

Nicor Gas Adjustable Savings Goals & Weighted Average Measure Life (WAML)

SAG Presentation

January 15, 2019



Overview



Adjustable Savings Goals

- Approved Plan Goals
- Measures Affected
- Key Calculations and Assumptions
 - Furnaces
 - Boilers
 - Insulation/Air Sealing
 - Errata
- Adjusted Savings Goals

Adjustable Weighted Average Measure Life (WAML)

- Approach
- Measure Life Assumptions based on TRMv7 & Assumptions
- Adjusted WAML Based on TRMv7 Measure Life Updates

Approved Plan Goals



Year	Net Therms	Life Cycle Net Therms
2018	16,509,650	213,084,028
2019	16,509,650	213,084,028
2020	16,509,650	213,084,028
2021	16,509,650	213,084,028
4 Year	66,038,600	852,335,980
Weighted Average Measure Life (WAML)		12.91
Stipulated WAML Minimum		11.91

Measures by Program



Program	No TRMv7 Measure Change	TRMv7 Measure Change	“Customized” TRM Measures	Custom Measures	Total
BEER	94	4	7	6	111
BNC	0	0	0	3	3
Custom	0	0	0	13	13
HEER	3	7	0	0	10
HES	11	14	1	3	29
IQ	14	14	2	5	35
MF	24	10	2	6	42
Outreach	0	6	0	1	7
RNC	0	0	0	1	1
SB	35	2	5	4	46
SEM	0	0	0	3	3
Total	181	57	17	45	300

Customized TRM Measures



For Nicor Gas E3 model purposes, “Customized TRM” measure is a measure that utilizes the TRM methodology to calculate savings, in conjunction with:

- past program verified savings history & methodologies
- Nicor Gas specific market research and/or weighted average savings calculations
- other workpaper research/methodologies to determine specific Nicor Gas plan savings estimates.

- 17 measures identified in original Adjustable Savings Goal template as “Custom” calculate savings using the TRM
- Savings for these Customized TRM measures could potentially be impacted by future TRM version changes.
- Measure Life changes in the TRM will also impact these Customized TRM measures.

TRMv7 Calculations and Assumptions



5.3.7 High Efficiency Furnace

- **Old TRMv6** $\Delta Therms = \text{Gas_Furnace_Heating_Load} * HF * ((1/(\text{AFUE}(\text{base}) * (1 - \text{Derating}(\text{base})))) - (1/(\text{AFUE}(\text{eff}) * (1 - \text{Derating}(\text{eff}))))))$

- **New TRMv7**
$$\Delta Therms = \frac{EFLH * CAPInput}{(1 - \text{Derating}_{eff})} * \left(\frac{\text{AFUE}(eff) * (1 - \text{Derating}(eff))}{\text{AFUE}(base) * (1 - \text{Derating}(base))} - 1 \right) / 100,000$$

- Where CAPInput = Gas Furnace input capacity (Btuh) = Actual
- Nicor Gas's Assumption to determine Furnace Input Capacity (CAPInput)
 - Actual Furnace data in our HEER & MF program from PY5, PY6, 2018.
 - Input Capacity Data Source: AHRI - Matched furnace models from AHRI to participation data to obtain the input capacity.

Furnace Capacity Calculation



Based on average input capacity by offering – PY5, PY6 & 2018

Program	Measure	Total Units	Sum CAPInput (000)	Average CAPInput (Btuh)
HEER	Furnace, >95% AFUE	16,506	1,380,249	83,621
HEER	Furnace, >97% AFUE	2,685	220,770	82,223
MF	Furnace, >95% AFUE MF IU	33	1,702	51,576

Algorithm Calculation Example:

Chicago 95% AFUE, Avg. 83,621 Btuh furnace installed replacing 80% AFUE Furnace without verified quality installation

New Calculation:

$$\Delta\text{Therms} = ((976 * 83,621) / (1 - 0.064) * (((0.95 * (1 - 0.064)) / (0.8 * (1 - 0.064)))) - 1) / 100,000$$

$$= 163.5 \text{ Therms}$$

$$\text{TRMv6 } \Delta\text{Therms} = 175.9 \text{ Therms}$$

TRMv7 Calculations and Assumptions



5.3.6 High Efficiency Boiler

- **Old TRMv6**

$$\Delta\text{Therms} = \text{Gas_Boiler_Load} * \text{HF} * (1/\text{AFUE}(\text{base}) - 1/\text{AFUE}(\text{eff}))$$

