

DSM Portfolio Development: City of Tallahassee

Florida Public Service Commission
Staff Workshop
4/25/08

City of Tallahassee
Your Own UtilitiesSM



City's DSM Portfolio

- ◆ Developed during the most recent IRP Study
- ◆ Measures identified using a unique dynamic analysis method to establish cost-effectiveness
- ◆ Represents an ambitious expansion of the City's existing DSM/EE efforts
- ◆ Projected to provide significant benefits
 - Demand savings of 167 MW (21% of 2026 peak)
 - Energy savings of 561 GWh (14% of 2026 sales)
 - Eliminates need to add resources until 2016 based on latest load forecast

Initial DSM Evaluation

- ◆ Utilized traditional RIM + PT approach to select DSM for use in the IRP Study
 - 191 measures evaluated
 - Avoided unit was gas combined cycle
- ◆ No measures passed RIM
 - Avoided unit economics too attractive vs. existing generation
- ◆ City Commission authorized alternative screening method
 - Measures must pass PT and TRC
 - Choose measures with RIM > 0.75

Initial DSM Evaluation

- ◆ Alternative screening method resulted in only 38 measures selected for use in the IRP
 - 52 residential measures: 19 passed PT; 10 passed TRC; 5 with RIM > 0.75
 - 139 commercial measures: 86 passed PT; 76 passed TRC; 33 with RIM > 0.75
- ◆ City Commission directed staff to seek other methods that would allow more robust consideration of DSM in the study

Developing the DSM Portfolio

- ◆ Characterized more complete list of measures
- ◆ Compared DSM measure and supply-side levelized costs
- ◆ Estimated market size, penetration and implementation rate for discrete DSM “bundle”
- ◆ Meta-analysis of DSM potential studies used as cross-check on overall estimated level of savings
- ◆ Developed measure load shapes, to “subtract” from base system forecast load profile
- ◆ Assessed cost-effectiveness using IRP tools (present worth revenue requirements comparisons)

DSM/EE Measure Data

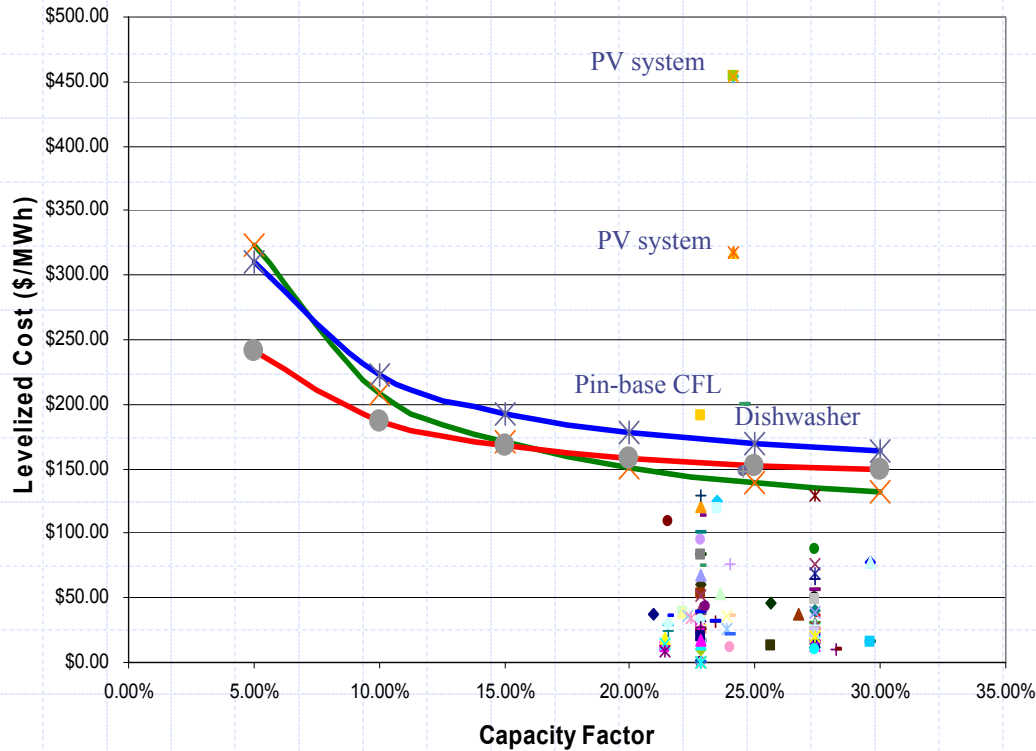
- ◆ Definitions of DSM measure/baseline technologies, energy savings, incremental cost, and measure life
- ◆ Candidate measures from available datasets (CA, New England, Austin Energy, GA Power and FL utility filings, etc.)
- ◆ Energy Gauge software used to model savings for certain weather-sensitive measures
- ◆ Included measures accounting for bulk of available savings (not all conceivable measures) and measure bundles

