

New Developments in M&V



Outline

- What is M&V 2.0?
- Utility Program Applications / NMEC
- Interval Analysis Tools
- Current Research
- Usefulness for ESCOs
- Challenges

What is M&V 2.0?

- **Interval Data Billing Analysis**
- Automated methods (monthly or other)
- Near-real time results
- IOT metering
- More data (Skyspark, etc.)
- Nonintrusive load monitoring

Applications – Utility Programs

- Customer targeting
- Customer acquisition
- Enabling hard-to-M&V Program Types (behavior, tune-ups)
- Early feedback on failing projects

NMEC – Utility Programs

Site Level vs. Population Level NMEC



First National
341 feet



Flavors of NMEC

Savings = (Baseline Period Energy – Reporting Period Energy)
+/- Routine Adjustments +/- Non Routine Adjustments

Options for Non Routine Adjustments (NRA):

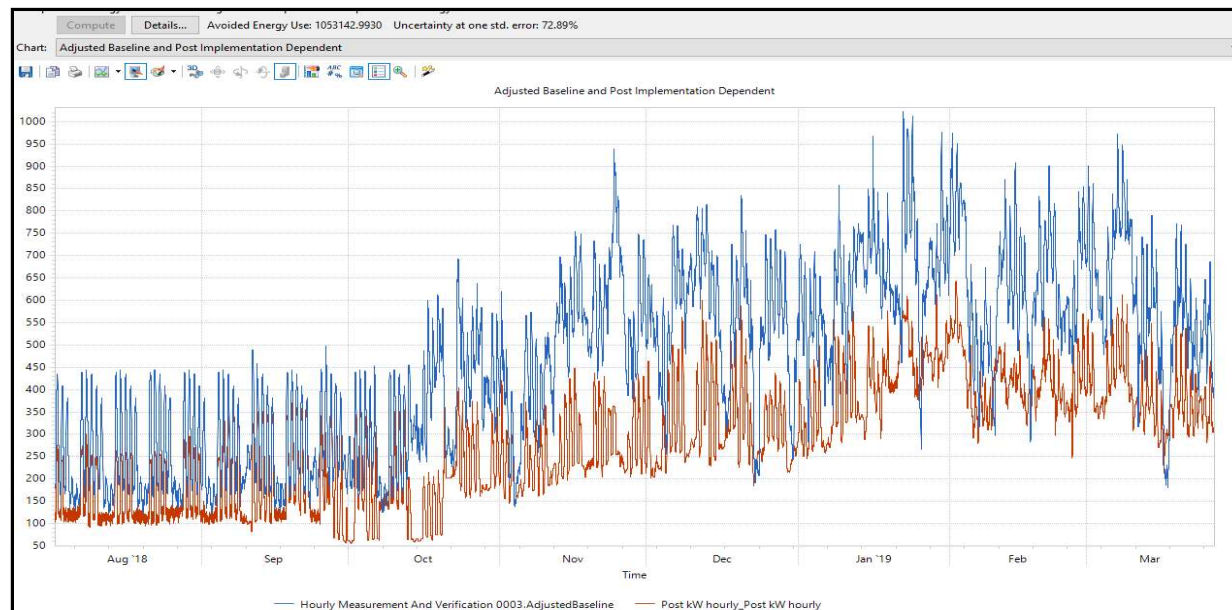
Population	Applicable Sectors	Baseline Adjustment Technique
Homogenous	Residential	Comparison group
Heterogeneous	Nonresidential	NRA

Flavors of NMEC

Option	Treatment of NRAs
Population with Comparison	Embedded billing analysis with a comparison group
Embedded Option C	Embedded billing analysis of all participants while attempting to identify and quantify NRAs at high rigor.
Unadjusted	No NRA or Comparison Group

