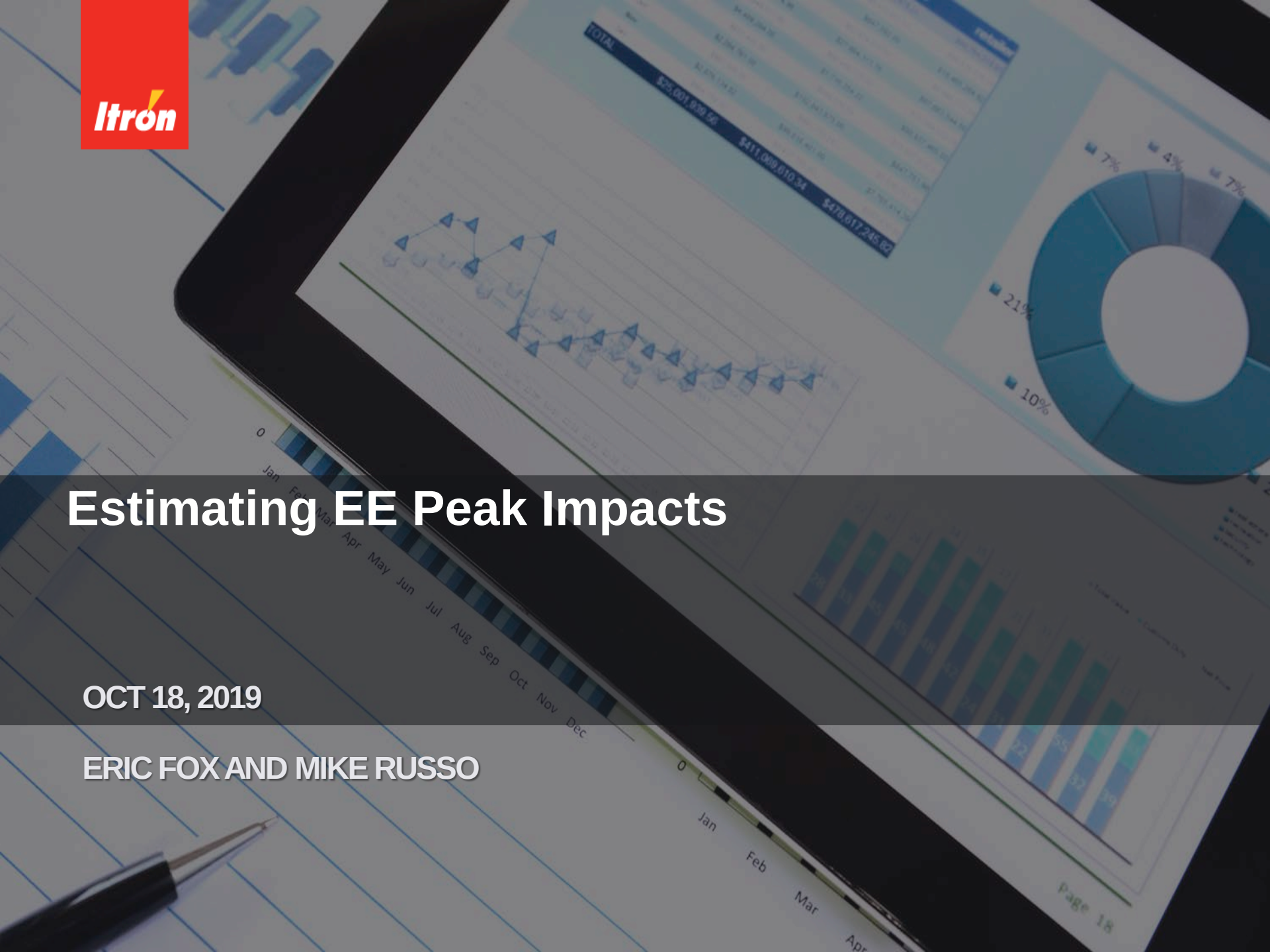


Estimating EE Peak Impacts

OCT 18, 2019

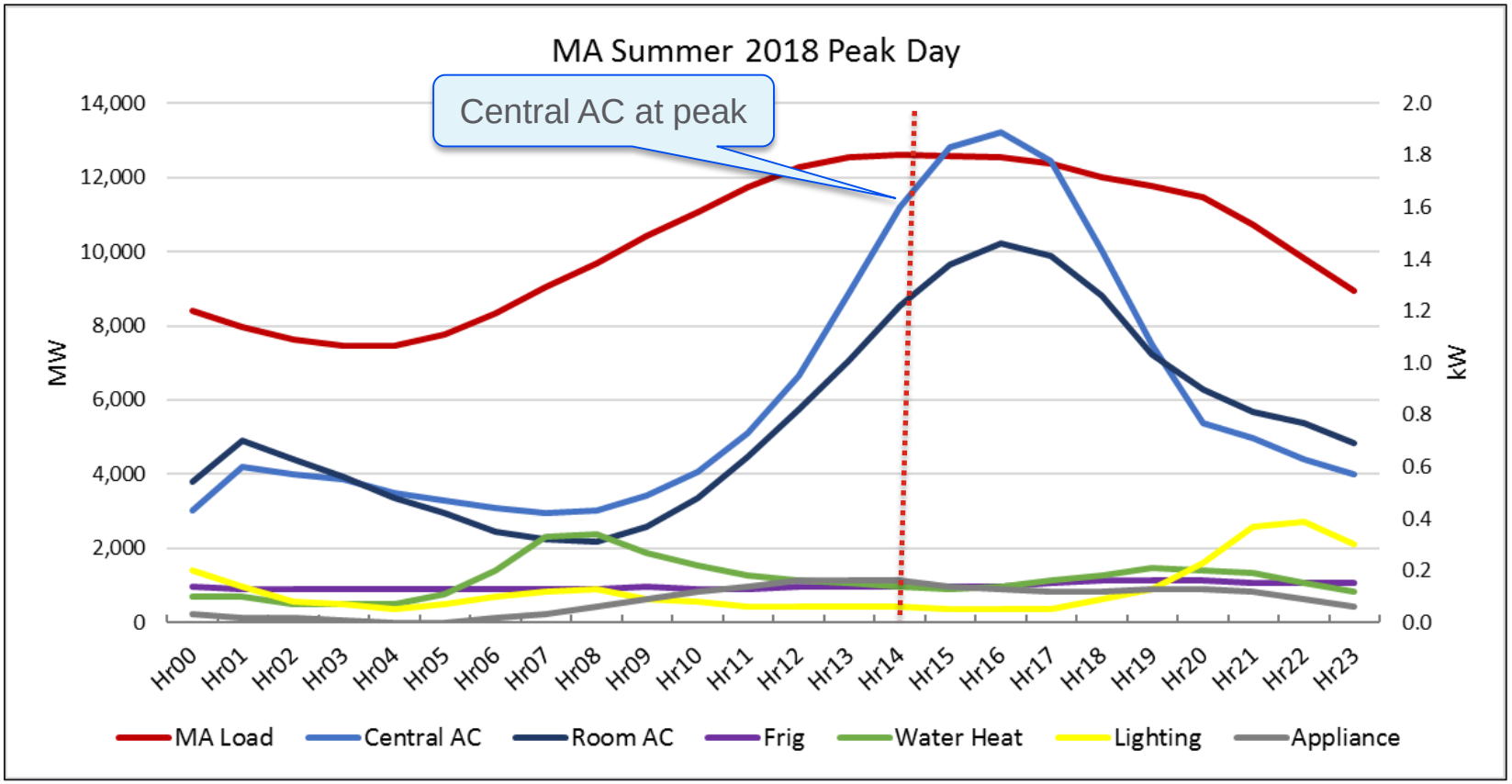
ERIC FOX AND MIKE RUSSO

TRANSLATING ENERGY TO PEAK SAVINGS

- Current Approach
  - Derive demand impacts by applying static summer peak-to-energy ratios to EE energy savings
    - All end-uses have the same impact on peak demand
    - Winter impact on peak demand is just a proration of summer impact
- New Approach
  - Apply seasonal weighted end-use demand factors to EE energy savings
    - Impact changes over time as end-use mix changes
    - Winter and summer impacts reflect seasonal end-use characteristics

