



The Future Of EM&V: Shooting For The Stars

Moderator: Mark Kravatz, Optimal Energy

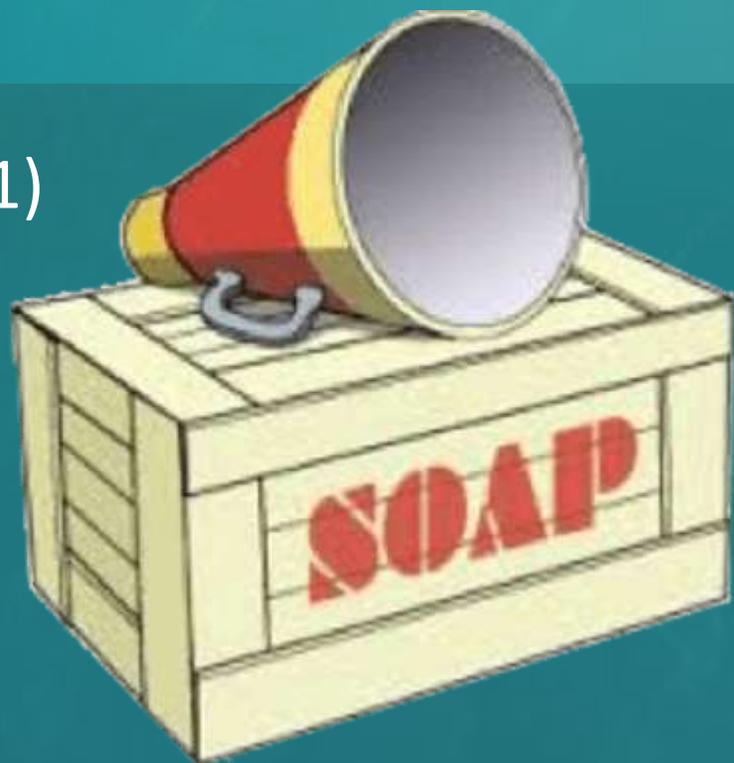
Tami Buhr, Opinion Dynamics

Ethan Goldman, ReCurve

Greg Thomas, PSD

Goal for this session

- 1)



- 2)



THE FUTURE OF EM&V IS NOW

TAMI BUHR, VP
OPINION DYNAMICS



Drivers of the Future of EM&V

- Enhanced Data and Computing Power
 - AMI/Smart Tech/IOT
 - Automated Analytics
- New grid needs and opportunities accelerating the adoption of distributed energy resources (DERs)
 - Typically behind the meter power generation and storage (PV, CHP, cogeneration, microgrids, wind turbines, generators, energy storage)
 - Changing paradigm that introduces energy efficiency and demand response technologies (including electric vehicles), as well as control and optimization of utility assets
 - Any one of these technologies constitutes an entire field of innovation and adaptation



PSEG Long Island Embraces Beneficial Electrification

- Response to NY State GHG reduction goals
- Programs are fuel neutral to spur beneficial electrification
- Future EM&V will involve:
 - Updating TRM, cost-effectiveness screening tool, and long-range planning tool to accommodate non-electric savings
 - Assessing electric savings potential under several different electricity price avoided cost scenarios
 - New oil and gas end uses
 - Heat pump programs that reduce oil use
 - Fuel-neutral deep energy retrofit programs
 - Locational impact assessments
 - Electric vehicles program costs and savings
 - Including as storage devices
 - Fuel-neutral P4P programs





