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Protocols for Evaluating Energy Efficiency – Both Sides of the Atlantic

Frank Stern, Navigant, Boulder, CO
Dimitris Vantzis, Navigant, London, UK



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Having standard protocols for estimating impacts is critical to maintaining confidence in energy efficiency.

Many protocols have been developed on both sides of the Atlantic

These protocols have many similarities, but also significant differences in terms of allowed approaches as well as terms used

Harmonizing these protocols will facilitate international trade in the energy efficiency industry and support the development of international agreements for climate change mitigation

This paper presents a summary of the uses of the protocols, the major protocols in use, key distinctions, and recommendations for harmonization

A number of protocols have been developed on both sides of the Atlantic.

International Protocols

- International Performance Measurement and Verification Protocols
- Tool for the Demonstration and Assessment of Additionality
- Monitoring and Reporting Regulation for the European Emissions Trading Scheme
- Common Methods and Principles for Calculating the Impact of Energy Efficiency Obligations
- Measuring and Reporting Energy Savings for the Energy Services Directive

Protocols used in the European Energy Efficiency Obligation Schemes

- Italy
- U.K.
- France
- Denmark

U.S. Protocols

- Uniform Method Project Protocols
- Model Energy Efficiency Program Impact Evaluation Guide
- California Evaluation Framework
- California Evaluation Protocols
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers Guideline 14
- Regional Technical Forum
- California Standard Practice Manual

Several terms are key to understanding various protocols and their differences.

- » **M&V:** Estimation of electrical energy, electrical demand, and/or fuel energy saved due to a measure or a project based on field measurements
- » **Impact evaluation:** Estimation of the amount of electrical energy, electrical demand, and/or fuel energy saved due to a program
- » **NTG:** This term is used primarily in North America. It refers to the proportion of outcomes that are attributable to the program rather than other influences, such as market drivers or other programs. Net-to-gross includes free ridership (savings that would have occurred in the absence of the program) and spillover – (savings attributable to program influences that occur outside of the program)
- » **Additionality:** This term is used primarily in the context of the Kyoto Protocol. It refers to emissions reductions savings that are additional to any that would have occurred in the absence of certified project activity

Several terms are key to understanding various protocols and their differences.

- » **Ex ante savings:** Savings estimated before EE measure implementation
- » **Ex post savings:** Savings estimated after implementation. More expensive but more accurate than ex ante savings
- » **Deemed savings:** Typically set for an efficiency measure/technology and unit of application, which is derived from historical evaluations, usually used with programs targeting simpler efficiency measures with well-known and consistent performance characteristics

International protocols vary widely.

	IPMVP	Tool for the Demonstration and Assessment of Additionality	Measuring and Reporting Energy Savings for the Energy Services Directive	Common Methods and Principles for Calculating the Impact of Energy Efficiency Obligations Schemes
Application	Focuses on M&V, also an element of program evaluation. Used for monitoring and evaluating energy efficiency projects for climate change mitigation.	Demonstrating and assessing additionality, applicable to a wide range of project types	Energy efficiency programs in the European Union, in light of the Directive 2006/32/EC	Energy efficiency obligation schemes in Europe
M&V Options	<ul style="list-style-type: none"> • Engineering analysis • Metering a • Billing data analysis • Building Simulation 	<ul style="list-style-type: none"> • Does not address gross impact 	<ul style="list-style-type: none"> • Metering • Billing data analysis • Enhanced engineering estimates • Deemed estimates • Top down regression analysis 	<ul style="list-style-type: none"> • Deemed savings. • Metered savings • Engineering estimates • Surveyed savings (for measures that impact consumer behavior)
Primary Accreditation of Savings	Ex Post	Ex Ante	Ex Ante	Ex Ante/Ex Post
Consideration of NTG/Additionality?	No	Yes	Yes	No
Consideration of cost?	No	Yes	No	No

In Europe, the dominant M&V choice between the largest EEO schemes is deemed savings.

	UK	Italy	France	Denmark
Application	Energy Saving Obligations Utility Obligations Energy Efficiency Resource Standards White Certificates Programs			
M&V Options	<ul style="list-style-type: none"> • Deemed savings • Case-by-case approval for other measures 	<ul style="list-style-type: none"> • Deemed savings • Engineering approach • Metered baseline method 	<ul style="list-style-type: none"> • Deemed Savings • Case-by-case approval for other measures 	<ul style="list-style-type: none"> • Deemed savings • Engineering calculations
Accreditation of Savings	Ex ante	Ex ante (majority) and ex post	Ex ante	Ex ante (first-year savings)
Consideration of NTG/Additionality?	Yes	Yes	Yes	Yes
Consideration of cost?	No	No	No	No

In the case of measures that are not in the lists of deemed measures, the program operator needs to develop a baseline and demonstrate the level of additional energy savings to the program administrator.