Busbar Screening Step

- ◆ Individual DSM/EE measure costs compared to busbar cost of similar supply-side resources
 - Levelized cost of the measure savings computed over the measure life
 - Busbar cost of a comparable supply-side resource computed over the measure life of the DSM/EE alternative(s)
- ◆ Most DSM/EE measures were lower cost than the supply-side resource

Sample Busbar Screening Chart

Levelized Cost Comparison for DSM Measures with 20% - 30% Capacity Factor

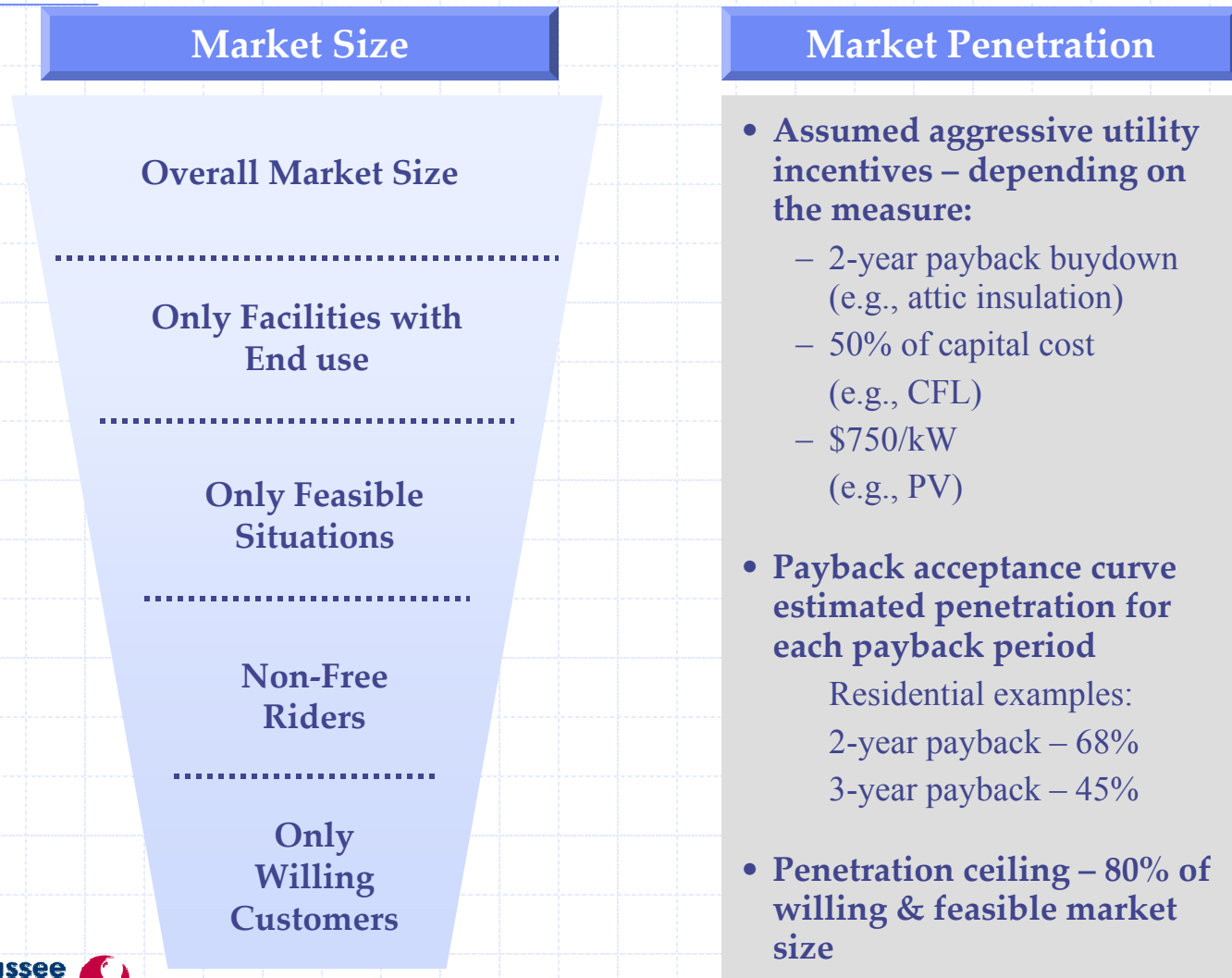


DSM Measures/Generation Options

- | | | |
|-----------|--------|--------|
| 30 | 232 | 231 |
| 233 | 234 | 118 |
| 230 | 227 | 228 |
| 229 | 109 | 110 |
| 31 | 32 | 135 |
| 148 | 152 | 182 |
| 186 | 131 | 133 |
| LM6000 SC | 7EA SC | 7FA CT |
| 134 | 138 | 141 |
| 143 | 144 | 145 |
| 146 | 150 | 174 |
| 176 | 177 | 178 |
| 179 | 181 | 184 |
| 185 | 199 | 201 |
| 202 | 132 | 136 |
| 137 | 139 | 140 |
| 142 | 147 | 149 |
| 151 | 153 | 175 |
| 180 | 183 | 187 |
| 198 | 200 | 112 |
| 27 | 28 | 29 |
| 82 | 92 | 113 |
| 83 | 93 | 95 |
| 85 | 84 | 94 |
| 107 | 212 | 213 |
| 244 | 245 | 225 |
| 260 | 226 | 261 |
| 96 | 86 | 108 |
| 155 | 158 | 159 |
| 173 | 163 | 169 |
| 197 | 190 | 193 |
| 157 | 154 | 156 |
| 164 | 160 | 162 |
| 167 | 165 | 166 |
| 171 | 168 | 170 |
| 189 | 172 | 188 |
| 194 | 191 | 192 |
| 214 | 195 | 196 |
| 218 | 250 | 217 |
| | 253 | 254 |

