

Polling Question

What is your primary role?

1. HVAC/Mechanical Contractor
2. Consulting/specifying Engineer
3. Building Owner
4. Architect
5. Energy Engineer
6. Facility Manager
7. MEP Engineer
8. Property Manager
9. OEM
10. Other





Upcoming Changes To Commercial Rooftops and Splits

Webinar | October 31st 2017

Meet Your Emerson Moderators

Michael Oakley



Market Manager – Commercial | Air Conditioning
Emerson Commercial and Residential Solutions
1675 West Campbell Road | Sidney, OH 45365
T +1 937 498 3109 | M +1 937 710 2448
Michael.Oakley@emerson.com

Jason Warner



Manager, Global Commercial Scroll Engineering | Air Conditioning
Emerson Commercial and Residential Solutions
1675 West Campbell Road | Sidney, OH 45365
T +1 937 498 3672 | M +1 937 710 5126
Jason.Warner@emerson.com

Factors Influencing The U.S. Commercial A/C Market

Megatrends Driving Change In Commercial Air Conditioning

Trend



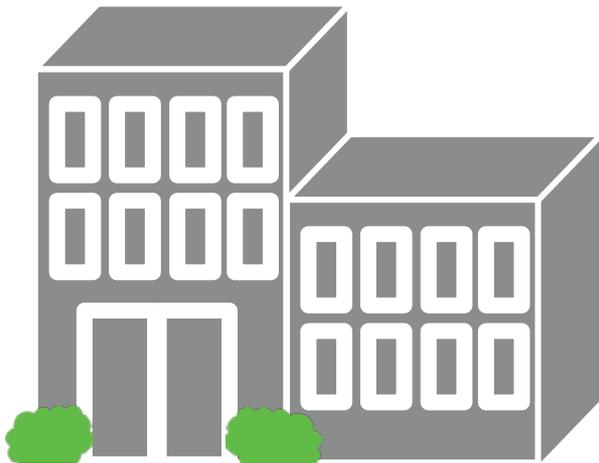
**Building Automation /
Connectivity**



Comfort and Air Quality



**Energy Efficiency and
Sustainability**



Emerson Response

- **Sub-system controls / monitoring**
- **Air Management**
 - Latent vs. Sensible
 - IAQ
- **Modulation Technologies**
 - Compression and controls
- **Low-GWP Refrigerants**
 - A2L compression
 - Next Gen compression

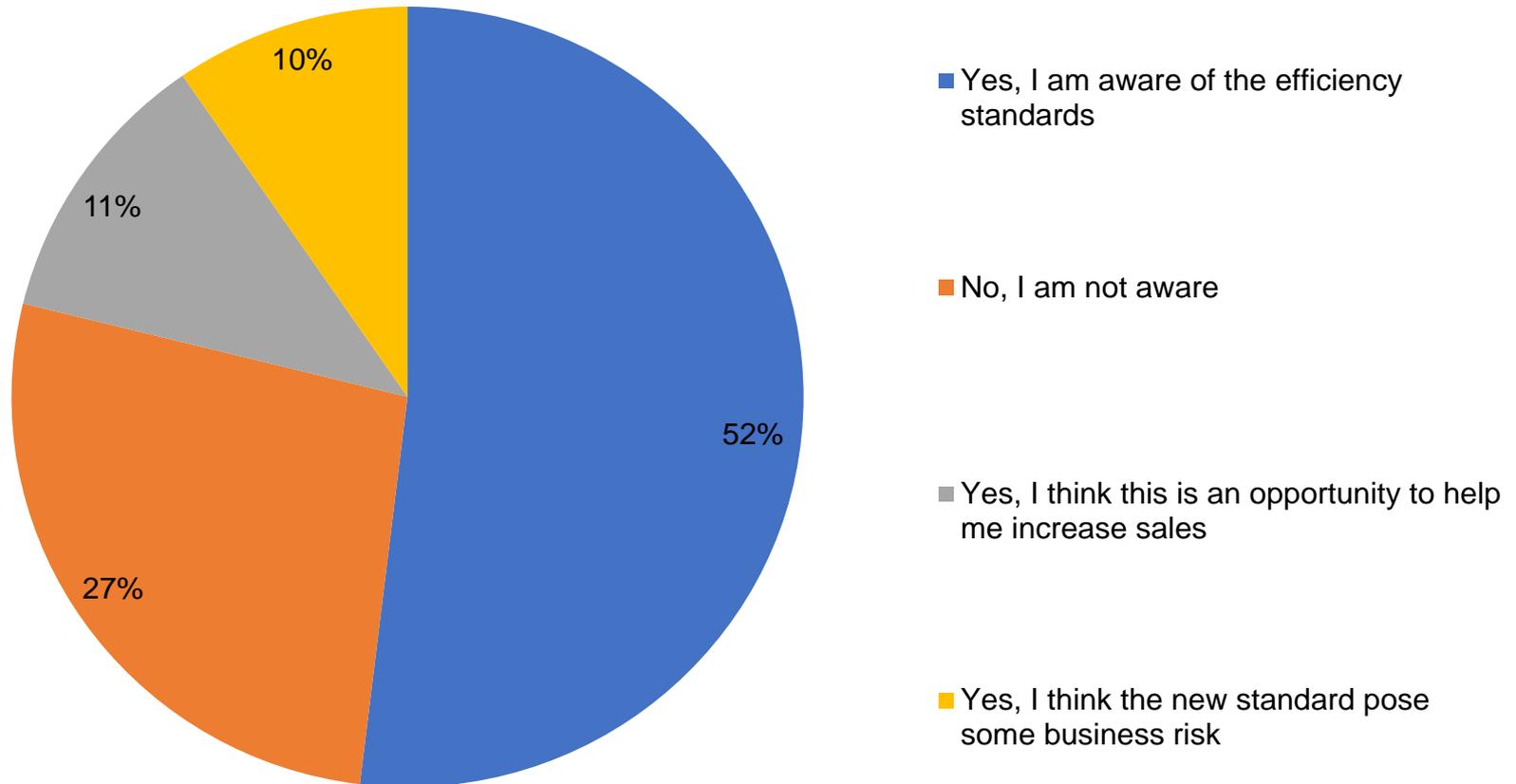
Polling Question

Are you aware of the change in DOE minimum efficiency requirements for light commercial packaged equipment that will be effective as of 1/1/2018?

