ComEd®
Energy Efficiency Program

Retail Products Platform (RPP) Product Operational Strategy

Clothes Washers

Last Updated: Sept 25, 2020

Developed for Commonwealth Edison by Energy Solutions

Clothes Washers Overview

Product Name: Residential Clothes Washers

Product Description: A consumer product designed to clean clothes, utilizing a water solution of soap and/or detergent and mechanical agitation or other movement, and must be one of the following classes: automatic clothes washers, semi-automatic clothes washers, and other clothes washers.

Product Specification: Integrated Modified Energy Factor (IMEF) is the efficiency metric and is measured using the Department of Energy (DOE) test procedures and compared against a minimum threshold set by ENERGY STAR®. It is the quotient of the load capacity divided by the total energy consumption per cycle.

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Executive Summary

- To increase market impact, ESRPP should continue to advocate for two separate ENERGY STAR Most Efficient (ESME) levels: a higher ESME level for front-loading and lower ESME level for top-loading washers.
- Currently there are no top-loading ESME models (Slide 18). Top-loading washers are less expensive and have a market share close to 70% (Slide 20). Their efficiency has not changed significantly. An appropriate ESME level would encourage improvements.
- 63% of front-loading sales qualify for ESME (Slide 18). The most efficient front-load washers are the most expensive products. In order to be more effective, ESME should apply to a smaller subset of higher efficiency products.

Clothes Washers – Regulatory Background

Standards Dashboard and Timeline

Product	Federal Regulation			
Residential				
Clothes Washers	**Current Status**	**Last Action Taken**	**Next Planned Action**	**When is next Regulation publication congressionally mandated?**
Test Procedure (TP)	The Most Recent Test Procedure for this product was published on August 05, 2015	RFI Published May 22, 2020	Comment Period Reopened. Closed July 6, 2020, Framework Document to be published (date unknown)	8/5/2022
Energy Conservation Standards (ECS)	The most recent energy conservation standard for Clothes Washers was published on May 31, 2012	RFI Published August 2, 2019	NOPR to be published (Date not identified)	5/31/2018
	Voluntary Specification			
ENERGY STAR	ENERGY STAR has established a specification for Clothes Washers and is in the process of updating the specification			
	NEEA Initiatives			
	NEEA Initiative covering this product			
NEEA Initiatives	Retail Product Portfolio			

Product Types (per DOE §430.32)

Product Class	Integrated Modified Energy Factor (IMEF) (cu.ft./kWh/cycle)	Integrated Water Factor (IWF) (gal/cycle/cu.ft.)
Top-loading, Compact (less than 1.6 ft^3 capacity)	1.15	12.0
Top-loading, Standard (1.6 ft^3 or greater capacity)	1.57	6.5
Front-loading, Compact (less than 1.6 ft^3 capacity)	1.13	8.3
Front-loading, Standard (1.6 ft^3 or greater capacity)	1.84	4.7

Testing and Certification

- Non-DOE test methods: AHAM HLW-1, IEC 60456
  - The AHAM standard is the basis for the ENERGY STAR test method for cleaning performance[1]
- Certifications
  - UL 2157, UL 1206 (industrial)
  - AHAM 7003/CSA R7003-16/UL 7003, Sustainability Standard for Household Clothes Washers (ANSI and SCC accredited)
  - CEE has a specification with 3 tiers for standard sized clothes washers and 2 for small volume. Tiers do not distinguish between front and top loading[2].

[1] https://www.energystar.gov/sites/default/files/asset/document/Draft%20Test%20Method%20for%20Determining%20Residential%20Clothes%20Washer%20Cleaning%20Performance.pdf
[2] https://library.cee1.org/system/files/library/13445/CEE_ResidentialClothesWasherSpecification_05Feb2018.pdf

Current ENERGY STAR Requirements

Product Type	Maximum Integrated Modified Energy Factor (IMEF) (cu.ft./kWh/cycle)	Maximum Integrated Water Factor (IWF) (gal/cycle/cu.ft.)
Residential Clothes Washers, Front-loading (> 2.5 cu-ft)	2.76	3.2
Residential Clothes Washers, Top-loading (> 2.5 cu-ft)	2.06	4.3
Residential Clothes Washers (≤ 2.5 cu-ft)	2.07	4.2

The ENERGY STAR specification incentivizes smart grid functionality/connected functionality by providing an energy allowance

Energy Solutions found an average IMC of $207 using web-scraped data for ENERGY STAR qualifying products compared to nonqualifying products.[1]