Opinion **Dynamics**

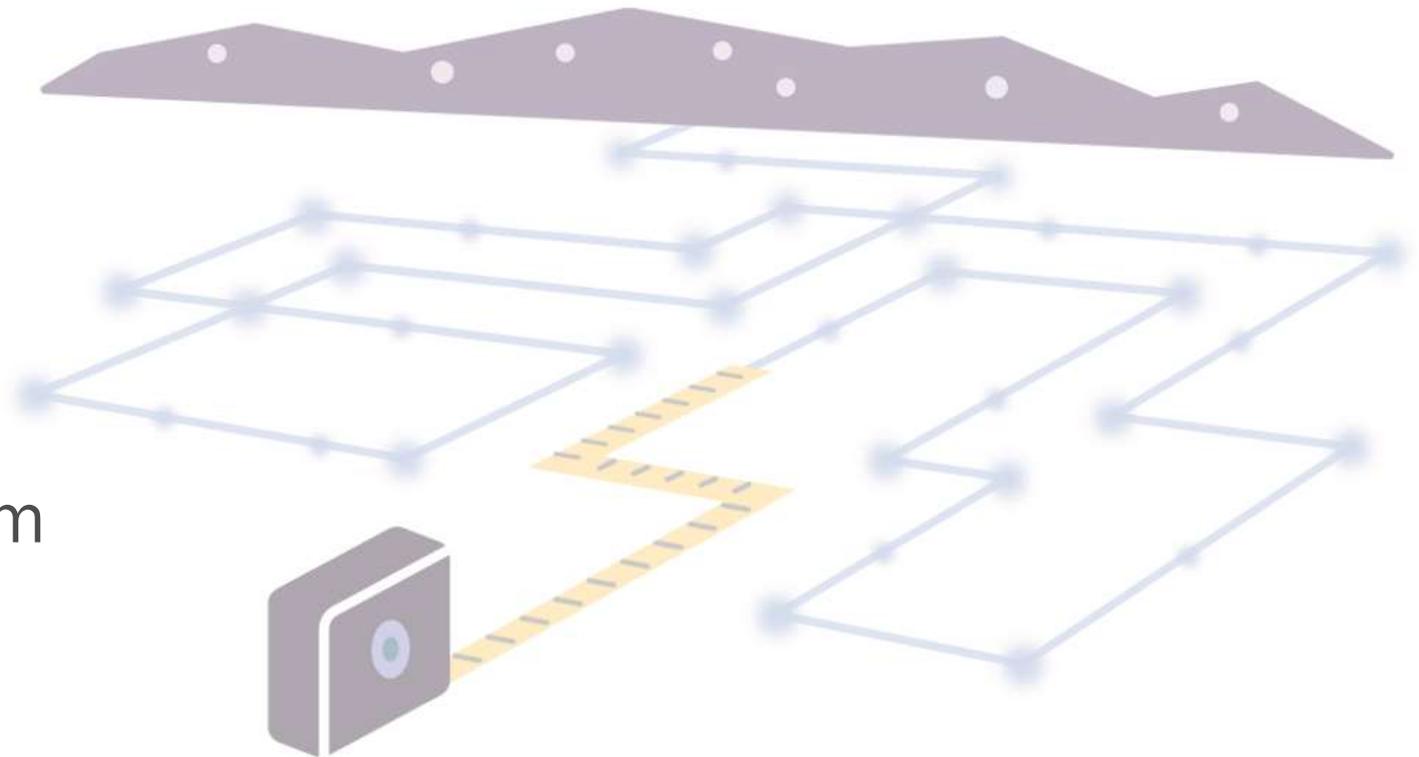
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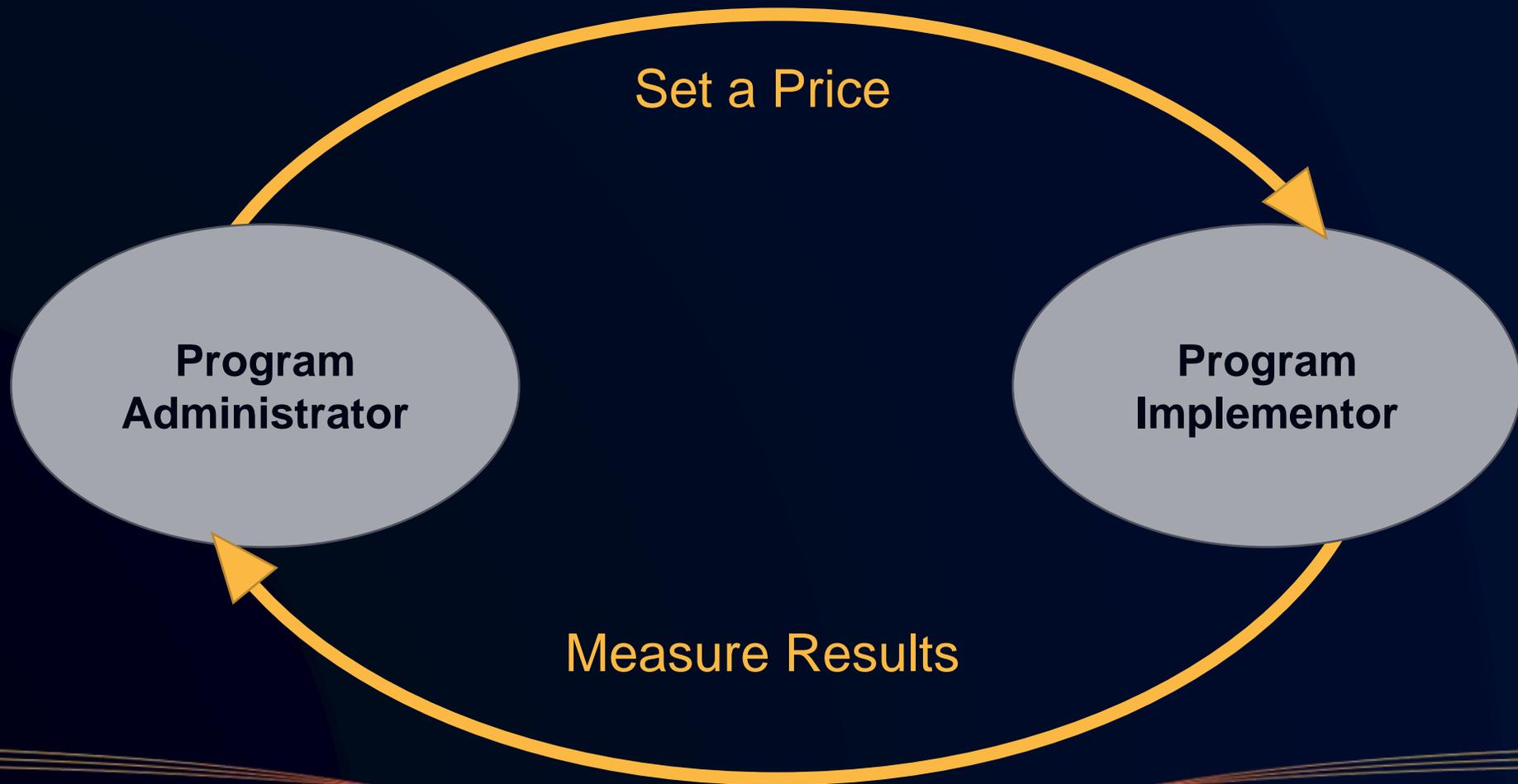
