



Results from CY2019 DNREC Impact and Process Evaluation

EEAC Meeting – January 13, 2021



Evaluation Team Introduction

- **EcoMetric** conducted the CY2019 evaluation of DNREC's energy efficiency and renewable energy programs:
 - Energy Efficiency Investment Fund (EEIF)
 - Weatherization Assistance Program (WAP)
 - Green Energy Program (GEP)
- Today's Speakers:
 - Salil Gogte, President, EcoMetric
 - Greg Clendenning, NMR Group Inc.
 - Kyle McKenna, Managing Consultant, EcoMetric
- Project Team Leads:
 - Michelle Bruchs, Managing Consultant, EcoMetric
 - Monica Nevius, Directors, NMR Group Inc.

Agenda

1. Evaluation Philosophy

2. Evaluation Activities

3. Portfolio Results

4. Cross-Cutting Activities

5. EEIF Results

6. WAP Results

7. GEP Results

8. Additional Support Services

2. Evaluation Activities

Program	Program Year	Impact Evaluation	Process Evaluation	Cost-Effectiveness Calculation	Non-Energy Benefits	Greenhouse Gas Estimation
EEIF	2019	✓	✓	✓		✓
WAP	2018	✓		✓	✓	✓
GEP	2019	✓	✓	✓		✓

3. Portfolio Level Summary: Gross Verified Savings

Electric Results					
Program	Reported Energy Savings (MWh)	Reported Peak Demand Savings (MW)	Verified Energy Savings (MWh)	Verified Peak Demand Savings (MW)	Energy Savings RR (%)
EEIF	16,674	NR	16,819	2.79	101%
GEP	NR	NR	400	0.32	NA
WAP	301	0.06	234	0.04	78%
Total	16,975	0.06	17,453	3.14	103%

Fossil Fuel Results			
Program	Reported Fossil Fuel Savings (MMBtu)	Verified Fossil Fuel Savings (MMBtu)	Fossil Fuel Savings RR (%)
EEIF	24,462	24,373	100%
WAP	2,306	1,701	74%
Total	26,768	26,074	97%

3. Portfolio Level Summary: Net Verified Savings

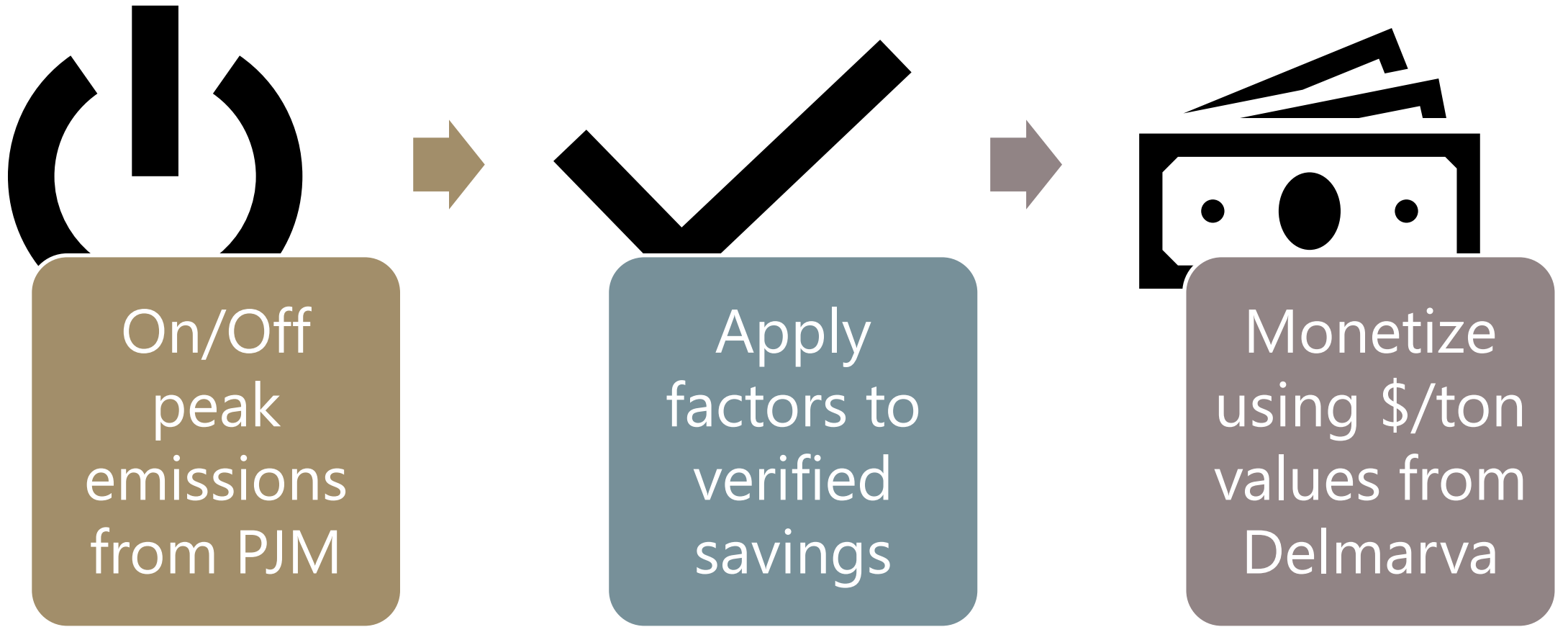
Electric and Fossil Fuel Results			
Program	Net Verified Energy Savings (MWh)	Net Verified Peak Demand Savings (MW)	Net Verified Fossil Fuel Savings (MMBtu)
EEIF	13,280	2.20	17,061
WAP	234	0.04	1,701
Total	13,514	2.24	18,762