[1] See Figure 7 in the Clothes Washers Memo

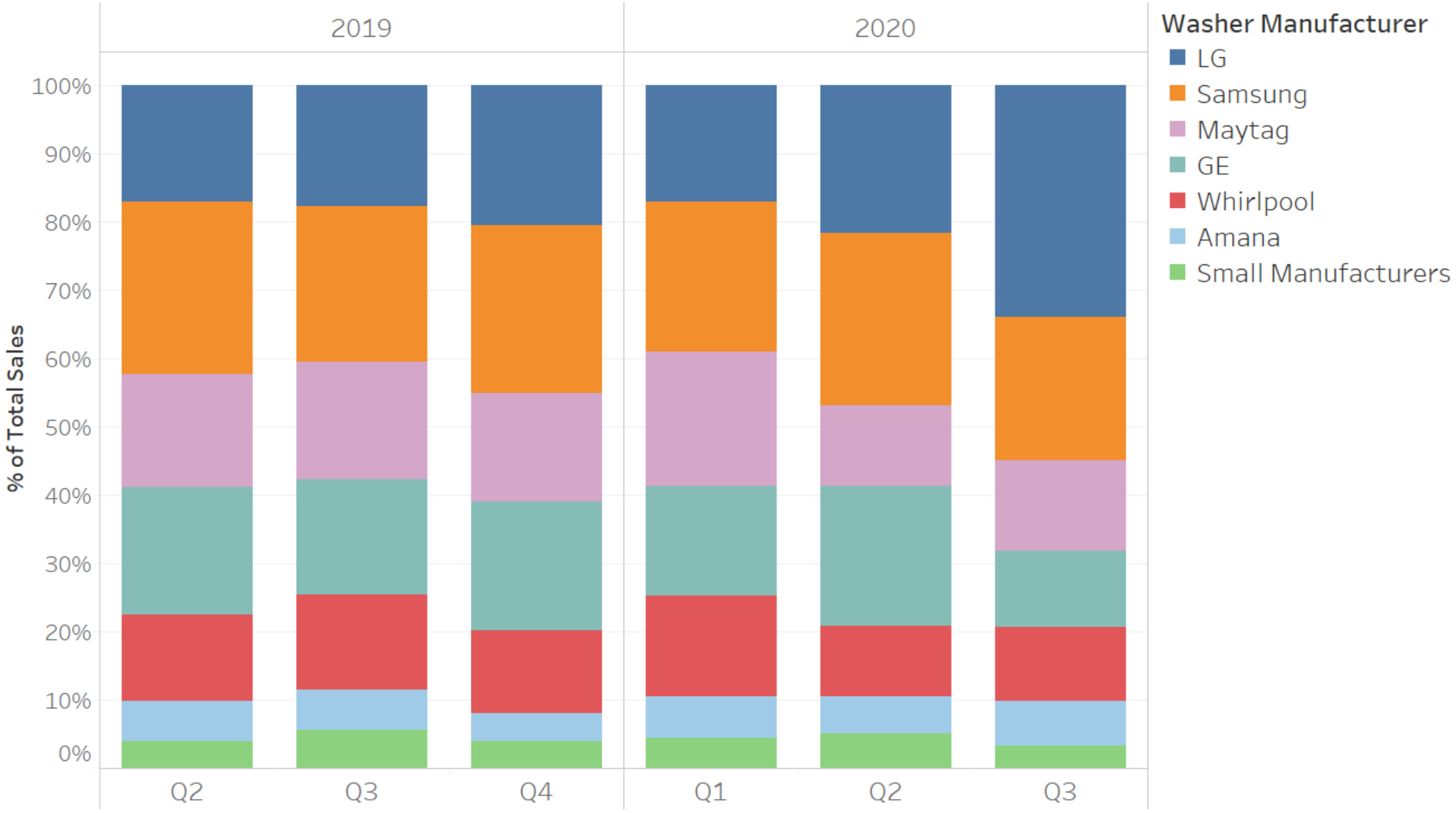
Product Readiness

Product Development Roadmap

	Pre-2020	2020	2021	2022	2023	2024
Top Load						
Top Load Agitator						
Top Load Impeller						
Extra-large Capacity						
Front Load						
Standard Front Load						
Extra-large Capacity						
Compact Front Load						
Emerging Technology						
Ultrasonic						
Washer Beads						
CO2	Commercial Applications					
General Features						
Steam Wash						
AI/Smart Software						
WiFi Connected						

Use declining
Use unchanged
Use increasing

Manufacturers (Commonwealth Edison Territory)