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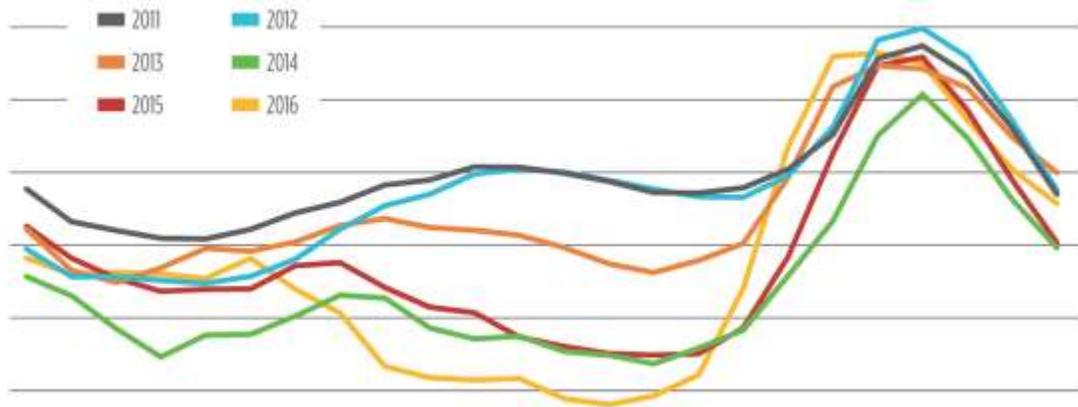
Ethan Goldman, Director of Customer Solutions

