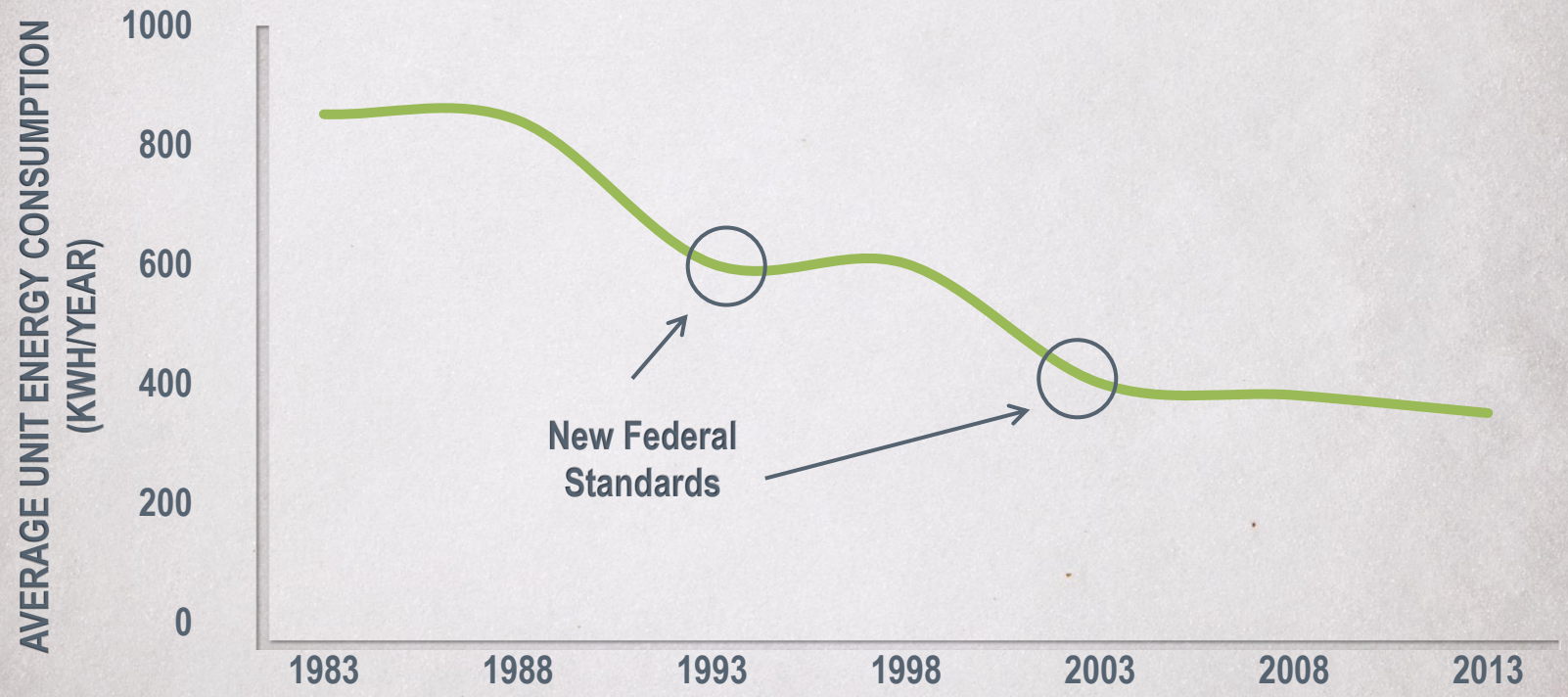
THE FUNDAMENTALS OF MOMENTUM SAVINGS

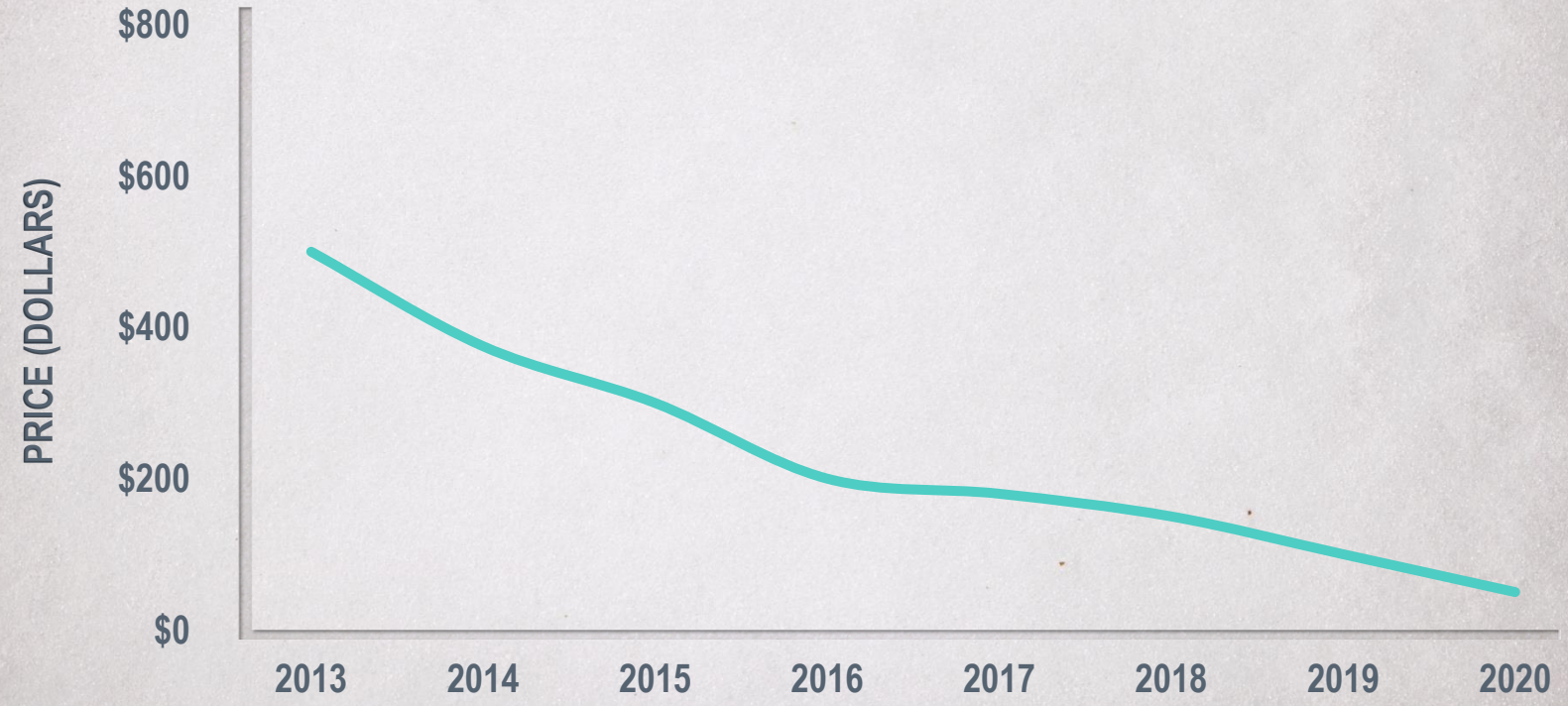
Bonneville
POWER ADMINISTRATION

MARKETS CHANGE

CLOTHES WASHERS MARKET



LED LUMINAIRE FORECASTED PRICES

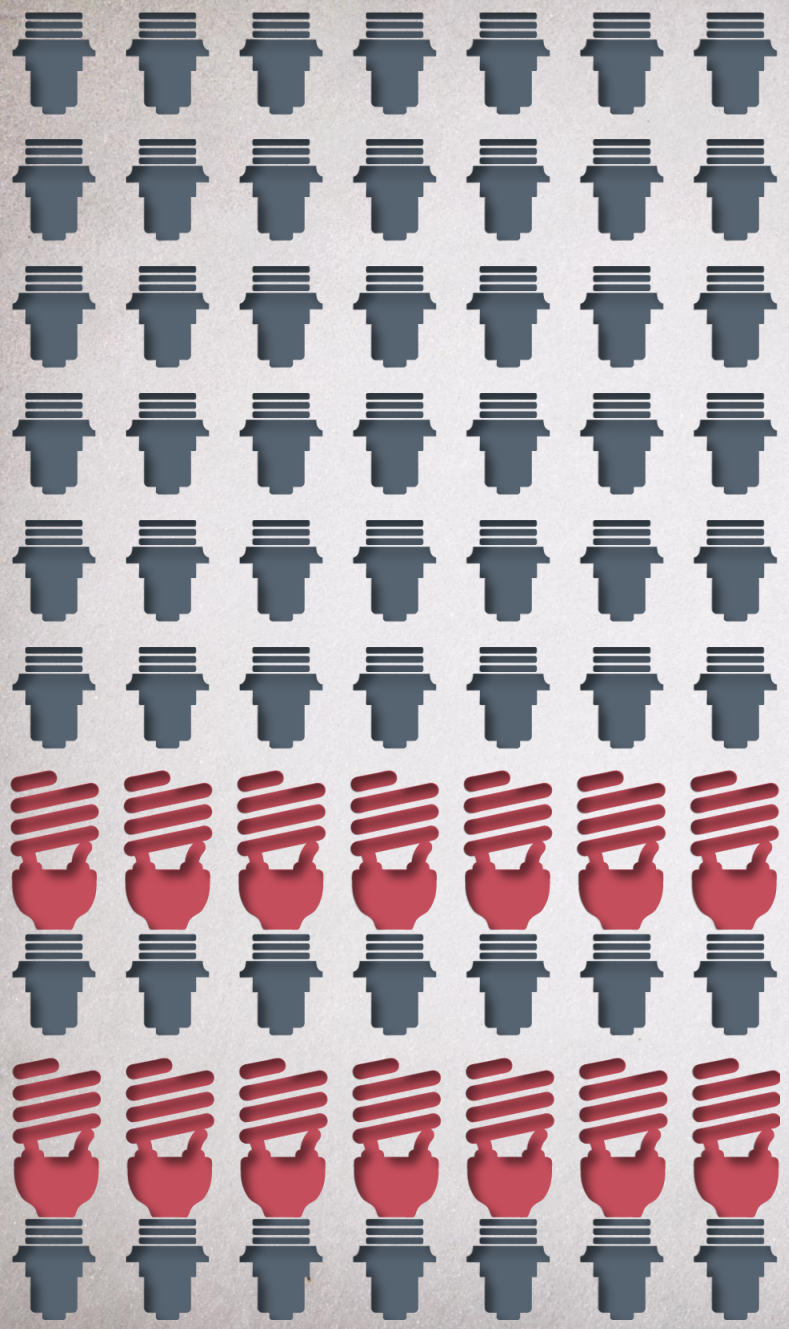


STOCK VS. FLOW

STOCK

NEEA'S BUILDING STOCK ASSESSMENTS

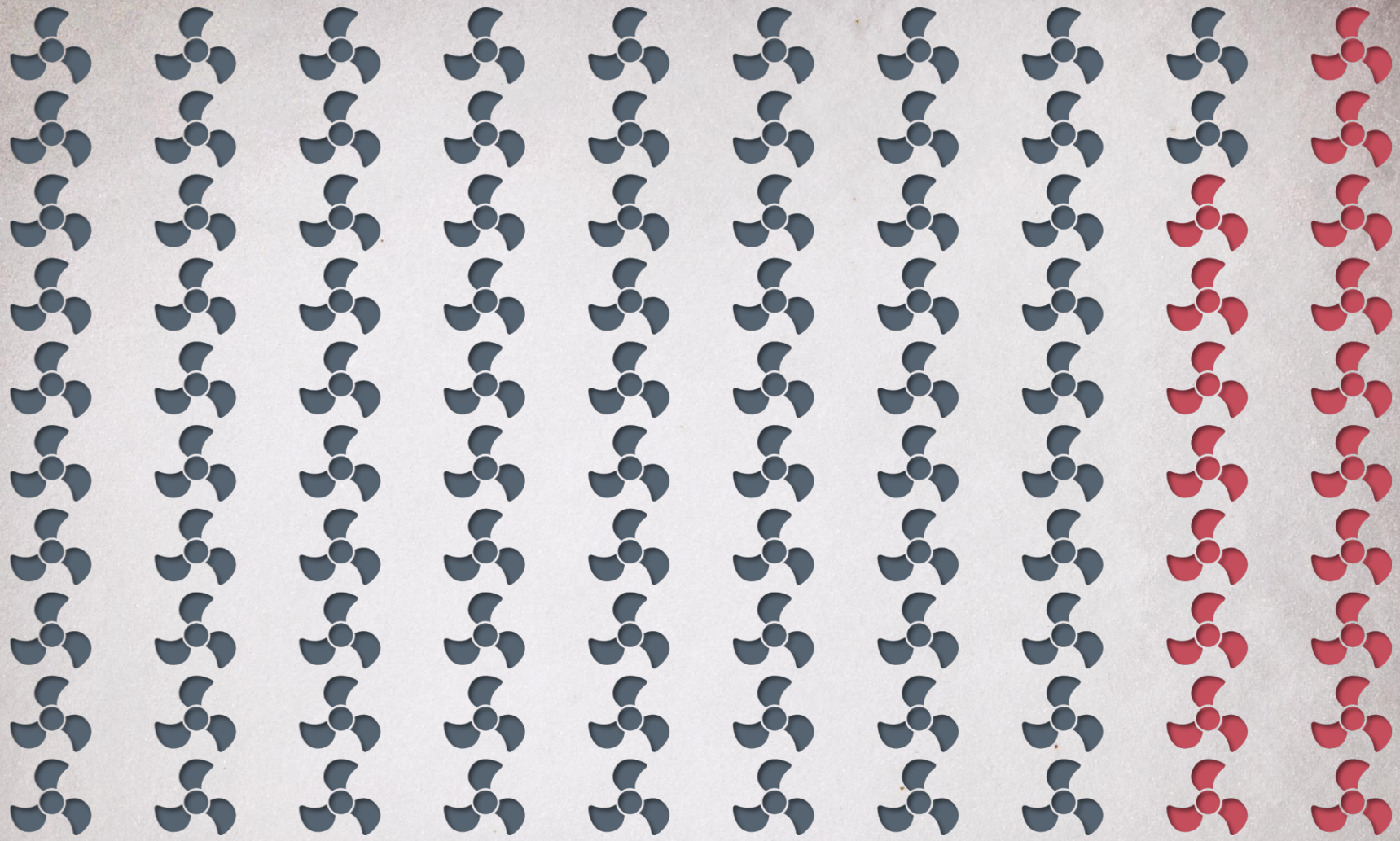
Residential Commercial



The Northwest has over 285 million residential light sockets.

IN 2011, THE NORTHWEST HAD 25% OF SOCKET SATURATION OF CFLS.

