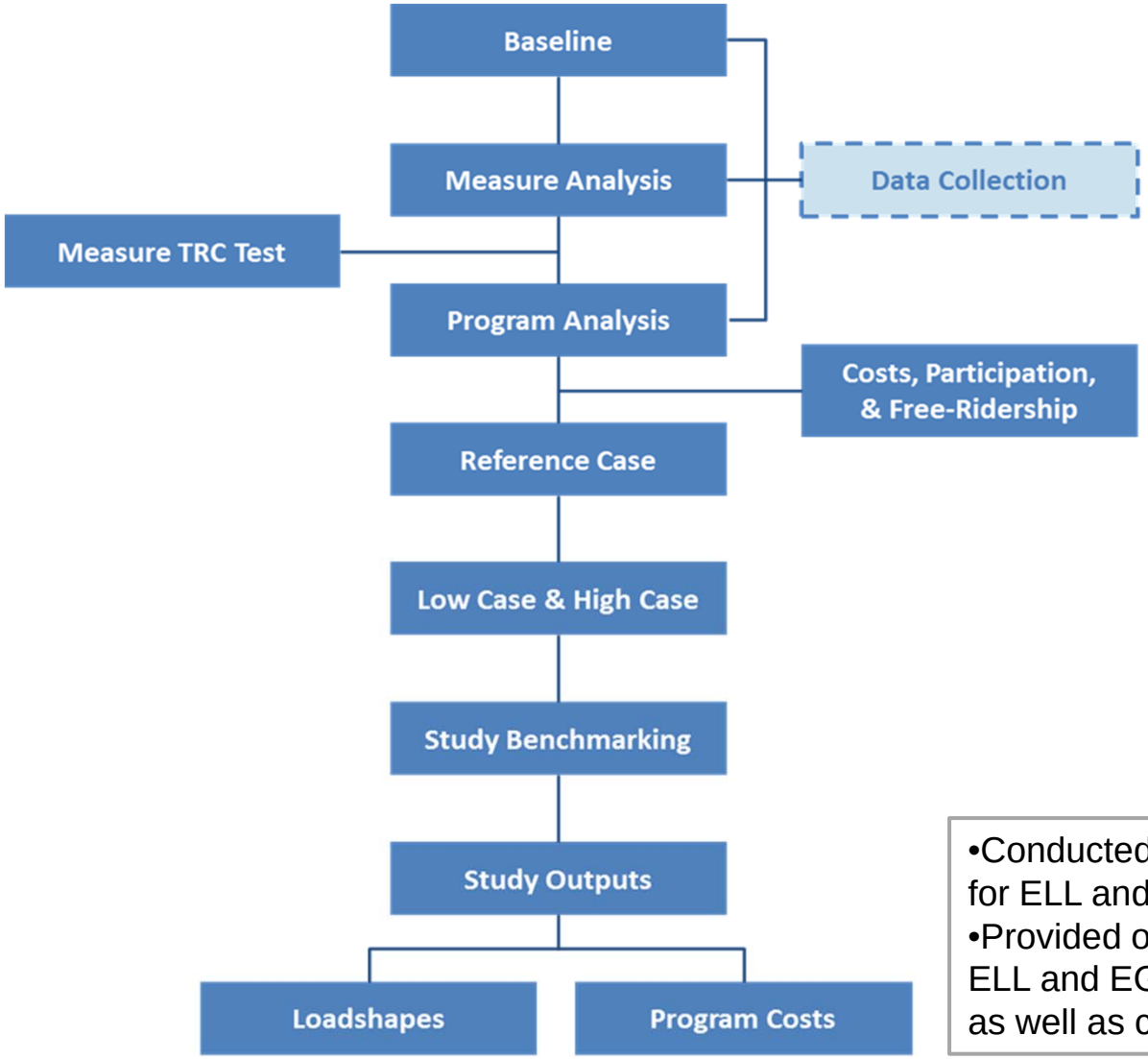
Objectives of the Potential Study

- Develop electric achievable program savings and cost projections[(1)] representing three levels of achievable DSM (low, reference, and high) over 20 years (2015-2034).
- Develop hourly load shapes for 2015-2034 for the Entergy Louisiana and Entergy Gulf States Louisiana 2015 IRP analysis.

Note: The Potential Study should not be applied directly to short-term DSM planning activities, such as program implementation plans or utility goal setting, but can serve as one of the inputs into the more detailed analysis necessary to support such planning.