3. Portfolio Level Summary: Cost-effectiveness Results

Program	NPV of Program Benefits	NPV of Program Costs	TRC Benefit-Cost Ratio
EEIF	\$22,788,108	\$7,695,337	2.98
GEP	\$9,553,617	\$6,938,009	1.38
WAP	\$1,650,743	\$1,355,897	1.22
Total	\$33,992,468	\$15,989,243	2.13

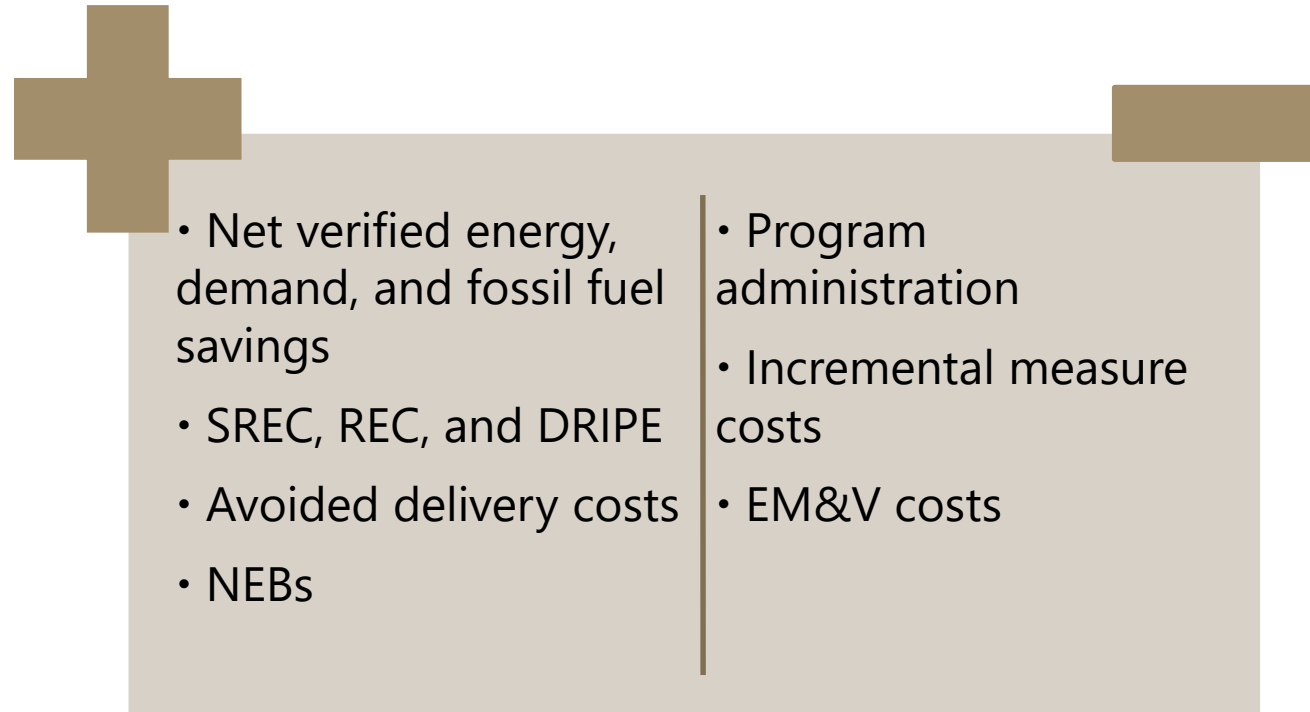
Net Present Value (NPV) = today's value of the lifetime saving