The Future of M&V is.... Measure Everything!

Why Do We Even Have M&V?



Why is M&V Changing?



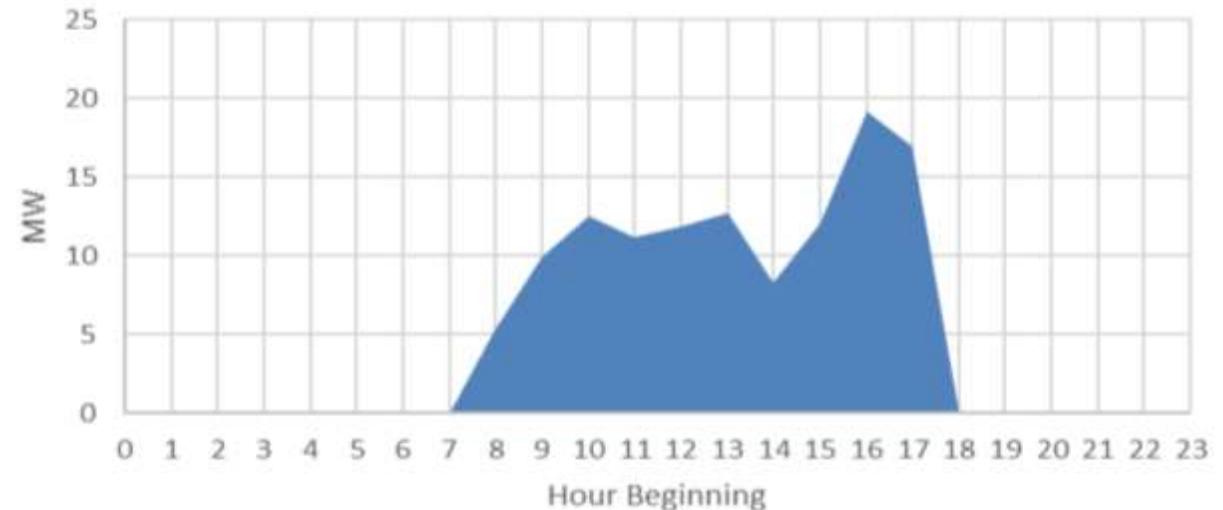
Oakland Clean Energy Initiative

Replacing 165 MW of Supply with EE

Dynegy 165 MW Peak Gas Turbine



OCEI Peak Day Hourly Resource Need



Greg Thomas

Founder, Chief Strategy and Technology Officer



PERFORMANCE
SYSTEMS
DEVELOPMENT

Are the TRMs designed 30 years ago helping us meet today's statewide energy efficiency goals?

1. Grid Modernization

2. Decarbonization

3. Meeting Deeper Energy Efficiency Goals

What TRM based EE is doing now

Example 2017 Statewide Measure Counts

- 2.4 million lightbulbs
- 160,000 DHW saving devices
- 26,000 thermostats
- 23,000 furnace/boilers
- 7,800 heat pumps
- 1,500 Central AC
- 193 air sealing projects
- 24 shell insulation projects
- 4 duct sealing projects