(1) Utility costs include: incentives and administrative (and if applicable installation and ongoing costs incurred by ELL or EGSL)

DSM Potential Study Approach



- Conducted bottom-up analysis for ELL and EGSL
- Provided outputs separately for ELL and EGSL, as well as combined outputs

Achievable Potential Scenario Definitions

- **Reference case potential**. The realistic level of cost-effective savings that could be achieved by utility programs given the best information available at the time of the Potential Study. Incentive levels are generally between 25% and 75% of incremental cost, with the exception of hard-to-reach markets, e.g., small business, where incentives need to be different.
- **High case potential**. The level of cost-effective savings that could be achieved by utility programs at maximum incentive levels. Incentive levels were set to 100% of incremental costs where possible.
- **Low case potential**. The level of cost-effective savings that could be achieved at lower incentive levels. In most cases incentives were capped at 25%.

DSM Inputs to IRP

Input	Values
Loadshape format	Hourly (load savings estimates for every hour of every year over the 20 year time horizon)
Savings inputs	Load shapes provided for each program for each scenario
Cost inputs	Total electric program costs, by program by year

Potential study data source summary

Data Type	Source (Year)
Avoided costs, customer counts, load forecasts, retail rates	Entergy (2014)
Residential, Commercial and Industrial Baseline data	Entergy Residential Appliance Saturation Surveys (2006)
	U.S. DOE Residential Energy Consumption Survey (RECS, 2009)
	U.S. Census Data (2009)
	Commercial Building Inventory (CBI) data for Louisiana (2014)
	Air Conditioning Heating and Refrigeration Institute (AHRI, 2014)
	U.S. DOE Commercial Buildings Energy Consumption Survey (CBECS, 2003)
	U.S. DOE Manufacturing Energy Consumption Survey (MECS, 2010)
	Other Secondary Sources (see report Appendix)
	ICF expert judgment
Residential, Commercial and Industrial Measure data	AR Technical Resource Manual (TRM) v. 3.0 (2014)
	OK TRM (2014)
	IL TRM (2014)
	ICF measure databases (2014)
	AR Technical Resource Manual v. 3.0 (2014)
	OK TRM (2014)
	IL TRM (2014)
	Mid-Atlantic TRM (2014)
	U.S. DOE studies; U.S. EPA studies; LBNL studies; other published studies (see report Appendix)
Program data	U.S. EIA (2010-2012)
	ACEEE (2014)
	ICF (multiple years)

Programs types modeled

RESIDENTIAL

- Home Energy Use Benchmarking
- Lighting and Appliances
- Appliance Recycling
- Multifamily
- Efficient New Homes
- ENERGY STAR Air Conditioning
- Home Energy Audit and Retrofit
- Pool Pump
- Water Heating
- Low Income Weatherization
- Direct Load Control
- Dynamic Pricing

COMMERCIAL

- Commercial Prescriptive and Custom
- Data Centers
- New Construction
- Retro commissioning (RCx)
- Small Business
- Dynamic Pricing

INDUSTRIAL

- Industrial Prescriptive and Custom
  - •Machine Drive
  - •Process Heating
  - •Process Cooling and Refrigeration
  - •Facility HVAC
  - •Facility Lighting
  - •Other Process/Non-Process Use
  - •All Systems (e.g., Sub-metering)

Electric Energy End Uses Modeled

Sector	End Use
Residential	Lighting
	Consumer Electronics
	Appliances
	HVAC
	Hot Water
	Shell
	Other (e.g., home energy use benchmarking)
Commercial	Lighting
	HVAC
	Refrigeration
	Hot Water
	Food Service Equipment
	Other (including RCx, Data Center)
Industrial	Machine Drive
	Pumps
	Fans
	Compressors
	Other applications
	Process Heating
	Process Cooling and Refrigeration
	Other Process Uses
	Electro-Chemical
	Facility HVAC
	Facility Lighting
	Other non-process use

Measures included in study:

•Represent commercially available measure types for each end use

•Start with comprehensive list

•Test each for cost-effectiveness

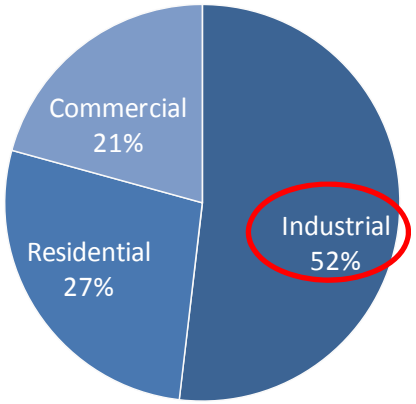
•Include in DSM potential estimates only measures with TRC of at least 1.0, with limited exceptions

Sector	# Measure Types Evaluated	Total # Measures Evaluated (All Measure Permutations)
Residential	45	128
Commercial	46	503
Industrial	101	466
Total	**192**	**1,097**

Note:
67% of measures evaluated were retrofit in nature,
31% were replace-on-burnout, 2% were new construction

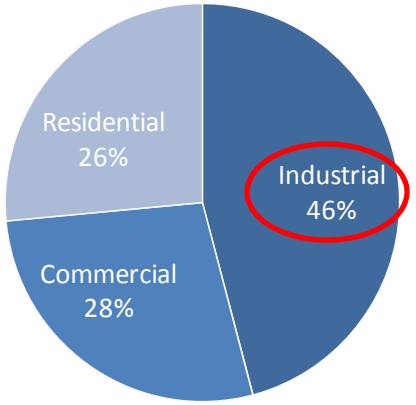
Distribution of Total Base Year (2013) Electric Electricity Use, by Sector, for ELL, EGSL and U.S. Total

ELL



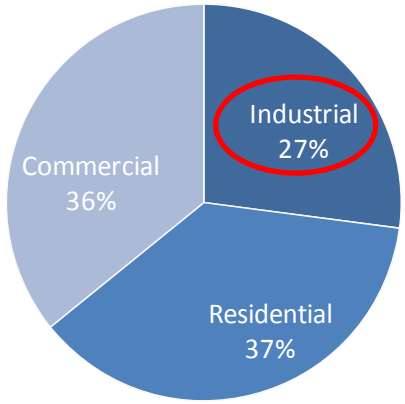
*ELL Total 2013 Sales= 32,220 GWh

EGSL



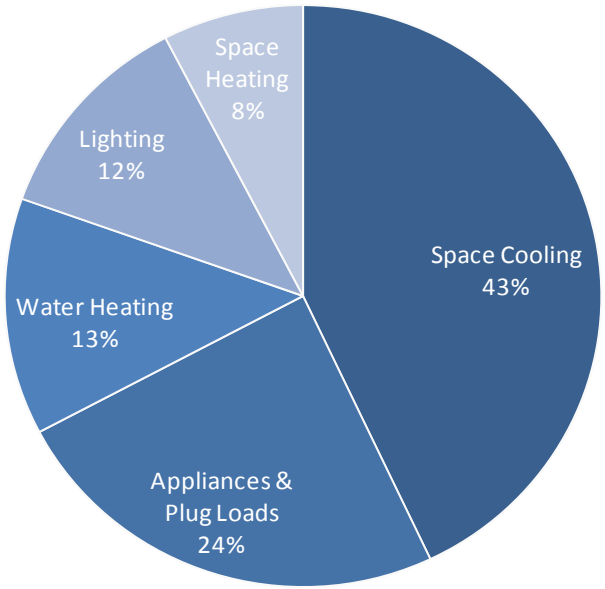
*EGSL Total 2013 Sales= 19,663 GWh

U.S. Total



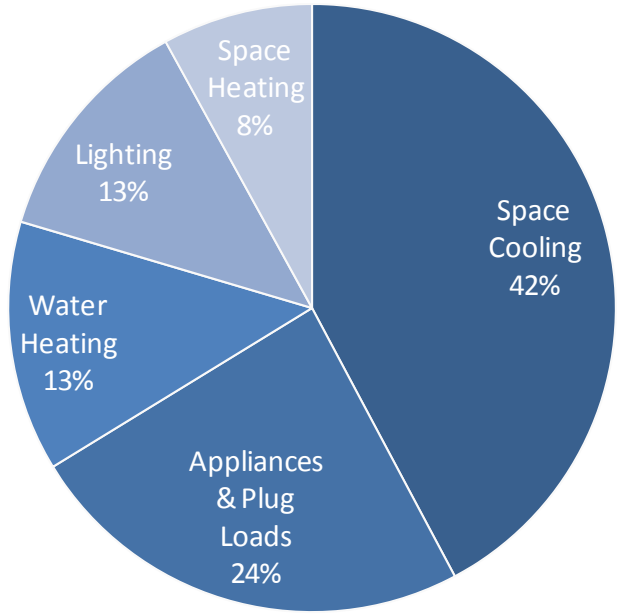
Distribution of Base Year (2013) ELL & EGSL Residential Electricity Use by End Use