4. Cross-Cutting Activities: Greenhouse Gas (GHG) Approach



4. Cross-Cutting Activities: Cost-Effectiveness

$$TRC \text{ Benefit Cost Ratio} = \frac{NPV \text{ of Benefits}}{NPV \text{ of Costs}}$$



5. EEIF: Sample Frame Coverage

Project Type	Stratum	Population			Sample				
		Projects	Energy Savings (MWh)	Gas Savings (MMBtu)	Sample Points	Sampled MWh	Percent MWh	Sampled MMBtu	Percent MMBtu
Prescriptive	Certainty	9	7,871	0	9	7,871	47%	0	0%
	Large Probability	10	3,236	0	10	3,236	19%	0	0%
	Small Probability	58	3,829	0	48	2,795	17%	0	0%
Custom - Electric	Certainty	1	270	0	1	270	2%	0	0%
	Probability	0	0	0	0	0	0%	0	0%
Custom - Gas	Certainty	2	1,468	24,462	2	1,468	9%	24,462	100%
	Probability	70	0	0	0	0	0%	0	0%
Total		80	16,674	24,462	70	15,639	94%	24,462	100%

5. EEIF: Gross Verified Savings

Measure Type	Number of Projects	Electric Realization Rate	Gross Verified Energy Savings (MWh)	Relative Electric Precision at 90% Confidence	Gross Verified Peak Demand Reduction (MW)	Gross Verified Gas Savings (MMBtu)	Relative Precision Gas at 90% Confidence
Prescriptive	67	102%	15,066	1.4%	2.48	0	NA
Custom – Electric	1	27%	273	0.0%	0.01	0	NA
Custom – Gas	2	100%	1,480	NA	0.29	24,373	0.0%
Total	70	101%	16,819		2.79	24,373	

5. EEIF: Process Evaluation Background

Objectives

- Info to help meet participation goals
- Extent of contractor agreement on issues identified in previous evaluation, progress toward resolution

Methods

- Program materials & tracking data review
- In-depth interviews
 - Program staff to identify program developments or changes since last evaluation
 - 9 contractors who applied for EEIF grants on behalf of customers & 6 organizations that received EEIF grants in 2019, to understand perspectives on program, contractor marketing & use of media for marketing, early effects of pandemic
- Usability testing of online application portal

5. EEIF: Process Evaluation Results

- Selected findings
 - Some contractors & property managers installing equipment to eliminate pathogens; could increase energy consumption
 - Contractors largely rely on word-of-mouth marketing, use little social media
- Related recommendations
 - Monitor trends in pandemic-related equipment installations, consider researching energy implications & encouraging use of higher-efficiency versions
 - Develop marketing materials for contractor use, noting supported equipment that improves indoor air quality; optimize website to increase visibility in search engine results

5. EEIF: Process Evaluation Results

- EEIF progress since previous evaluation
 - Revised application & approval process to simplify and speed it up
 - Hired consultant to develop online portal to further speed process & improve communication
- Online portal usability test findings
 - Portal provides simple but full-featured platform for submitting accurate, complete applications
 - Website speed & operation were smooth, error-free
 - Minor improvement suggestions
 - Ensure optimized for smart phone and various browsers
 - Add summary screen for applicant to review info before submitting application

5. EEIF: Evaluation Key Findings

- The EEIF program achieved a **101%** realization rate for gross electric savings
 - Reported savings for lighting projects did not utilize waste heat factors
- The EEIF program achieved a **100%** realization rate for gross natural gas savings
 - Technical baselines for custom projects were found to be appropriate
- Participants are installing filtration equipment to eliminate pathogens
- Developed application portal to streamline application process

6. WAP: Program Reported Savings

Calendar Year	Projects Completed	Fossil Fuel Savings (MMBtu)	Electric Savings (MWh)	Demand Savings (MW)
2018	242	2,276	301	0.06
Total	242	2,276	301	0.06

- CY2018 reported savings were based on CY2016-2017 evaluation results
- CY2018 weatherized homes included a larger percentage of manufactured homes when compared to the single family and manufactured homes weatherized in CY2016-2017
- Homes weatherized in CY2018 included more electrically heated homes compared to home weatherized in CY2016-2017