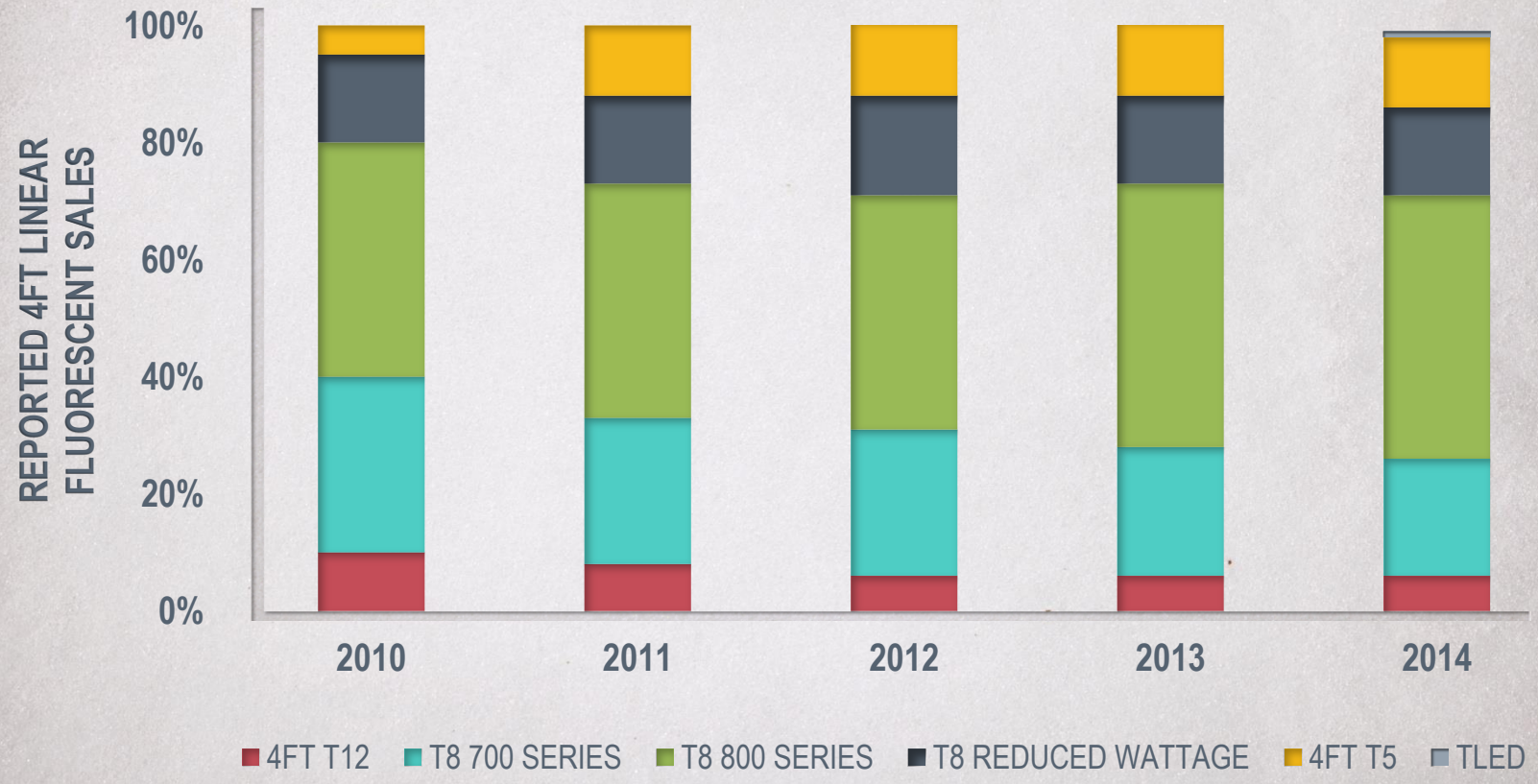
FLOW



18% OF AIR SOURCE HEAT PUMPS SOLD

were high efficiency (HSPF of 9.0 or greater) in 2014

REGIONAL SALES, LINEAR FLUORESCENT LAMPS

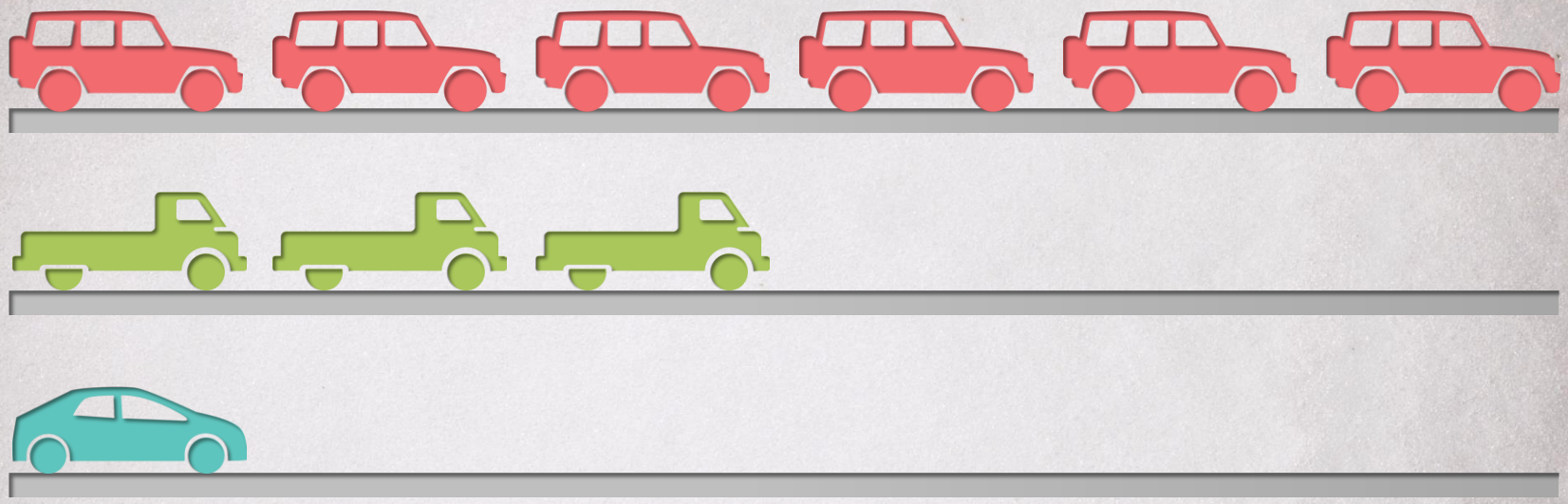


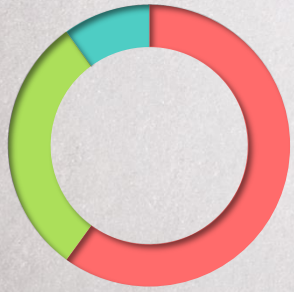
Source: Navigant and Cadeo Analysis of Distributor Sales Data

TAKE-AWAYS

1. MOMENTUM SAVINGS OCCUR WHEN MARKETS CHANGE
2. STOCK REPRESENTS PAST DECISIONS; FLOW REPRESENTS CURRENT DECISIONS

THE EFFICIENCY MIX



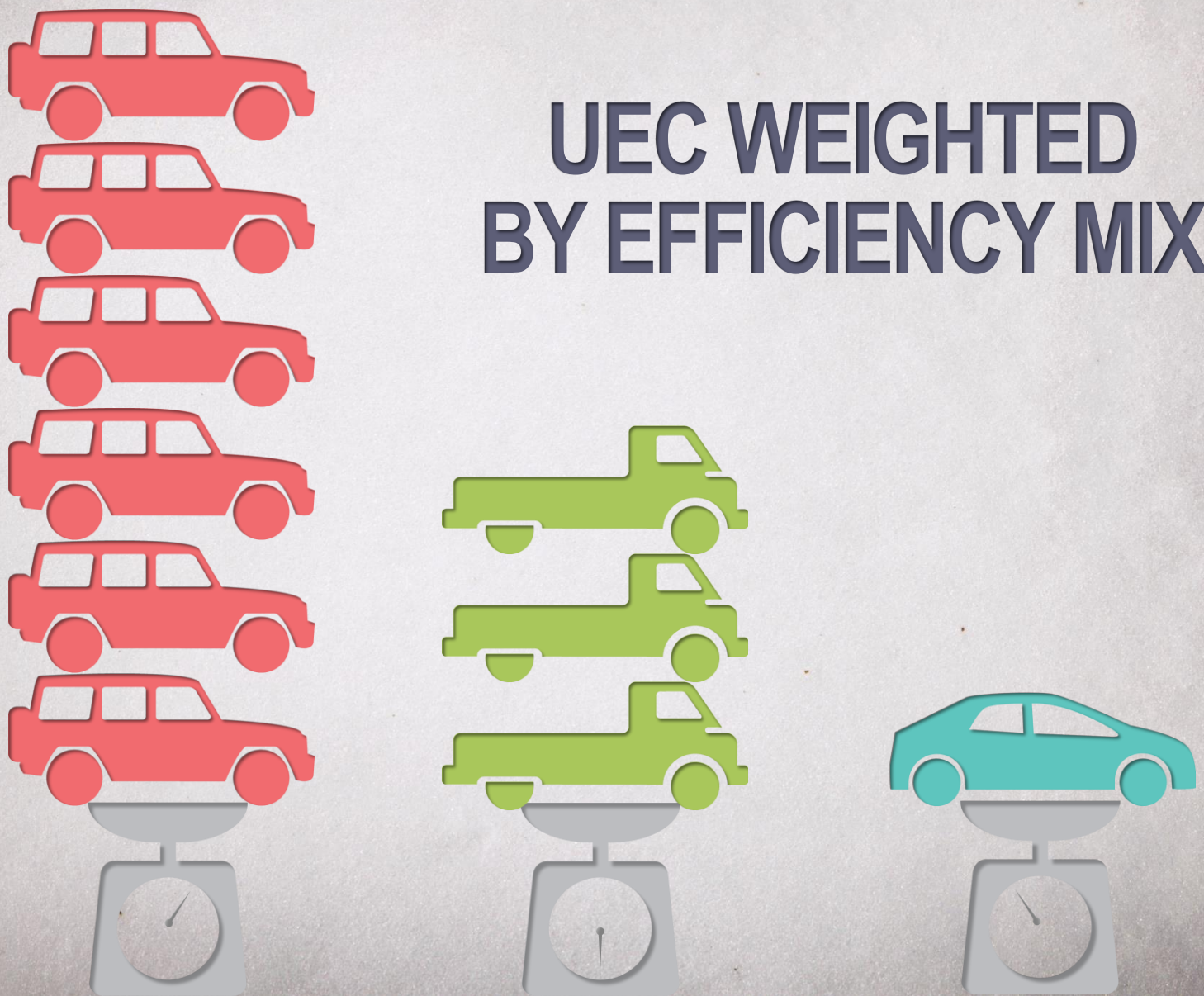


THE EFFICIENCY MIX

is the distribution of sales that fall within each efficiency level in a given market in a given year

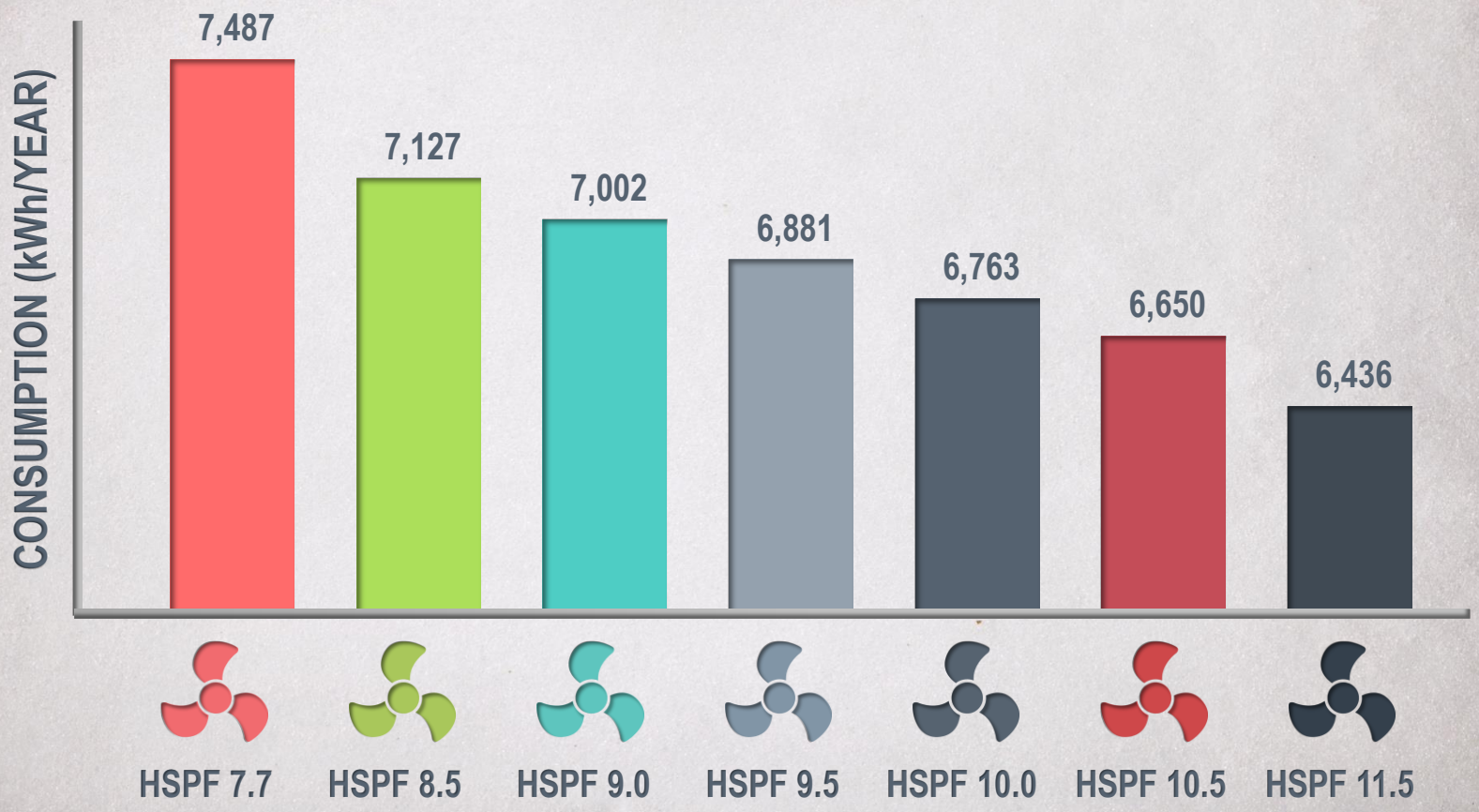
UNIT ENERGY CONSUMPTION (UEC)