ELL



Total 2013 Residential Sales=8,820 GWh

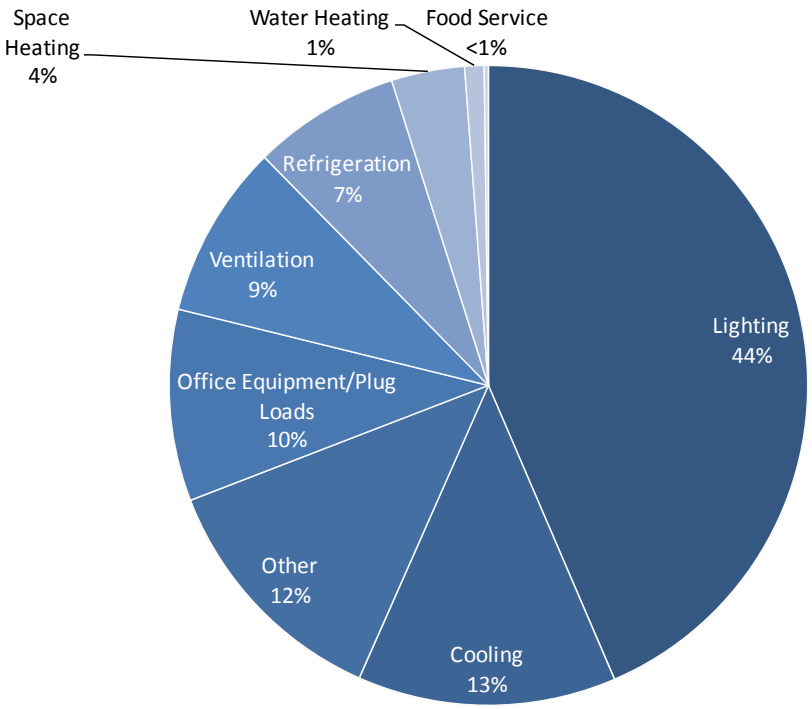
EGSL



Total 2013 Residential Sales=5,206 GWh

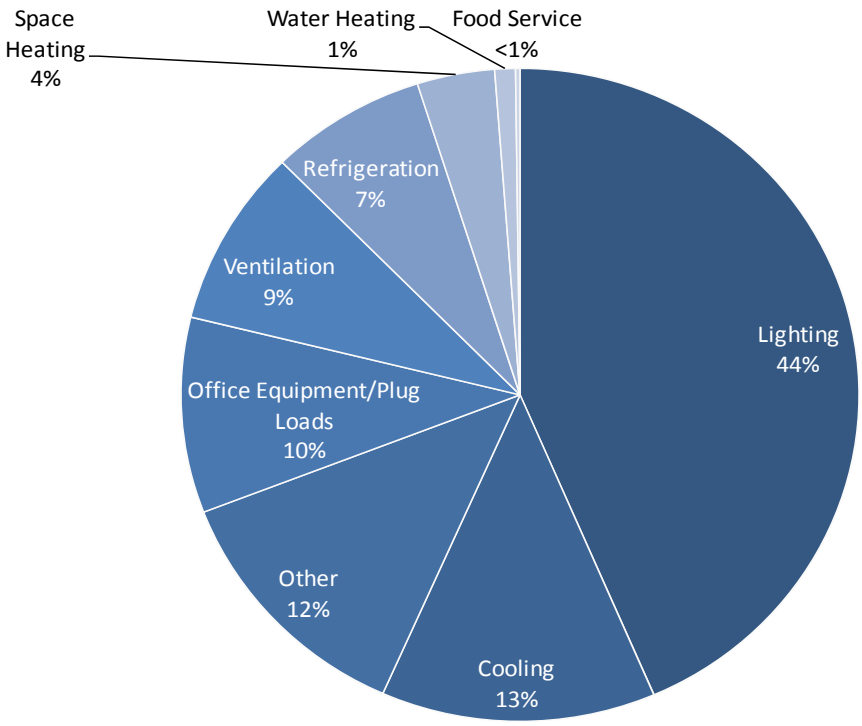
Distribution of Base Year (2013) ELL & EGSL Commercial Electricity Use by End Use

