Return of Pay-for-Performance Stronger with M&V 2.0

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What is Pay-for-Performance?

Pay-for-Performance programs are energy efficiency programs in which the customer compensation is directly tied to measures of performance (unlike traditional programs that may provide payments to customers solely for participation)

- Pay-for-performance programs have been around for more than 25 years
- Renewed interest as persistent EE savings are becoming important elements of the efforts to build a cleaner and more flexible grid across the country
- P4P programs are generally marked by a combination of dynamic savings estimation and payments
- P4P programs improve the persistence of the EE savings by making performance payments throughout the program and providing feedback to make adjustments that can increase savings and ensure their persistence
- P4P is not limited to equipment upgrades or building retrofits, but include behavioral, operational, and retro-commissioning activities

Traditional vs. Pay-for-Performance

	Traditional EE	Pay for Performance
Main Premise	• Compensate customers based on participation	• Compensate based on performance
Customer Class	• Residential, commercial, and industrial	• Mainly commercial and industrial
Compensation Approach	• Customers rewarded for making EE investments • Often in the form of rebates	• ESCOs or customers are rewarded for EE savings assumed to be created by investments • Can make use of a mix of upfront and installed payments as needed
M&V Approach	• Provides more data for pre- and post- program evaluations	• Provides more data and feedback to tie to interim evaluations/payments
Risks	• Allocated to utility or program administrator	• Allocated to service provider/ESCO or customer
Persistence of Savings	• Based on estimates, uncertain and hard to track	• Increased through incentives of earning continuous payments

P4P is not a substitute for the next generation of traditional EE programs, but often works best as a complement

What is M&V 2.0?

- P4P programs require new methods of Evaluation, Measurement, and Verification (EM&V) to compute EE savings that will form the basis of payments to customers
- These new methods require more granular data/frequent measurements and are enabled by advanced utility metering, big data analytics and new smart devices for customers. **The application of this new data to EM&V is often referred to as M&V 2.0**
- The distinction between traditional M&V and M&V 2.0 is **automated analytics and granularity of data**
- While there is great interest in M&V 2.0 methods, more research is needed to understand what techniques are included in M&V 2.0 and the actual scale of improvements compared to traditional M&V models
  - Growing literature on the subject, the execution of a new crop of pilot programs, and the emergence of new emerging cloud-based software companies

Elements of Traditional EM&V

	Alternatives for Measurement and Verification		
Elements of Evaluation	**M&V**	**"Deemed" Savings**	**Statistical Analysis**
• Impact Evaluation • Program Evaluation • Market Evaluation • Considers policy goals, free ridership, codes, *etc.*	• Based on metering, engineering calculation, and modeling • IPMVP defines options • Appropriate for individual projects and across programs	• Using prior credible data or calculations of as an estimate • Often collected in Technical Reference Manuals (TRMs) • Appropriate for projects and can be scaled up to estimate programs	• Large-scale consumption statistical analysis with the use of comparison groups • Can be used for programs or portfolios

How does M&V 2.0 enhance EM&V?

	Enhancements of M&V		
Enhancements of Evaluation	**M&V**	**"Deemed" Savings**	**Statistical Analysis**
• Analysis improved by software • Faster feedback allows program implementers to make timely adjustments • Improvements of pre-program screening and customer targeting	• Improves reliability of measurements • Allows continuous rather than monthly calculations	• Improved M&V feed estimates could create better data for building "deemed savings"	• Improved granularity of data and computing ability allows continuous comparison of treatment vs. control

Two main types of M&V 2.0 methods:

- Advanced data analytics through software (cloud computing)
- Improved data collection through hardware (smart meters and thermostats)

M&V 2.0 applied to Pay-for-Performance

M&V 2.0 is suitable for P4P programs if the improvements due to continuous measurements and more timely/accurate data exceeds the costs of collecting and processing that data

- Whole-building EE P4P programs are often improved by M&V 2.0 because of automation and standardization of data collection and processing

Several P4P pilots compare the accuracy of energy savings from M&V 2.0 with savings based on deemed and modeled methods to help determine areas where it is most applicable

