APPLYING GROSS AND NET SAVINGS IN AN INTEGRATED POLICY FRAMEWORK

By: Daniel M. Violette, Ph.D.
Managing Director – dan.violette@navigant.com

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Why isn't this an easy process?

Many different views!

"Evaluation takes too long to produce estimates of savings, particularly net savings."

"Too great a focus on FR and not enough on SO and ME. We are trying to impact the market."

"Need to understand attributable savings to make EE investment decisions."

"Methods are unreliable and often yield estimates that are biased."

"Program administrators can't plan when targets and incentives are changed by an evaluation that takes place a year later."

"Evaluation costs too much. Diverts resources from planning and implementation efforts."

"Need accurate $/kWh values for resource planning and for ratepayer protection."

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Purpose of this work

- This draws from on-going work at the Northeast Energy Efficiency Partnerships (NEEP) on developing tools and guidance for EM&V. The foundational documents can be found at:
  http://www.neep.org/gross-and-net-savings-principles-and-guidance

  - To help stakeholders assess gross savings (GS) and net savings (NS) issues in context of overall policy decisions

  - To provide supportive tools that can be relevant as policies and practices change and evolve

  - *Caveat*: This guidance does not advocate for specific policies or methods

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Jurisdictions are Reviewing EE Policies

- Assessing the role of GS and NS in an energy efficiency (EE) policy framework:

  - Uses of GS and NS and methods for estimating.

  - Assess whether the uses of GS and NS are consistent with their goals and views regarding EE objectives.

- Use of GS and NS estimates can be context dependent.

- One jurisdiction with one set of policies may use GS and NS savings estimates differently than another jurisdiction.

- AND, both can be appropriate and consistent given their respective overall framework for EE policies and objectives.

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Policy Decisions influenced by GS and NS

Example Policies	Related Issues
Setting EE targets and metrics	• Set by legislative mandate (e.g., 20% reduction by 2025) • Policy-driven variable targets (e.g., all cost-effective EE) • Prospective or Retrospective application of GS and NS
Tracking towards targets and metrics	• Assessing progress towards multi-year goals • Feedback for program/portfolio modifications • Prospective or Retrospective application of GS and NS
Determining measure or program cost-effectiveness	• Selecting benefit-cost test • Defining inputs and outputs

Addressing Revenue Erosion and Lost Margins	• Addressing lost revenues
	   – Lost margin recovery due to EE
	   – Decoupling
	   – Other options

Incentives	• Performance targets for EE • Shared benefit incentives
Planning	• Resource planning to minimize/manage revenue requirements • Meeting environmental goals • Other goals – resiliency, resource diversification, risk management

Six Guidance Principles – What should you think about?

#1: Establish a Common Understanding	• Work from common GS and NS concepts and definitions • Avoiding misunderstandings can lead to more productive dialogue
#2: Align Methods and Use with Policies	• How to measure and apply GS • Whether / how to measure and apply NS values
#3: Address the Value of Information	• Weigh the value of the information produced by NS studies against the costs of the studies • Seek ways to increase the value of NS studies
#4: Apply the Concept of Symmetry	• Recognize all components of NS – both positive and negative influences • Consider the effects of not including all net components
#5: Ensure Transparency	• Document assumptions, sources, and methods used for GS and NS estimates • See Section 2 for a draft template
#6: Allow for Multiple Views Across Stakeholders	• Allow for flexibility across EE policies regarding applications of and methods for assessing GS and NS • Seek agreement on core concepts

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Principle 1: Establish a Common Understanding

Common GS and NS definitions and constructs can avoid misunderstandings and lead to a more productive dialog.

- Issues tied to GS and NS are often complex and nuanced creating opportunities for misunderstanding or confusion.

- Constructs introduced are:

  • The use of conceptual and operational definitions of GS and NS.

  • Baselines for GS and NS are needed as both are estimates of a change in energy use, i.e., energy savings.

  • The increasing importance of timelines in estimating savings.

[1]/This follows the axiom that a question well asked is half answered.

[2]/Jonas Salk is credited with saying: "What people think of as the moment of discovery is really the discovery of the question."

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Conceptual Definition for GS

Generally accepted definition:

"the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated." (SEE Action, 2012)

- Participants in this definition include:

  - Direct participants, e.g., those that receive rebates for actions taken.

  - Participants in market-based programs or upstream programs.

- This definition is conceptual in that it does not provide a frame for estimating GS.

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Operational Definition for GS

- The operational definition provides the frame for GS estimation.

- Difference between energy use post-participation and the appropriate GS baseline.

- GS baselines can vary across program types and across jurisdictions.

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GS Baselines

- **GS baselines** typically try to bring the baseline and post-participation periods to the same set of conditions.

- The pre-condition energy use (i.e., the baseline) might be adjusted for factors such as:

  - weather,

  - operating hours between pre- and post-installation conditions,

  - interaction effects, e.g., the interaction between lighting and heating energy use.

  - currently available equipment if the replaced equipment are no longer available – might reflect codes and standards.