- **New TRMv7**

$$\Delta\text{Therms} = (\text{EFLH} * \text{CAPInput} * (\text{AFUE}(\text{eff}) / \text{AFUE}(\text{base}) - 1)) / 100000$$

- Where CAPInput = Gas Boiler input capacity (Btuh) = Actual
- Nicor Gas's Assumption to determine Boiler Input Capacity (CAPInput)
 - Actual HEER & MF program data from PY5, PY6, 2018 to determine the average input capacity.
 - Input Capacity Data Source: AHRI - Matched Boiler models from AHRI to the participation data to obtain input capacity

Program	Measure Name	Count	Sum of CAPInput	Average CAPInput (Btuh)
HEER & IQ	Boilers, >95% AFUE <300 MBH	359	46,255	128,844

TRMv7 Assumptions & Errata Update



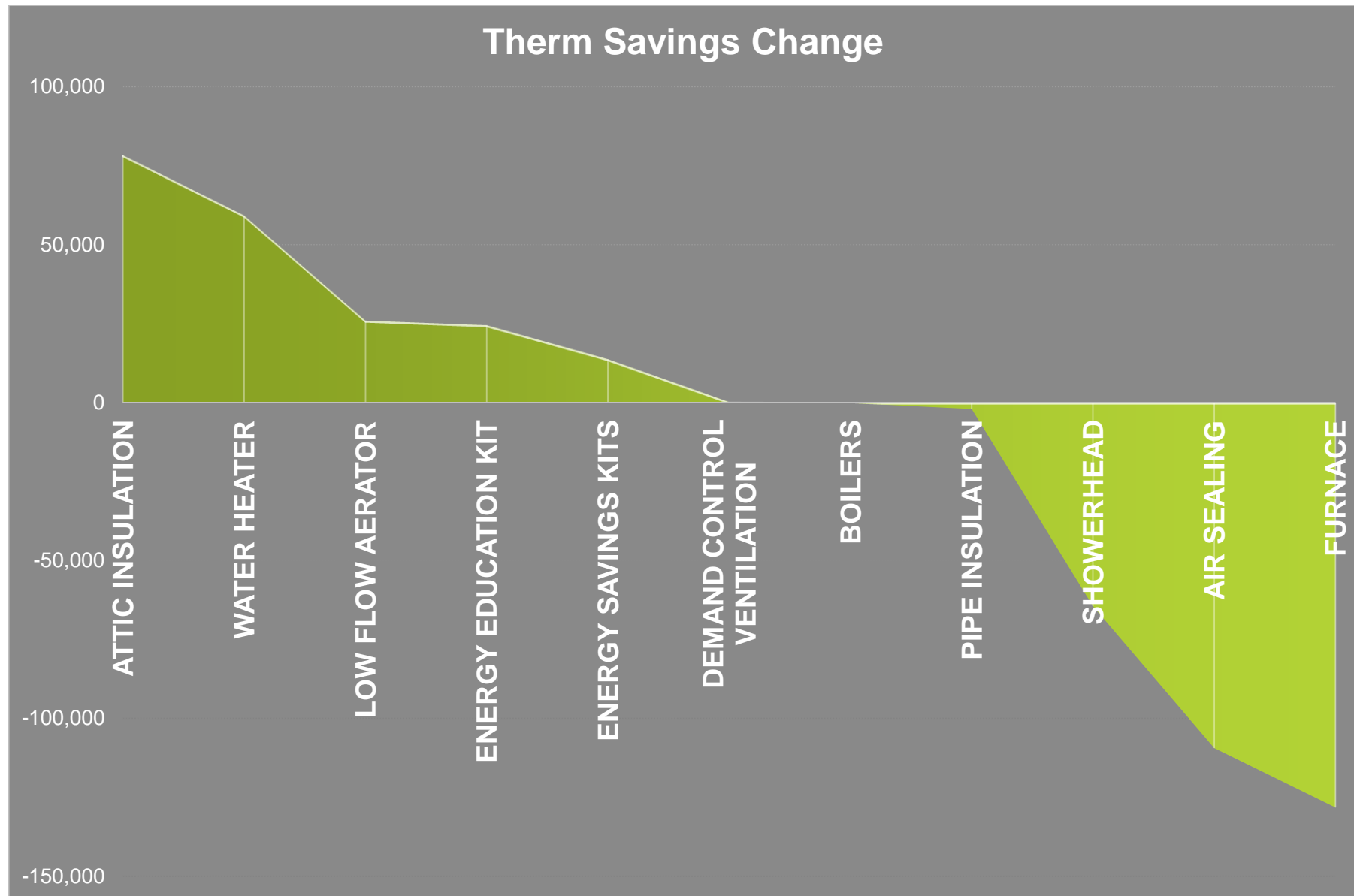
Other Assumption:

- 5.6.1 Air Sealing Measure – All IQ & majority HES program measure participation in Air Sealing are factored with Attic Insulation participation.