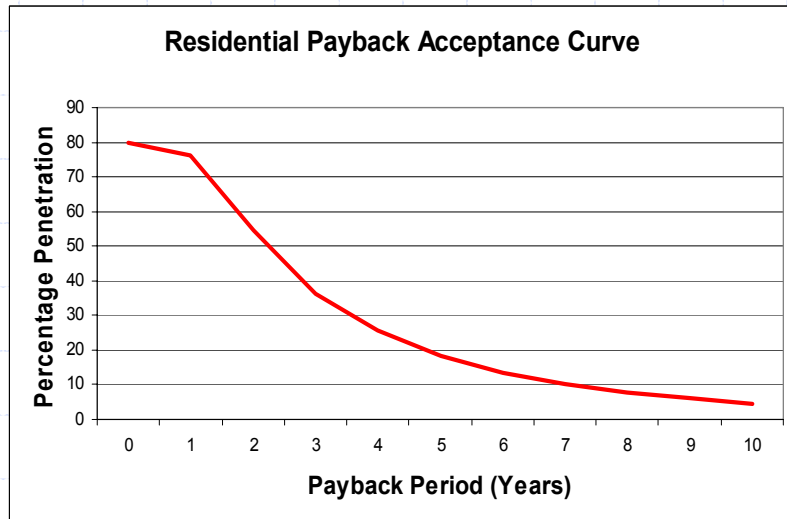


Estimate of Market Size & Penetration

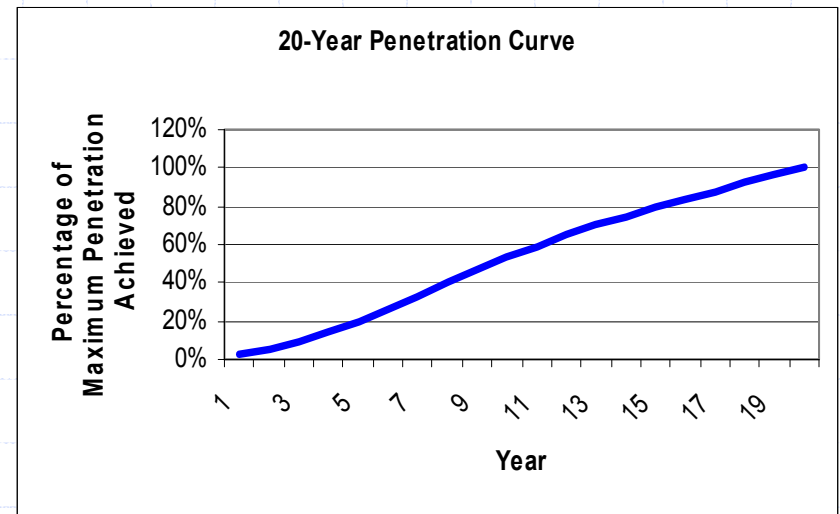


Market Penetration & Ramp-up Rate

Payback acceptance curve – based on measure economics for the customer, used to estimate market penetration for various payback periods.



Implementation rate curve – used to estimate percentage of maximum penetration occurring each year – assumed gradual ramp-up to maximum penetration over 20 years.



Note: This curve implicitly includes factors such as stock turnover, new construction, program ramp-up rates.



Meta-analysis of DSM Potential Studies

◆ Essentially a top-down analysis

- Reviewed achievable savings estimates from 17 studies
- Selected most recent/most geographically appropriate studies
- As needed, converted maximum savings potential estimates to average annual estimates
- Accounted for limited activities that a single Florida municipal utility could undertake
- Results: 0.7-0.9%/year savings potential (sales)