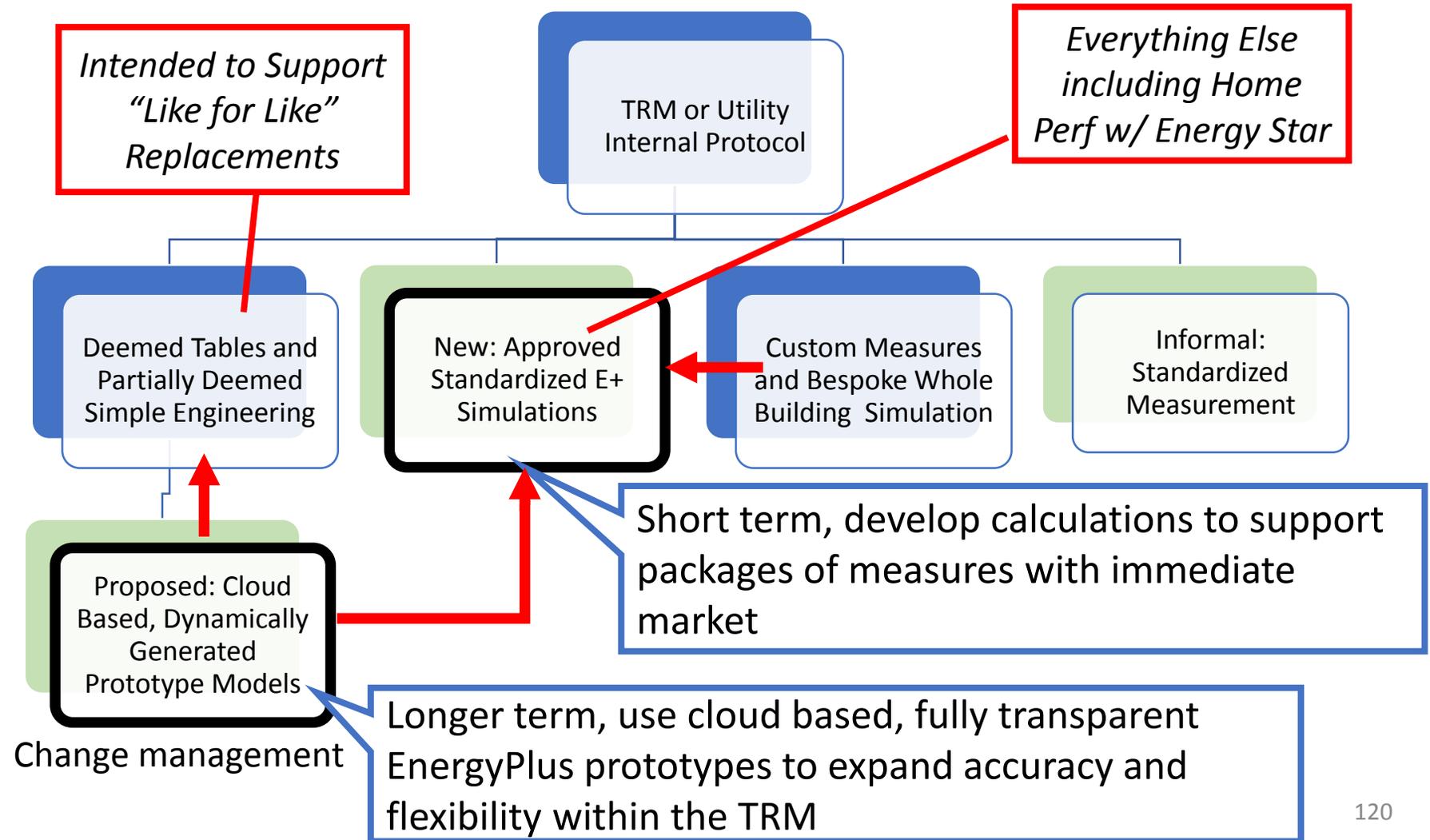
Electrification will increase
HP and AC #'s dramatically

?