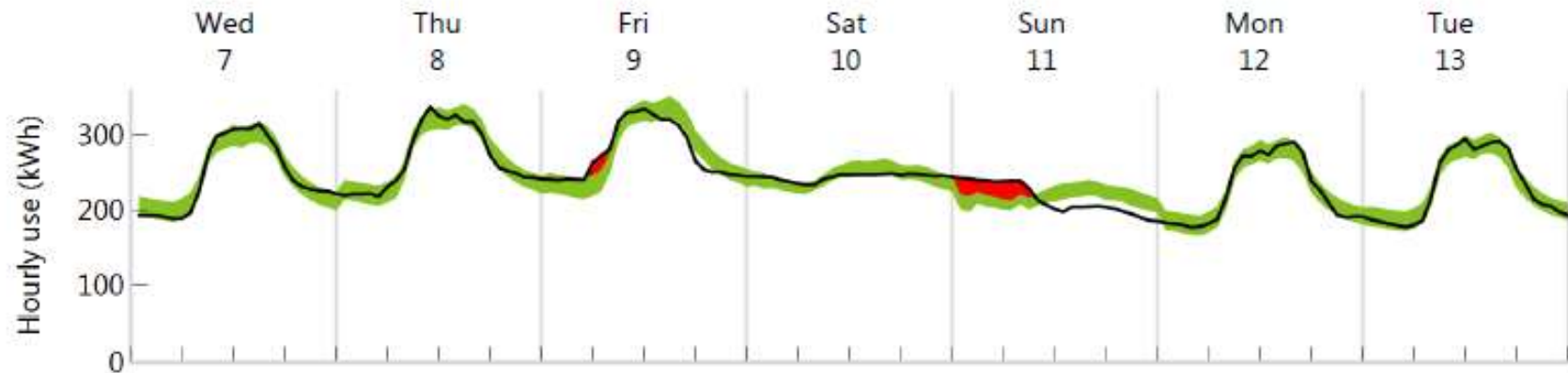
New Tools

- LBNL Tool, Universal Translator for hourly
- New Abraxas tools
- Disaggregation and data visualization tools



Heat Maps, Targeting and Deviation

R	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	153	162	165	163	171	179	283	364	359	361	366	363	363	352	338	212	159	145	135	137	146	152	216	158
2	161	162	169	169	173	175	306	305	311	331	323	316	317	321	308	178	148	143	140	194	146	231	155	159
3	166	163	165	169	170	192	344	350	361	381	390	363	353	354	399	230	137	140	138	159	301	152	154	155
4	157	174	247	163	167	165	284	377	417	360	385	359	348	356	327	196	144	145	150	155	154	159	161	166
5	162	185	216	167	168	172	209	206	204	205	199	196	188	187	179	132	134	134	133	137	182	212	148	155
6	153	158	163	162	163	164	162	157	157	155	150	150	141	139	135	180	141	135	138	139	146	153	155	159
7	164	164	170	172	176	179	174	221	173	161	153	152	143	136	135	127	125	123	125	126	135	142	155	152
Grar	159	166	183	166	170	175	247	280	278	274	275	267	260	258	254	179	141	137	137	148	170	169	165	158



Current Work

EVO Uncertainty Subcommittee

EVO M&V 2.0 Subcommittee

EVO NRA Subcommittee

- Automated Methods / 2.0
- Traditional Methods
- Calculation standardization
- Standardization vs Accuracy

EVO Tool Testing Portal

Interval Uncertainty

Opportunities - Interval Data M&V

- You can capture changes in energy usage patterns quickly
- You can characterize what types of changes are occurring and when they occur, which will help when it comes to determining what is happening at the building

Opportunities for ESCos - RFP

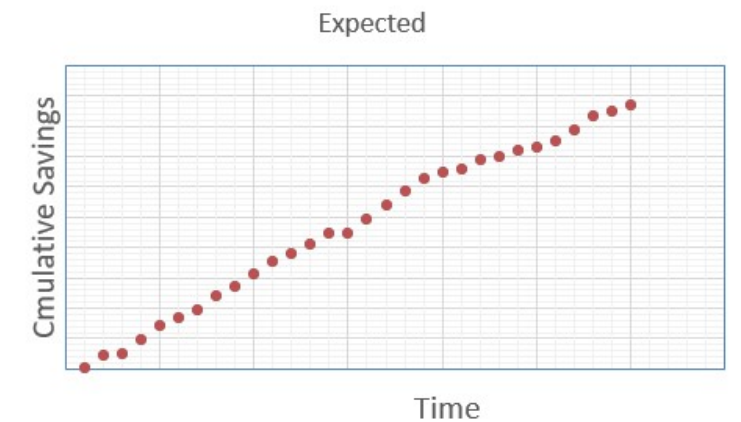
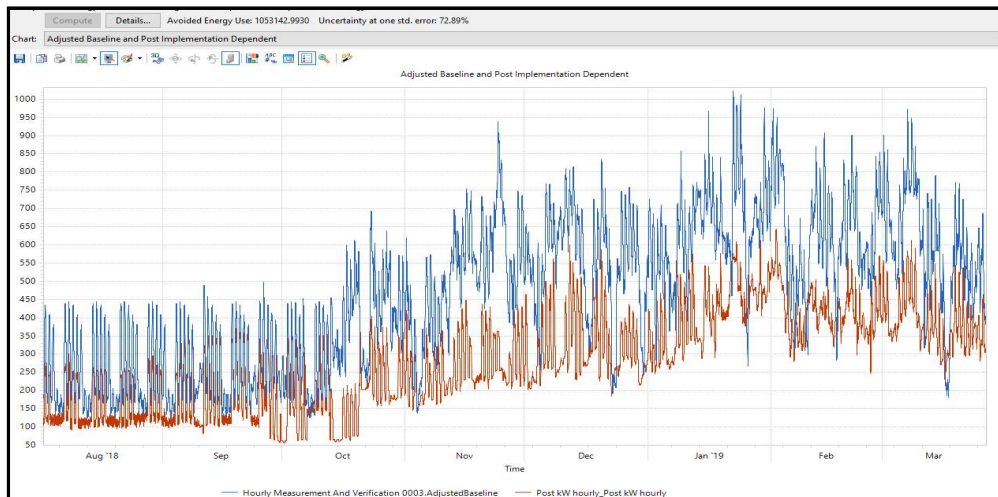
- Differentiator at RFP stage