RESIDENTIAL END-USE LOADS - SUMMER

Based on Itron Residential Load Research End-Use Shapes



RESIDENTIAL COOLING IMPACT FACTORS

Central AC	Hr 14	Hr 15	Hr 16	Hr 17	Hr 18	Annual kWh
Load	1.60	1.83	1.89	1.78	1.43	882
Peak Factor	1.81	2.07	2.14	2.02	1.62	
Room AC	**Hr 14**	**Hr 15**	**Hr 16**	**Hr 17**	**Hr 18**	**Annual kWh**
Load	1.22	1.38	1.46	1.41	1.26	696
Peak Factor	1.75	1.98	2.10	2.03	1.81	

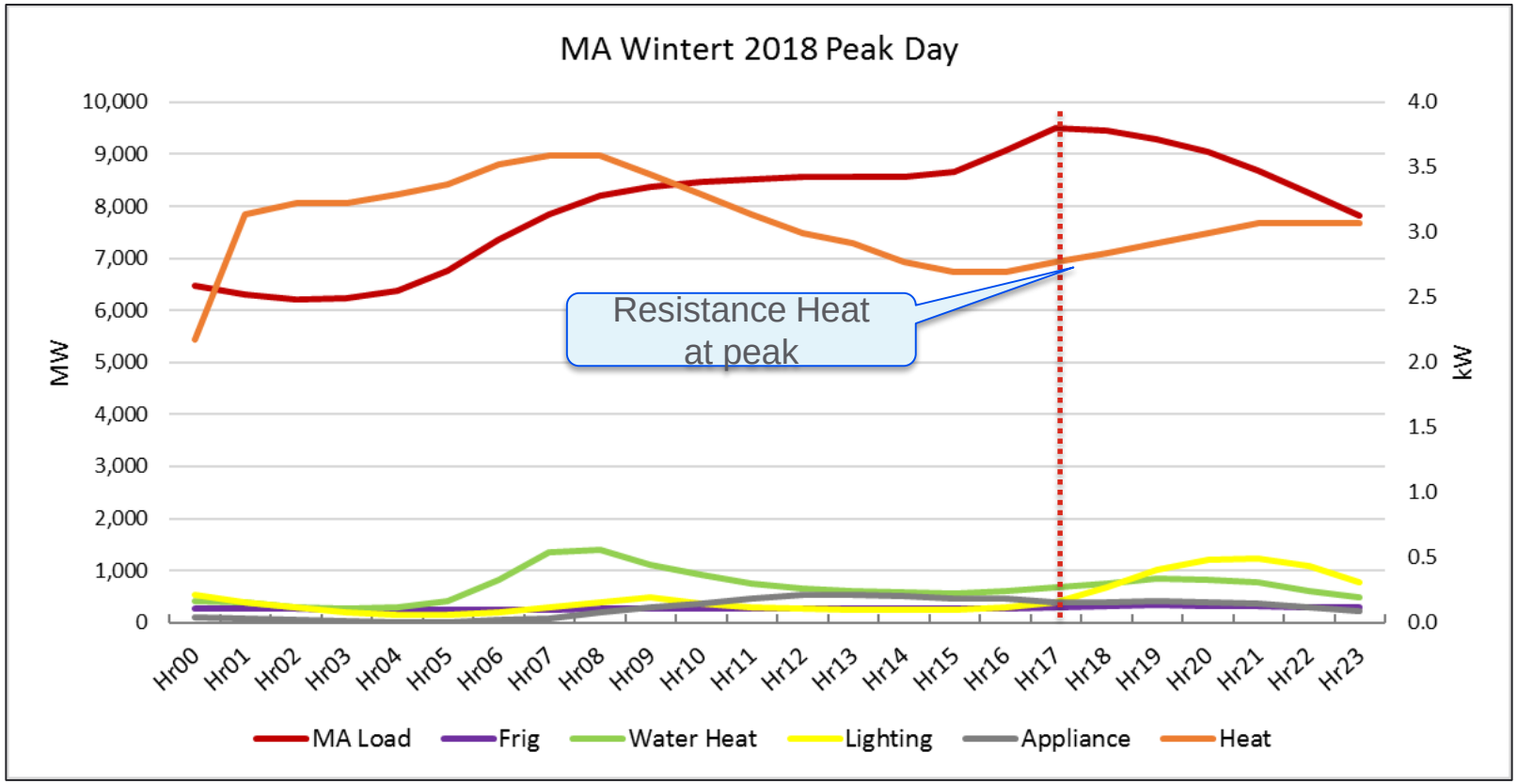
For illustrative purposes

$$PeakFactor = Load\ at\ Peak \div Annual\ kWh \times 1{,}000$$