P4P and M&V 2.0 is being piloted for residential class, enabled by the availability of AMI data

P4P and M&V 2.0 is gaining traction in jurisdictions which has high EE saving targets and an emphasis on the persistence of the impacts (i.e. FEJA Act in Illinois)

Three Notable Pilots/Case Studies

	NYSERDA SEALED Program	PG&E's Residential P4P Pilot	Energy Trust P4P Pilot
History/Status	Initiated in 2016	Initiated in 2017; results due by the end of 2018	Initiated in 2014
Sector	Residential, single family	Residential, single family	Whole building M&V, Commercial, one pilot participant
Targeted Measures	Broad range, but most focus on air sealing and HVAC	Flexible; up to the discretion of aggregator	Flexible; combination of measures
P4P Mechanism/Payment Structure	Guarantees minimum EE savings, if more than guarantee is realized, profits go to SEALED.	Payments to the aggregator ($/kWh) based on performance	Incentives paid over three years ($/kWh), rates negotiated
Data Required	Monthly billing analysis	AMI Interval Data	Billing and meter data
M&V 2.0 applied?	Yes (by SEALED)	Yes (by OpenEE)	Yes (by Energy 350)
Quantified Savings/Success	No public reports yet	Targeting 6% electric and 16% gas savings per home	18% savings

Recap

- Neither P4P nor M&V 2.0 are new concepts, but the combination of the two, particularly in the residential sector, is fairly new and expected to provide deeper and more persistent savings
- Most P4P implementations so far have been undertaken by aggregators and focused on commercial and industrial projects. Even though residential customers can be aggregated similarly, there is limited activity in this space (mostly in the form of pilots)
- There is need for more pilots to assess whether P4P models will be able to achieve more savings than traditional efficiency programs, achieve savings at a lower cost, or attain different types of savings
- More granular data from M&V 2.0 can better support the use of energy efficiency as a non-wires alternative for targeted load reductions than deemed savings calculations
- M&V 2.0 is better suited for P4P programs that can be improved by continuous and timely data without the costs of collecting/processing that data outweighing the benefit

References

Ellen Franconi, *et al*., "The Status and Promise of Advanced M&V: An Overview of "M&V 2.0" Methods, Tools, and Applications," Lawrence Berkeley National Laboratory, February 2017. Hereinafter LBNL Feb 2017

Jessica Granderson *et al.*, "How Accurate is Automated, M&V 2.0?" Lawrence Berkeley National Laboratory

Sanem Sergici, Heidi Bishop, and Ahmad Faruqui, "A Review of Pay-for Performance (P4P) Programs and M&V 2.0," Forthcoming Report, November 2018

Julia Szinai, "Putting Your Money Where Your Meter is a Study of Pay-for-Performance Energy Efficiency Programs in the U.S.," Natural Resources Defense Council, April 3, 2017

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Dr. Sanem Sergici is a Principal in The Brattle Group's Boston, MA office specializing in program design, evaluation, and big data analytics in the areas of energy efficiency, demand response, smart grid and innovative pricing. She regularly supports electric utilities, regulators, law firms, and technology firms in their strategic and regulatory questions related to retail rate design and grid modernization investments.

Dr. Sergici has been at the forefront of the design and impact analysis of innovative retail pricing, enabling technology, and behavior-based energy efficiency pilots and programs in North America. She has led numerous studies in these areas that were instrumental in regulatory approvals of Advanced Metering Infrastructure (AMI) investments and smart rate offerings for electricity customers. She also has significant expertise in development of load forecasting models; ratemaking for electric utilities; and energy litigation. Most recently, in the context of the New York Reforming the Energy Vision (NYREV) Initiative, Dr. Sergici studied the incentives required for and the impacts of incorporating large quantities of Distributed Energy Resources (DERs) including energy efficiency, demand response, and solar PVs in New York.

Dr. Sergici is a frequent presenter on the economic analysis of DERs and regularly publishes in academic and industry journals. She received her Ph.D. in Applied Economics from Northeastern University in the fields of applied econometrics and industrial organization. She received her M.A. in Economics from Northeastern University, and B.S. in Economics from Middle East Technical University (METU), Ankara, Turkey.

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