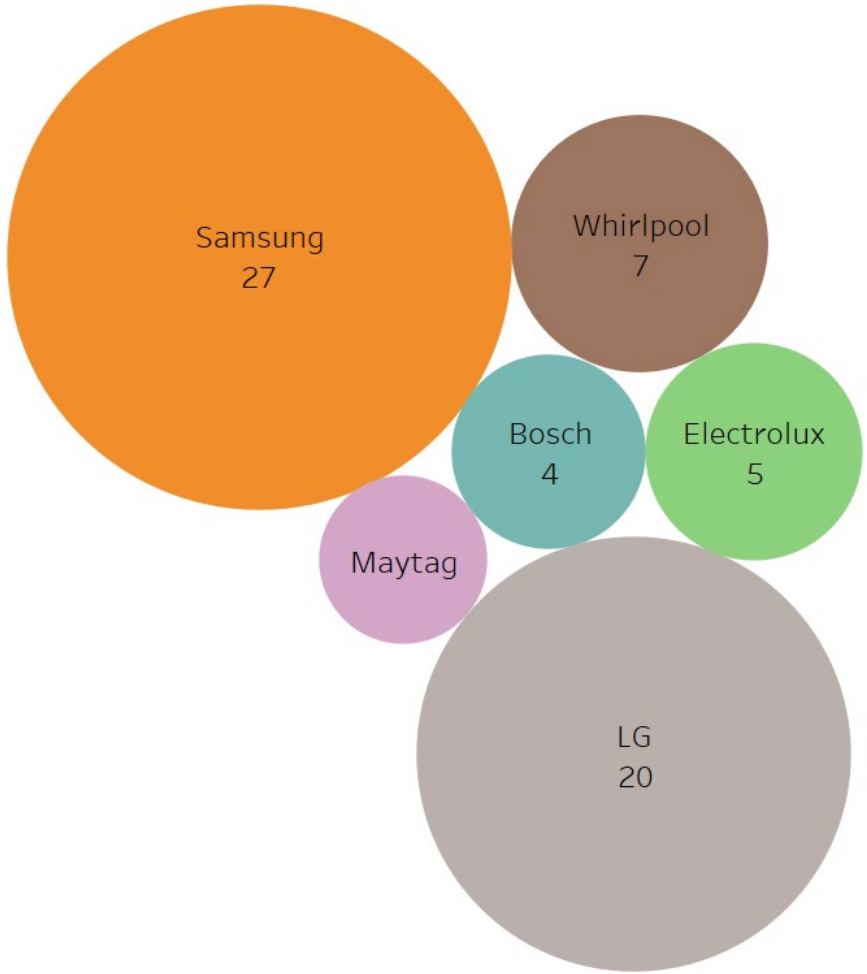
Manufacturer Locations and Opportunities

Manufacturer	Factory Location	Opportunities for Partnership
Whirlpool[1]	Clyde, OH Mexico	
Frigidaire (Electrolux)	Mexico	
Samsung	Newberry, SC South Korea	
GE Appliances[2]	Louisville, KY	Engagement on ultrasonic washer technology and higher efficiency agitator top-load washer
LG	Clarksville, TN Thailand	Engagement on higher efficiency agitator top-load washer
Beko/Blomberg		
		Engage with all manufacturers to optimize spin cycles on all load cycles

[1]Whirlpool brands include, Whirlpool, Amana, and Maytag
[2]GE Appliances brands include, GE, GE Profile, Hotpoint, and Haier

ESME Brands' Model Mix

Brands that sell ESME washers are selling multiple models in that category



- All ESME washers are front-loading models
- Shown here: Number of ESME models each brand sells
- ESME models make up most front-loading model sales (see slide 18)

ComEd RPP Sales Data (2019-2020)