- Peak factor could be as high as 2.1 or as low as 1.2, depending on timing and mix of room and central air conditioning.

RESIDENTIAL END-USE LOADS - WINTER

Based on Itron Residential Load Research End-Use Shapes

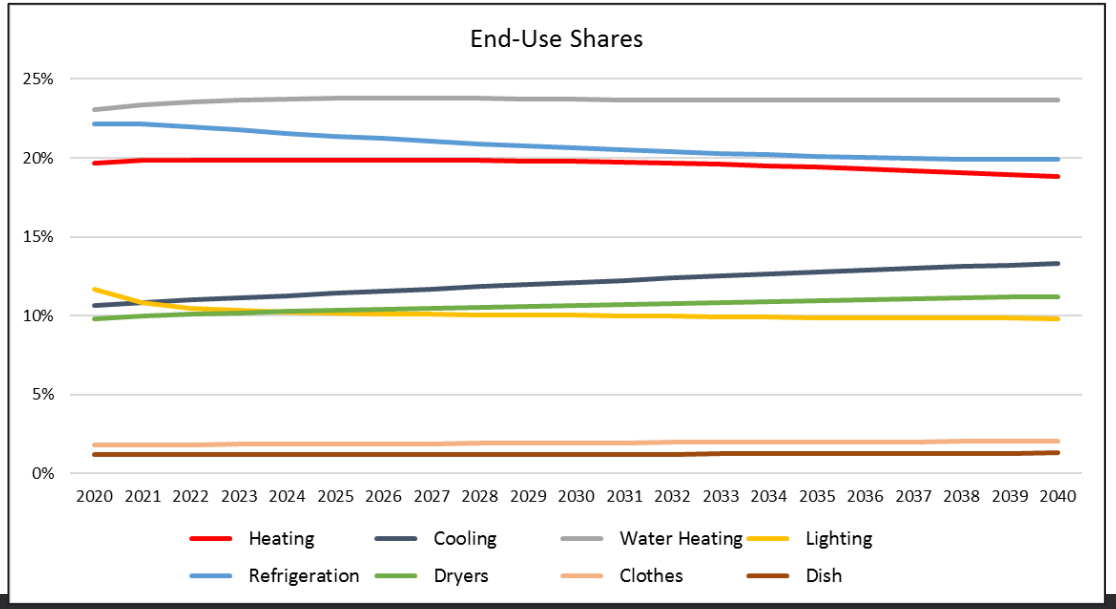


RESIDENTIAL IMPACT FACTORS

2020			
End-Use	Savings Share	Summer Pk Factor	Winter Pk Factor
Heating	20%	-	0.58
Cooling	11%	1.29	-
Water Heating	23%	0.09	0.16
Lighting	12%	0.04	0.29
Refrigeration	22%	0.13	0.12
Dryers	10%	0.13	0.16
Clothes	2%	0.11	0.14
Dish	1%	0.08	0.24
Weighted	**100%**	**0.20**	**0.23**