UEC WEIGHTED BY EFFICIENCY MIX

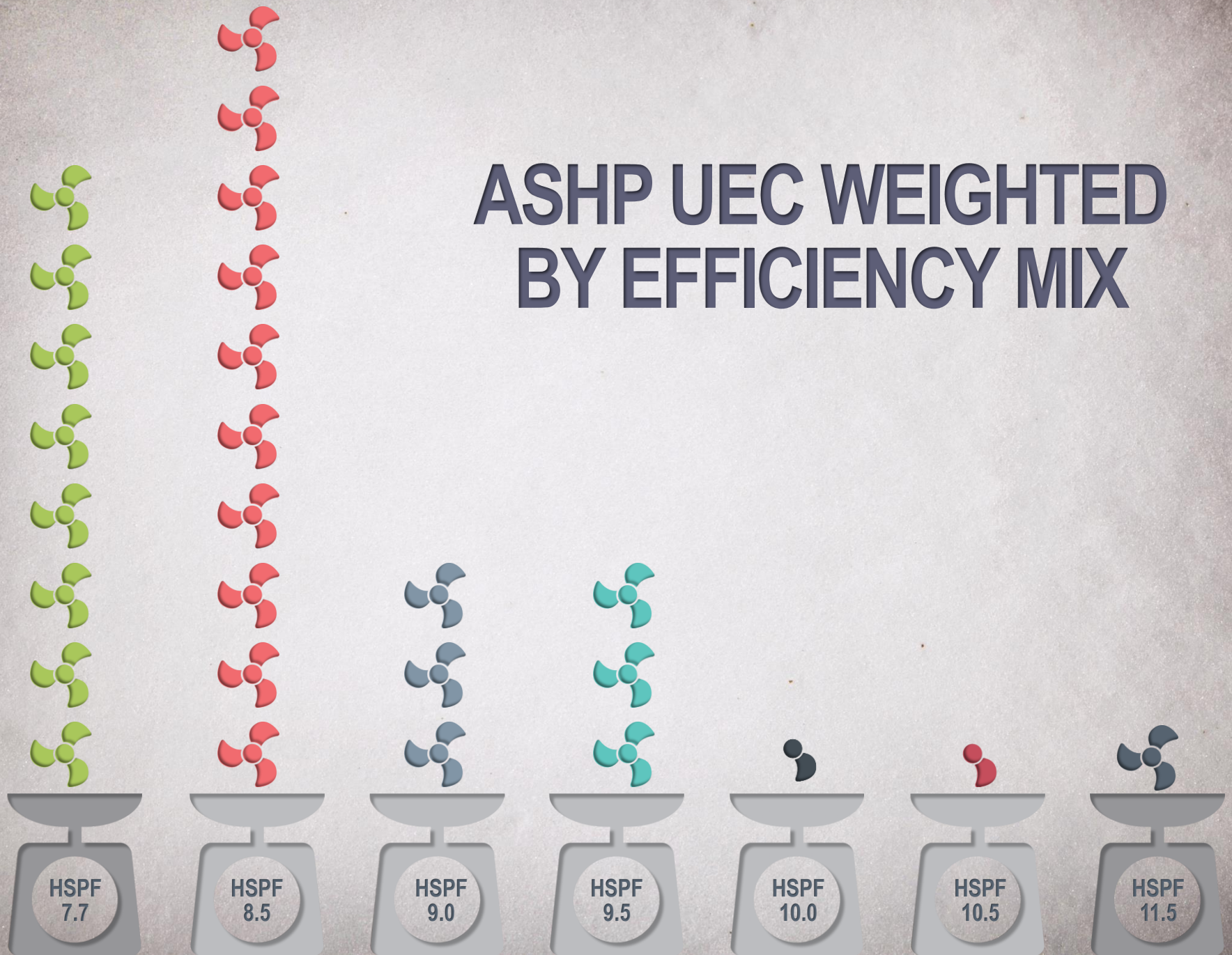


UEC WEIGHTED BY EFFICIENCY MIX

ASHP UNIT ENERGY CONSUMPTION



ASHP UEC WEIGHTED BY EFFICIENCY MIX



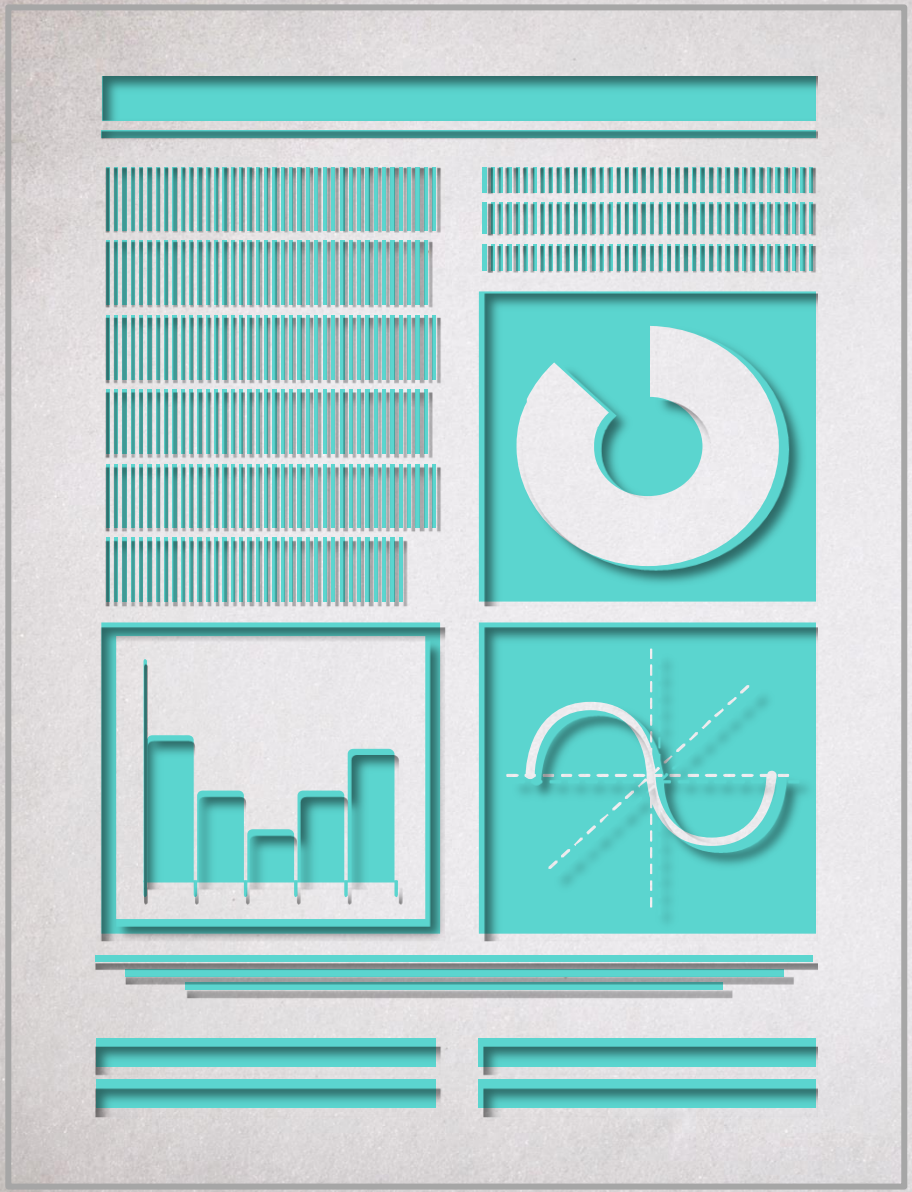
ASHP UEC WEIGHTED BY EFFICIENCY MIX

7,835
kWh/year

TAKEAWAYS

1. THERE ARE MANY EFFICIENCY LEVELS IN THE MARKET, AND THEY'RE ALL PART OF THE MARKET AVERAGE
2. EACH EFFICIENCY LEVEL HAS ITS OWN UEC
3. WE WEIGHT EACH UEC BY SALES DATA TO GET OVERALL AVERAGE UEC