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Example of Different Options for GS Baselines
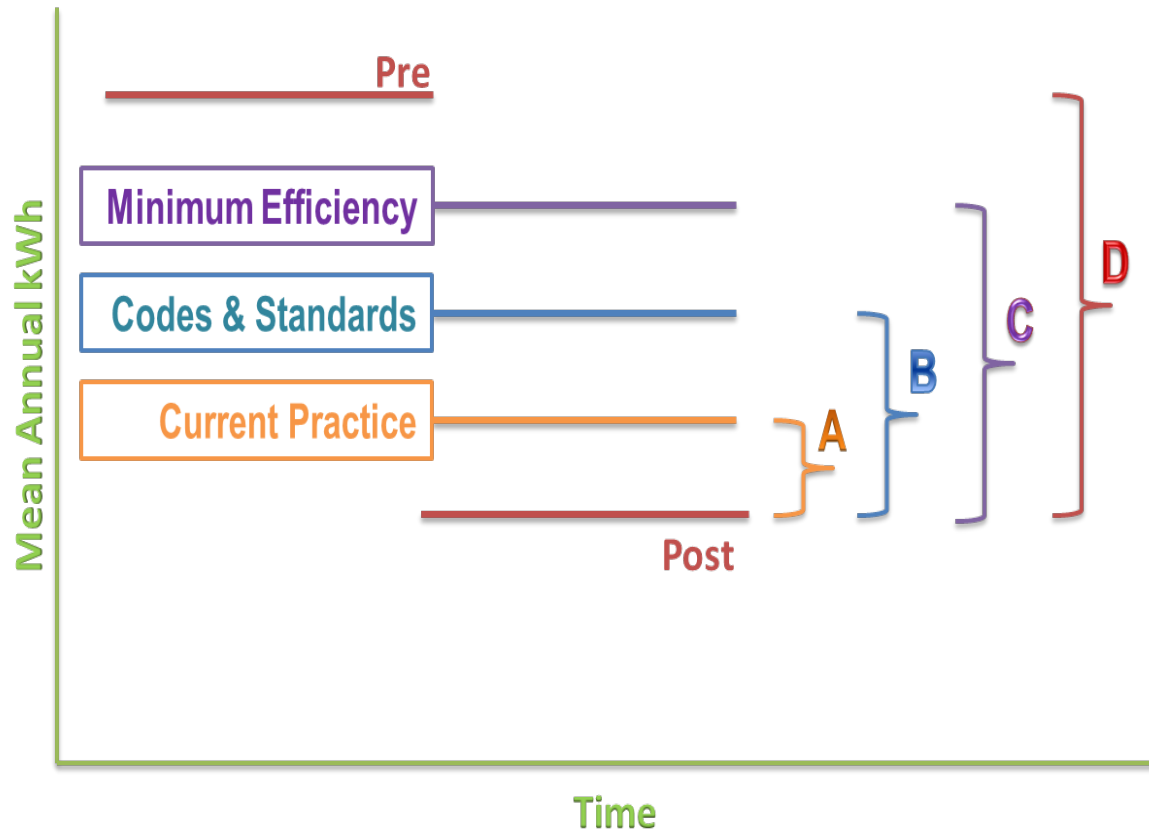
- Pre = Pre-installation mean annual energy of a representative sample of participants
- Minimum Efficiency = Minimum efficiency available in the market
- Code & Standards = Efficiency level compliant with codes and standards (C&S)
- Current Practice = is based on the efficiency of current equipment commonly purchased in the market.
- Post = Post-installation mean annual kWh for the same random sample of participants

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Conceptual Definition of NS

General agreement: "Those savings that are 'attributable' to the EE program or activity." (SEE Action 2012)

- It should be noted that GS also includes savings that can be defined as attributable the program.

  • GS could not occur without the installation of measures or actions taken by the program.

- NS includes considerations not included in the operational definition of GS:

  • Whether some participants would have installed measures even if the program had not existed?

  • Are there other actions taken outside the program, but are influenced by the program?

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Operational Definition of NS

- Different jurisdictions translate this concept into different operational definitions.

- One operational definition of NS produces an equation shown below that includes three components not included in GS:

Net Savings = Gross Savings – Free ridership (FR) + Spillover (SO)+ Market Effects (ME)

- Jurisdictions may not include all of these factors in their operational definition of NS.

- To further complicate these NS components, there are subcategories for each.