Leverage open source technology to enhance the TRMs using “standardized” cloud-based simulations

PSD Project history:

1. DOE
2. VEIC
3. NREL
4. E4TheFuture
5. NYSERDA



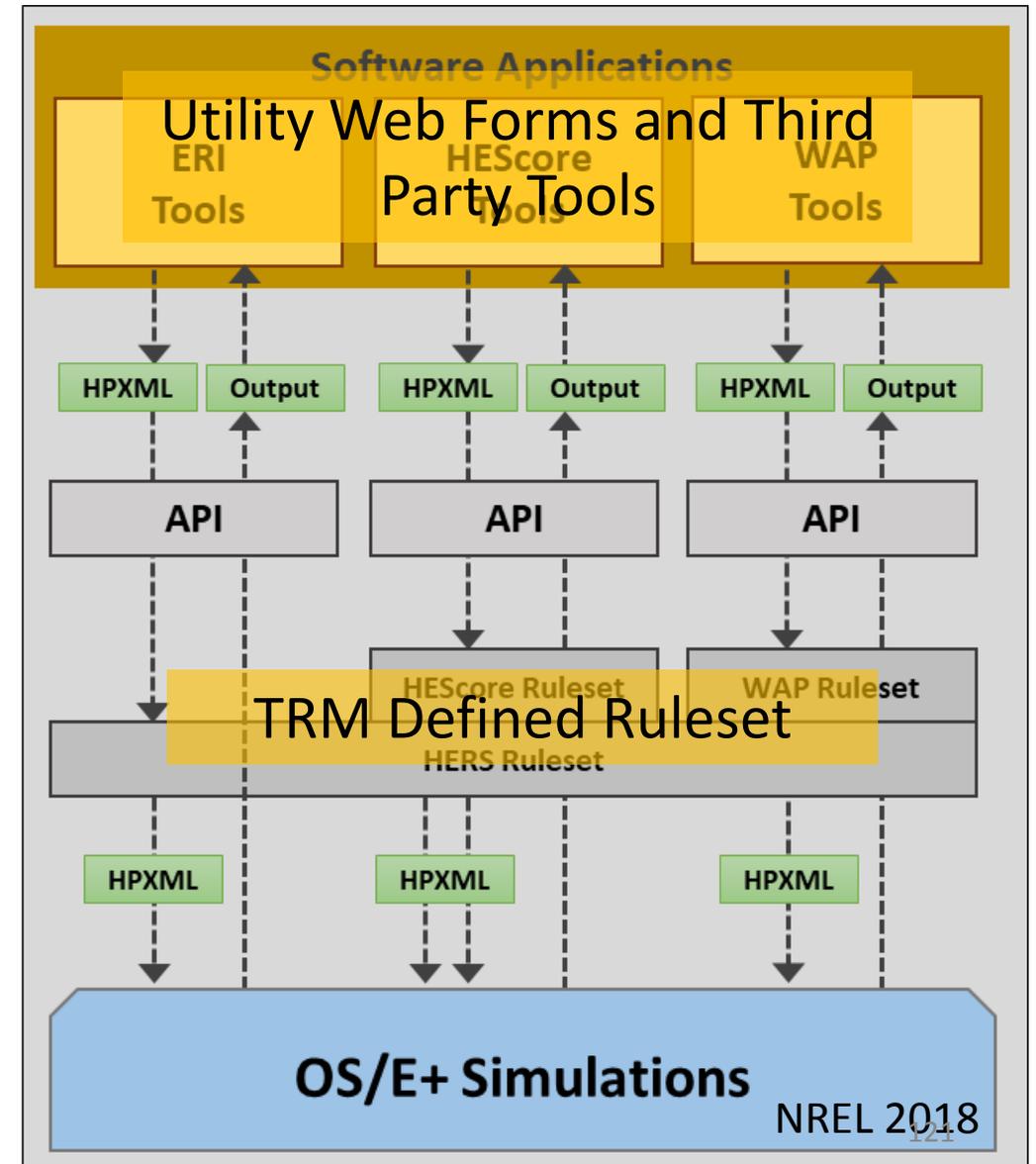
The open-source centralized server future is being implemented now by DOE