◆ Compared results to bottom-up results: 0.7% savings potential

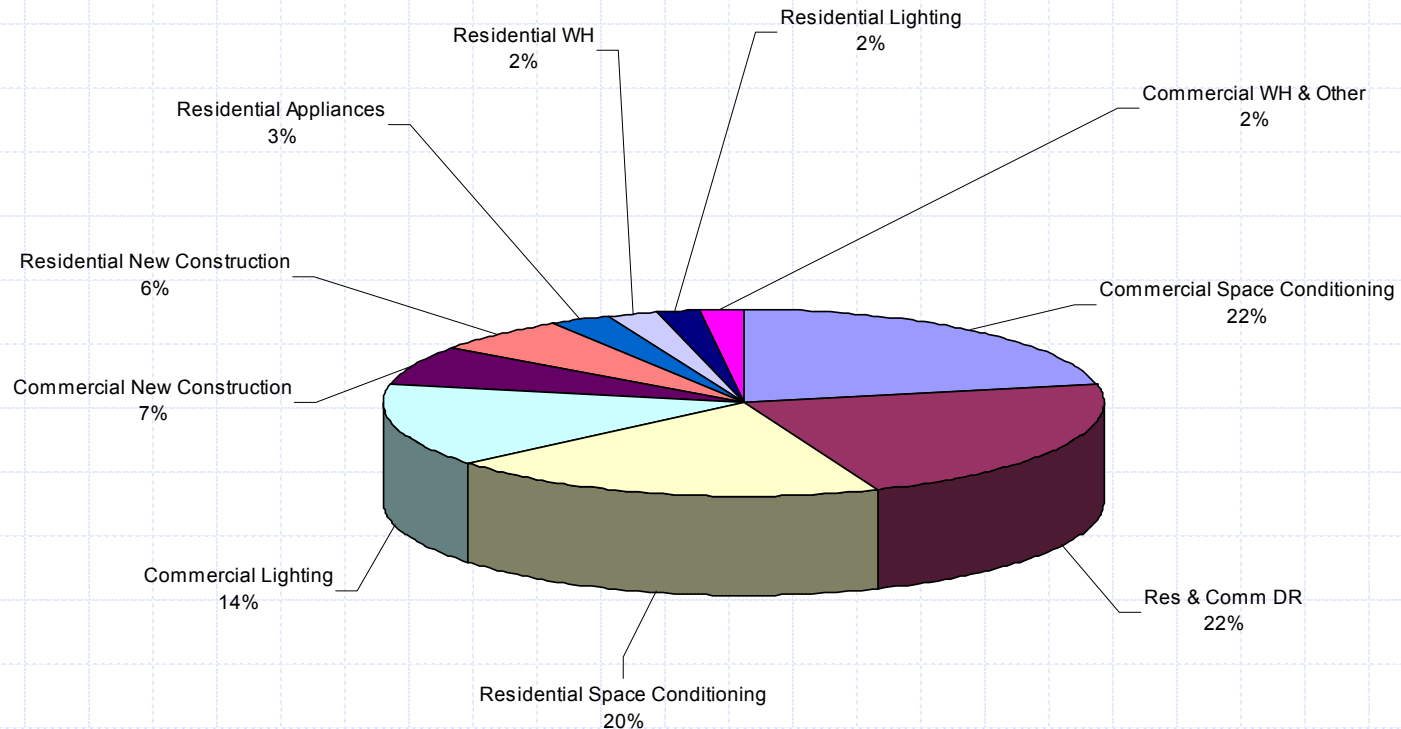
Load Shape Development

- ◆ Used end-use load shapes developed and vetted for California utilities
- ◆ Compiled DSM measures into bundles addressing specific end uses
- ◆ Mapped each measure bundle to appropriate end-use load shape
- ◆ Results used to develop overall DSM portfolio savings load shape (subtracted from system load shape for IRP analysis)