SALES DATA



DISTRIBUTOR SALES DATA

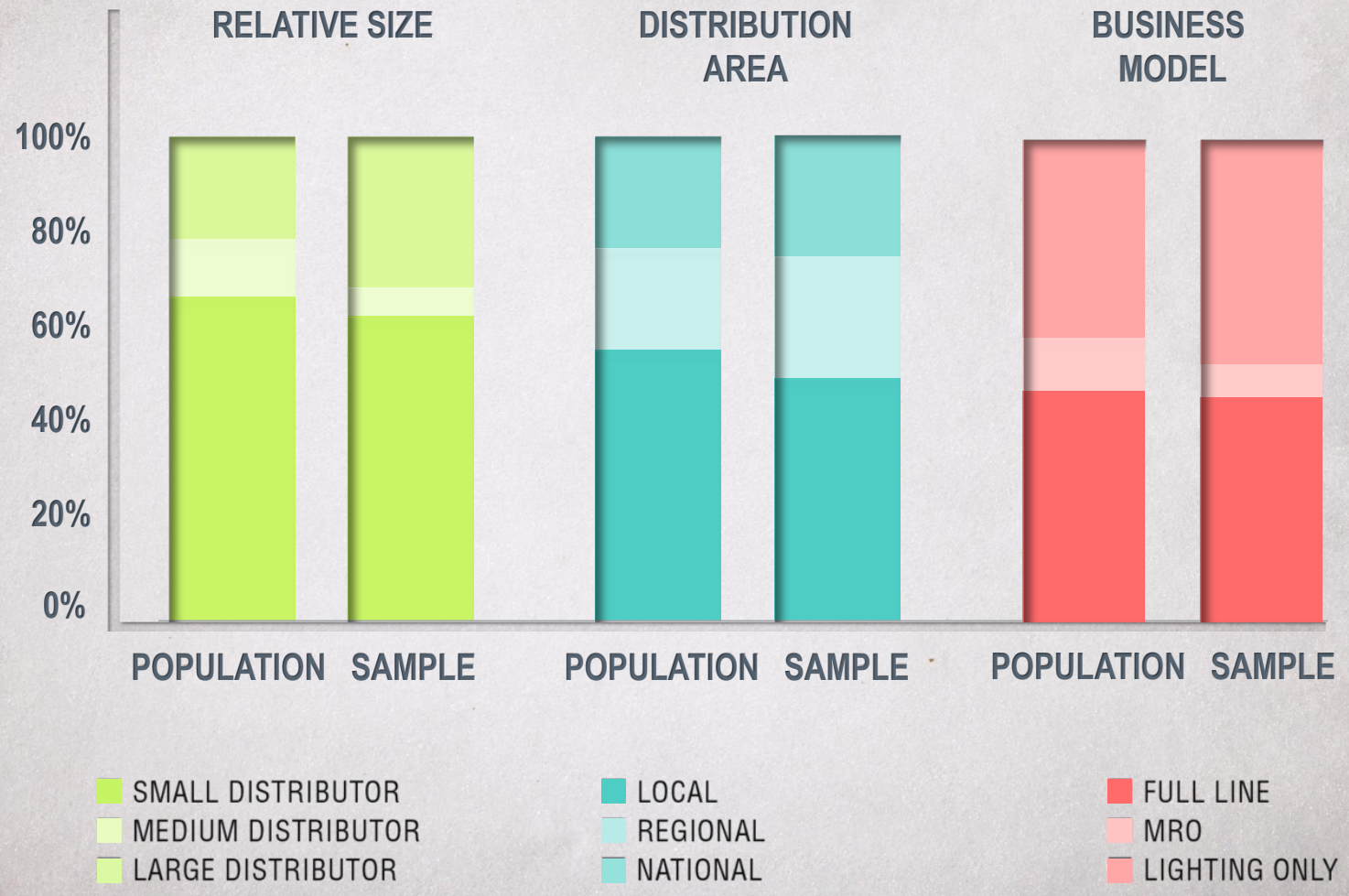
DISTRIBUTOR TYPES

Maintenance
Repair & Operations

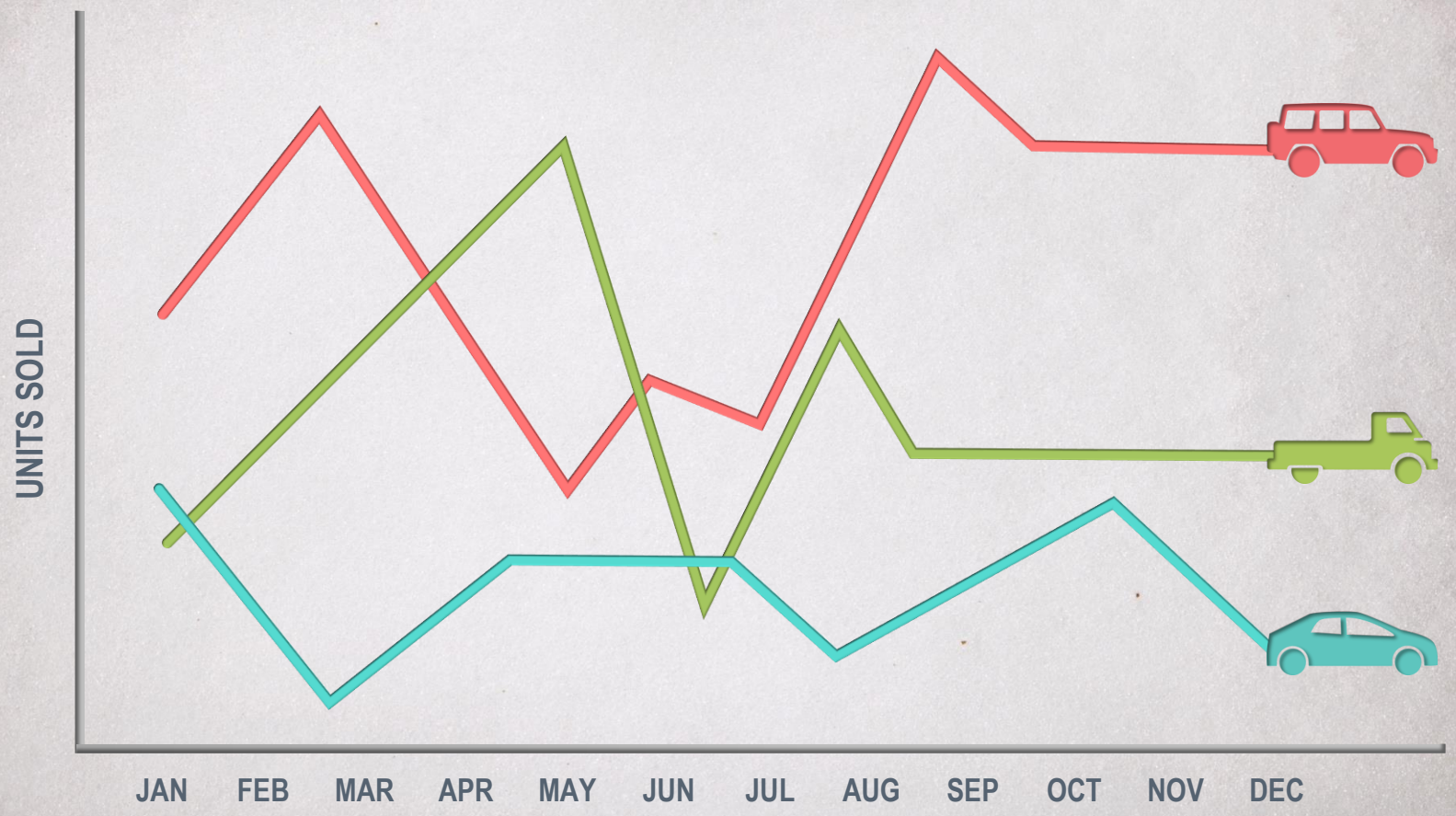
Full Line

Lighting Only

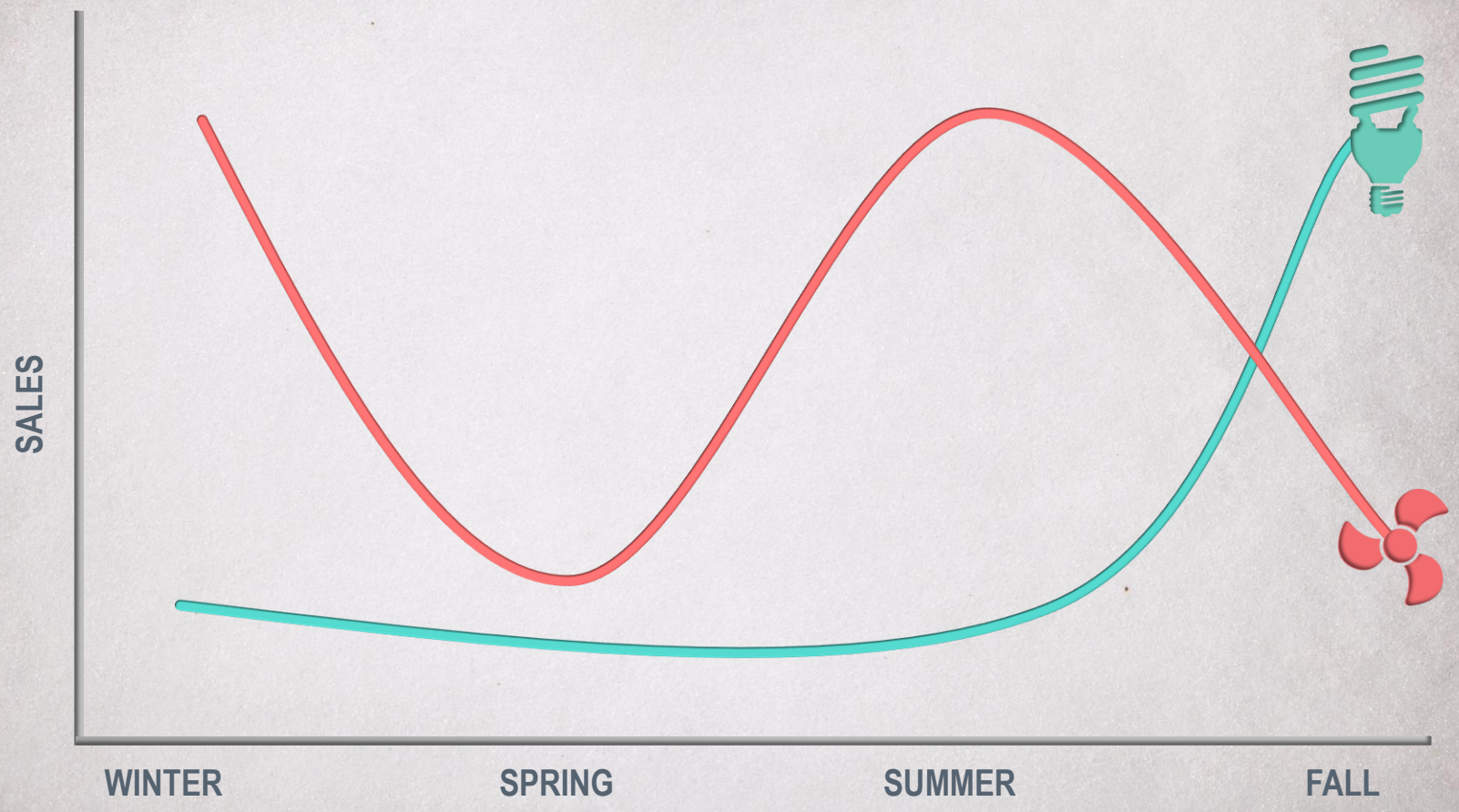
SURVEY REPRESENTATION



SALES IN THE BASELINE YEAR



SEASONALITY AND SALES



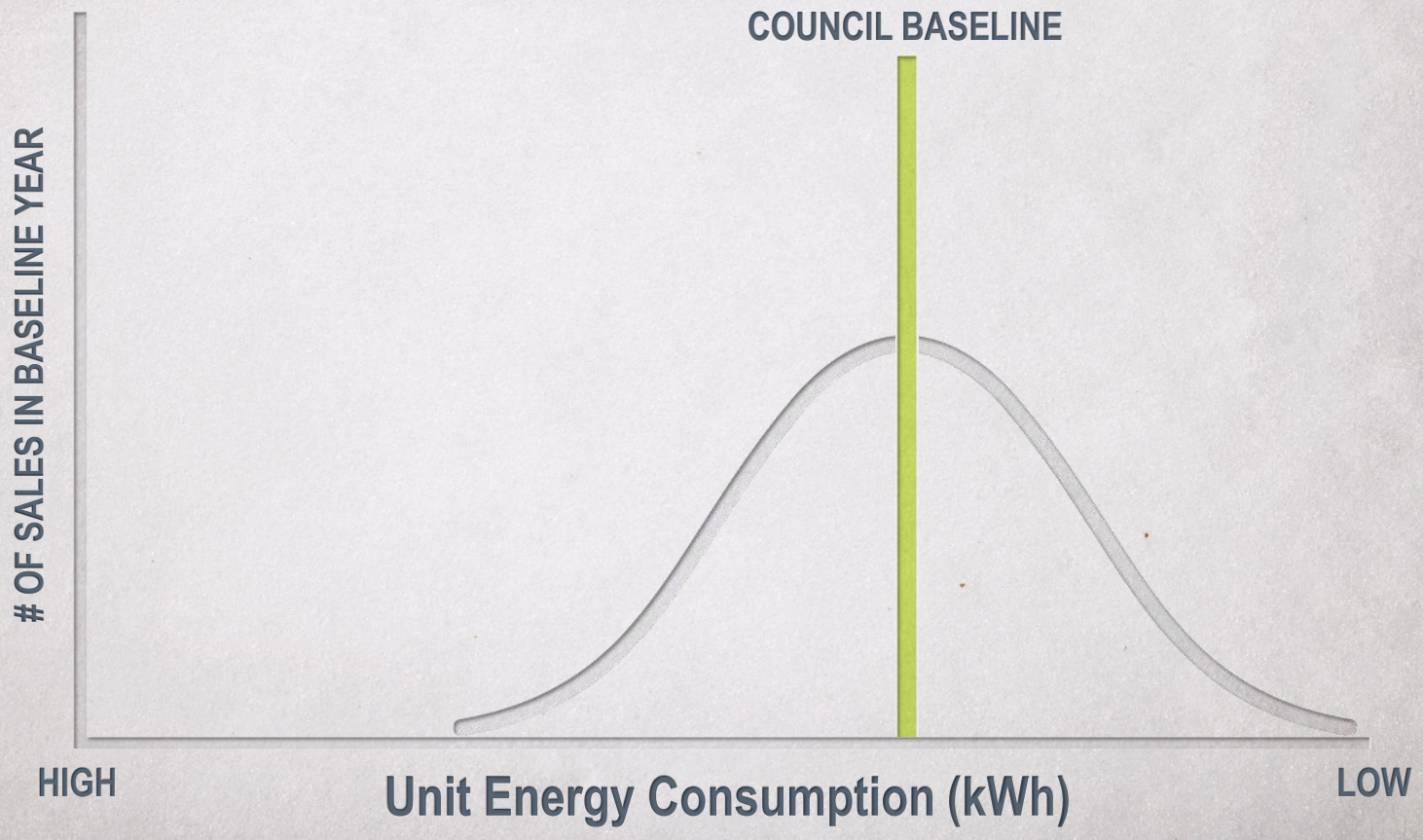
Not to scale

TAKE-AWAYS

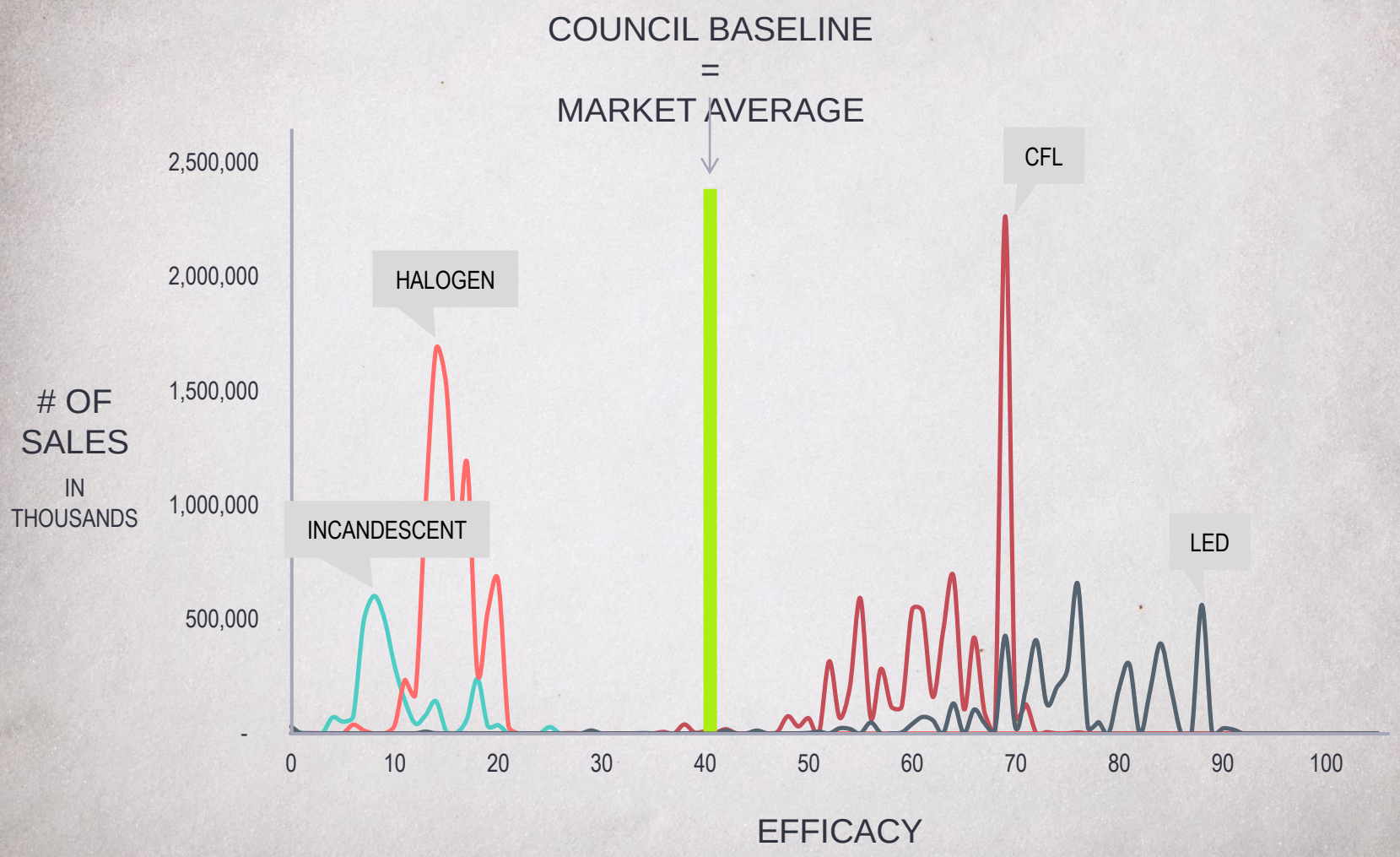
1. SALES DATA IS THE BEST INDICATOR OF PRODUCT FLOW AND CAN BE COLLECTED WITH CREATIVITY AND COMMITMENT
2. SALES DATA CAN BE REPRESENTATIVE, EVEN WHEN INCOMPLETE
3. WE CAN USE MARKET SEGMENTATION TO INFORM WHETHER OR NOT OUR SALES DATA IS REPRESENTATIVE
4. WE CAN ACCOUNT FOR SEASONAL VARIATIONS BY ESTABLISHING AVERAGE EFFICIENCIES USING FULL YEAR DATA