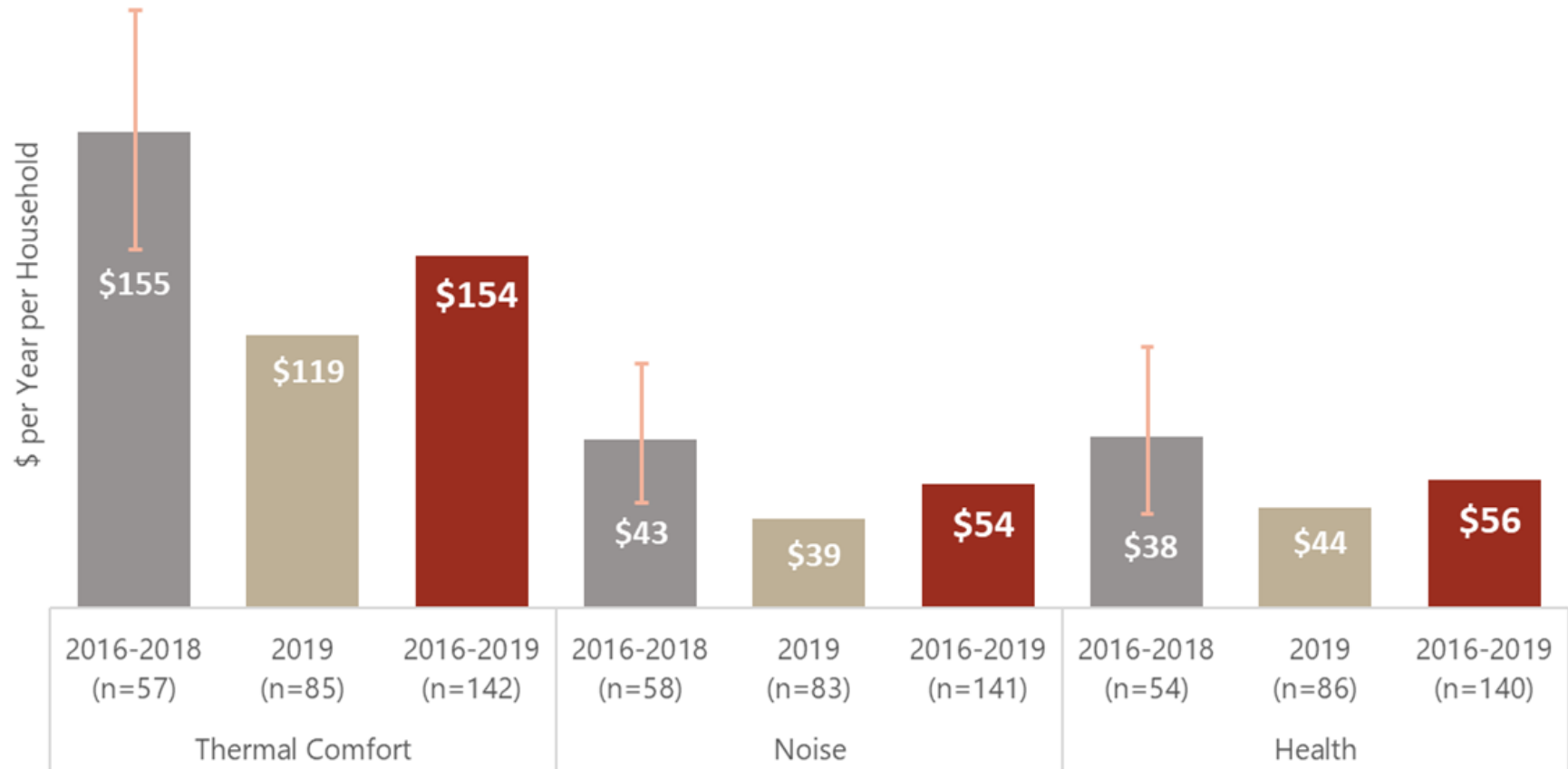
6. WAP: Gross Verified Savings

Heating Type	Home Type	Number of Homes	Electric Realization Rate	Gross Verified Energy Savings (MWh)	Peak Demand Reduction Realization Rate	Gross Verified Peak Demand Reduction (MW)	MMBtu Realization Rate	Gross Verified Savings (MMBtu)
Electric	Single Family	49	96%	97	89%	0.018	NA	NA
	Manufactured Home	32	149%	49	359%	0.006	NA	NA
Natural Gas	Single Family	27	29%	8	17%	0.001	110%	285
	Manufactured Home	3	37%	1	16%	0.000	65%	32
Other Fuel	Single Family	36	100%	43	54%	0.004	99%	380
	Manufactured Home	95	39%	36	33%	0.007	63%	1,004
Total		242	78%	234	64%	0.04	79%	1,701