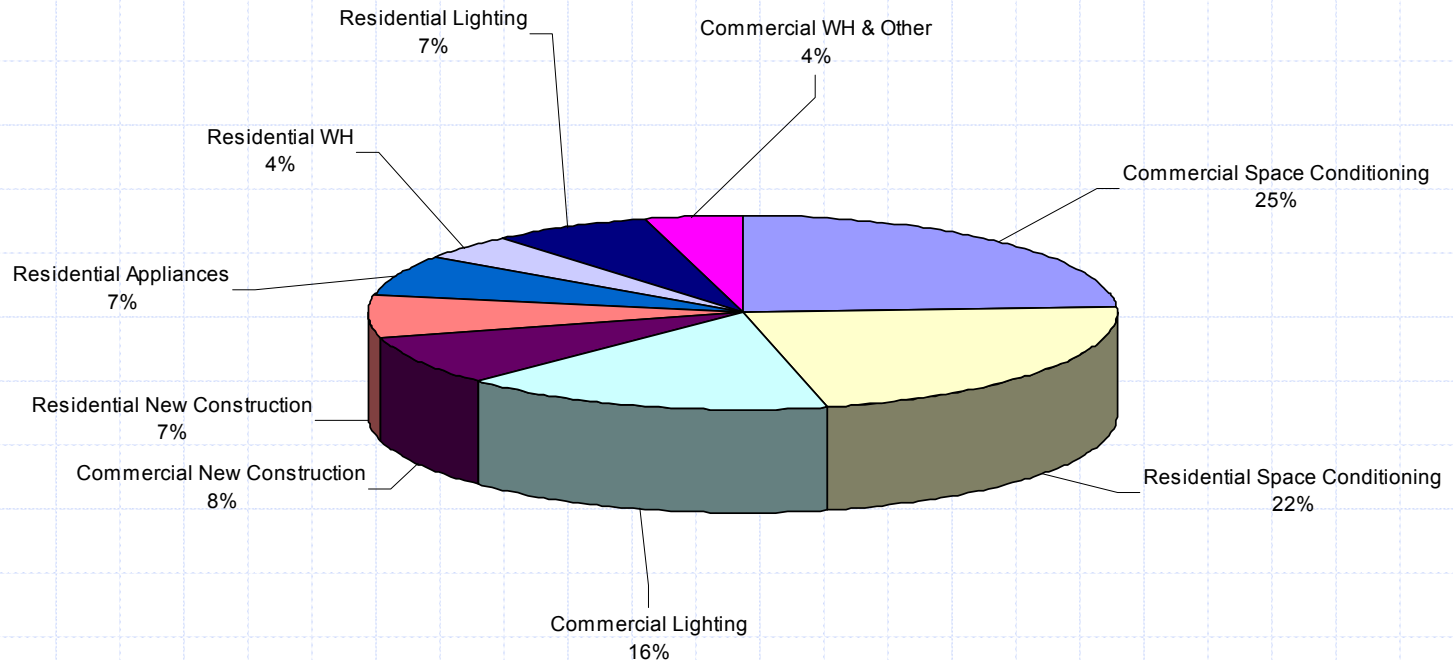
Cost-Effectiveness Test

- ◆ DSM portfolio cost effectiveness was confirmed using IRP tools (optimization & production costing)
- ◆ Plans were developed and costs estimated both with and without DSM
 - Variations of DSM portfolio also tested
- ◆ Plans with DSM had lower system costs (Present Worth of Revenue Requirements)
 - Recognizes the dynamics of system dispatch
 - Also reflects changes in the optimized resource plan(s) when DSM is included