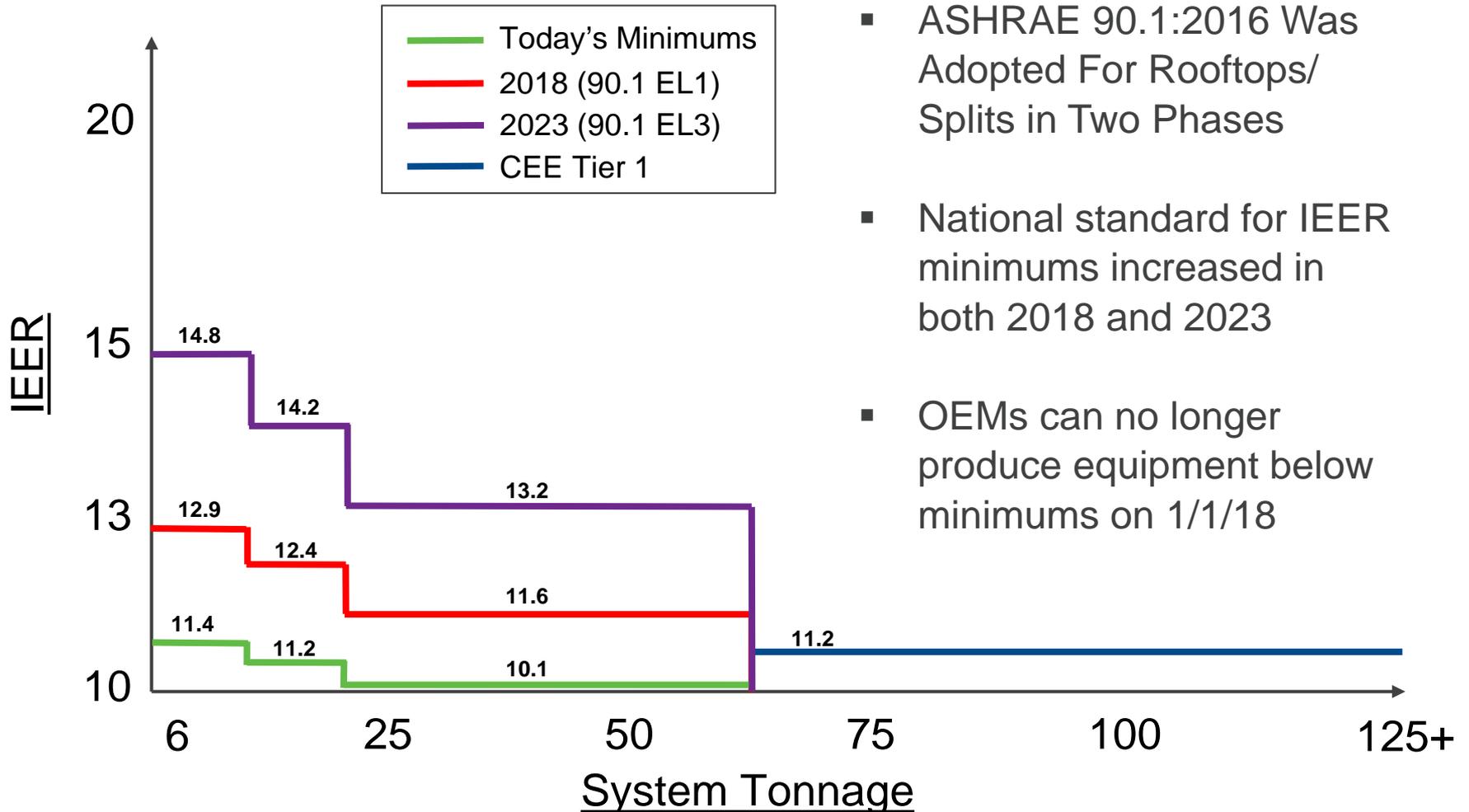
1. No, I am not aware
2. Yes, I am aware of the change in efficiency standards
3. Yes, I think this is an opportunity to help me increase sales
4. Yes, I think the new standards pose some business risk



Are you aware of the Department of Energy (DOE) minimum efficiency requirements for light commercial packaged equipment that are effective as of 1/1/2018?