ELL



Total 2013 Commercial Sales=6,688 GWh

EGSL



Total 2013 Commercial Sales=5,436 GWh

Base Year (2013) Industrial Electricity Use by Sector by End Use, ELL

	Large Industrial						Small Industrial	All Sectors
	Petroleum Refining	Industrial Organic Chemicals	Plastics & Polymers	Chlor-alkali	Pulp & Paper	All Other - Large Industrial		
Total Industrial Base Year (2013) Sales, GWh	5,801	1,313	114	3,824	642	2,431	2,306	**16,431**
% Total Industrial Base Year (2013) Sales	35%	8%	1%	23%	4%	15%	14%	**100%**
End Use	**% Base Year (2013) MWh Use by Sector by End Use**							
Machine Drive	80%	80%	44%		92%	52%	52%	**54%**
-Pumps	48%	48%	9%		29%	14%	14%	**26%**
-Fans	7%	7%	6%		18%	8%	8%	**6%**
-Compressors	12%	12%	7%		4%	9%	9%	**8%**
-Motor - Other Applications	13%	13%	22%		42%	22%	22%	**14%**
Process Heating	3%	3%	19%			11%	11%	**5%**
Process Cooling and Refrigeration	5%	5%	12%			7%	7%	**4%**
Other Process Uses	2%	2%	3%			2%	2%	**1%**
Electro-Chemical	0%	0%	1%	90%		9%	9%	**24%**
Facility HVAC	3%	3%	10%		0%	8%	8%	**4%**
Facility Lighting	2%	2%	8%			6%	6%	**3%**
Other non-process use	0%	0%	2%		8%	2%	2%	**1%**
Other process/Other non-process use				10%				**2%**

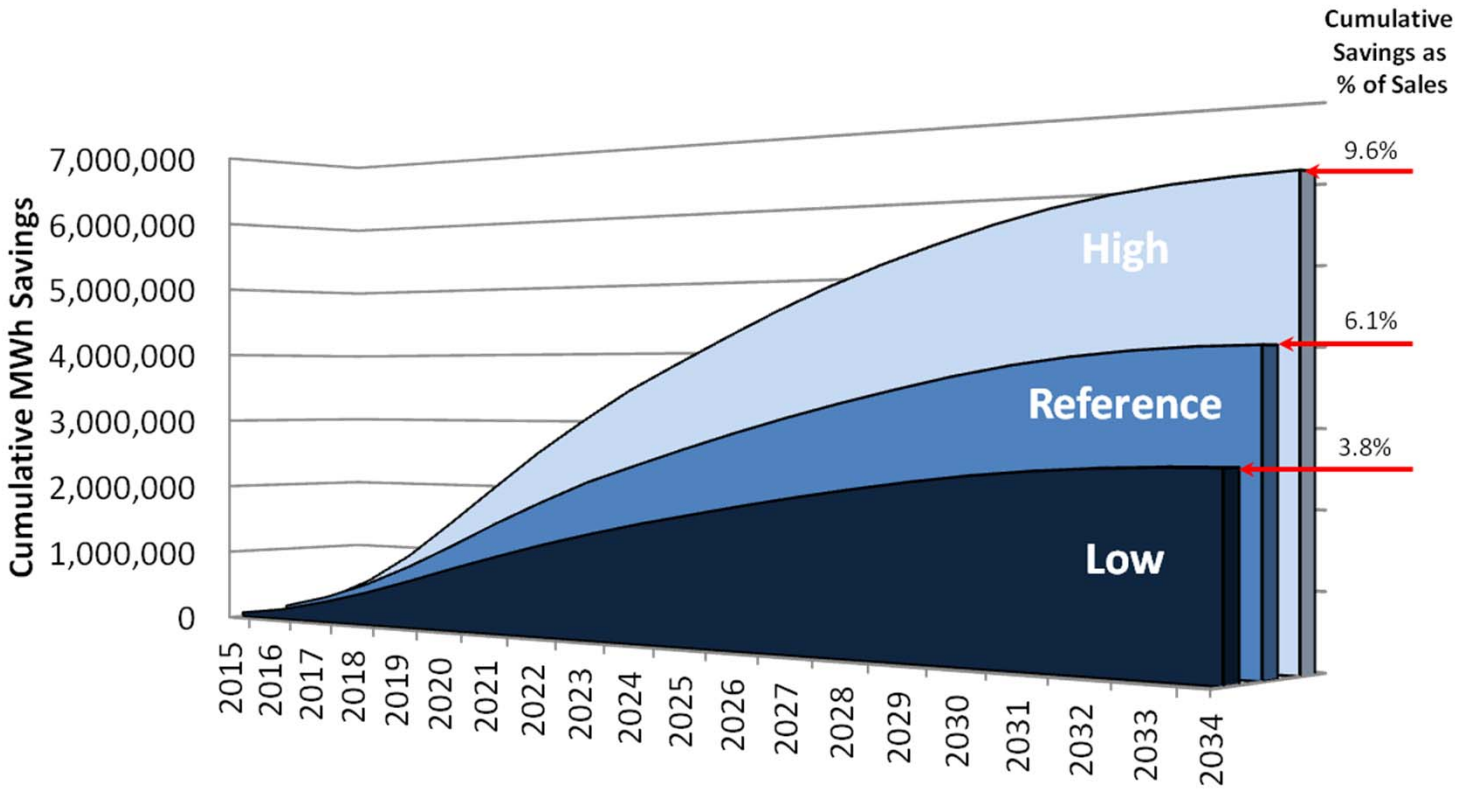
Base Year (2013) Industrial Electricity Use by Sector by End Use, EGSL