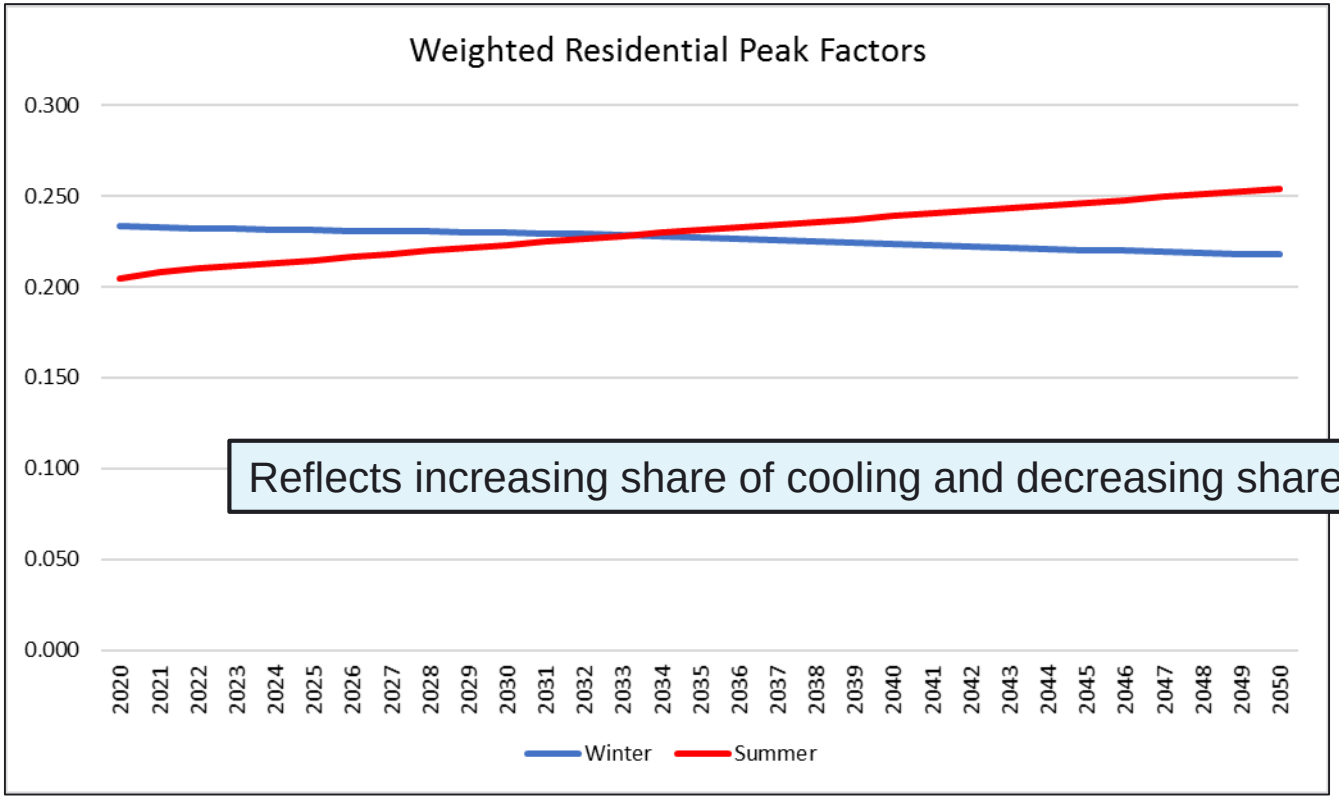
For illustrative purposes

$$PkSavings = Energy\ Savings * PeakFactor$$



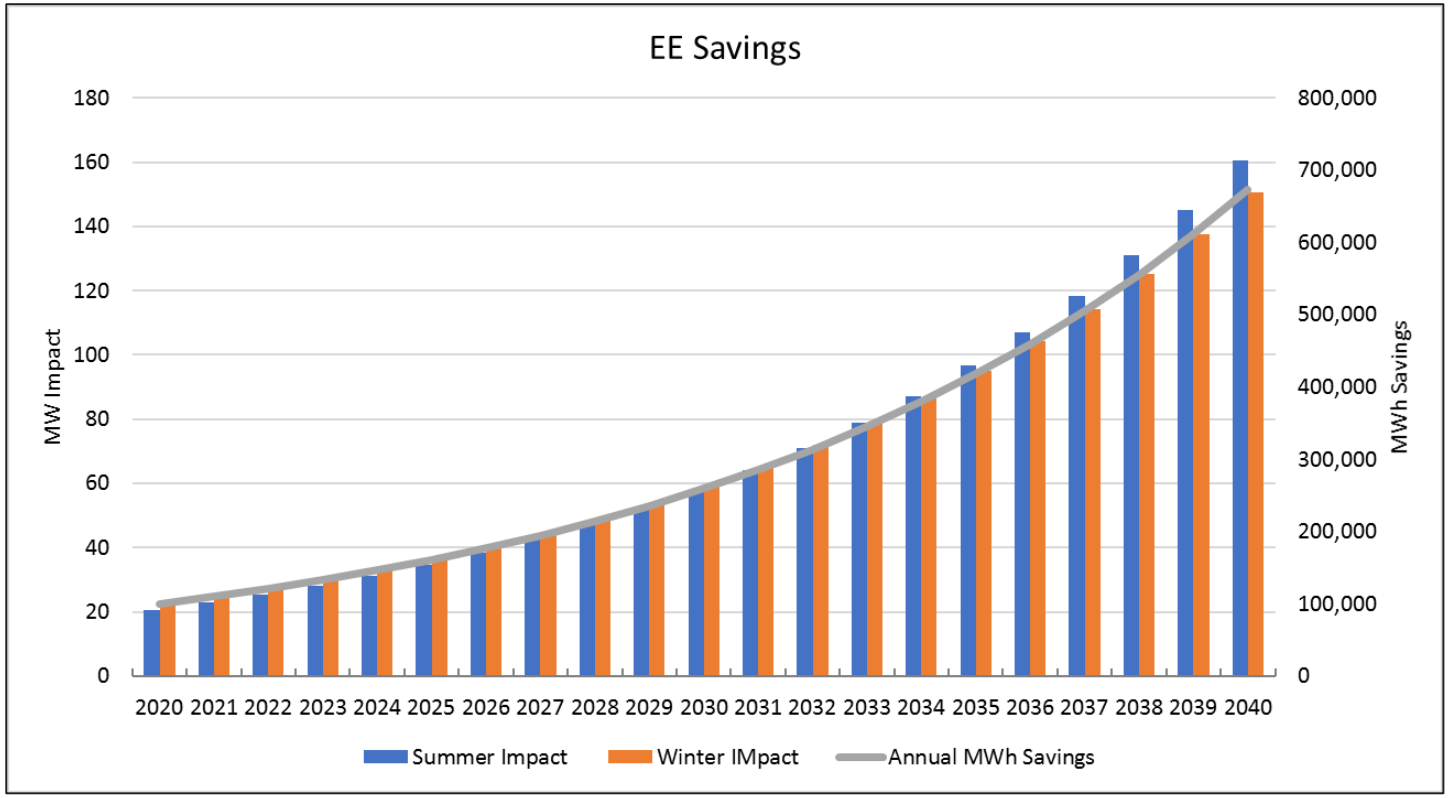
CHANGING DYNAMICS

Like EE savings, weighted peak factor changes over time with change in end-use mix



Reflects increasing share of cooling and decreasing share of lighting

RESULTING RESIDENTIAL DEMAND PEAK IMPACTS



$$PkSavings = Energy\ Savings * PeakFactor$$

» Identical approach used for commercial sector

QUESTIONS ?