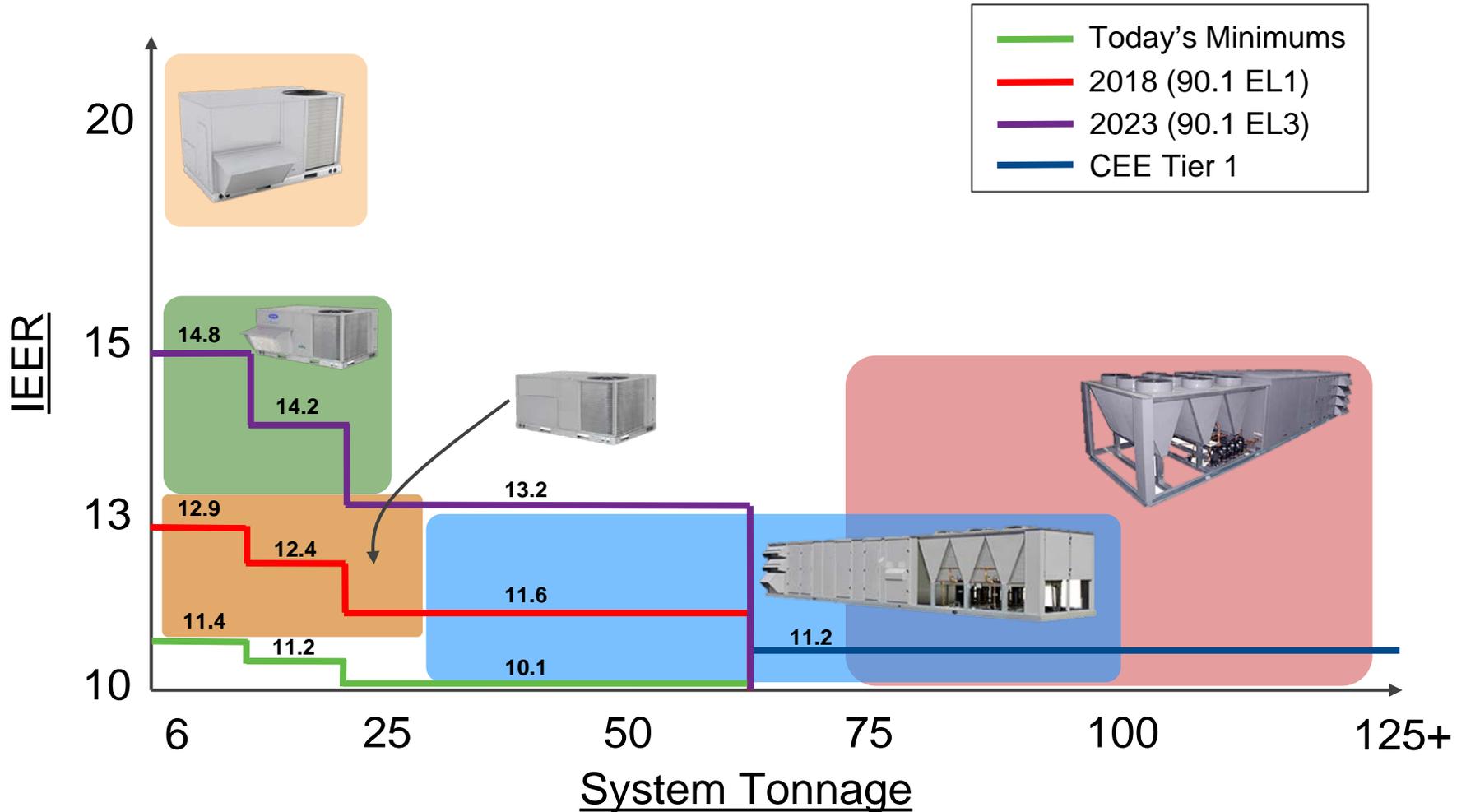
DOE Efficiency Regulations For Commercial Equipment (Rooftops & Split Systems Greater Than 6 Tons)



- ASHRAE 90.1:2016 Was Adopted For Rooftops/ Splits in Two Phases
- National standard for IEER minimums increased in both 2018 and 2023
- OEMs can no longer produce equipment below minimums on 1/1/18

Note: Below 6 Ton, managed by SEER
 Note: Electric Heat values shown other equipment subtract 0.2 IEER

OEM Commercial Portfolio's Will Refresh To Comply With Regulation



Note: Below 6 Ton, managed by SEER

Note: Electric Heat values shown other equipment subtract 0.2 IEER

Polling Question

Which of the following best describes the impact new efficiency regulations has on your business?

1. Not at all
2. I am concerned about my ability to compete and remain in business
3. Using this opportunity to upsell with higher revenues/margins
4. Other



How Does Compressor Selection Influence IEER?

How Is System IEER Calculated?

IEER is a Weighted Average

Point	System Net Capacity	Weighting
A	100%	0.020
B	75%	0.617
C	50%	0.238
D	25%	0.125