- DOE funded, open source work, coordinated with NASEO, NREL delivery
- Machine-to-machine standardized data transfer from third party tools
- Centralized server performing credentialed calculations
- EnergyPlus for residential building retrofits
- Leverages vendor investments in HPXML

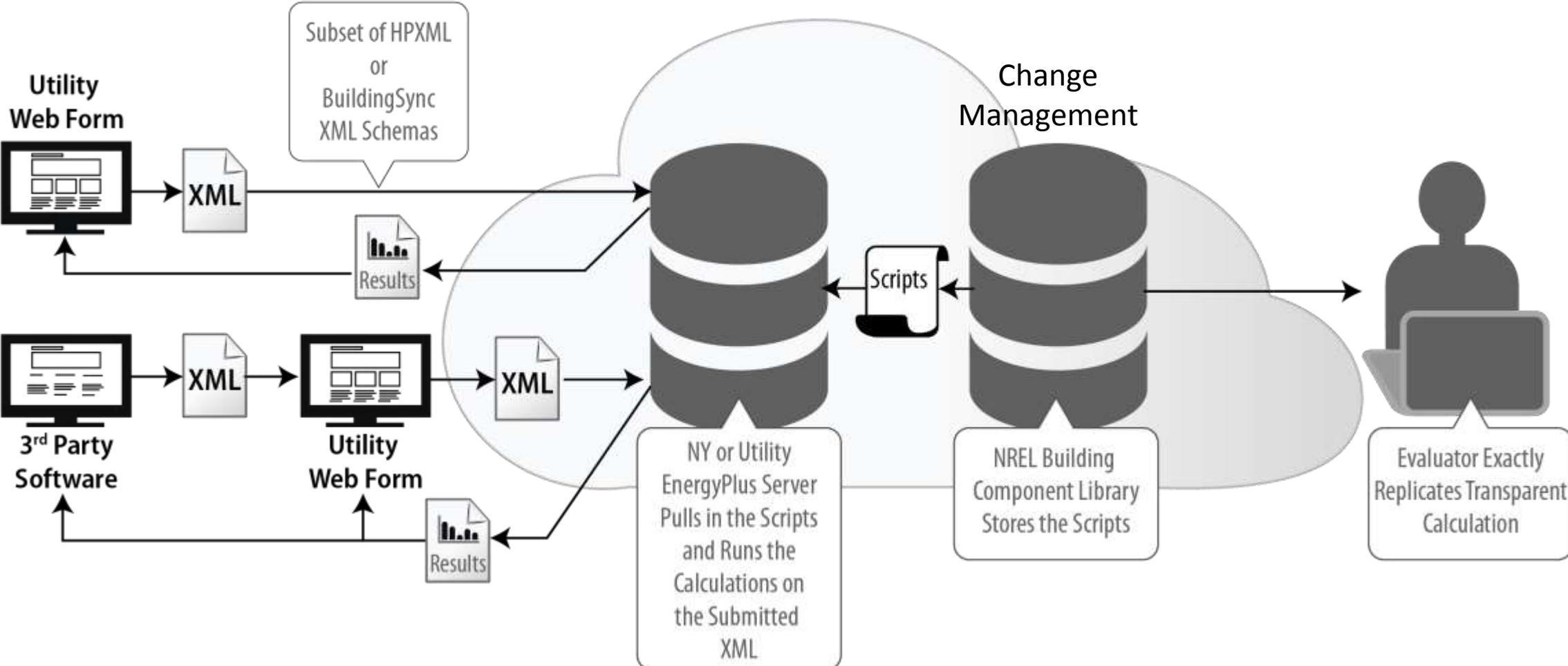
Standard Format

Agreed Upon Common Rulesets

Shared Server Energy Calculation



Dynamically deemed calculations configured for fuel switching, packages of measures, and new technologies



And Now....