THE BASELINE

AVERAGE UEC IN THE BASELINE YEAR



CURRENT PRACTICE BASELINE



General Purpose Lamps

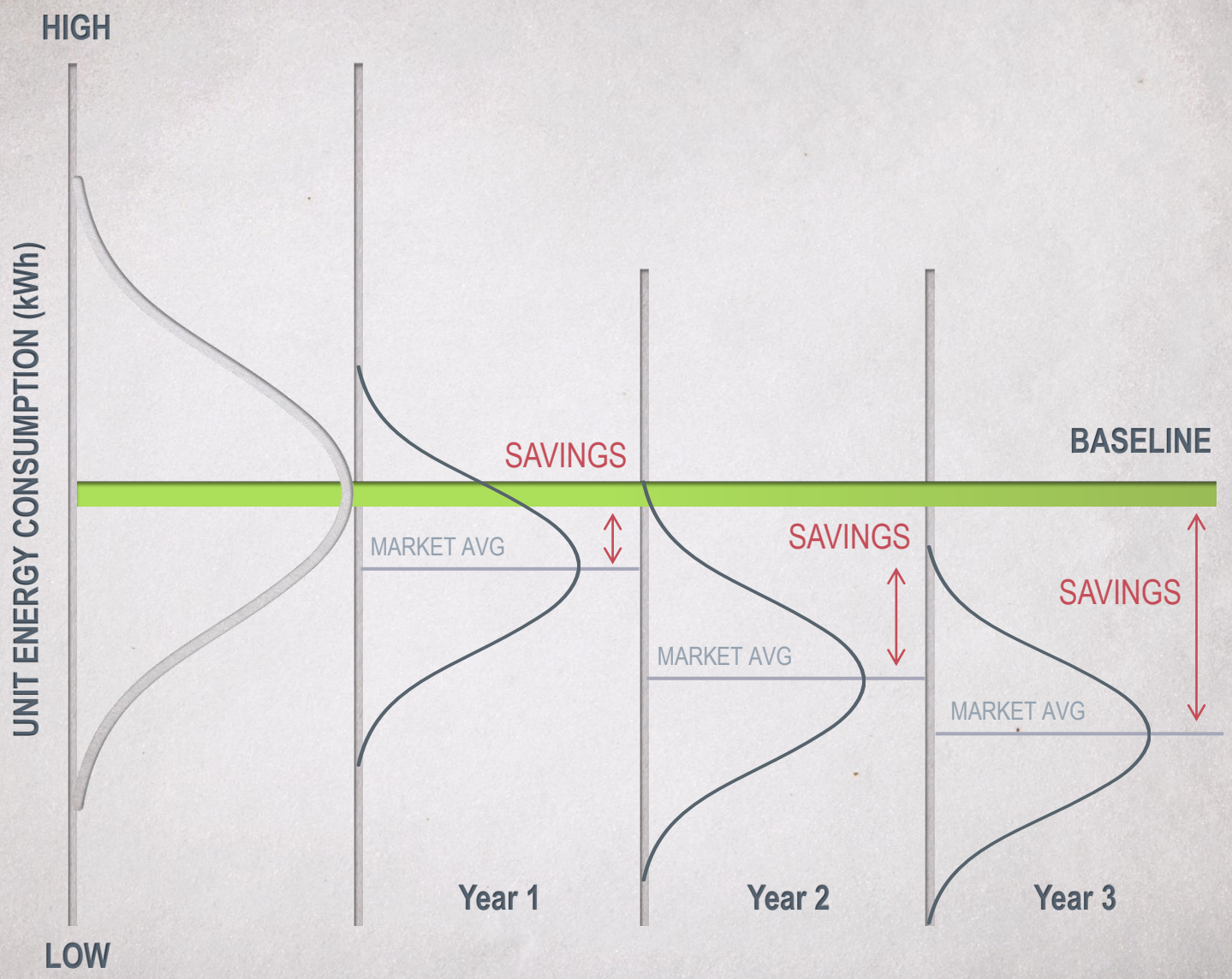
FROZEN

EFFICIENCY

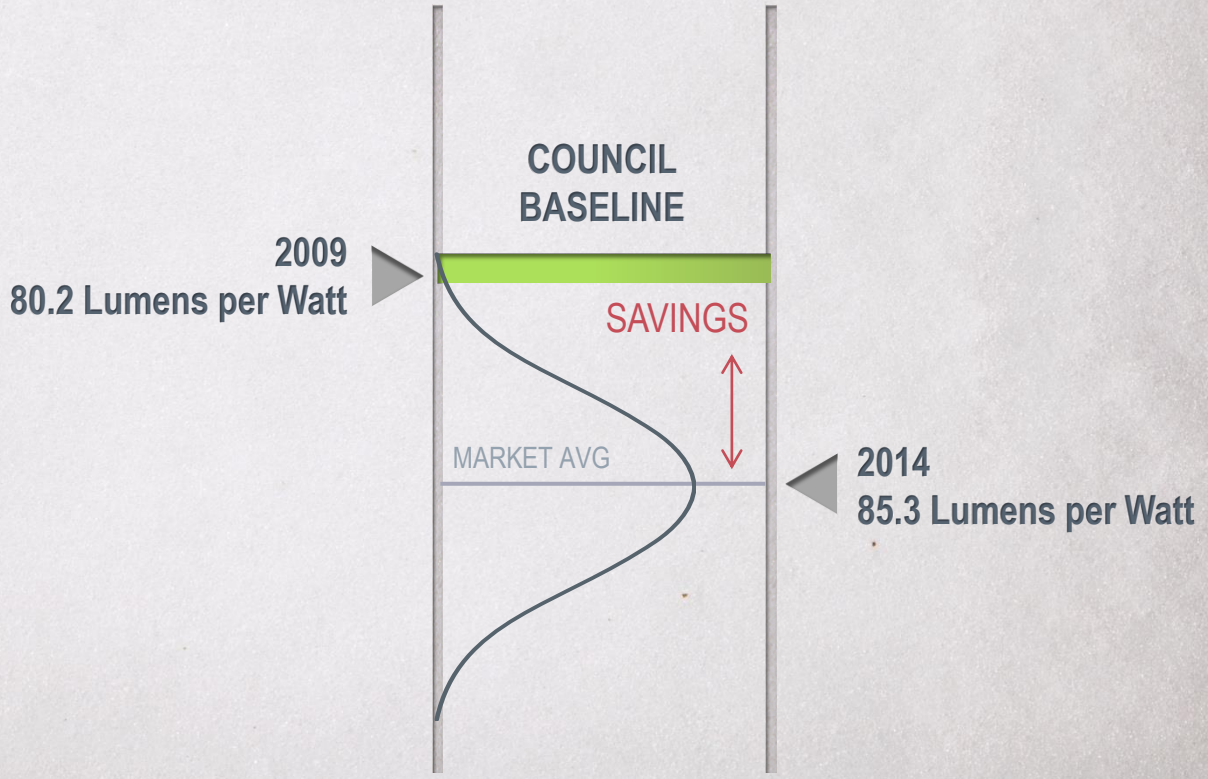
TAKE-AWAYS

1. CURRENT PRACTICE = FLOW
2. CURRENT PRACTICE = MARKET AVERAGE
3. BASELINE EFFICIENCY MIX IS FROZEN

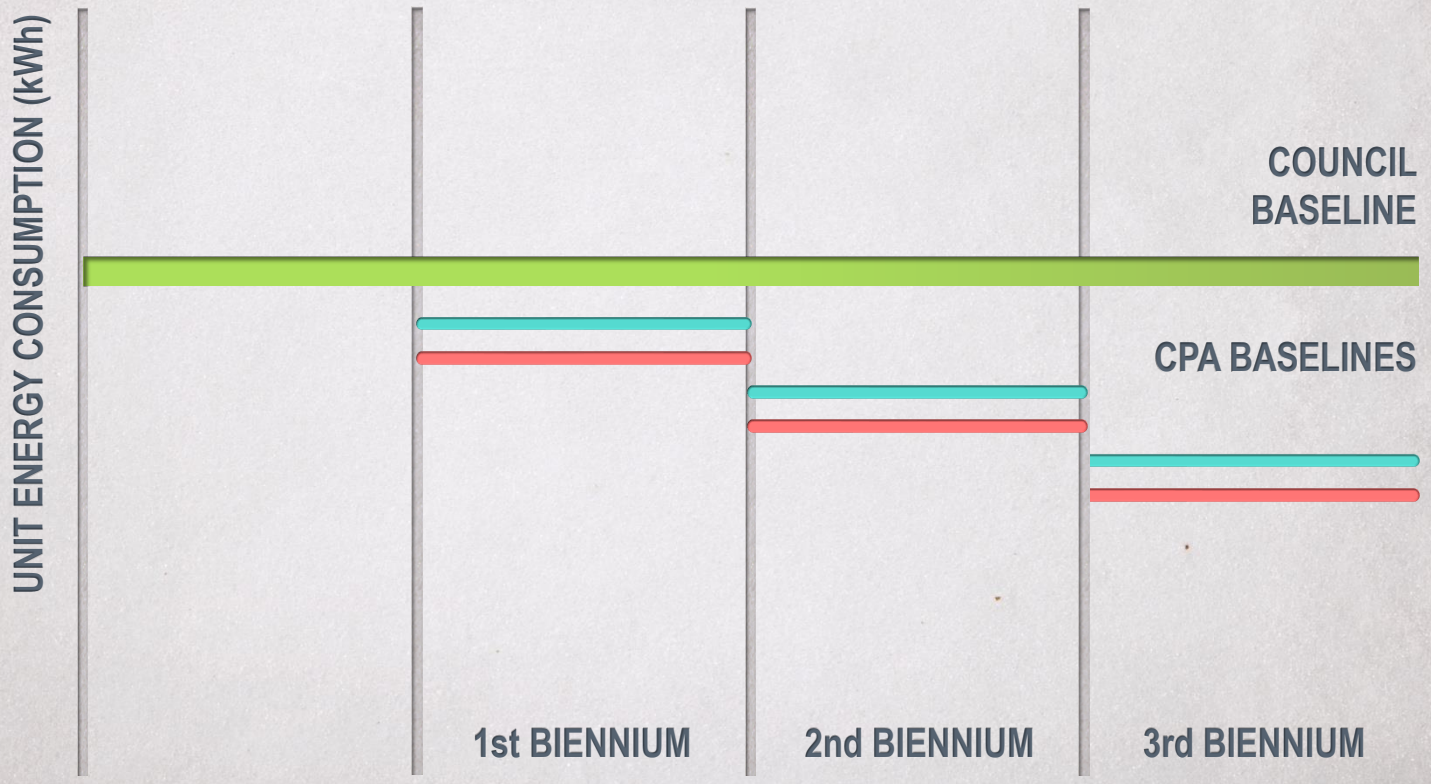
THE ACTUAL

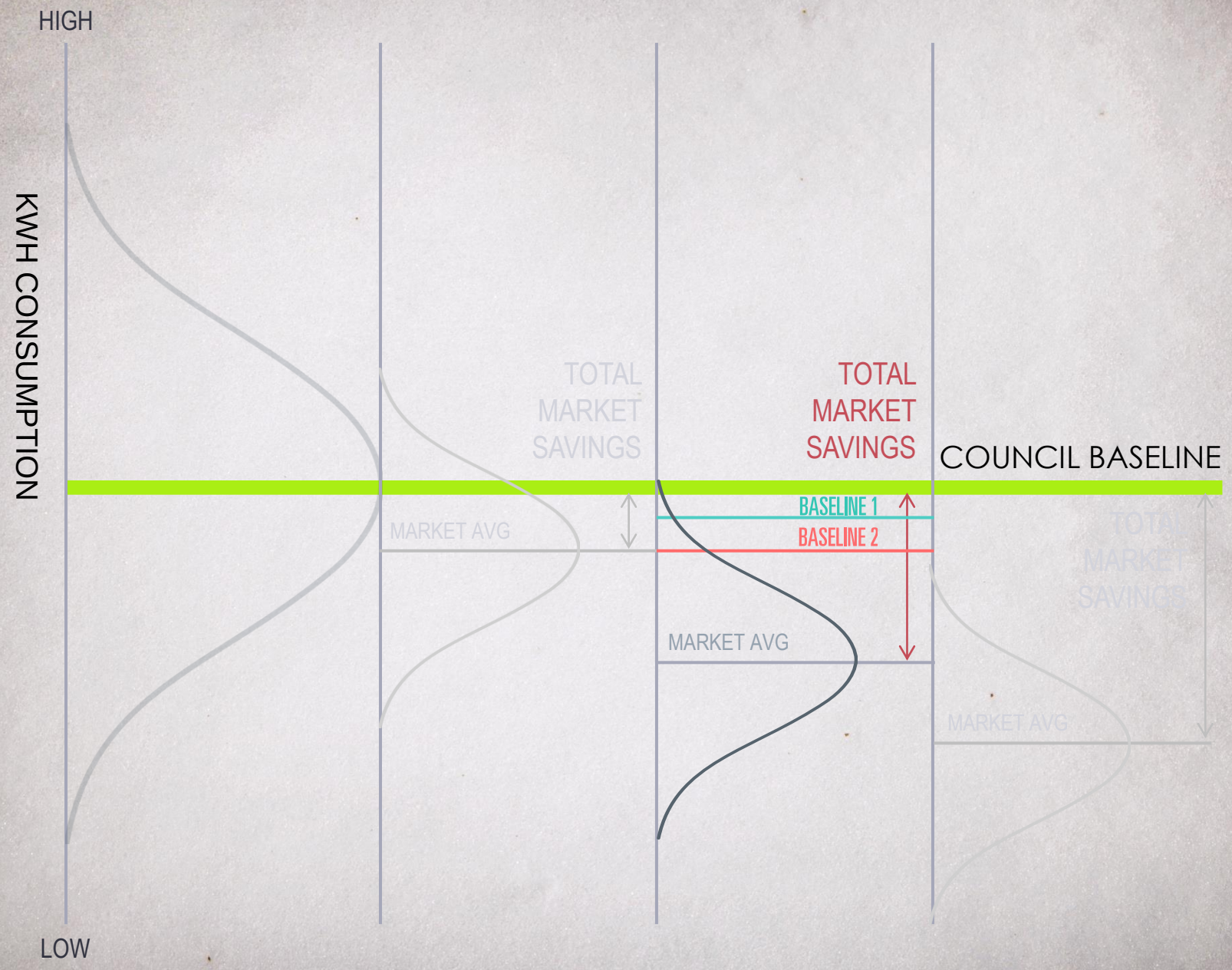

HIGH
UNIT ENERGY CONSUMPTION (kWh)
LOW
BASELINE
SAVINGS
MARKET AVG
SAVINGS
MARKET AVG
SAVINGS
MARKET AVG
Year 1
Year 2
Year 3

LINEAR FLUORESCENT LAMP EXAMPLE



BASELINES CHANGE THE ANALYSIS



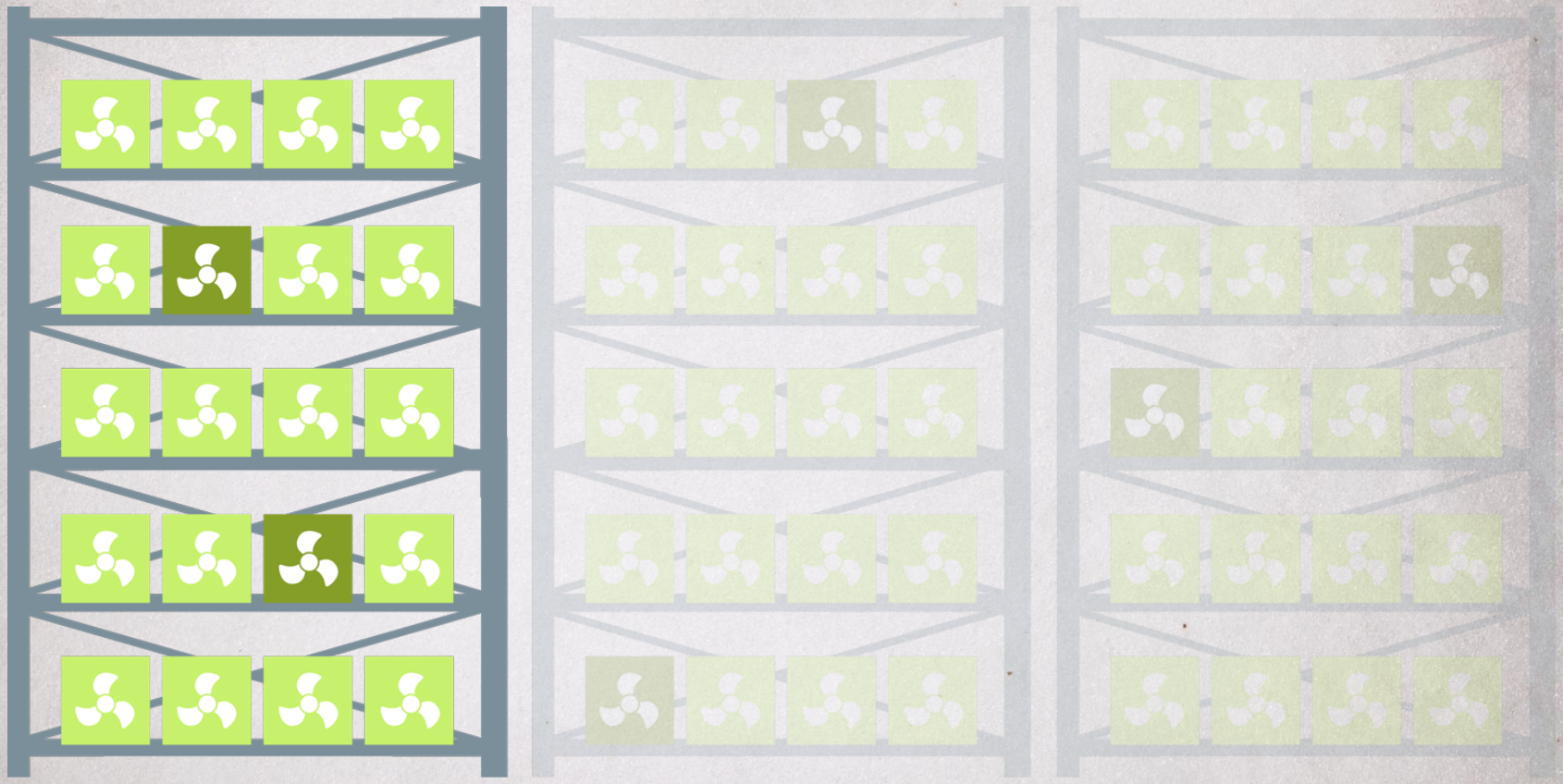

HIGH
KWH CONSUMPTION
LOW
TOTAL MARKET SAVINGS
MARKET AVG
TOTAL MARKET SAVINGS
COUNCIL BASELINE
BASELINE 1
BASELINE 2
MARKET AVG
TOTAL MARKET SAVINGS
MARKET AVG

TAKE-AWAYS

1. THE ACTUAL AND THE BASELINE ARE THE SAME ANALYSIS, AT DIFFERENT POINTS IN TIME
2. MOMENTUM SAVINGS MEASURES THE CHANGE IN THE TOTAL MARKET, NOT DISCRETE WIDGETS
3. BASELINE INCONSISTENCY CREATES INACCURACY IN REPORTING