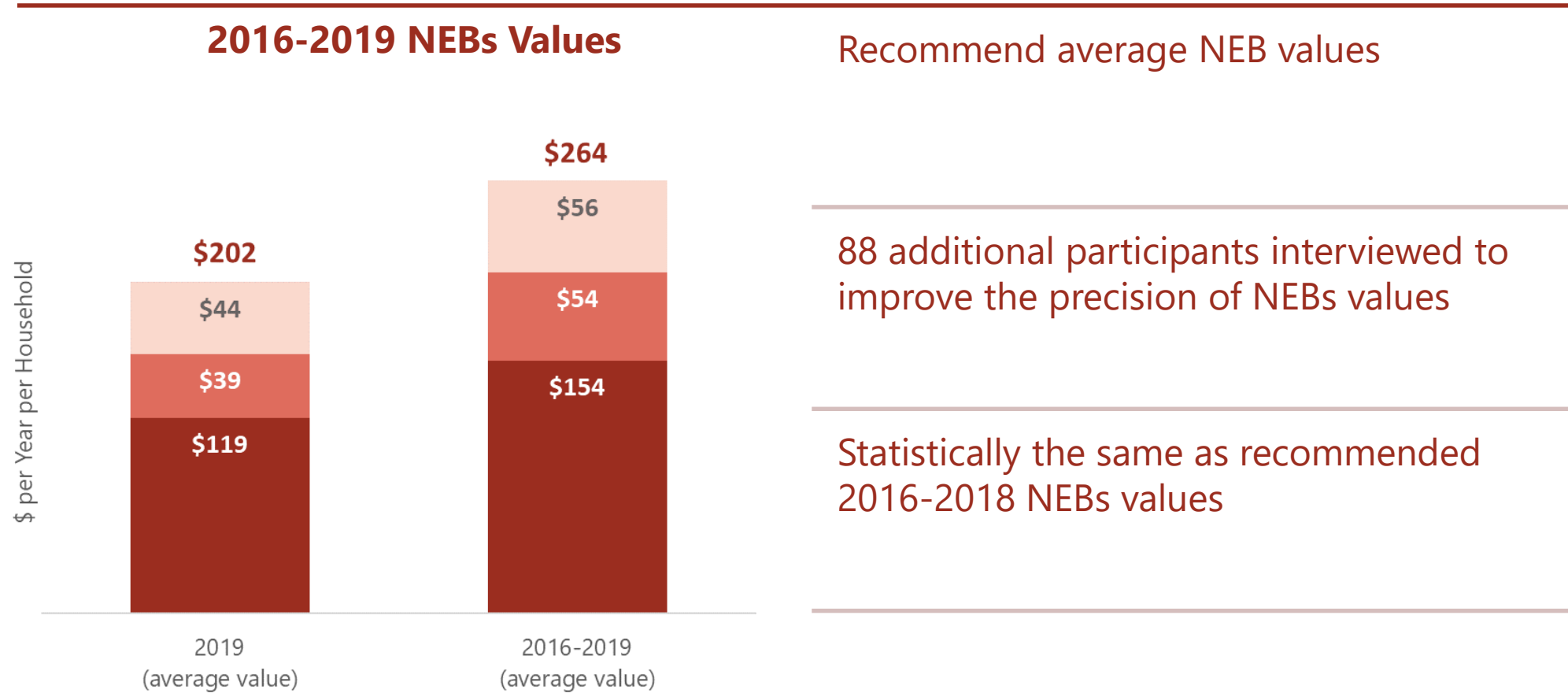
6. WAP: Per Home Savings Matrix

Heating Type	Home Type	Per Unit Energy Savings (kWh)	Per Unit Peak Demand Reduction (kW)	Per Unit Energy Savings (MMBtu)
Electric	Single family	2,043	0.40	NA
	Manufactured home	1,191	0.09	NA
Natural Gas	Single family	825	0.13	9.9
	Manufactured home	672	0.14	14.3
Other fuel	Single family	1,196	0.17	10.6
	Manufactured home	771	0.17	14.6

Mid-point (Avg) Estimates and Lower Bound of Confidence Interval (2016-18 only)