Clothes Washers RPP Sales Analysis

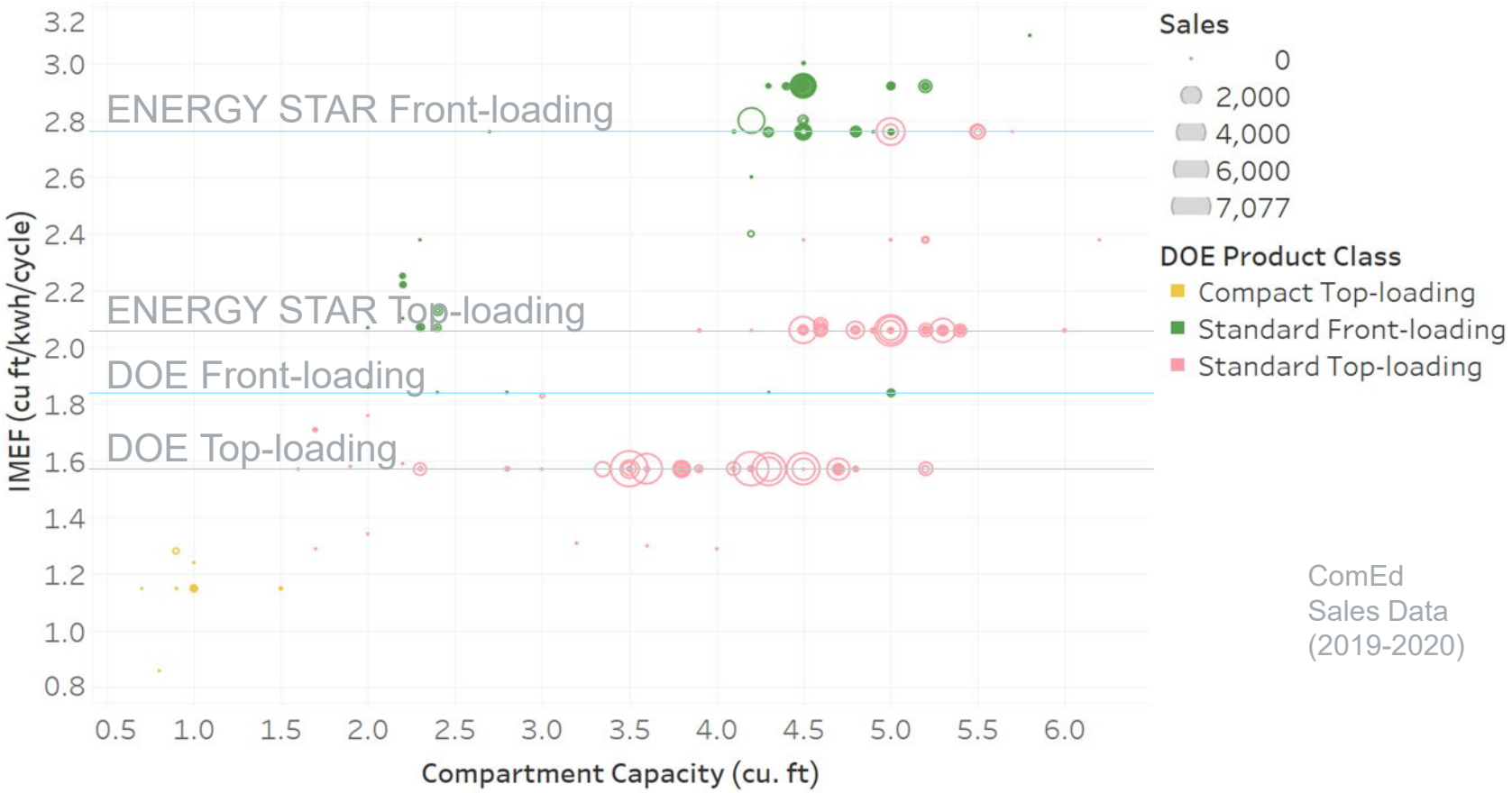
RPP Measure History

Start Date	Tier	Level
06/01/2020	Basic*	ENERGY STAR version 8.0, top-load only
	Advanced	ENERGY STAR Most Efficient 2020

*Commonwealth Edison only incentivizes the Basic Tier.