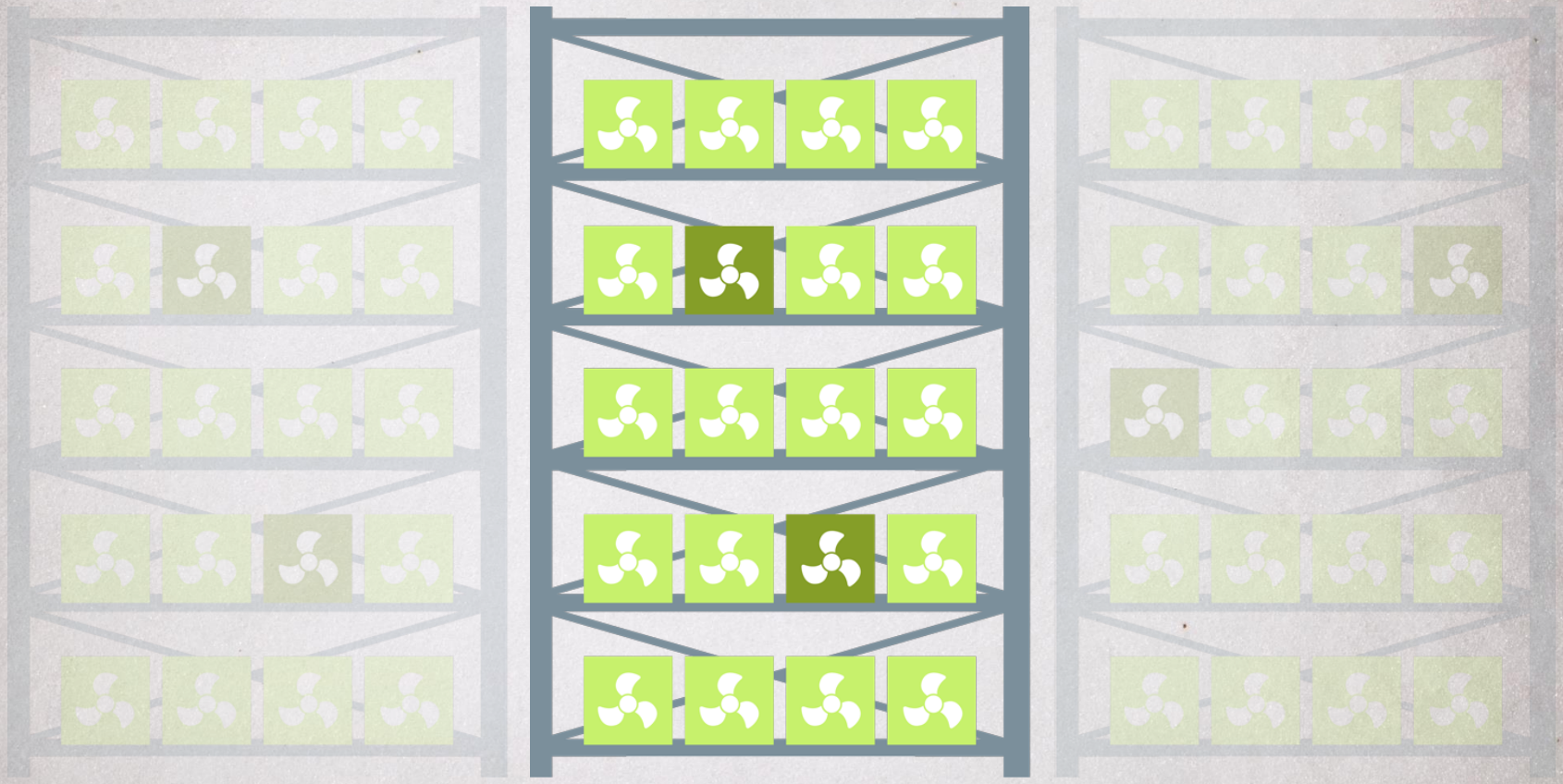
EFFICIENCY IN THE BASELINE

TOTAL SALES MIX



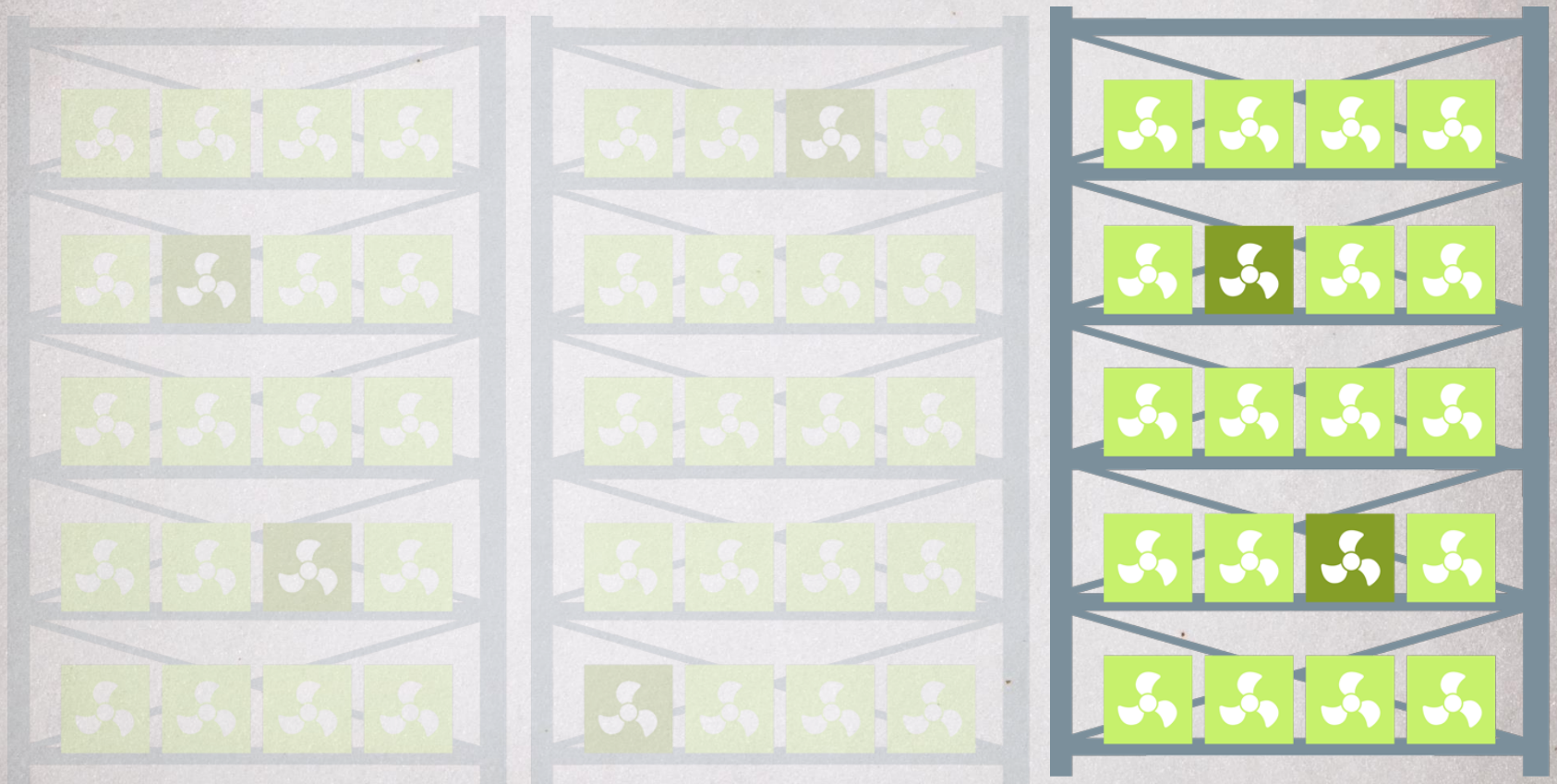
YEAR ONE YEAR TWO YEAR THREE

TOTAL SALES MIX



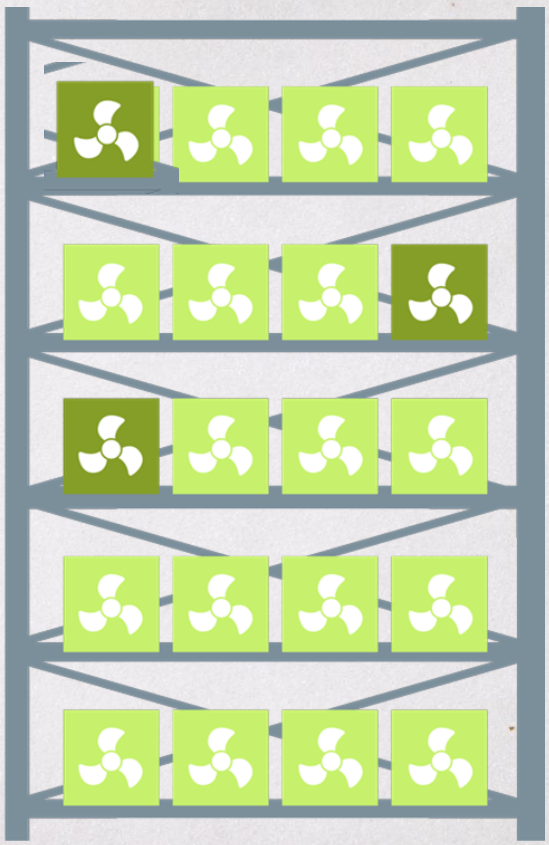
YEAR ONE YEAR TWO YEAR THREE

TOTAL SALES MIX



YEAR ONE YEAR TWO YEAR THREE

TOTAL SALES MIX



YEAR FOUR

TAKE-AWAYS

1. FROZEN EFFICIENCY ASSUMES THAT THE EFFICIENCY AT THE TIME OF THE PLAN CONTINUES: NO INCREMENTAL SAVING UNLESS THE MARKET CHANGES

ANNUAL MARKET SIZE

ANNUAL MARKET SIZE × AVERAGE UEC = TOTAL MARKET CONSUMPTION

HOW BIG IS THE REGIONAL MARKET?

THREE APPROACHES

Top-Down

Scaling down national shipment data to the represent the PNW

Bottom-Up

Scaling up sales data from a subset of regional data

Stock-Turnover

Estimating annual sales using installed stock data and assumed lifetime

TOP-DOWN APPROACH

900 MILLION LAMPS

Estimated 2014 National Shipments

4.2 PERCENT

PNW as % of National Population

92 PERCENT

Retail Lamps Purchased by Residential Customers

34.4 MILLION LAMPS

Top down estimate of 2014 PNW residential lamp market

Source: Cadeo analysis of NEMA A-line Lamp Shipment Index.
Population statistics taken from US Census Bureau

BOTTOM-UP APPROACH

15.7 MILLION LAMPS

2014 Nielsen Sales Data for PNW

23.5 PERCENT

% of Total PNW Sales Captured by Nielsen

92 PERCENT

Retail Lamps Purchased by Residential Customers

61.3 MILLION LAMPS

Bottom-up Estimate of 2014 PNW residential lamp market

Source: Cadeo analysis of NEMA A-Line Lamp Shipment Index, Nielsen sales data.

COMPARISON

Top-Down

34.4 million

Estimated 2014 PNW Shipments

Bottom-Up

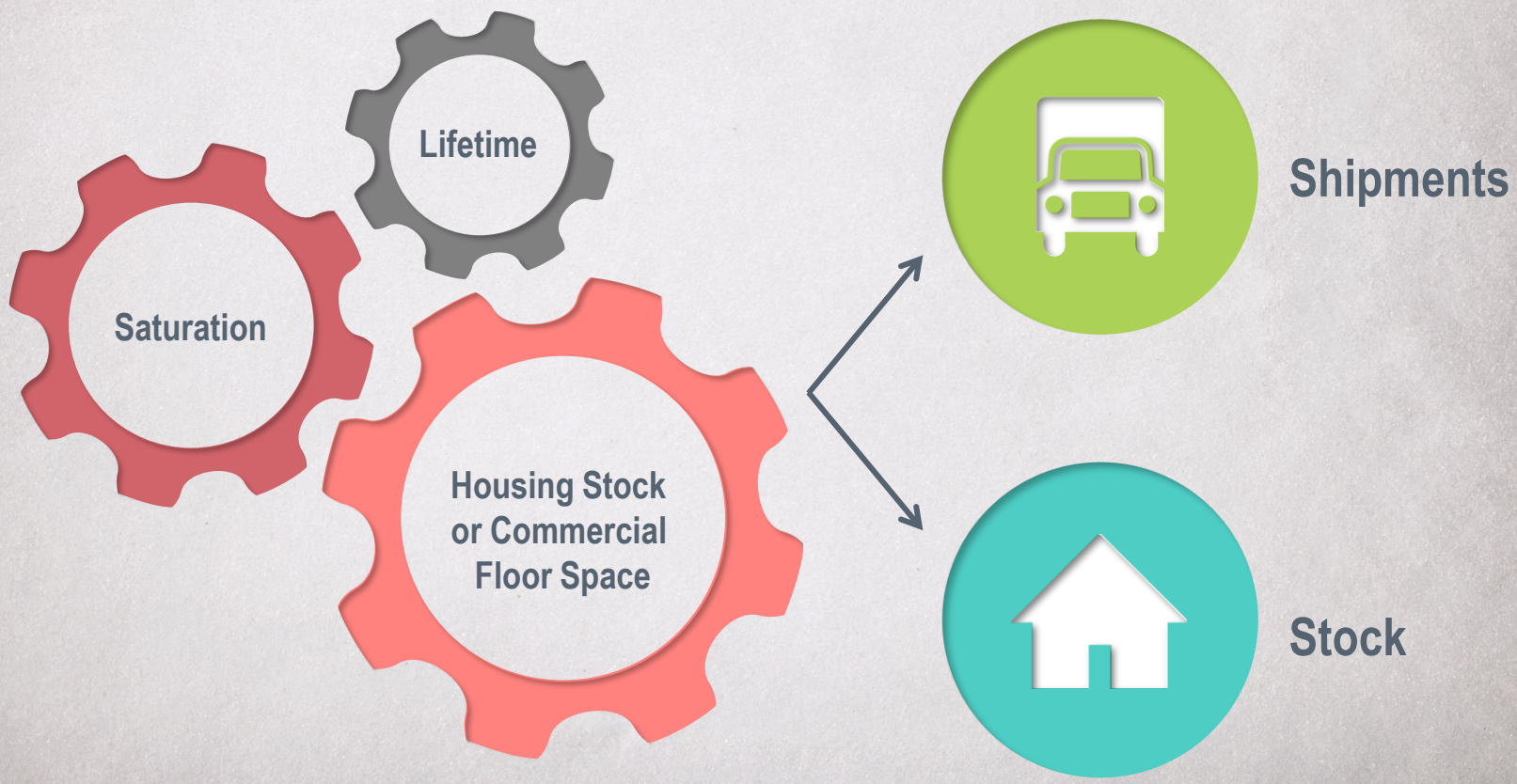
61.3 million

Estimated 2014 PNW Sales

Market Size:
~ 48 million general purpose lamps

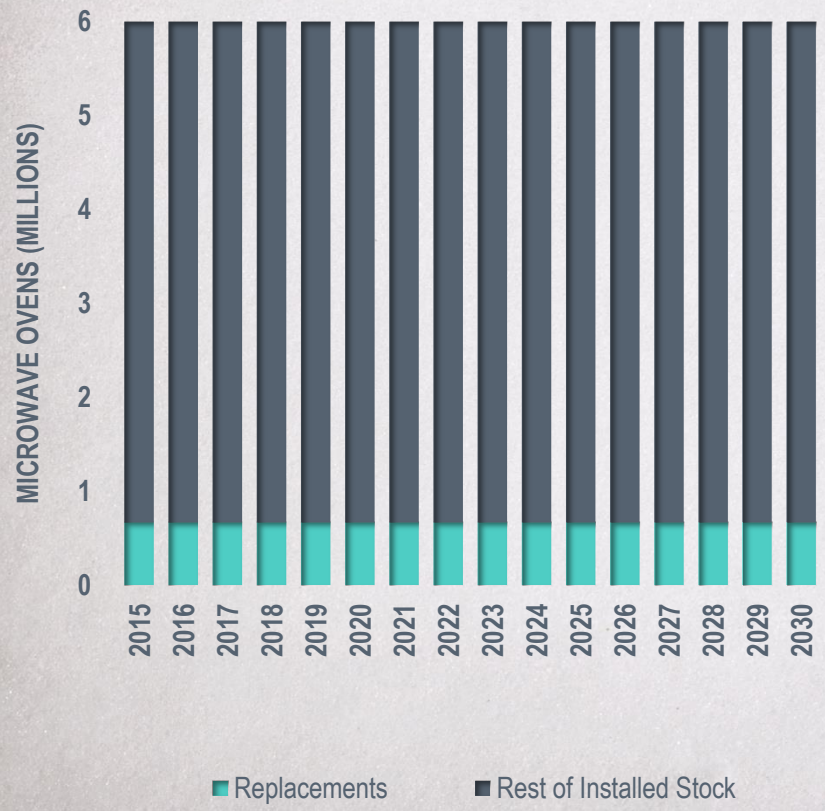
Source: Cadeo analysis of NEMA A-line Lamp Shipment Index, Nielsen sales data.
Population statistics taken from US Census Bureau

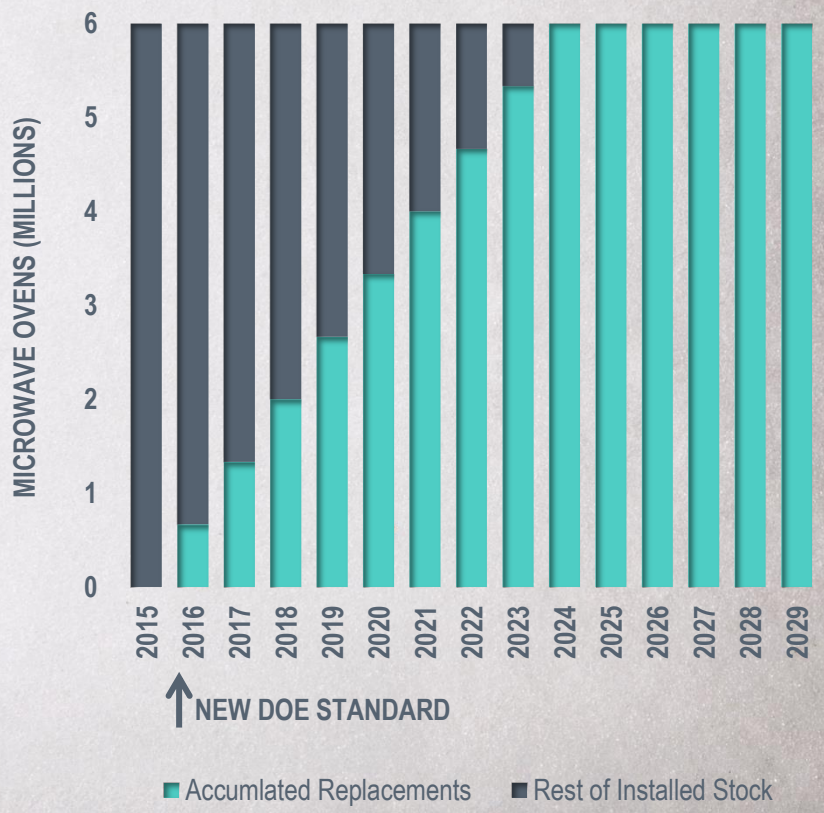
STOCK TURNOVER MODEL OVERVIEW



EXAMPLE: MICROWAVES

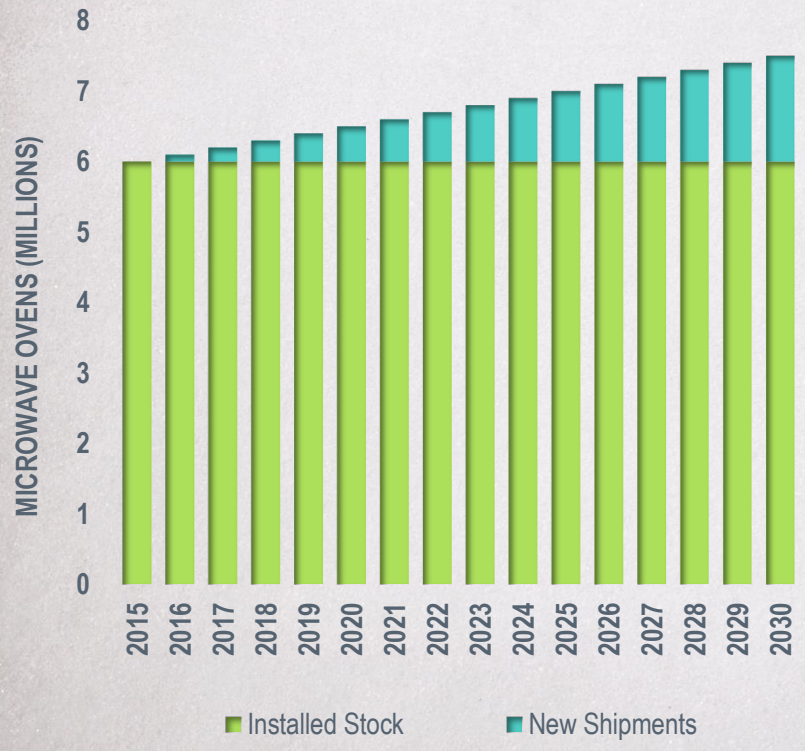
REPLACEMENTS SHIPMENTS IN EXISTING STOCK