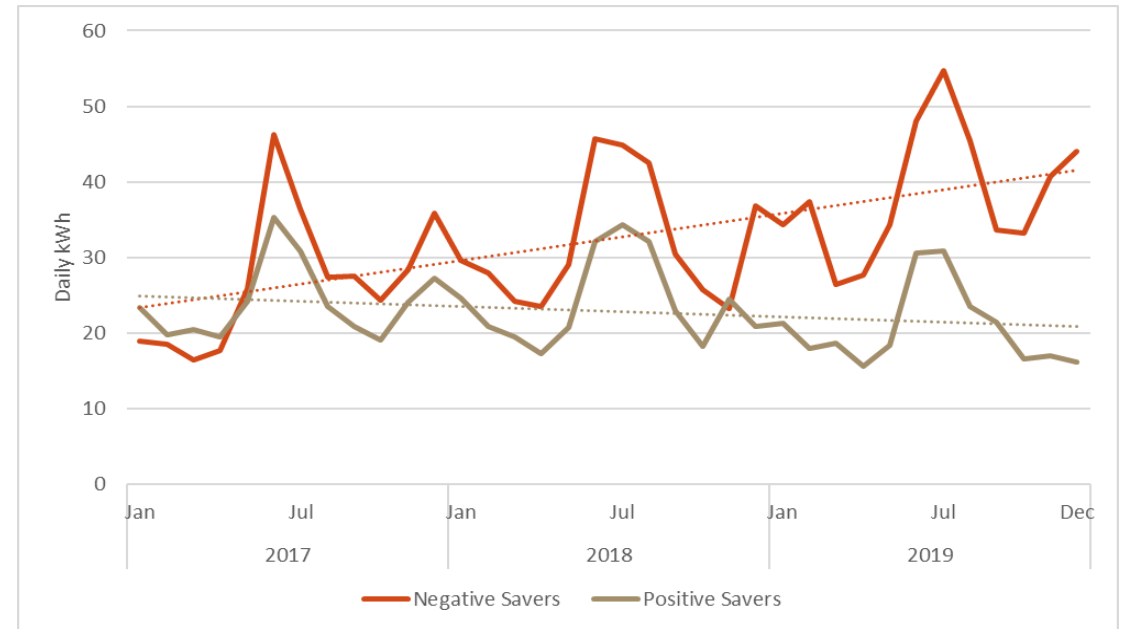
6. WAP NEBs Results



6. WAP: Evaluation Key Findings

- WAP achieved a **78%** realization rate for gross electric savings and an **79%** realization rate for gross fossil fuel savings
 - Billing data appears to show increased (supplemental heating and AC) post-weatherization usage for some homes
- WAP was found to be a cost-effective program with a TRC ratio of **1.22**

Natural gas heated homes kWh usage across pre- and post-weatherization period



7. GEP: Program Summary

Program Year	Measure	Count	Capacity (MW)	Capacity (Tons)	Capacity (Gallons)
2019	PV	192	1.74	0	0
	Geothermal	20	0	115	0
	Solar Water	2	0	0	160
Total		214	1.74	115	160

- Fewer projects were completed, on average, in 2019 when compared to the average number of projects completed from 2016 to 2018 (434 annually)
- Most of the projects completed through the program are solar PV which is consistent with projects completed between 2016 and 2018

7. GEP: Sample Frame Coverage

Project Type	Facility Type	Population			Sample			
		Projects	Capacity	Unit	Sample Points	Sampled Capacity	Unit	Percent Sampled Capacity
Solar PV	Non-Profit	2	0.06	MW	1	0.09	MW	52%
	Non-Residential	6	0.11	MW	2			
	Residential	51	0.67	MW	8	0.19	MW	12%
		133	0.89	MW	12			
Geothermal	Residential	69	115	Tons	3	20	Tons	17%
Solar Water	Residential	2	160	Gallons	2	160	Gallons	100%
Total		214			28			

7. GEP: Verified Results

Project Type	Facility Type	Verified Capacity Realization Rate	Verified Capacity	Unit	Relative Precision at 90% Confidence	Gross Verified Energy Savings (MWh)	Gros Verified Peak Demand Savings (MW)
Solar PV	Non-Profit	100%	0.06	MW	0.00%	91	0.09
	Non-Residential	100%	0.11	MW	0.17%	153	0.15
	Residential	101%	0.68	MW	0.80%	932	0.67
		111%	0.99	MW	4.63%	1,453	1.11
Geothermal	Residential	100%	115	Tons	0.00%	29	0.02
Solar Water	Residential	100%	160	Gallons	0.00%	4	0.001
Total						2,663	2.03