$IEER = (0.020 \cdot A) + (0.617 \cdot B) + (0.238 \cdot C) + (0.125 \cdot D)$

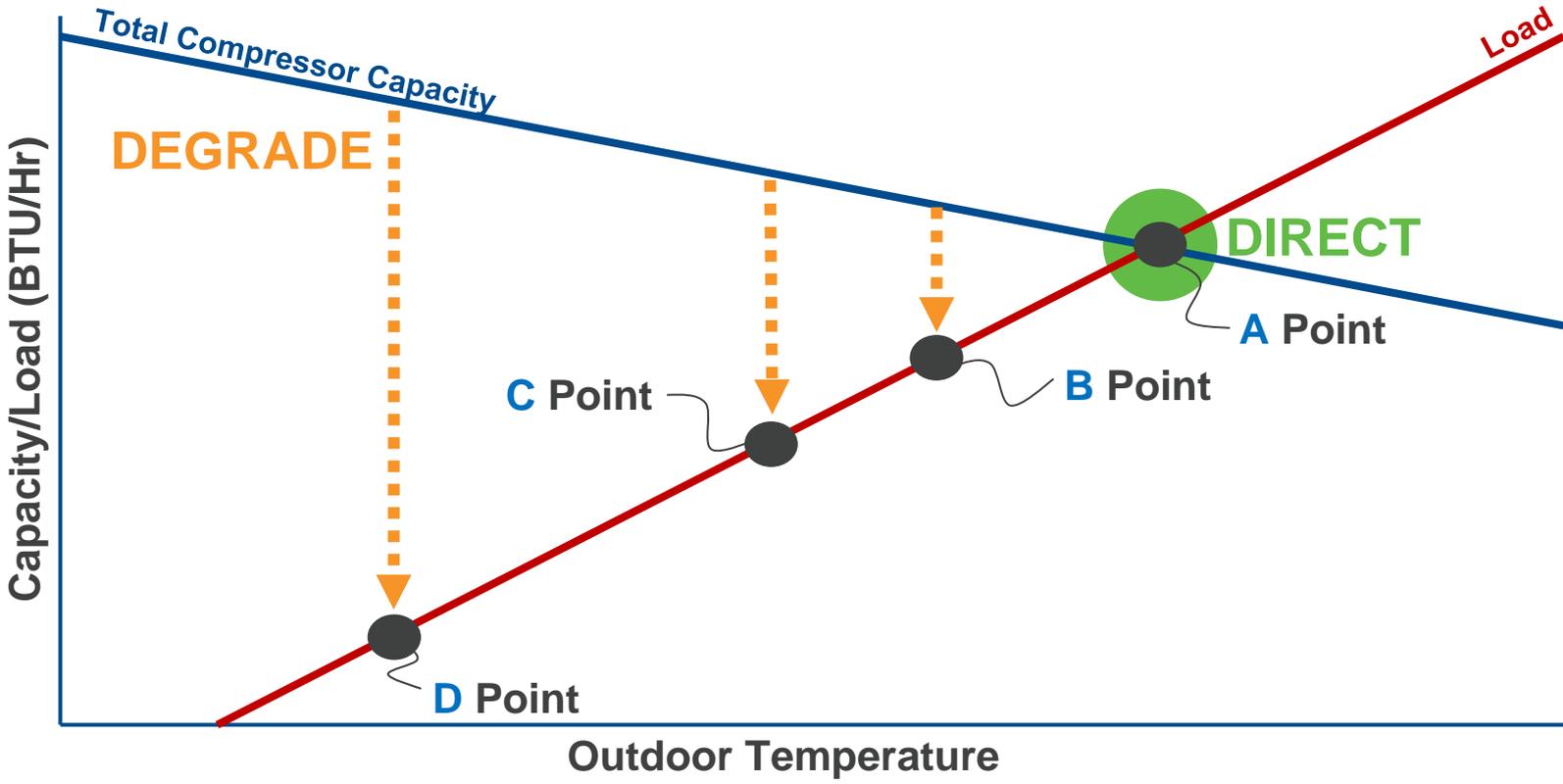


What If I can't run **DIRECT** at all of those points?