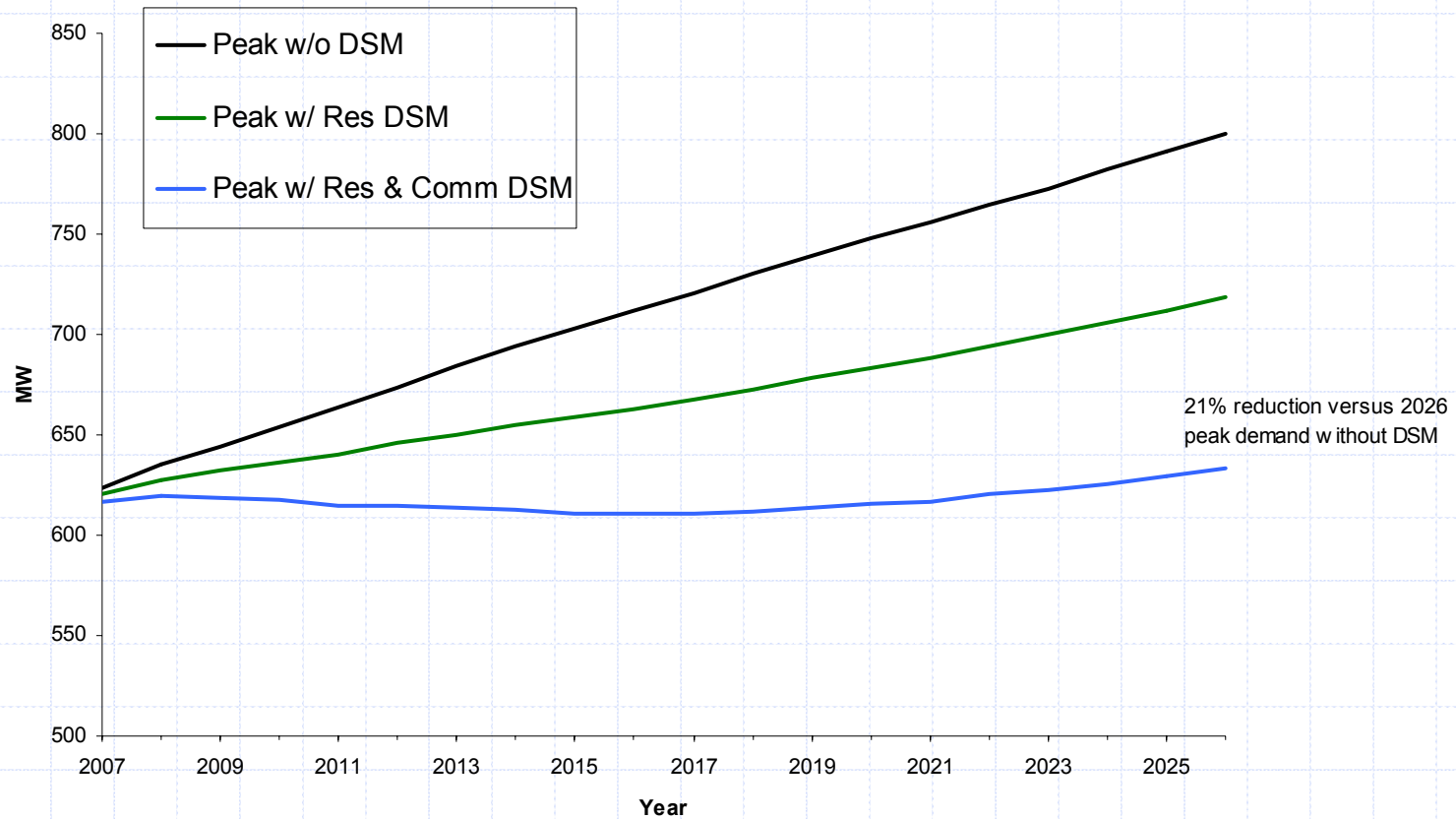
Portfolio Contribution (Summer Peak Reduction)