	Large Industrial						Small Industrial	All Sectors
	Petroleum Refining	Industrial Organic Chemicals	Plastics & Polymers	Chlor-alkali	Pulp & Paper	All Other - Large Industrial		
Total Industrial Base Year (2013) Sales, GWh	335	323	472	1,923	441	3,384	1,456	**8,333**
% Total Industrial Base Year (2013) Sales	4%	4%	6%	23%	5%	41%	17%	**100%**
End Use	**% Base Year (2013) MWh Use by Sector by End Use**							
Machine Drive	80%	80%	44%		92%	52%	52%	**44%**
-Pumps	48%	48%	9%		29%	14%	14%	**14%**
-Fans	7%	7%	6%		18%	8%	8%	**6%**
-Compressors	12%	12%	7%		4%	9%	9%	**7%**
-Motor - Other Applications	13%	13%	22%		42%	22%	22%	**17%**
Process Heating	3%	3%	19%			11%	11%	**8%**
Process Cooling and Refrigeration	5%	5%	12%			7%	7%	**5%**
Other Process Uses	2%	2%	3%			2%	2%	**2%**
Electro-Chemical	0%	0%	1%	90%		9%	9%	**26%**
Facility HVAC	3%	3%	10%		0%	8%	8%	**6%**
Facility Lighting	2%	2%	8%			6%	6%	**4%**
Other non-process use	0%	0%	2%		8%	2%	2%	**2%**
Other process/Other non-process use				10%				**2%**

Participation Modeling Methodology

- *Eligible stock*. How many units could be replaced in each year?
  - Applicability; current saturation, replace-on-burnout; retrofit; new construction
- *Financial barriers*. Modeled using payback acceptance.
- *Non-financial barriers.* Contractor participation rates; awareness; customer preference, etc.
- *Benchmarking.* Consideration of historical participation rates, particularly in the peer territories

Combined Louisiana (ELL + EGSL) Cumulative MWh Achievable Savings Forecast, by Scenario



Combined (ELL+EGSL) Total Savings, Costs, and Cost-effectiveness over 2015-2034 (20 Years)

Scenario	Cumula-tive GWh Savings	Cumula-tive GWh Savings as % of Sales	Cumula-tive MW Savings	Cumula-tive MW Savings as % of Peak	TRC Benefits ($Mil.)	TRC Costs ($Mil.)	Net TRC Benefits ($Mil.)	TRC B/C Ratio	Total Pro-gram Costs, ($Mil.)	Incre-mental Cost per kWh	Level-ized Cost per kWh
Low	2,549	3.8%	673	5.9%	$1,868	$1,002	$866	1.9	$1,387	$0.35	$0.04
Reference	3,996	6.1%	1,139	9.9%	$3,061	$1,665	$1,397	1.8	$2,637	$0.45	$0.05
High	5,923	9.6%	1,656	14.4%	$4,717	$3,415	$1,303	1.4	$6,362	$0.64	$0.08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