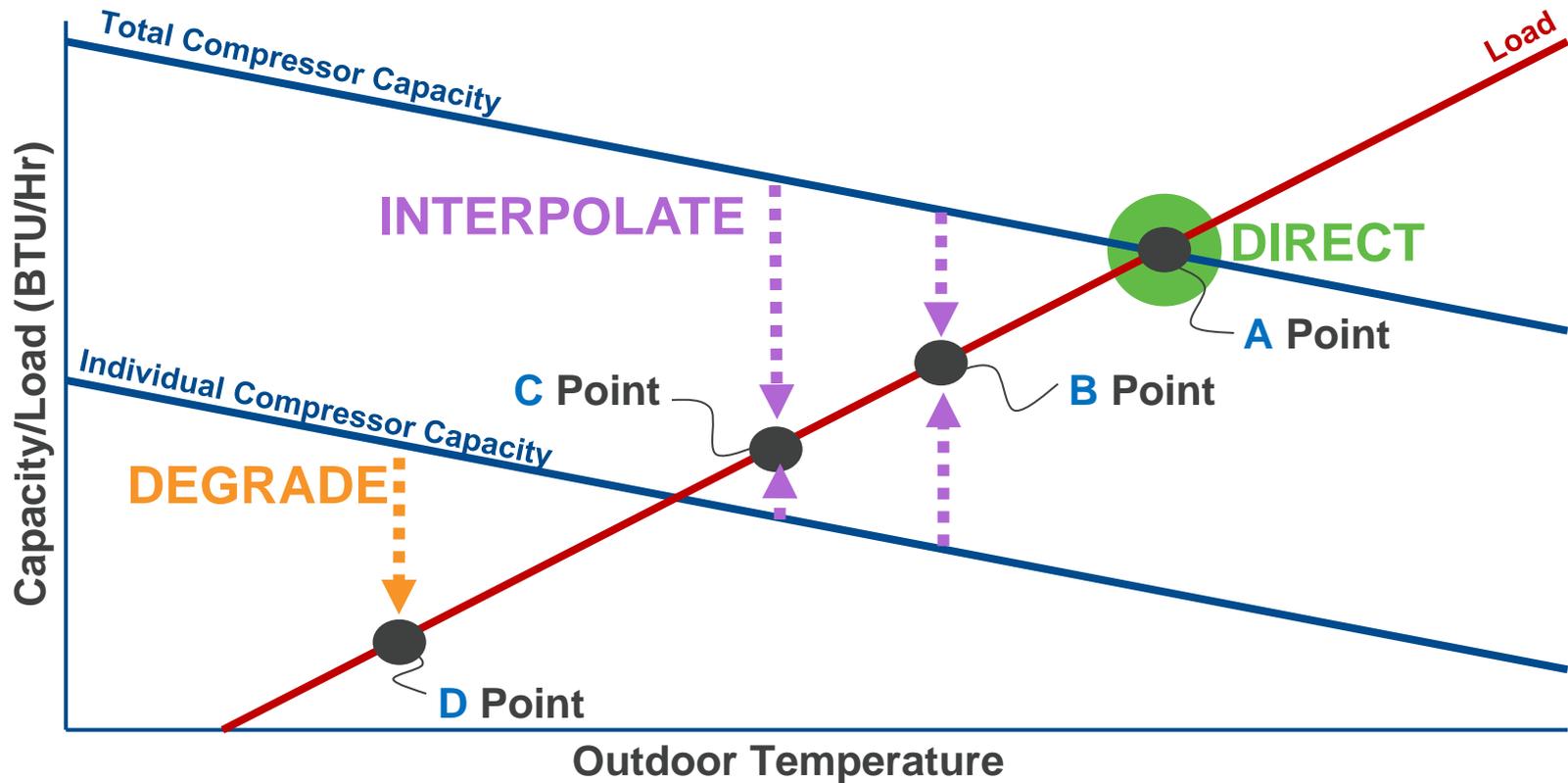


Calculation is adjusted using
INTERPOLATION & DEGRADATION

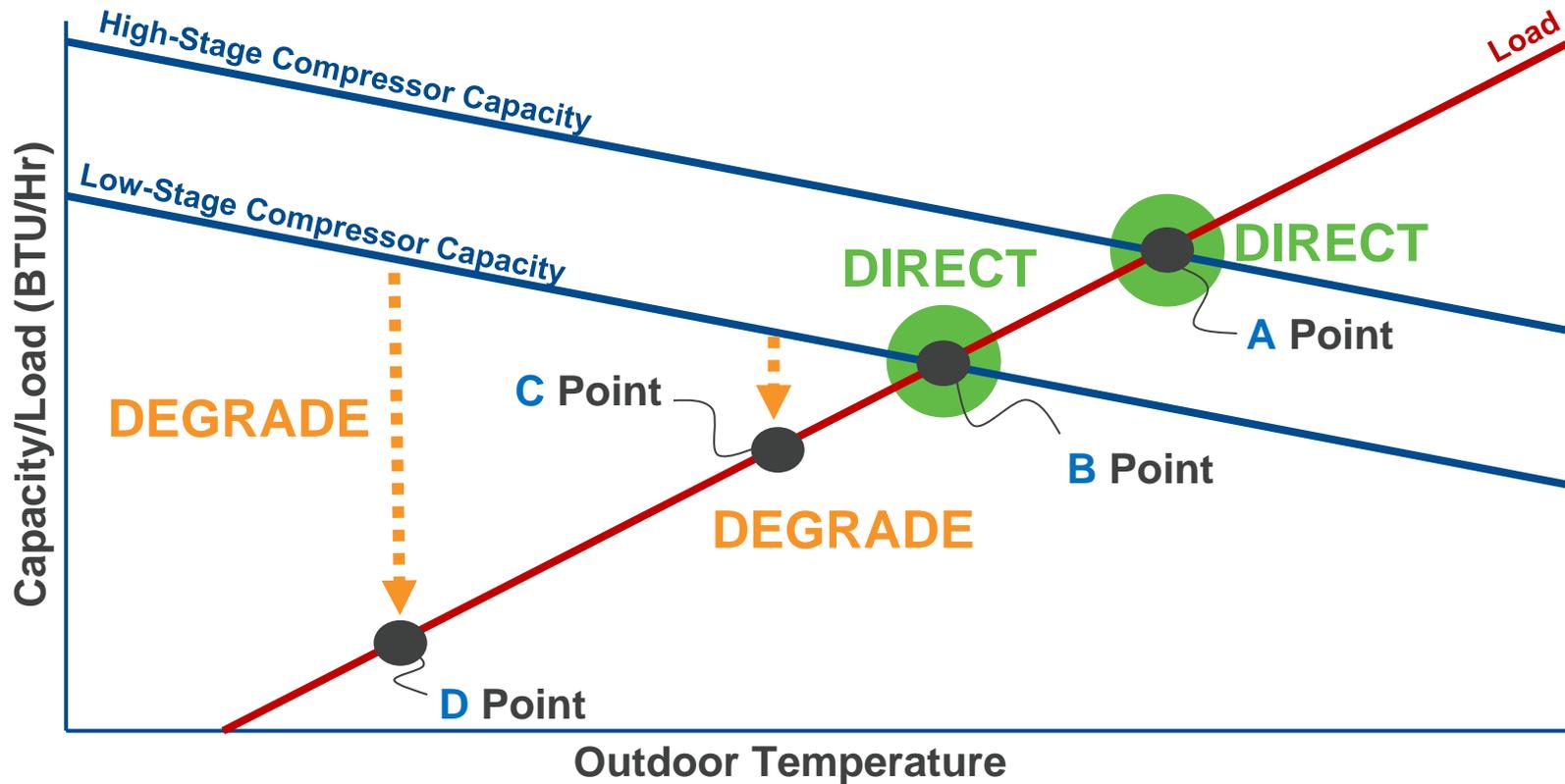
Consider How A System With A Single Mechanical Cooling Stage Might Rate



Consider How A System With Two Mechanical Cooling Stages Might Rate



Copeland Scroll Two-stage Targets Full Load And Highest Weighting Point



Example of How Calculation Plays Out In a System

Description		Fixed Single Circuit System		Two-Stage Single Circuit System	
Compressor		ZP83		ZPS83	
Number Of Unique Mechanical Cooling Stages		1		2	
Fan Speeds		Fixed		Fixed	
Point	Weight	Method	Perf.	Method	Perf.
100%	2%	Direct	10.9	Direct	10.9
75%	62%	Degrade	12.1 (Down From 12.9)	Direct	13.7
50%	24%	Degrade	13.0 (Down from 15.2)	Degrade	15.0 (Down From 16.9)
25%	12%	Degrade	11.4 (Down from 15.9)	Degrade	12.8 (Down from 17.7)