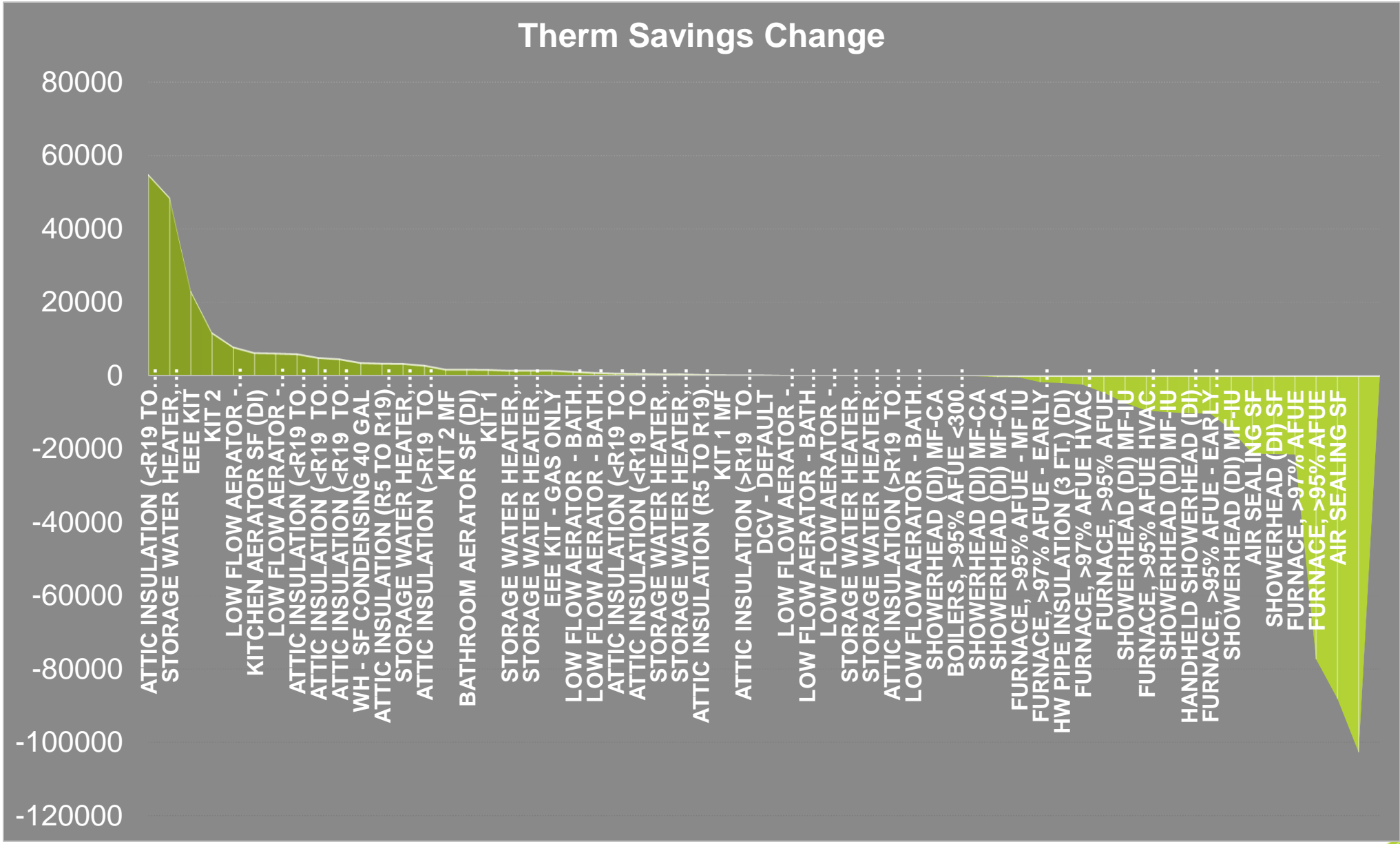
Errata Updates

- All VEIC – Errata changes were included in adjustments to Nicor Gas's TRMv7 updates
- Only one Gas Measures was affected In the Nicor Gas Plan
 - 4.3.1 Gas Water Heater
 - TRMv7 updates the Baseline Uniform Energy Factor (UEF) which adjusted the net Therm savings in the Nicor Gas Plan.