Energy Metric by Product Class

Front-loading units are significantly more efficient

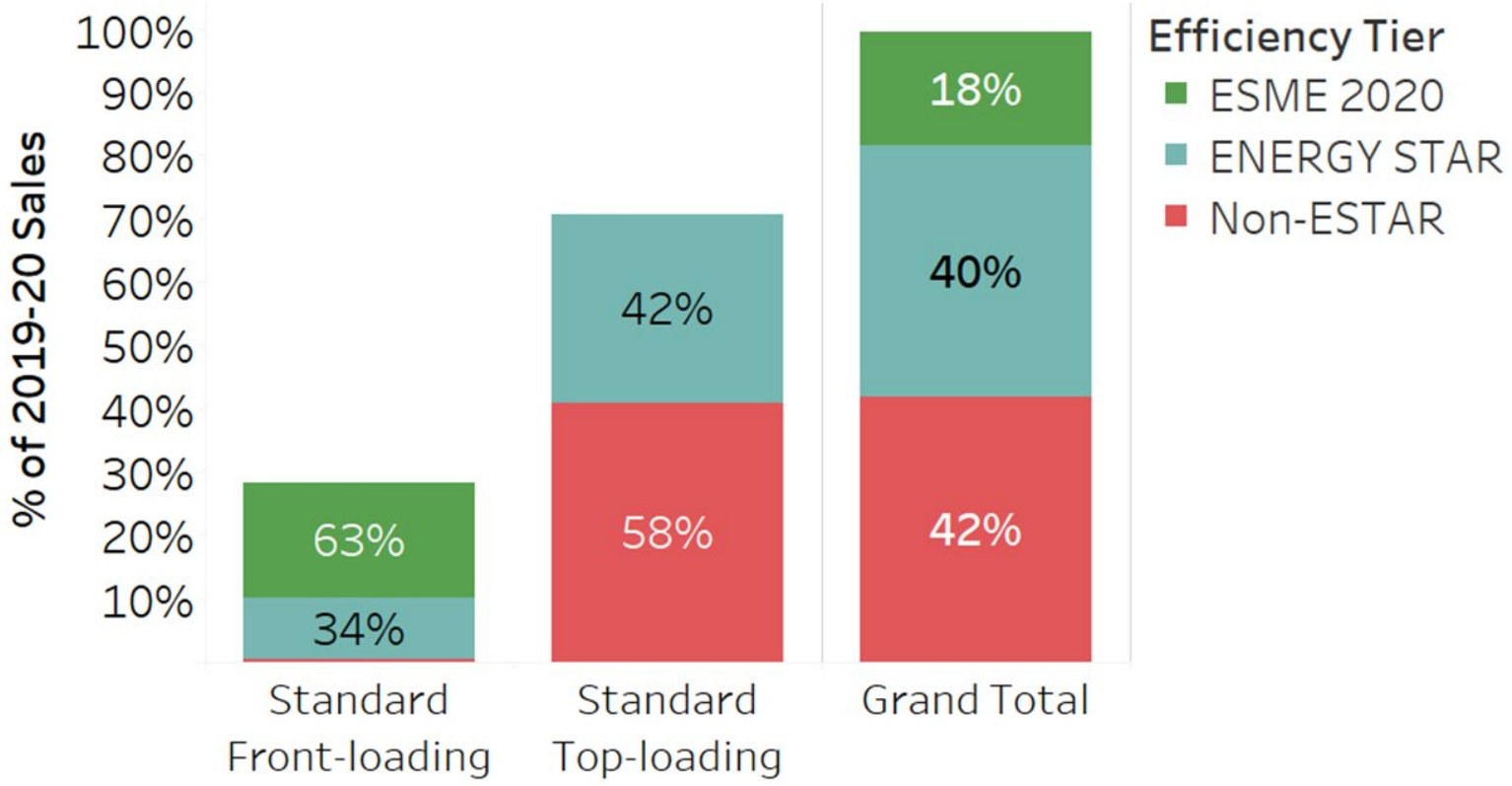


ComEd Sales Data (2019-2020)

- Average top-loading unit efficiency is far below the ENERGY STAR criteria
- Product clustering occurs along ENERGY STAR and DOE requirements levels for top-loading units
- The ENERGY STAR front-loading criteria is lower than the average front-loading unit efficiency
- The lack of separate ESME criteria for top-loaders makes it difficult to distinguish or incentivize more efficient products

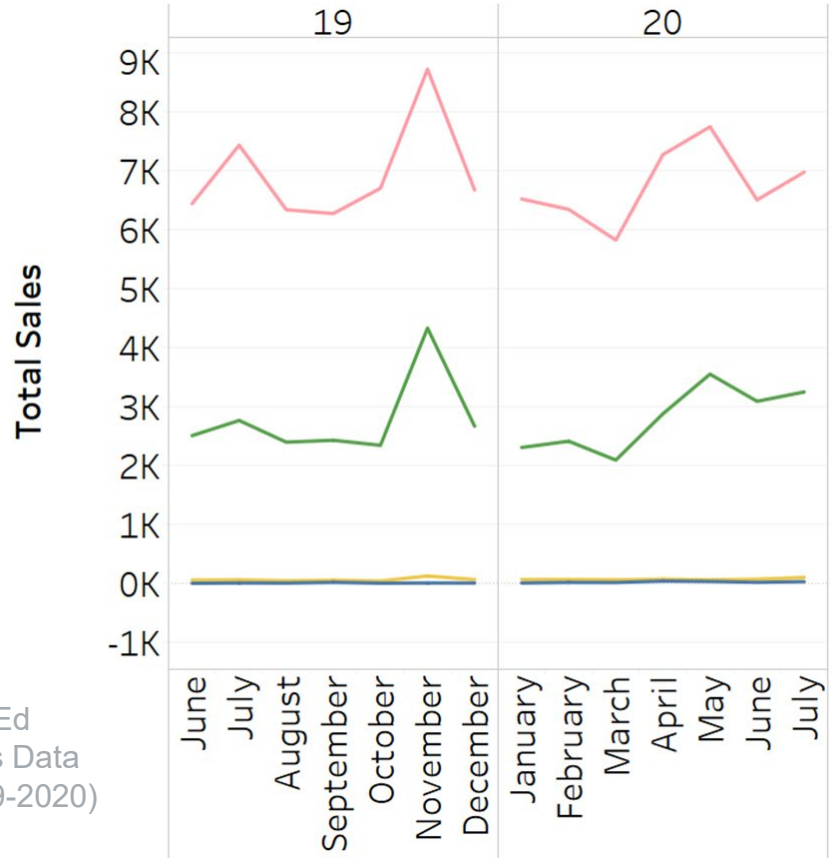
ENERGY STAR qualification by DOE Product Class