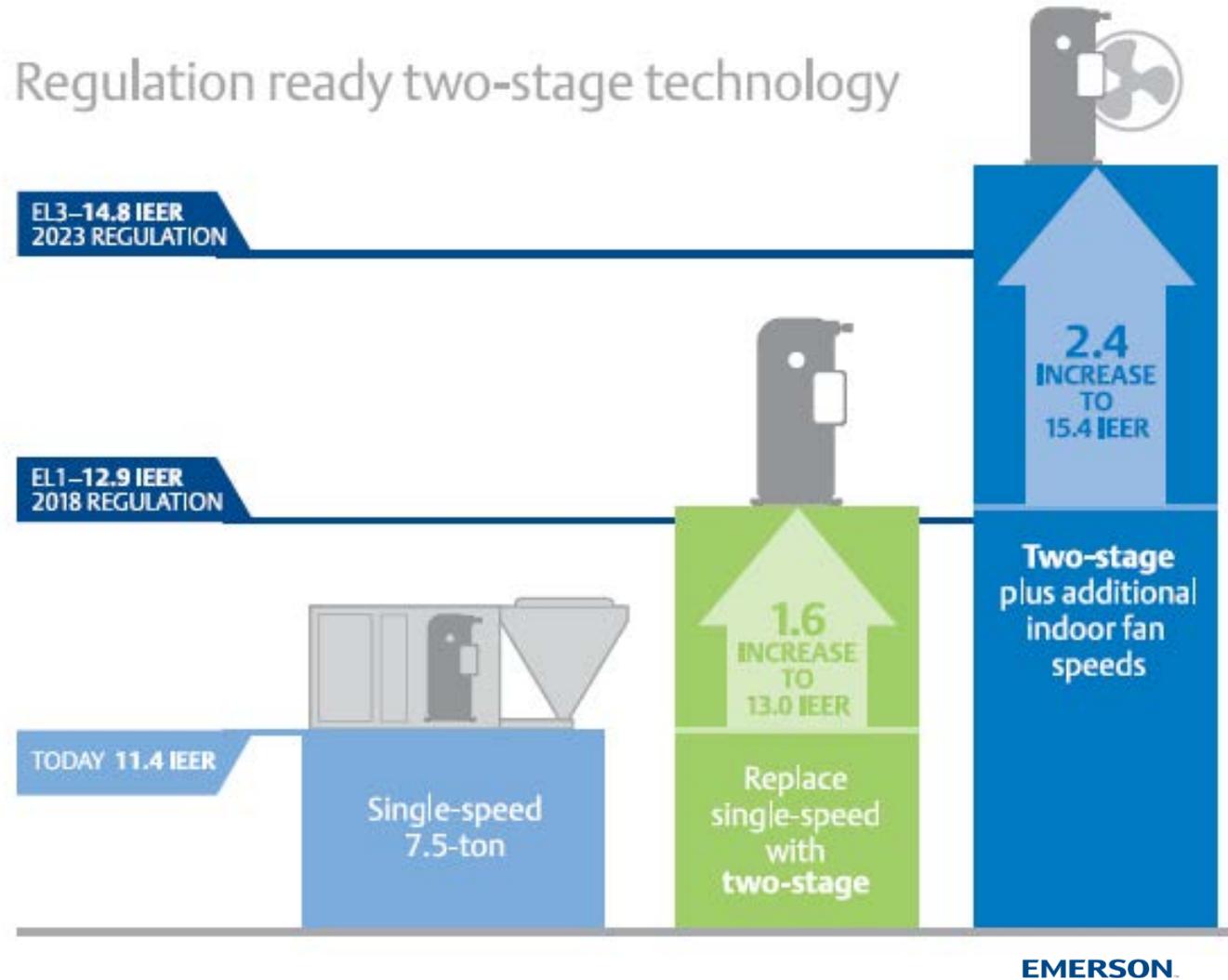
Fixed IEER = **12.2**

Two-Stage IEER = **13.9**

+ 14%

Two Stage Compressor Delivers Increased Efficiency

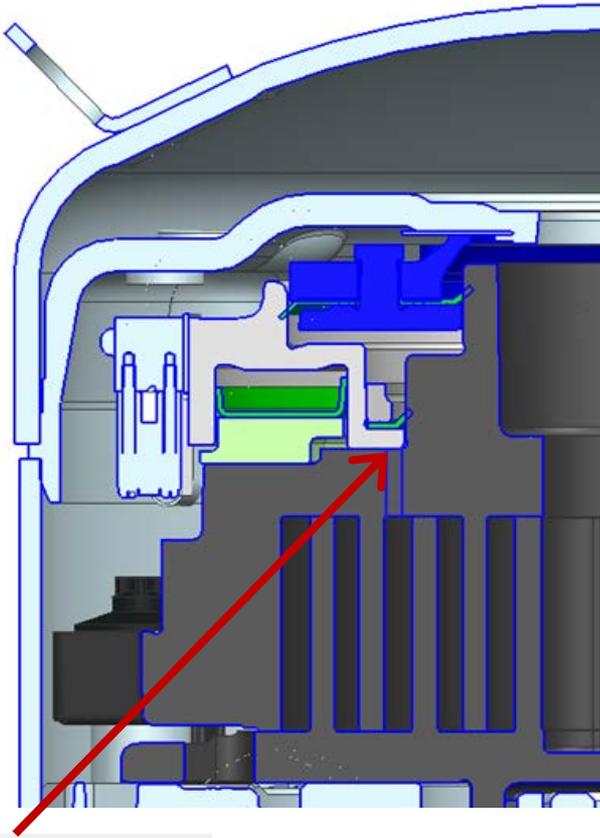
- Expanding two-stage technology up to 10HP
- Available Now in advance of 1/1/2018 regulation
- Attractive applied cost and key enabler for 2023 DOE regulation