Change In Savings Goal By Measure Group



Change in Savings Goal by Measure



Adjustable Savings Goals - 2019



Nicor Gas Net Therm Savings Goals based on TRMv7 Update

	Plan Energy Savings Goal (Therms)	Adjusted Energy Savings Goal (Therms)	Energy Savings Adjustment to Plan Goal (Therms)	Brief Explanation of Significant Adjustments
Program	2019	2019	2019	2019
(a)	(f)	(g)	(h)=(g-f)	(i)
BEER	2,859,285	2,862,428	3,143	Storage water heater & DCV
BNC	314,272	314,272	0	
Custom	3,517,892	3,517,892	0	
Outreach	1,569,325	1,609,226	39,901	Energy and Education Savings K
HEER	3,706,226	3,582,999	-123,228	Furnace and Boiler
HES	537,661	506,317	-31,343	Aerators, pipe and, air sealing, a
IQ	1,816,459	1,833,725	17,266	Air sealing, attic insulation, furna
MF	573,562	564,602	-8,960	Aerators, showerheads, furnace,
RNC	162,338	162,338	0	
SB	486,827	487,328	501	Storage water heater
SEM	965,804	965,804	0	
Portfolio Total (Therms)	16,509,650	16,406,931	-102,719	

Adjusted Savings Goals



Nicor Gas's Net Therm Savings Goals based on TRMv7 Update
(2020 and 2021 data provided for information only)

Year	2018 Plan Goal Net Therms	Adjusted Goal Net Therms	Difference
2018	16,509,650	16,509,650	0
2019	16,509,650	16,406,931	(102,719)
2020	16,509,650	16,406,931	(102,719)
2021	16,509,650	16,406,931	(102,719)
4 Year Total	66,038,601	65,730,443	(308,158)

Weighted Average Measure Life (WAML) Approach



- Original Plan Measure Life and Life Cycle Therms (column BD to BM)

Adjusted Measure Life	Plan Measure Life				Plan Life Cycle Therms				
	2018 Plan Measure Life	2019 Plan Measure Life	2020 Plan Measure Life	2021 Plan Measure Life	2018 Plan Life Cycle Therms	2019 Plan Life Cycle Therms	2020 Plan Life Cycle Therms	2021 Plan Life Cycle Therms	Total Plan Life Cycle Therms 2018-2021
Measure Life Adjustable? (1 if yes; 0 if no)									
<i>(bd)</i>	<i>(be)</i>	<i>(bf)</i>	<i>(bg)</i>	<i>(bh)</i>	<i>(bi)=(f x p x l x be)</i>	<i>(bj)=(g x q x m x bf)</i>	<i>(bk)=(h x r x n x bg)</i>	<i>(bl)=(i x s x o x bh)</i>	<i>(bm)=(bi+bj+bk+bl)</i>

- Adjusted Measure Life and Life Cycle Therms (column BN to BV)

Adjusted Measure Life				Adjusted Life Cycle Therms				
2018 Measure Life	2019 Measure Life	2020 Measure Life	2021 Measure Life	2018 Life Cycle Therms	2019 Life Cycle Therms	2020 Life Cycle Therms	2021 Life Cycle Therms	Total Adjusted Life Cycle Therms 2018-2021
<i>(bn)</i>	<i>(bo)</i>	<i>(bp)</i>	<i>(bq)</i>	<i>(br)=(f x p x aa x bn)</i>	<i>(bs)=(g x q x ag x bo)</i>	<i>(bt)=(h x r x am x bp)</i>	<i>(bu)=(i x s x as x bq)</i>	<i>(bv)=(br+bs+bt+bu)</i>

- WAML Calculation with Life Cycle Therm Totals

		Adjusted Measure Life				Adjusted Life Cycle Therms				
2021 Plan Life Cycle Therms	Total Plan Life Cycle Therms 2018-2021	2018 Measure Life	2019 Measure Life	2020 Measure Life	2021 Measure Life	2018 Life Cycle Therms	2019 Life Cycle Therms	2020 Life Cycle Therms	2021 Life Cycle Therms	Total Adjusted Life Cycle Therms 2018-2021
<i>(bl)=(i x s x o x bh)</i>	<i>(bm)=(bi+bj+bk+bl)</i>	<i>(bn)</i>	<i>(bo)</i>	<i>(bp)</i>	<i>(bq)</i>	<i>(br)=(f x p x aa x bn)</i>	<i>(bs)=(g x q x ag x bo)</i>	<i>(bt)=(h x r x am x bp)</i>	<i>(bu)=(i x s x as x bq)</i>	<i>(bv)=(br+bs+bt+bu)</i>
	852,336,113					213,084,028	213,522,449	213,522,449	213,522,449	853,651,375
WAML (Plan) ==>	12.91								WAML (Adjusted) ==>	12.99