Basic ENERGY STAR market penetration or better is almost 60%



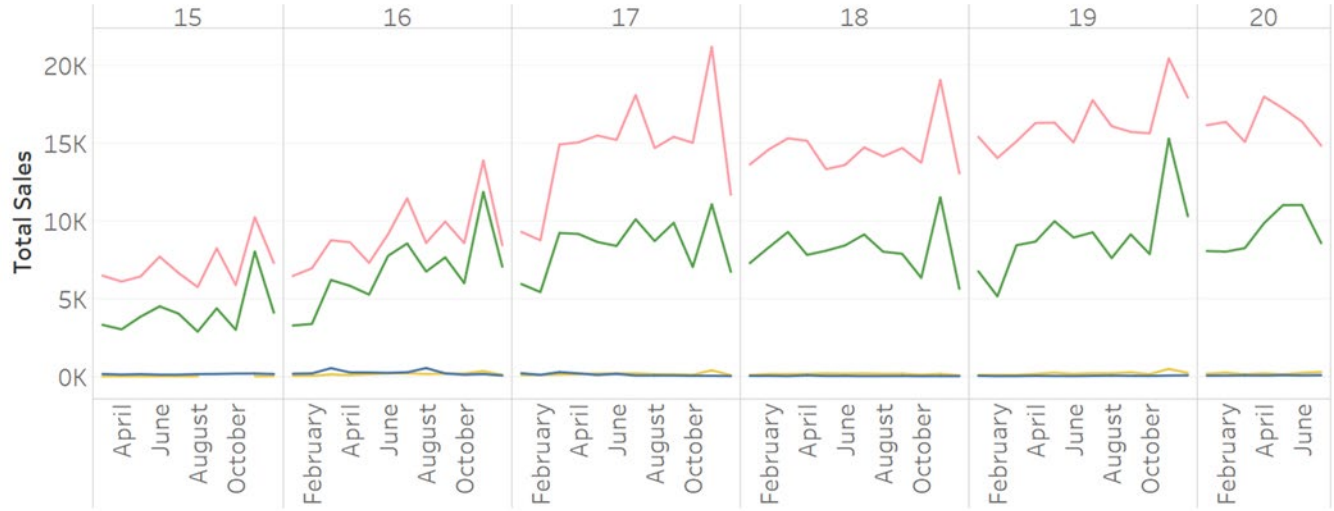
Most sales are top-loading washers, but all ESME sales in 2019-20 have been front-loading.

RPP Sales by Configuration



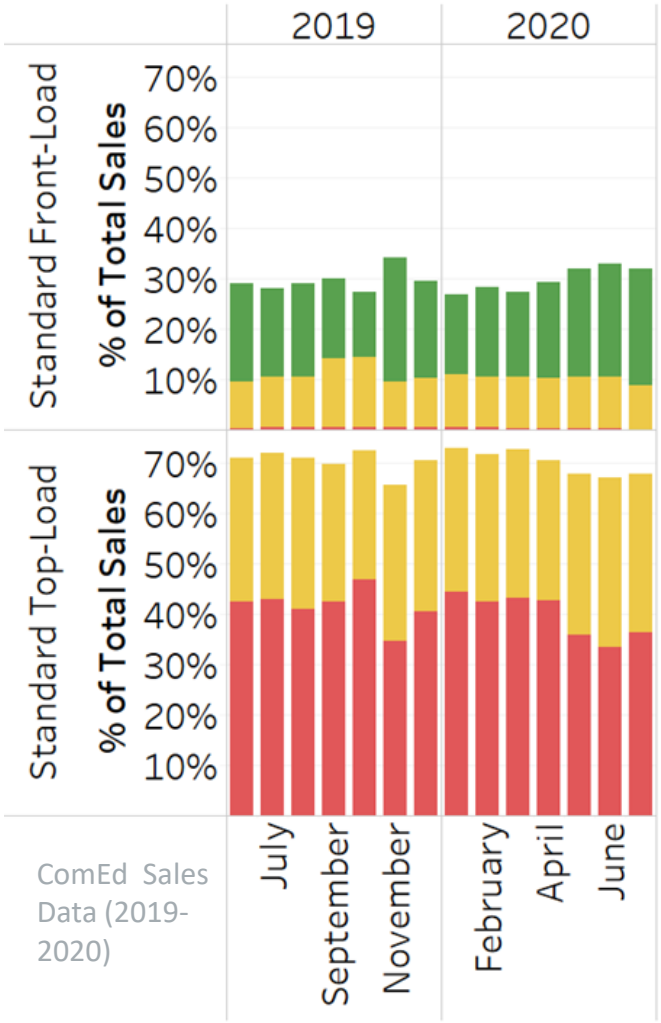
ComEd
Sales Data
(2019-2020)