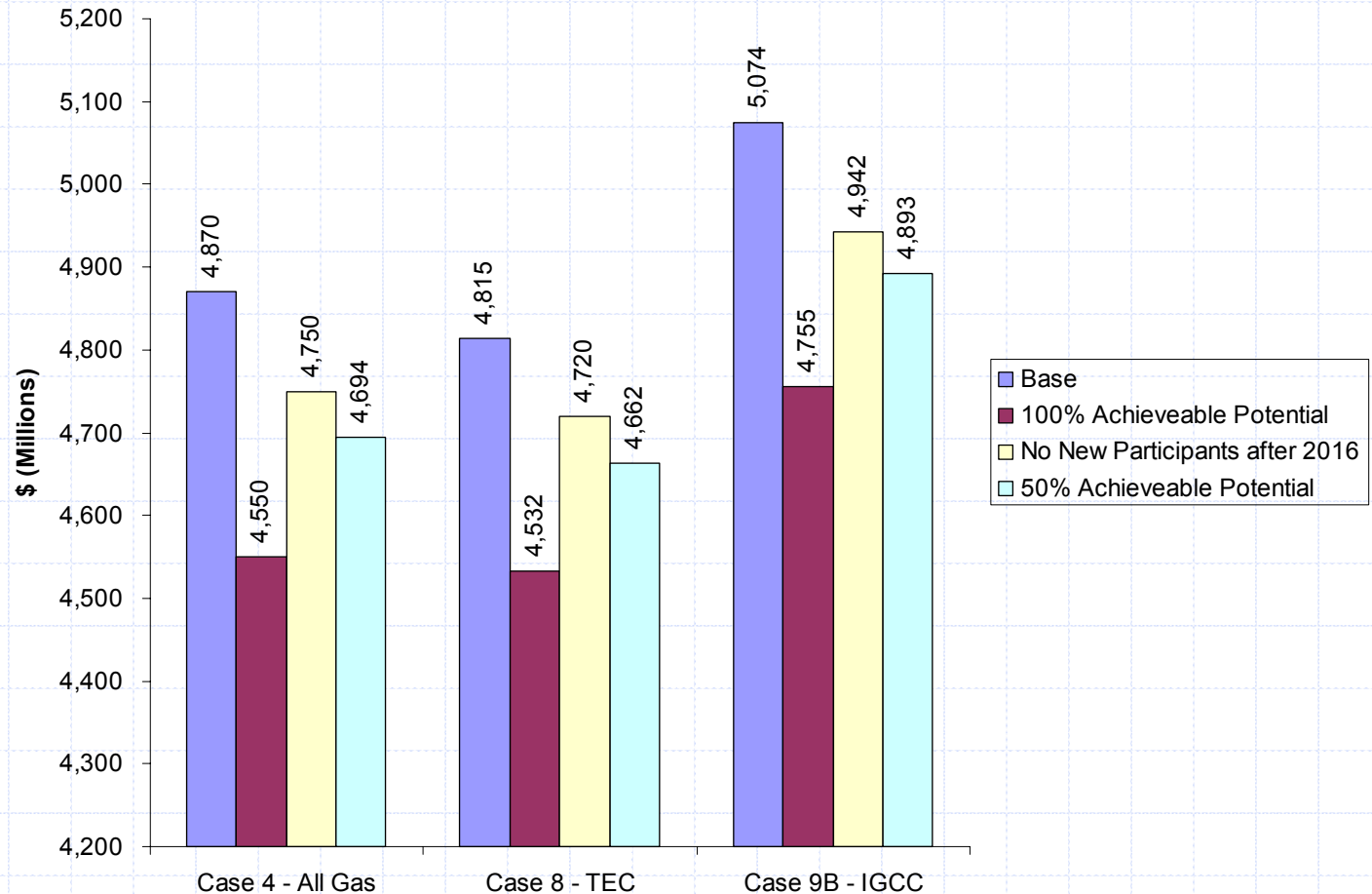
Portfolio Contribution (Annual Energy Savings)



DSM Portfolio Impact



Plan Cost Savings w/DSM



Pros & Cons

◆ Pros

- Cost-effective screening
- Reflects reality of program designs
 - ◆ More focus on end uses and programs than on individual measures
- Dynamic, rather than static assessment
- Understandable from decision-makers' viewpoint

◆ Cons

- Not as good for supply vs. DSM scenarios in which DSM measure cost effectiveness is generally marginal
 - ◆ Lower cost supply options
- Requires more complete dataset (impacts, load shapes) & effort to develop bundles

Questions?

Gary S. Brinkworth, P.E.

Manager, Electric Utility Strategic Planning

City of Tallahassee

850.891.3066

gary.brinkworth@talgov.com

City of Tallahassee
Your Own UtilitiesSM