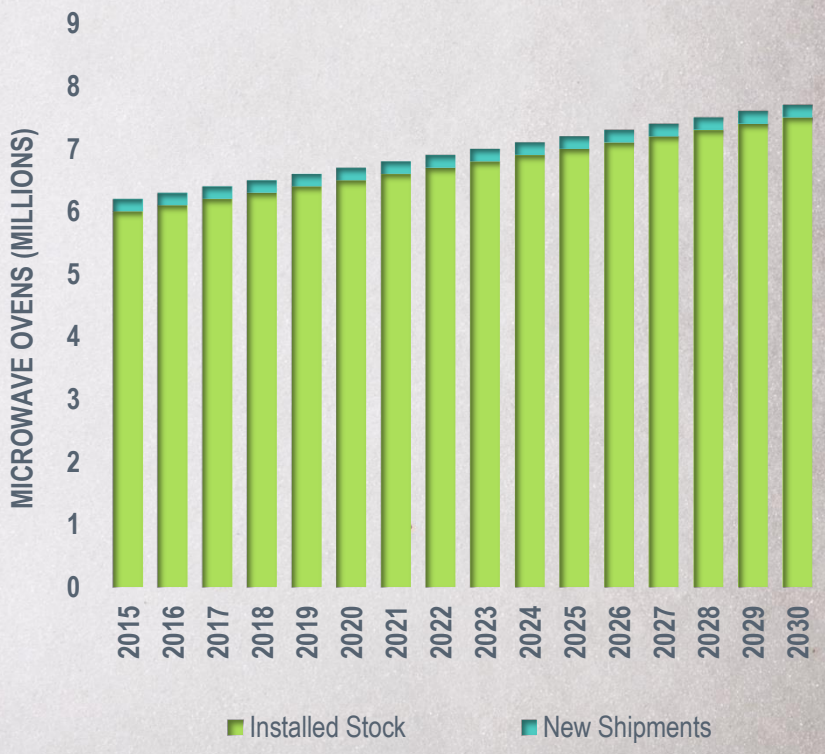




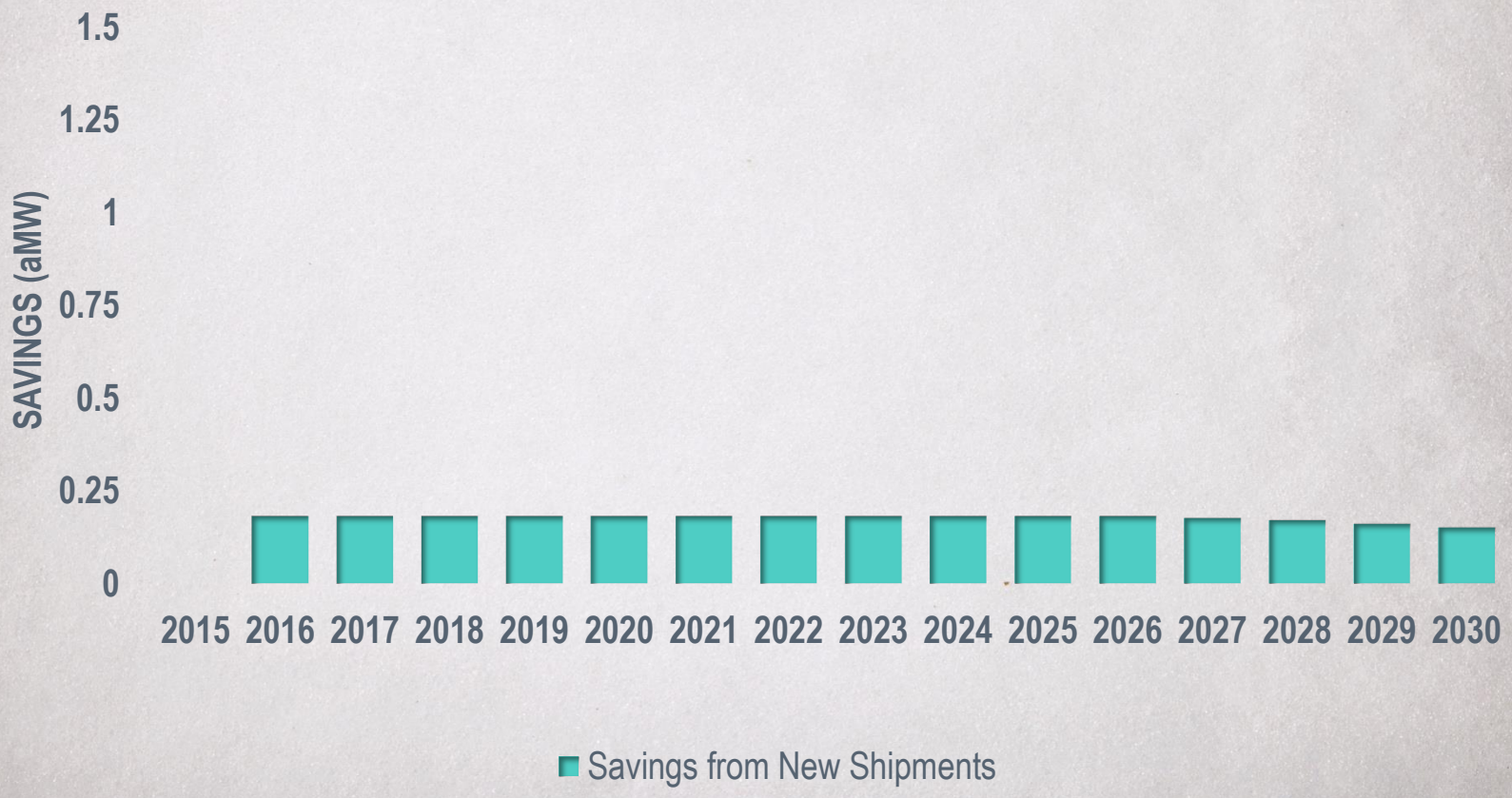
SAVINGS FROM EXISTING STOCK FOLLOWING STANDARDS

NEW SHIPMENTS AND STOCK GROWTH

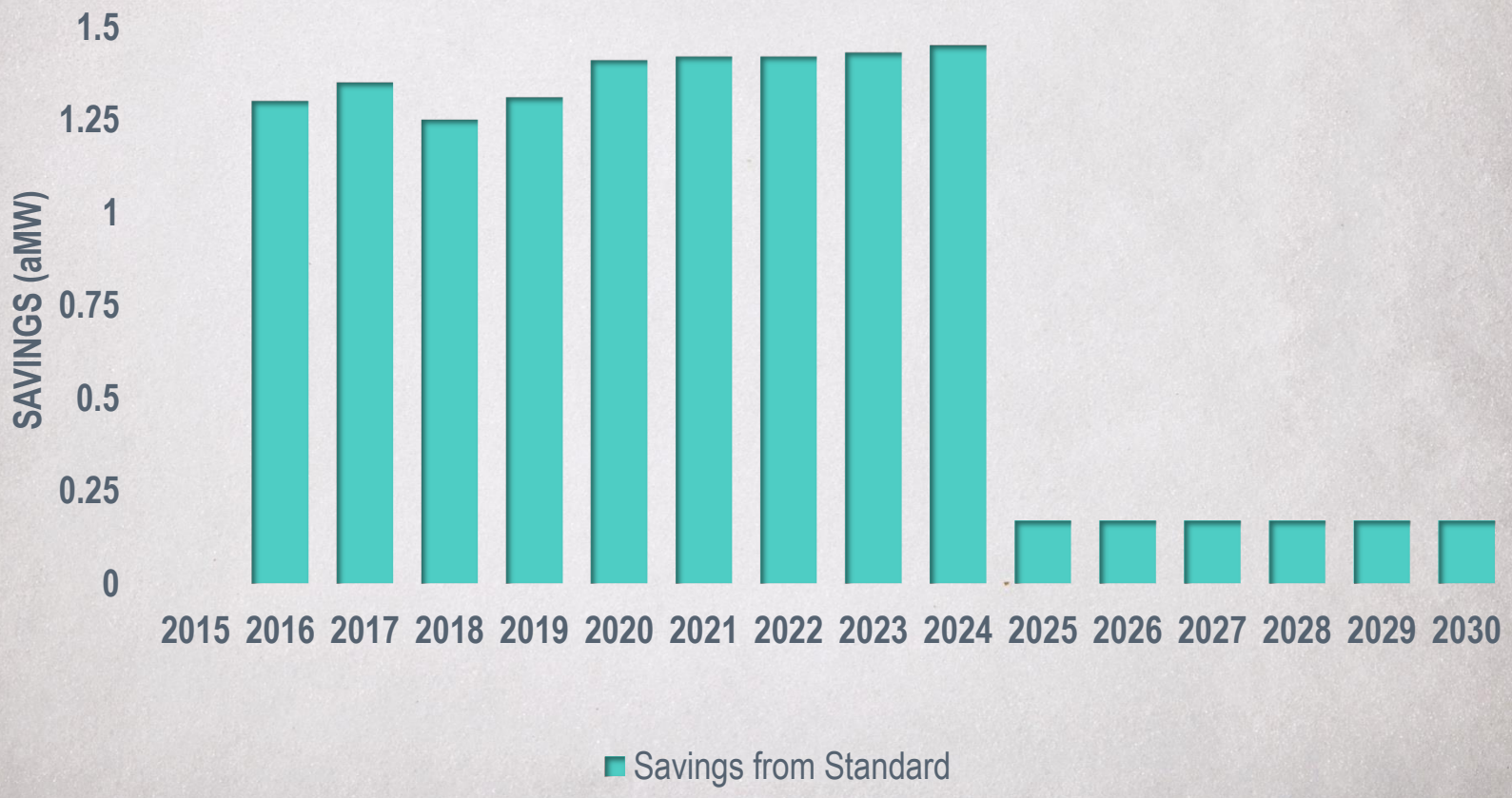




INCREMENTAL SAVINGS FROM NEW SHIPMENTS



INCREMENTAL SAVINGS FOLLOWING STANDARDS



TAKE-AWAYS

1. BPA USES THREE APPROACHES TO DEVELOP THE BEST POSSIBLE MARKET SIZE ESTIMATE
2. SAVINGS FROM STANDARDS ONLY CONTINUE UNTIL THE STOCK IS TURNED OVER

LOCAL VARIATION

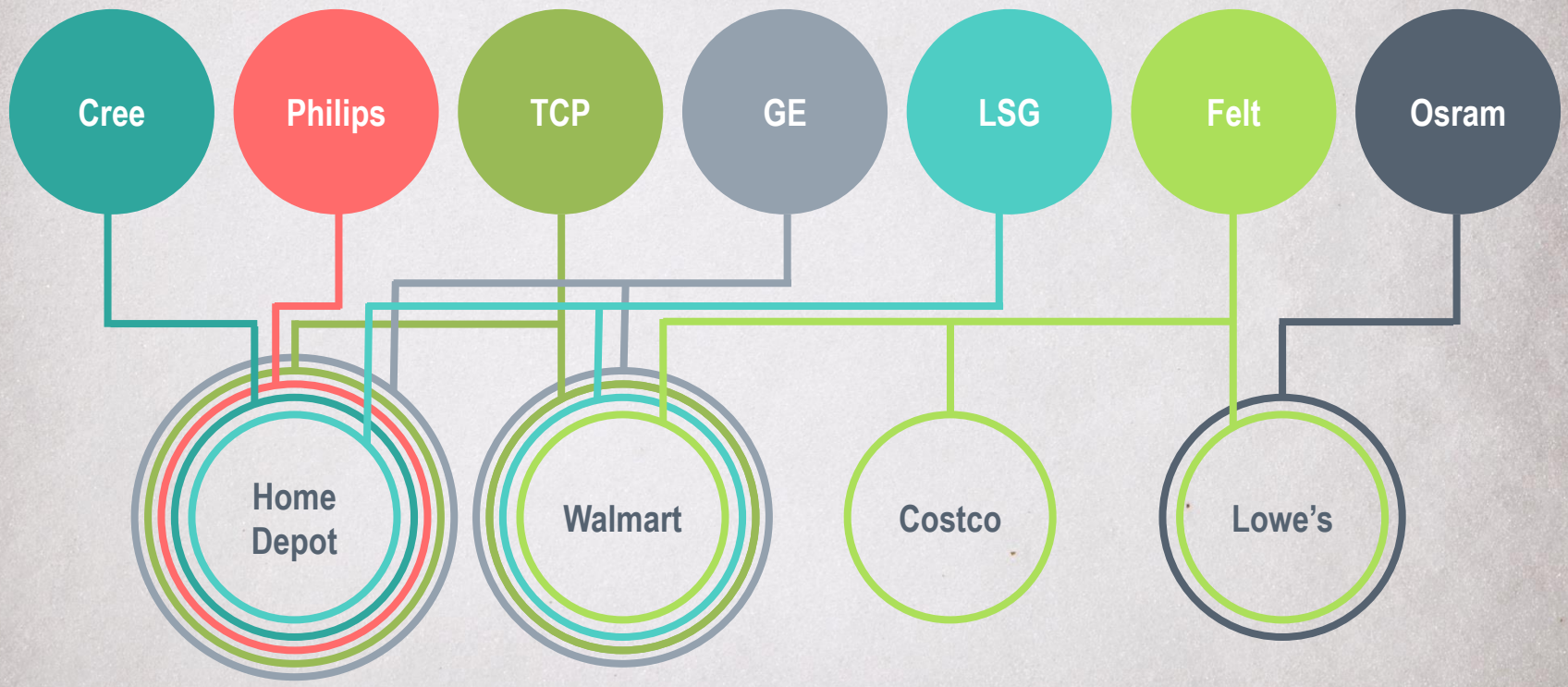
IN A BIG-BOX WORLD: MORE SIMILARITIES THAN DIFFERENCES