NEEA
Sales Data
(2015-2020)



- In supporting documentation for the Federal standard level adopted in 2012, DOE forecasted that front-loaders would surpass top-loaders in sales, but that hasn't materialized.
- The team should investigate non-incentive approaches to increase front-loading market share

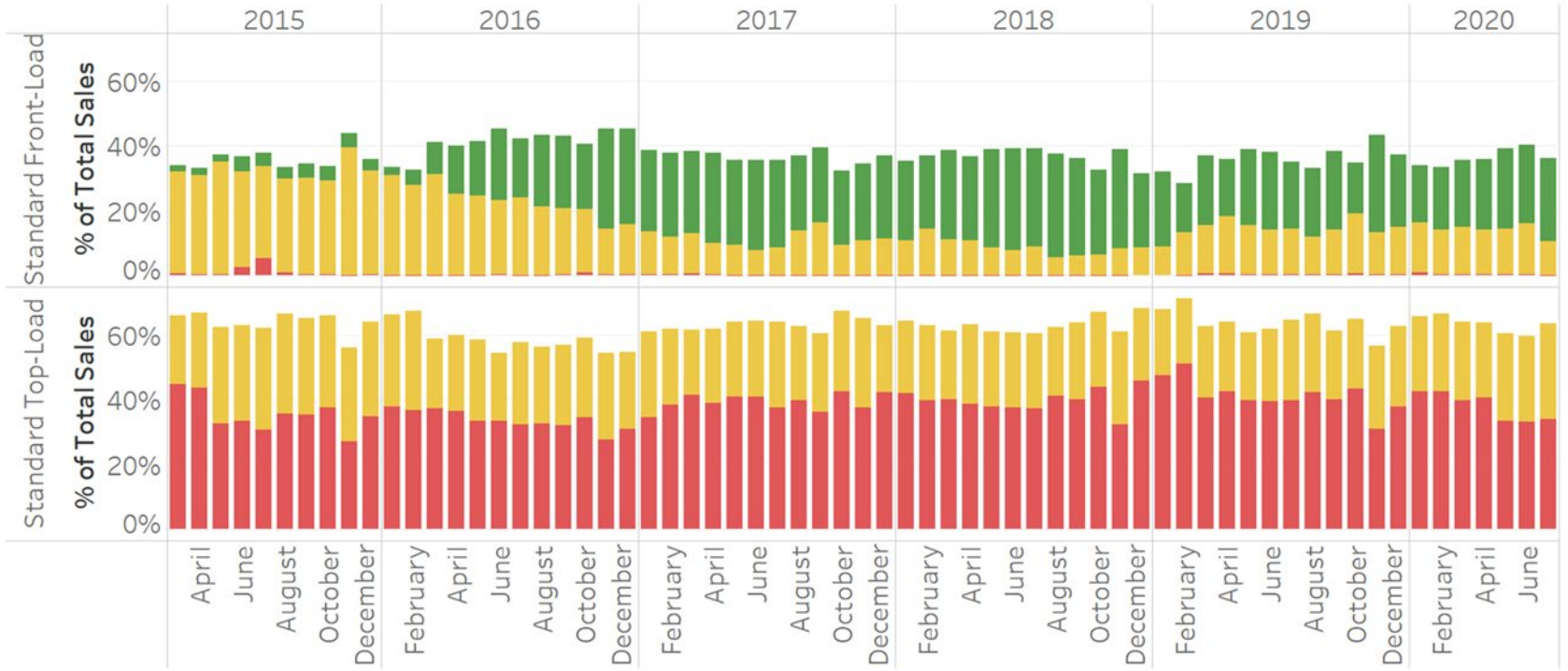
Market Share by Efficiency Mix



ComEd Sales Data (2019-2020)

Tiers describe units that meet the indicated efficiency requirements, even if the specification was not available at the time of sale.