U.S. protocols focus on ex post approaches.

	ASHRAE Guideline 14	California Evaluation Framework /Protocols	Model EE Program Impact Evaluation Guide	Regional Technical Forum Guidelines	CA Standard Practice Manual	Uniform Methods Project Protocols
Application	Provides detail on implementing commercial M&V plans	Planning and conducting evaluations of CA 's energy efficiency and resource acquisition programs	Energy efficiency program designers and evaluators looking for guidance on the evaluation process	Savings estimation approaches for use in the Northwest U.S	Benefit cost analysis	Protocols for a core set of commonly deployed EE measures
M&V Options	<ul style="list-style-type: none"> Billing analysis Metering Building simulation 	<ul style="list-style-type: none"> Engineering analysis Billing analysis Metering Building simulation 	<ul style="list-style-type: none"> Engineering analysis Metering Billing data analysis Building Simulation 	<ul style="list-style-type: none"> Deemed savings Engineering analysis Billing analysis Metering 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Engineering analysis Metering Billing data analysis Building Simulation
Accreditation of Savings	Ex Post	Ex Post	Ex Post	Ex Post or Ex Post	Ex Post or Ex Ante	Ex Post
Consideration of NTG/Additionality?	No	Yes	Yes	Yes – in baseline	Yes	Yes
Consideration of cost?	No	No	No	Yes	Yes	No

There are several different protocols on either side of the Atlantic, with significant differences in emphasis.

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In Europe

- Different national energy efficiency obligation programs have developed separate rules that nevertheless combine similar elements
- Dominant methodology for the measurement of savings is the use of deemed measures.
- Use of measured data and field observations is limited
- Common practice is to use an NTG ratio at a program level for each measure, which is reexamined and periodically revised

In the U.S.

- Protocols are more oriented towards ex post measurement and verification.
- Use of metering, site inspection, billing analysis, and calibrated simulation models with post installation data on projects and measures is standard practice.
- Reliance on empirical data give more rigour than reliance solely on engineering theory.

Both sides of the Atlantic consider the issue of what would have happened in the absence of the program or project, but with different terminology – net-to-gross in the U.S. and additionality in Europe.

Harmonizing these protocols will facilitate international trade and the development of international agreements for climate change mitigation.

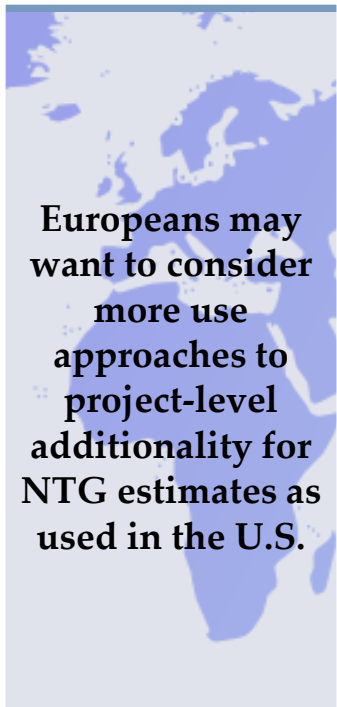
Some considerations in this harmonization




Agree on consistent terminology



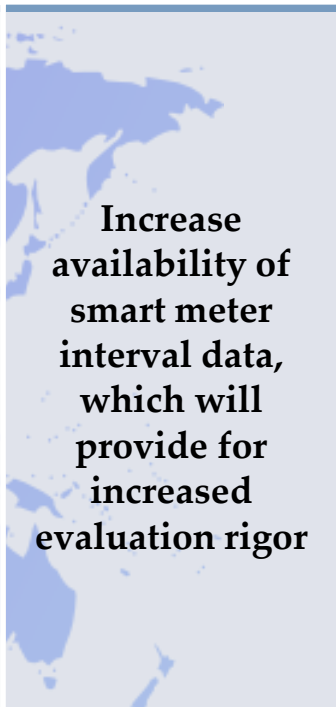
Increase in the use of ex post data in Europe



Europeans may want to consider more use approaches to project-level additionality for NTG estimates as used in the U.S.



Expand process for improving savings estimates, on both sides of the Atlantic



Increase availability of smart meter interval data, which will provide for increased evaluation rigor

Key CONTACTS



Frank Stern

Director

Boulder, Colorado

+1.303.728.2513

frank.stern@navigant.com

Dimitris Vantzis

Senior Consultant

London, UK

+44.20.7015.2362

dimitris.vantzis@navigant.com