7. GEP: Targeted Process Study

Evaluation Goals

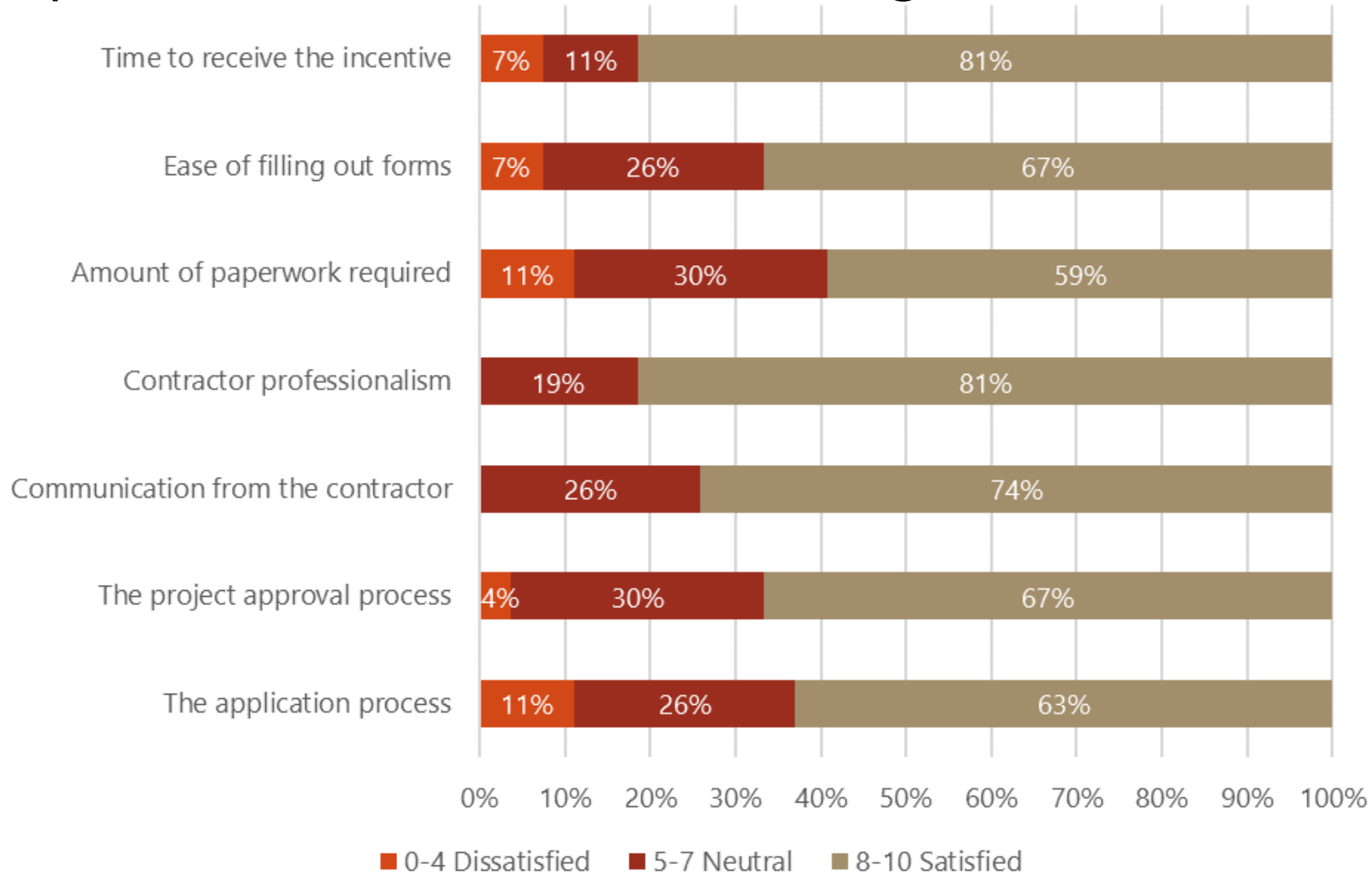


Evaluation Process



7. GEP: Targeted Process Study

Participant Satisfaction with GEP Program Elements (n=27)



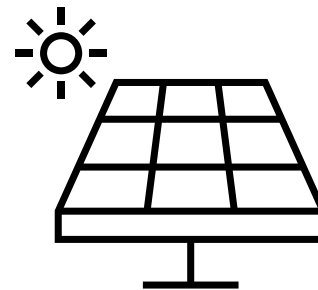
7. GEP: Targeted Process Study

Contractors reported being very satisfied with GEP overall and offered positive feedback on many aspects of the program.

Respondents said DNREC communicates well and is quick answer to questions. One contractor said, "Really a great program. Everything online is smooth and seamless."

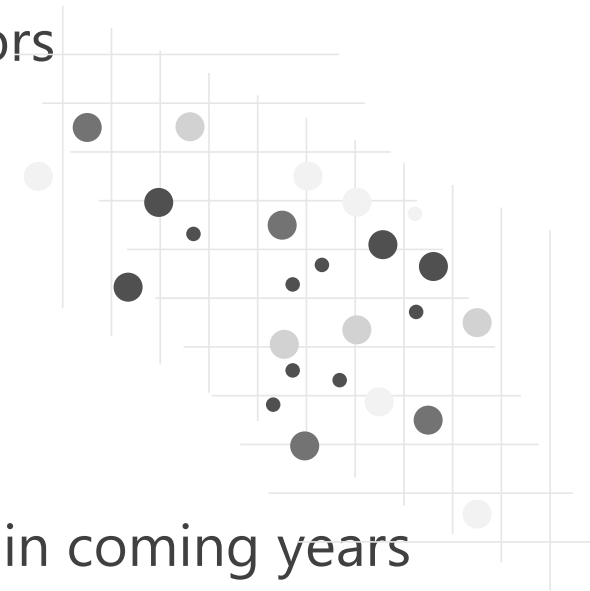
"Appreciate they have increased the grant amount and have taken off a requirement for commercial. Made very positive steps this year. Very grateful for the program."