Measure Life TRMv7 Updates



Measures affected by TRMv7 Measure Life(ML) updates

Program	TRM Measures		Customized TRM Measures		Custom Measures		Total
	TRMv7 Adjusted ML (No)	TRMv7 Adjusted ML (Yes)	TRMv7 Adjusted ML (No)	TRMv7 Adjusted ML (Yes)	TRMv7 Adjusted ML (No)	TRMv7 Adjusted ML (Yes)	
BEER	92	6	5	2	6	0	111
BNC	0	0	0	0	0	3	3
Custom	0	0	0	0	13	0	13
HEER	8	2	0	0	0	0	10
HES	7	18	1	0	3	0	29
IQ	16	12	1	1	5	0	35
MF	27	7	1	1	6	0	42
Outreach	0	6	0	0	1	0	7
RNC	0	0	0	0	1	0	1
SB	33	4	0	2	4	0	46
SEM	0	0	3	0	0	3	3
Total	185	53	11	6	39	6	300

Measure Life Assumptions



Energy Savings Kit & Whole Home – Same assumption in original Plan filing

- As filed in the Nicor Gas plan Measure Life is determined by the weighted average of the all TRM measure Therm savings multiplied by the Measure Life, divided by the total Therm savings.

Example: Energy Savings Kit 2 with the Measure Life calculation

Nicor Gas - Residential Kit			
Measure Assumptions			
Short Measure Name	Water Savings (Gallons / YR)	Therm Savings (2019-2021)	Measure Life (2019-2021)
1.5gpm Shower Head	1392.25	6.98	10.00
1.5gpm Shower Head	1392.25	6.98	10.00
1.0gpm Bath Aerator	171.23	0.58	10.00
1.0gpm Bath Aerator	171.23	0.58	10.00
1.5gpm Kitchen Aerator	1262.94	5.24	10.00
Shower Timer	739.97	3.71	2.00
Kit 2	5,129.87	24.07	9.00

Measure Life Assumptions



- Customized Measure Life Assumptions based on TRMv7
 - Original Measure Life from the Plan Appendix A

Program	Measure	Measure Type	IL-TRMv7 ML Update	Plan Measure Life (Appendix A)	TRMv7 Measure Life
BEER	Programmable Thermostat - Commercial	Customized TRM	TRMv7 4.4.18	4	8
BEER	Programmable Thermostat - Commercial DI	Customized TRM	TRMv7 4.4.18	4	8
BNC	Small to Mid New Construction	Custom	TRMv7 EUL Section 7	25	20.6
BNC	Large Commercial New Construction	Custom	TRMv7 EUL Section 7	25	20.6
BNC	Small to Mid New Construction - Public Sector	Custom	TRMv7 EUL Section 7	25	20.6
IQ	DHW WH Pipe Wrap - 6' - DI	Customized TRM	TRM 5.4.1	14	15
MF	DHW WH Pipe Wrap - 6' - DI	Customized TRM	TRM 5.4.1	14	15
SB	DHW WH Pipe Wrap - 6' - DI	Customized TRM	TRM 5.4.1	14	15
SB	Programmable Thermostat - Commercial	Customized TRM	TRMv7 4.4.18	4	8
SEM	SEM Industrial/Mfg	Custom	TRMv7 EUL Section 7	3	5
SEM	SEM Practitioner	Custom	TRMv7 EUL Section 7	3	5
SEM	SEM Education	Custom	TRMv7 EUL Section 7	3	5

Adjusted WAML based on Measure Life TRMv7 Updates



Year	Plan Net Therms	Plan Life Cycle Therms	Adjusted Net Therms	Adjusted Life Cycle Therms	Life Cycle Therm Change
2018	16,509,650	213,084,028	16,509,650	213,084,028	
2019	16,509,650	213,084,028	16,406,931	213,625,381	541,353
2020	16,509,650	213,084,028	16,406,931	213,625,381	541,353
2021	16,509,650	213,084,028	16,406,931	213,625,381	541,353
Total	66,038,601	852,335,980	65,730,443	853,960,171	1,624,191
Difference to Plan	-	-	(308,158)	1,624,191	-
WAML	12.91		12.99		0.08
Stipulated WAML Minimum	11.91		11.99		0.08

Adjustable Savings Goals with WAML

Questions & Next Steps