Two-Stage Technology Overview

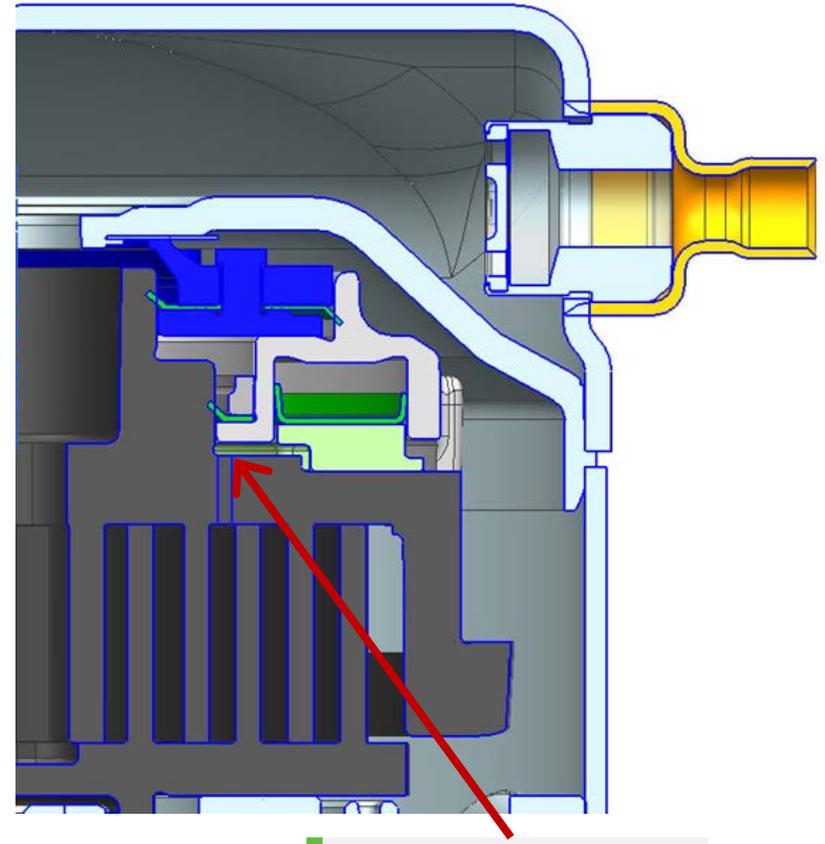
Copeland Scroll Two-stage Operation

High-Stage



Vent Holes Closed
Utilizing Full Scroll For
Compression

Low-Stage



Vent Holes Open
Bypassing Outer
Portion Of Scroll

Copeland Two-stage Scroll Compression Process

High-Stage Capacity

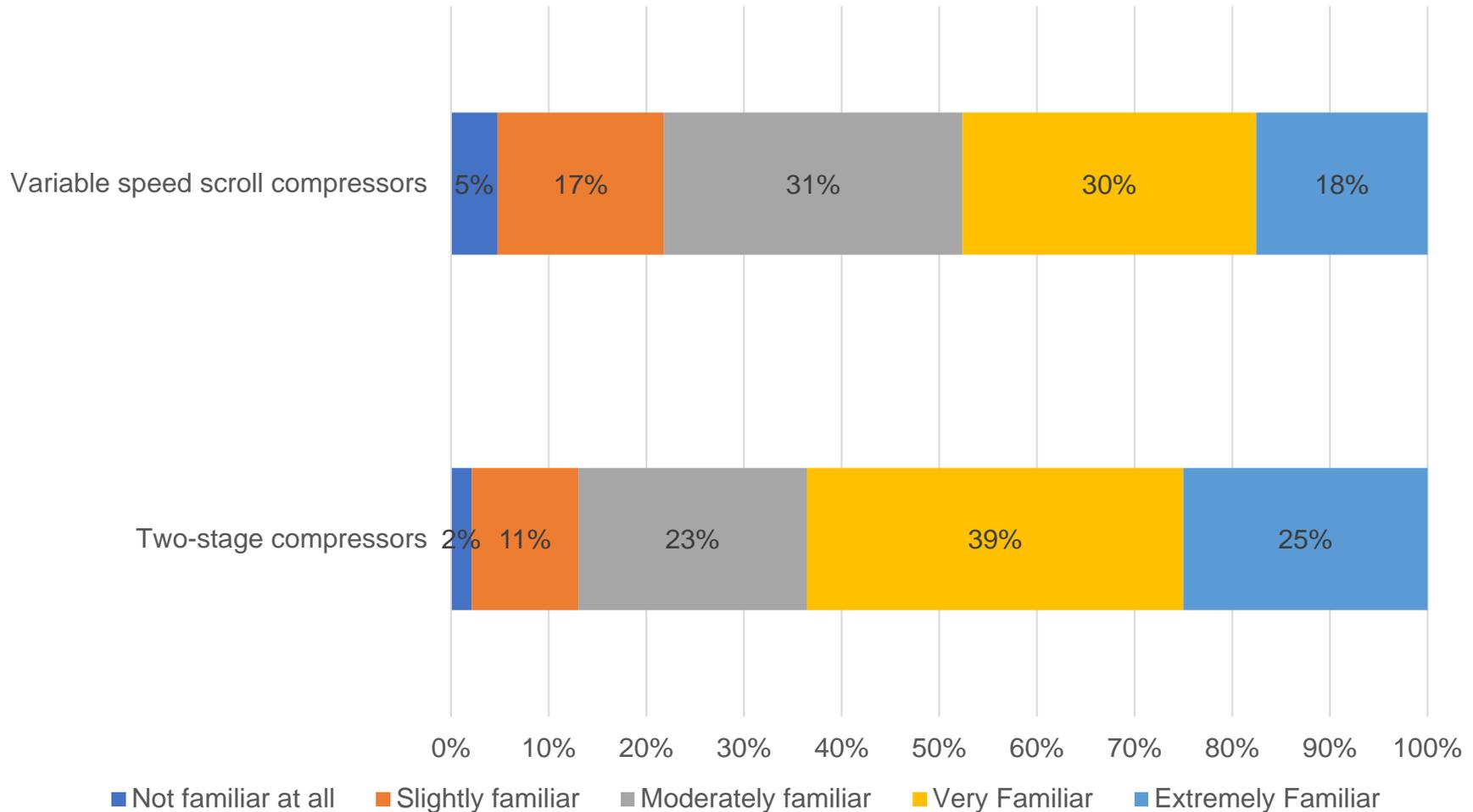


Low-Stage Capacity



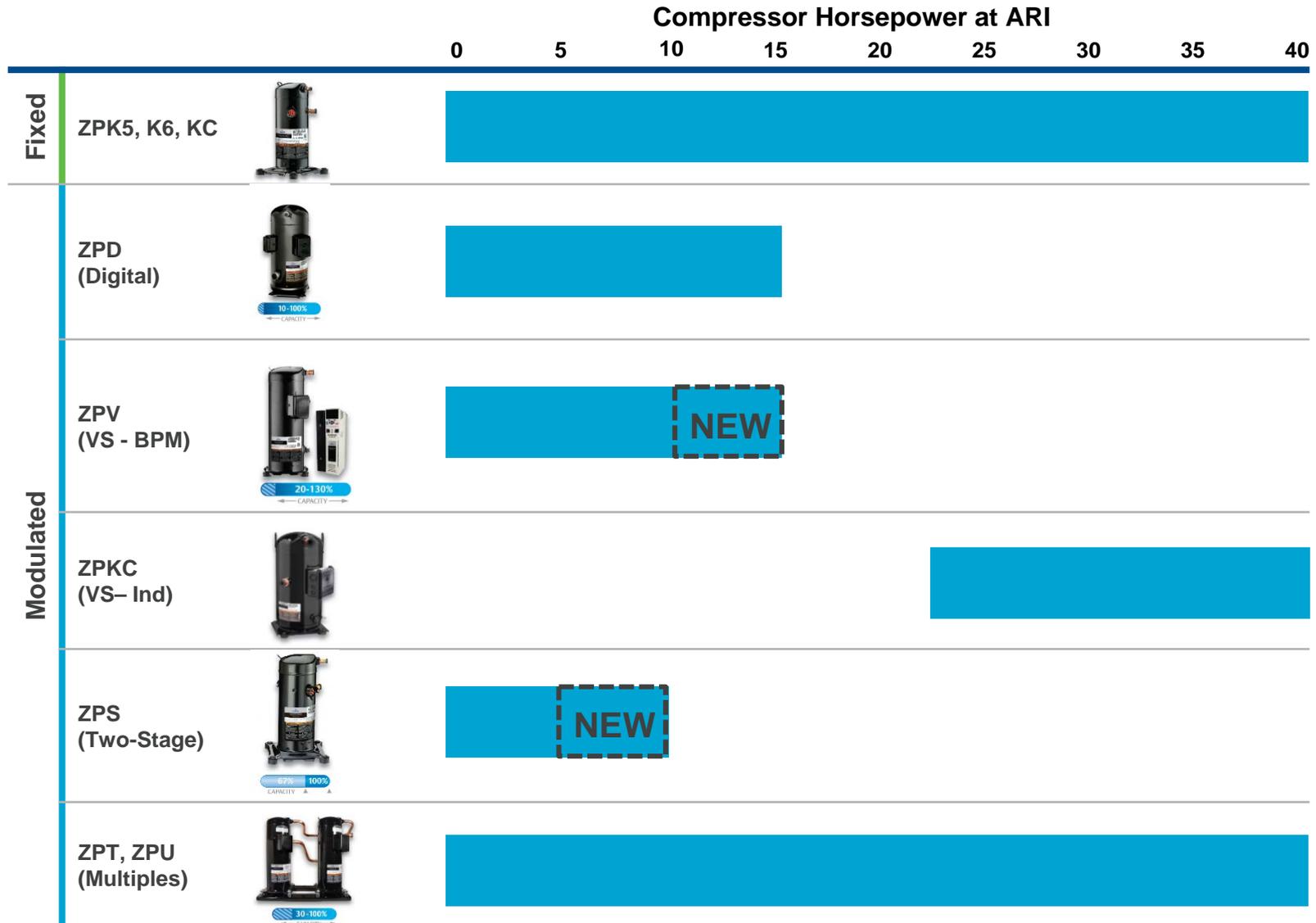
Emerson Solution Portfolio

How familiar are you with the following types of modulation technology?



Compressor Portfolio Overview

Emerson Has A Wide Offering Of Voltages, Optimization Points & Modulation Options



Compressor Modulation Technology Comparison

Modulation Technology	Products	Range	Capacity Control	Part Load Efficiency	Full Load Efficiency	Complexity
ZP (Fixed)		2-40HP	ON/OFF	Medium	High	Best
ZPS (Two-Stage)		2-10HP	67%, 100%	High	High	Best
ZPD (Digital)		3-15HP	10-100%	Medium	High	Better
ZPV (Variable Speed)		2-15HP	20-130%	Highest	Medium	Good
ZPT, ZPU (Multiples)		3-120HP	30-100%	High	High	Better

Trick Or Treat?

Summary of Upcoming Changes To Commercial Rooftops & Splits

- New efficiency regulations go into effect for commercial rooftops and splits as of January 1st 2018
- Commercial equipment is rated in IEER
- Emerson provides solutions for IEER, Modulation, Complexity
 - Emerson takes a balanced approach to deliver capacity modulation, efficiency and product complexity options to meet OEM design goals
 - New product introductions facilitate OEM designs. Keep your eyes peeled as new products begin to appear in the run up to the 2018 regulation implementation

Happy
Halloween!





INTRODUCING DESIGNER AIR

Thank You For Attending!

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