– GEP contractor



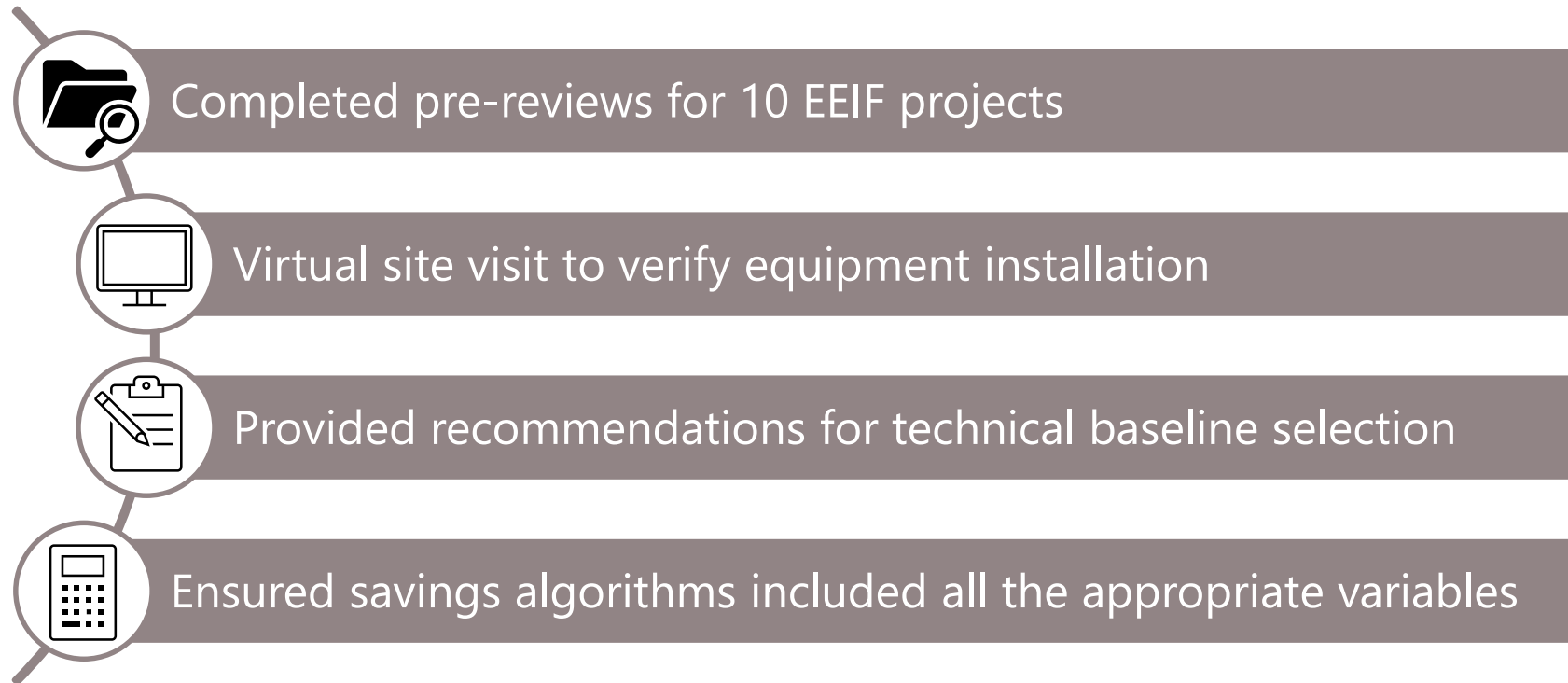
7. GEP Process Evaluation: Takeaways

- 1 Satisfaction is high from both participants and contractors
- 2 Half learn of program directly from contractors
- 3 About 25% found the program themselves
- 4 DNREC's has stated a goal to increase GEP participation in coming years
- 5 Opportunity to expand marketing and outreach beyond contractor in-person



8. Additional Support Services: EEIF Pre-Reviews

Goal: Reduce evaluation risk by aligning M&V assumptions and methodologies before project completion



Questions?

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