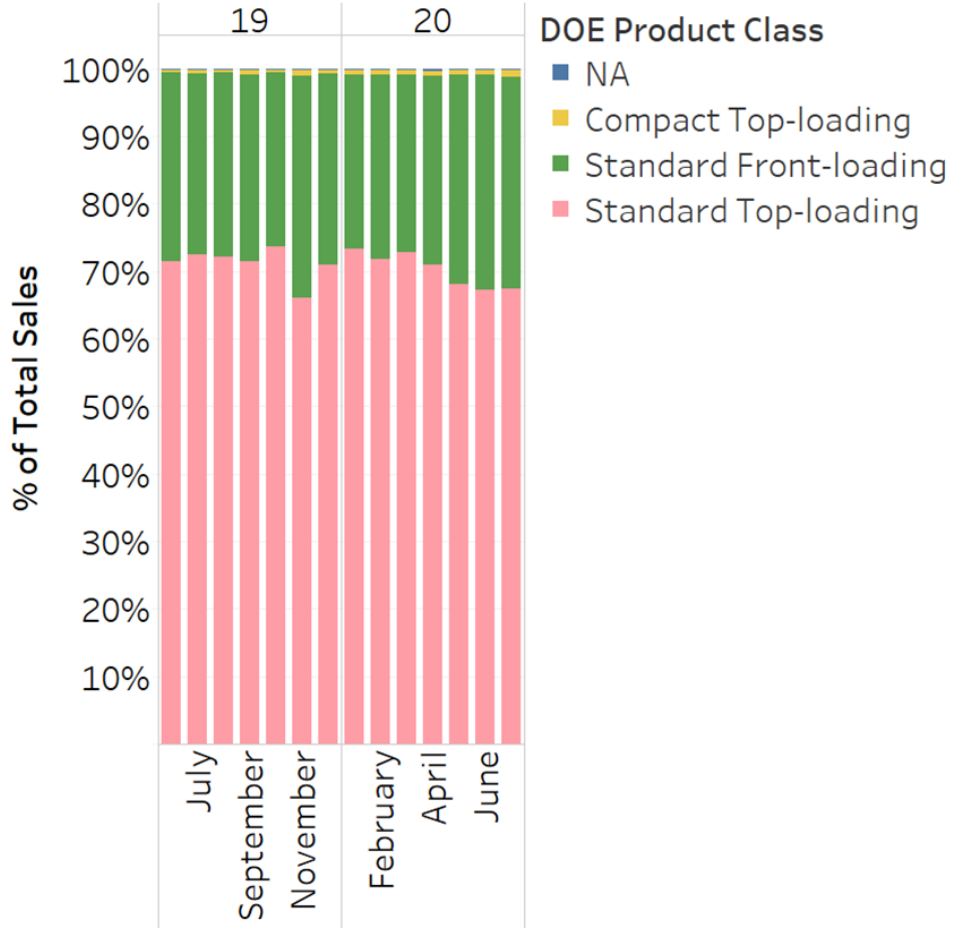
- Since Q1 2019, ENERGY STAR and ESME market penetration have been fairly constant.



NEEA Sales Data (2015-2020)

Market Share by Configuration & Size

Opportunity for energy savings if consumer preferences can be decoupled



- The market penetration of standard top-loading units have been fairly constant.
- Front and top loaders should be considered distinct product sub-categories for RPP purposes and the program should consider how to increase the efficiency of top-load washers.

Risk Assessment

Risk Assessment

Risk	Description	Level	Potential Impact	Response	Plan
ESME level	20% of the market qualifies for ESME, which is high, but more concerning is that these are all front-loading products and make up most of the front-loading market.	High	High	Mitigate	Continue to advocate for two ESME levels to be consistent with the two ENERGY STAR levels.
Top-loader preference	Top-loading washers continue to be the preferred product.	Medium	Medium	Mitigate	Increase efficiency of top-load washers

Clothes Washers Program Recommendations

Product Overview

Efficiency is not equally distributed between product subcategories

- Total market share of ENERGY STAR v8 has remained constant.
- ESME is the dominant efficiency level for front-load washers.
- The ESME 2020 level is reasonable for a minimum incentivization requirement, capturing about 20% of sales. However, within the sub-category of front-loading units it is more than 50% of sales.
- ESME 2020 is currently the advanced tier, and until ENERGY STAR revises the specification, it will be difficult for the program to set a more stringent advanced tier while remaining in alignment with ENERGY STAR.

Impact Opportunities

Advocacy for DOE and ENERGY STAR Improvements

- RPP product partners are investigating the test procedure and standard at the DOE level, developing a draft recommended test procedure for DOE.
- Restructure future ENERGY STAR and Most Efficient levels to better align with consumer preferences and market realities. This can drive improvements across different configurations.

Potential Next Steps

Industry Engagement

- Investigate the trends in high efficiency washers and agitator-less washers.
- Explore segmentation in front- and top- load models and advocate for increasing top-load efficiency. Advocate for appropriate ENERGY STAR levels based upon segmentation.
- Advocate for improved ESME to keep driving the market toward efficiency.
- Encourage manufacturers to offer a cheaper front-load option to increase market share.

Thank You!

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Appendix

Change Log

Revision	Date	Change(s)
1	9/25/2020	First release