## Preliminary ARP Parameter Comparison

| | DEER 2016[1] | Illinois 2015 | Mid-Atlantic (NEEP) 2014 | Massachusetts 2013 Report | Other: Industry (AHAM), UMP | Cal TF Recommendations |
|---|---|---|---|---|---|---|
| **UES** | $UEC_{removed}$ – $UEC_{replacement\ unit}$ (Secondary market and participant homes)<br><br>(Reduces savings in participant homes by 40% from simply using $UEC_{removed}$)<br><br>Savings: 519-360 kWh by IOU | $UEC_{removed}$ calculated using regression<br><br>AIC's year four average savings: 900.9 kWh | <u>Early Replacement</u><br>[($UEC_{existing}$ – $UEC_{efficient}$)*4yrs]+[($UEC_{federal.\ min}$ – $UEC_{efficient}$)*8yrs]<br>Range: 344-381 kWh<br><br><u>Early Retirement</u><br>$UEC_{removed}$ (regression)<br>BGE year 4: 761 kWh<br>Notes significant uncertainty/risk | Savings obtained directly from 2011 NMR Group evaluation study. Baseline is inefficient secondary working unit; high efficiency assumes no replacement.<br><br>Savings range across replacement scenarios: 533-835 kWh<br>Combined: 755 kWh | | |
| **Distribution of counterfactual paths** | • Keep in use: 14%<br>• Keep unused: 2%<br>• Destroyed by discarder: 13%<br>• Peer-to-peer transfer<br>  ○ Similar: 5.6%<br>  ○ New: 4.5%<br>  ○ None: 24%<br>• Retail transfer<br>  ○ Similar: 4.1%<br>  ○ New: 2.8%<br>  ○ None: 9.8%<br>  ○ For rental, commercial or other: 2%<br>  ○ Destroyed by secondary actor: 18.4% | Counterfactual assumed to be continued use as secondary unit. Replacement by more efficient unit assumed to be small portion and factored in as NTG. | <u>Early Replacement</u><br>Baseline condition is the existing unit (EmPower 2011 evaluation) for 4 year RUL, followed by 8 years of a replacement appliance meeting the minimum federal standards (weighted average of calculated UECs).<br><br><u>Early Retirement</u><br>Assumes a mix of primary and secondary units will be retired. TRM notes that "the hypothetical nature of this measure implies a significant amount of risk and uncertainty." | • Refrigerator recycle primary<br>• Refrigerator recycle secondary replaced<br>• Refrigerator recycle secondary not replaced | "41% keep old unit in use"<br><br>UMP Protocol<br>• Transfer: 50%<br>• Dispose: 20%<br>• Keep: 30% | |

[1] CMUA (POU) TRM uses DEER values

## Preliminary ARP Parameter Comparison

| | | | | | | |
|---|---|---|---|---|---|---|
| **EUL** | 14 years for new units<br>5 year RUL for picked up units | 8 year remaining useful life (2004 KEMA study) | 12 year measure life (ENERGY STAR calculator) | Measure life is 8 years | Primary owner:<br>~14 years<br>Secondary owner:<br>~6 or more years | |
| **Other savings degradations** | • Secondary market "viability factors"<br>• HVAC interactive effects (apply DEER factors) | • California's primary use case ($UEC_{removed}$ – $UEC_{replacement\ unit}$) is incorporated via NTG. This factor is expected to be very small.<br>• Part use factor available if needed (~.93-.85)<br>• Interactions in regression weighted by percentage in unconditioned spaces | <u>Early Replacement</u><br>N/A<br><br><u>Early Retirement</u><br>• Part use factor (.89 default value)<br>• Interactions in regression weighted by percentage in unconditioned spaces | .93 Coincidence Factor for winter peak<br><br>(All other possible degradations—persistence, in service, free ridership—don't seem to be applied) | Age is not primary factor in determining secondary market viability | |

**Other factors:**

- Possibility of splitting into two different measures: Recycling and early replacement (Mid-Atlantic/Vermont method).
- How far should secondary market effects be estimated?
  - Effect of removing units from secondary market on secondary market buyers
- Mean age of recycled stock by program territory relative to first Federal standard (1993)
  - Has significant effect on savings/cost effectiveness
  - Similar programs encourage a high mean age (~20) to maximize savings. Incorporating market viability factors for older units may punish this practice.
- Possible demand benefits in post-Aliso Canyon/duck curve loads?
  - Not likely since flat hourly loads, with only intra hourly variation