RBSA DIFFERENCES

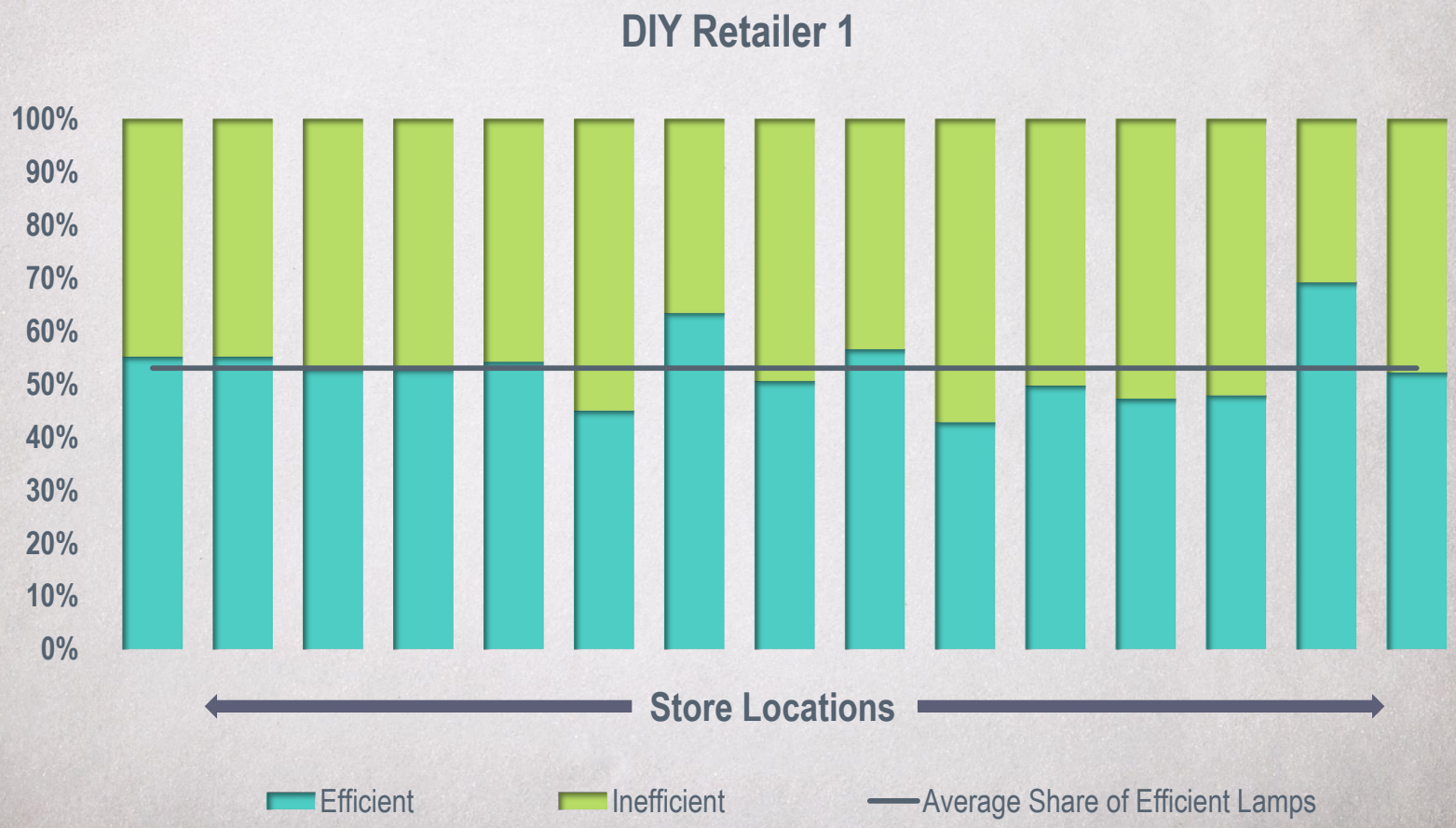
VINTAGE OF HOMES

FUEL AVAILABILITY

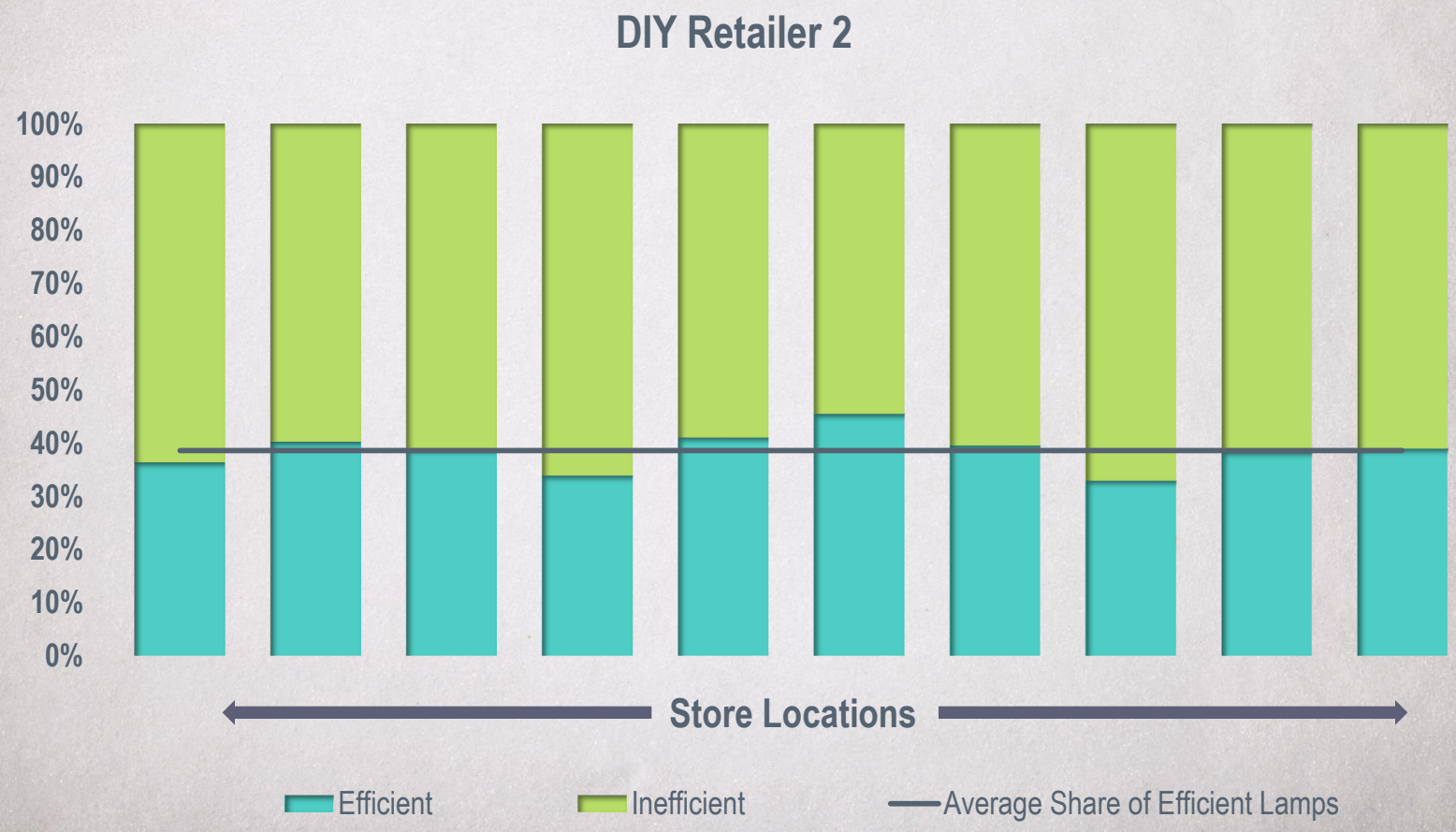
FOUR RETAILERS DOMINATE RESIDENTIAL LIGHTING



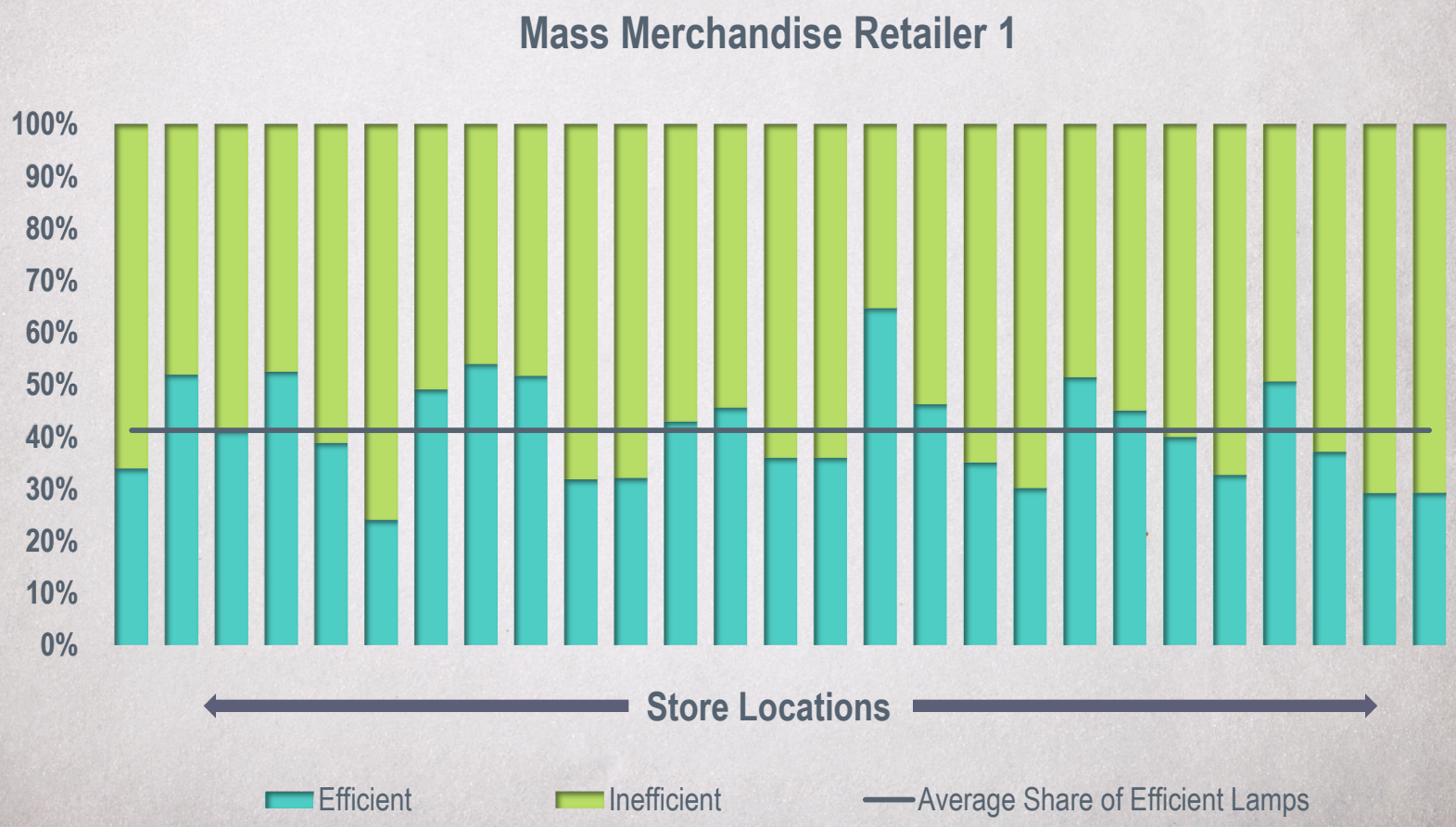
SHARE OF EFFICIENT LAMPS STOCKED BY STORE LOCATION



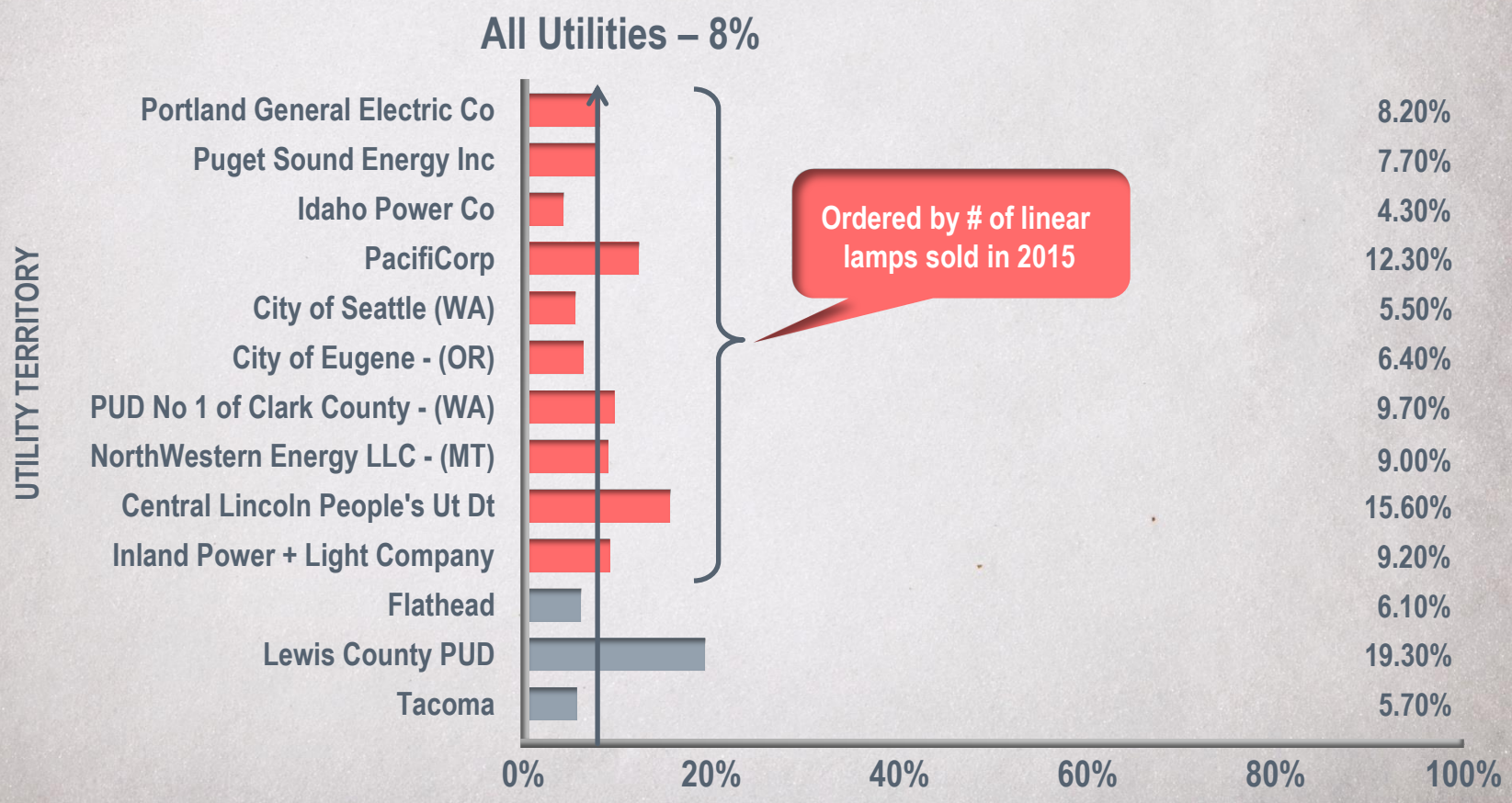
SHARE OF EFFICIENT LAMPS STOCKED BY STORE LOCATION



SHARE OF EFFICIENT LAMPS STOCKED BY STORE LOCATION



T12s AS % OF ALL LINEAR LAMPS SOLD INTO TERRITORY



TAKE-AWAYS

1. THERE IS MORE CONSISTENCY THAN DIFFERENCES IN SUB-REGIONAL MARKETS
2. VINTAGE AND FUEL AVAILABILITY ARE DRIVERS OF DIFFERENCE
3. THE AVERAGE IS ONLY AN AVERAGE

RECAP

TAKE-AWAYS: STOCK AND FLOW

1. MOMENTUM SAVINGS OCCUR WHEN MARKETS CHANGE
2. STOCK REPRESENTS PAST DECISIONS; FLOW REPRESENTS CURRENT DECISIONS

TAKE-AWAYS: EFFICIENCY MIX

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4. WE CAN ACCOUNT FOR SEASONAL VARIATIONS BY ESTABLISHING AVERAGE EFFICIENCIES USING FULL YEAR DATA

TAKE-AWAYS: BASELINE

1. CURRENT PRACTICE = FLOW
2. CURRENT PRACTICE = MARKET AVERAGE
3. BASELINE EFFICIENCY MIX IS FROZEN

TAKE-AWAYS: ACTUAL MARKET

1. THE ACTUAL AND THE BASELINE ARE THE SAME ANALYSIS, AT DIFFERENT POINTS IN TIME
2. MOMENTUM SAVINGS MEASURES THE CHANGE IN THE TOTAL MARKET, NOT DISCRETE WIDGETS
3. BASELINE INCONSISTENCY CREATES INACCURACY IN REPORTING

TAKE-AWAYS: EFFICIENCY IN THE BASELINE

1. FROZEN EFFICIENCY ASSUMES THAT THE EFFICIENCY AT THE TIME OF THE PLAN CONTINUES: NO INCREMENTAL SAVING UNLESS THE MARKET CHANGES

TAKE-AWAYS: MARKET SIZE

1. WE USE THREE APPROACHES TO DEVELOP THE BEST POSSIBLE MARKET SIZE ESTIMATE
2. SAVINGS ONLY CONTINUE UNTIL THE STOCK IS TURNED OVER

TAKE-AWAYS: LOCAL VARIATION

1. THERE IS MORE CONSISTENCY THAN DIFFERENCES IN SUB-REGIONAL MARKETS
2. VINTAGE AND FUEL AVAILABILITY ARE DRIVERS OF DIFFERENCE
3. THE AVERAGE IS ONLY AN AVERAGE