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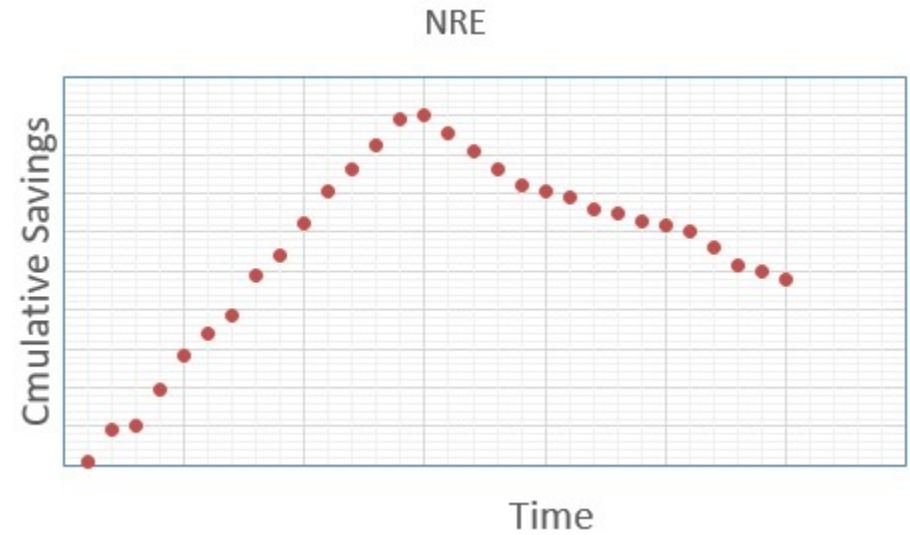
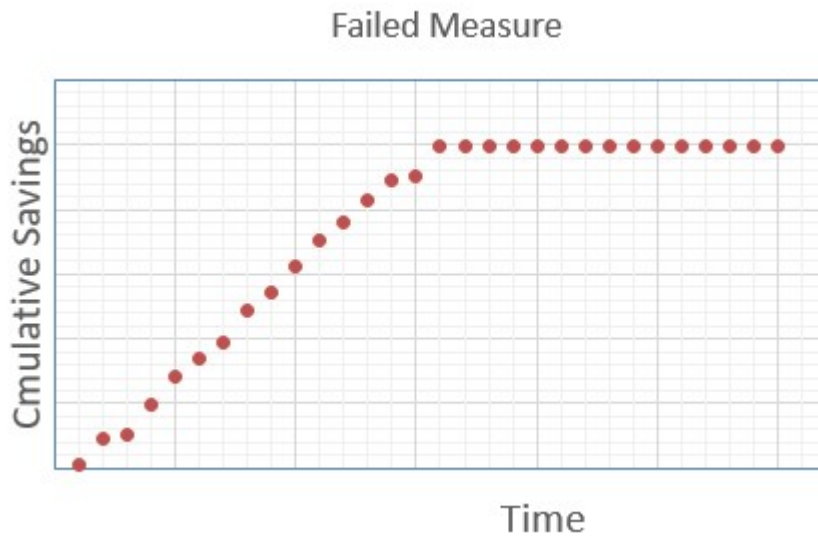
- Better end-use disaggregation?
- When does peak demand occur and will measures change it?

Opportunities for ESCOs – Risk Mitigation

- You can see “savings” and “anomalies” immediately.



Opportunities for ESCOs – Risk Mitigation



Opportunities for ESCos – Risk Mitigation

- Risk Mitigation Tool
 - Identify *POSSIBLE* NREs
 - Identify savings shortfalls
 - Documentation to support NRAs
- Facilitate smaller savings % projects
(behavior, tune-up)
- Use hourly in parallel to contractual M&V

Challenges

- Access to AMI data
- Consider sub-monthly intervals (but maybe not hourly)
- Not fully defined for contracts?
- M&V Report formatting

Thanks

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