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Shortened Version of Table in Paper		
Free ridership	**Spillover**	**Market Effects**
Free ridership (FR) is the program savings attributable to free riders (program participants who would have implemented a program measure or practice in the absence of the program). There are three types of free riders: • **Total free riders:** Participants who would have completely replicated the program measure(s) or practice(s) on their own and at the same time in the absence of the program. • **Partial free riders:** Participants who would have partially replicated the program measure(s) or practice(s) by implementing a lesser quantity or lower efficiency level. • **Deferred free riders:** Participants who would have completely or partially replicated the program measure(s) or practice(s) at a time after the program timeframe.	**Spillover (SO)** refers to additional reductions in energy consumption or demand due to program influences beyond those directly associated with program participation. There are generally two types of spillover: • **Participant spillover (PSO):** This represents the additional energy savings that are achieved when a program participant—as a result of the program's influence—installs EE measures or practices outside the efficiency program after having participated. Participant spillover subcategories include: o Inside spillover: Additional program-induced actions at the project site. o Outside spillover: Actions that reduce energy use outside participating sites. o Like spillover: Actions that are of the same type as those in the program. o Unlike spillover: Actions participants make outside the program that are unlike program actions. • **Nonparticipant spillover (NPSO):** This represents the additional energy savings that are achieved when a nonparticipant implements EE measures or practices as a result of the program's influence (for example, through exposure to the program) but are not accounted for in program savings.	**Market effects (ME)** refer to "a change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy efficiency products, services, or practices and is causally related to market intervention(s)" (Eto et al. 1996). For example, programs can influence design professionals, vendors, and the market (through product availability, practices, and prices), as well as influence product or practice acceptance and customer expectations. All these influences may induce consumers to adopt EE measures or actions (Sebold et al. 2001). **ME as SO:** Some experts suggest that market effects can be viewed as spillover savings that reflect significant program-induced changes in the structure or functioning of energy efficiency. As a result, care is needed to ensure that market effects include only those elements that are not already included in the spillover term.

NS Baselines

- **NS baseline** takes into account those factors that are related to behavior and choice.

- Additional components are addressed that are needed to enable <u>defensible estimates</u> of "attributable savings."

  - For example, savings that would have occurred in the absence of program intervention (e.g., FR)
    - Can be due to self-selection, but other factors contribute as well.

  - Decisions influenced by the program resulting in additional EE measures being installed (SO).

  - Effects on the market (ME).

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GS and NS Baseline Definitions

- As savings values, GS and NS both require two points to produce the estimated change:

  - An initial baseline and post-participation energy use.

- It is important to be clear about the starting point and the ending point used to produce each estimate.

- One challenge in defining baselines is that, by definition, baselines are unobservable.

- This is true for the evaluation of any decision in any field. It is not unique to EE. All disciplines have to address this issue not just EE evaluation.

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Difference between GS and NS Baselines

- What distinguishes a gross savings baseline from a net savings baseline?

  - GS reflect the savings due to the installation of the technology (or action) offered by the program *(but can be compared against different baselines).*

  - NS, in general, takes into account additional behavioral and choice options such as FR, SO, and broader changes in the market (ME).

- This framework views:

  - GS as being savings based on the technology; and,

  - NS being savings that also takes into account additional behavioral and selection factors.

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Principle 2: Align Methods and Use with Policies

- An over-arching theme of the framework is that:

    1. How GS and NS are estimated; and,

    2. How GS and NS are used …

        Should be aligned with the specific goals of the overall EE policy being implemented in a jurisdiction

- Considerations include:

    – Making good decisions regarding investments in EE.

    – Other stated goals for EE (and other DER) and appropriate tracking.

    – Equity in terms of tracking towards goals and use of savings estimates for cost recovery or incentives.

    – Alignment with resource planning.

    – Perceived equity in terms of changing the targets after-the-fact for program administrators and implementers.

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Principle 3: Address the Value of Information

- Value of information (VOI) considers potential value, or benefits, of the research results against the costs of the research.

- Assumptions are documented regarding what the studies might produce and how the results can be used to produce value.

- A VOI analysis can provide insights in terms of:

  - Assessing whether updated GS and NS information is needed.

  - Timing of GS and NS research.

  - Developing new views on the way research may be conducted.

  - Using decision-analytic approaches to quantify the VOI of more in-depth GS and NS studies.

    - These methods draw from work on the value of market research or the value of R&D investments.

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Principle 4: Apply the Concept of Symmetry

- The operational definition of GS and NS involves multiple components.

    - There is widespread agreement that FR, SO and ME exist for most programs, but may have different magnitudes across programs.

    - It may be appropriate for empirical studies to focus more on one factor than another due to its expected influence of that factor on NS.

- Policies on EE investments, program designs, and implementation should use the best available information on all components.

    - Some may be based on judgment and subject to uncertainty.

    - Sensitivity analyses can be based on a plausible range of values.

    - A balanced view should recognize what is included in estimates and the potential values of what may be excluded.

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Principle 5: Ensure Transparency

- Document assumptions, sources and methods for GS and NS estimates (a template starting point).

✓ Provides transparency and thorough decision documentation, *"Tell the decision story."*

✓ Designed based on the NEEP *EM&V Methods Standardized Reporting Forms*

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Principle 5: Ensuring Transparency

An 8 step process for documentation for transparency:

Step 1 — Define Key Terms

Step 2 — Determine how GS and NS will be used

Step 3 — Applied Retrospectively or Prospectively?

Step 4 — Determine GS and NS Research method(s)

Step 5 — Determine Overall Confidence or Rigor

Step 6 — Determine Net Savings Research Timeframe

Step 7 — Complete Value of Information Analysis

Step 8 — Ensure Transparency: Document NS Decisions
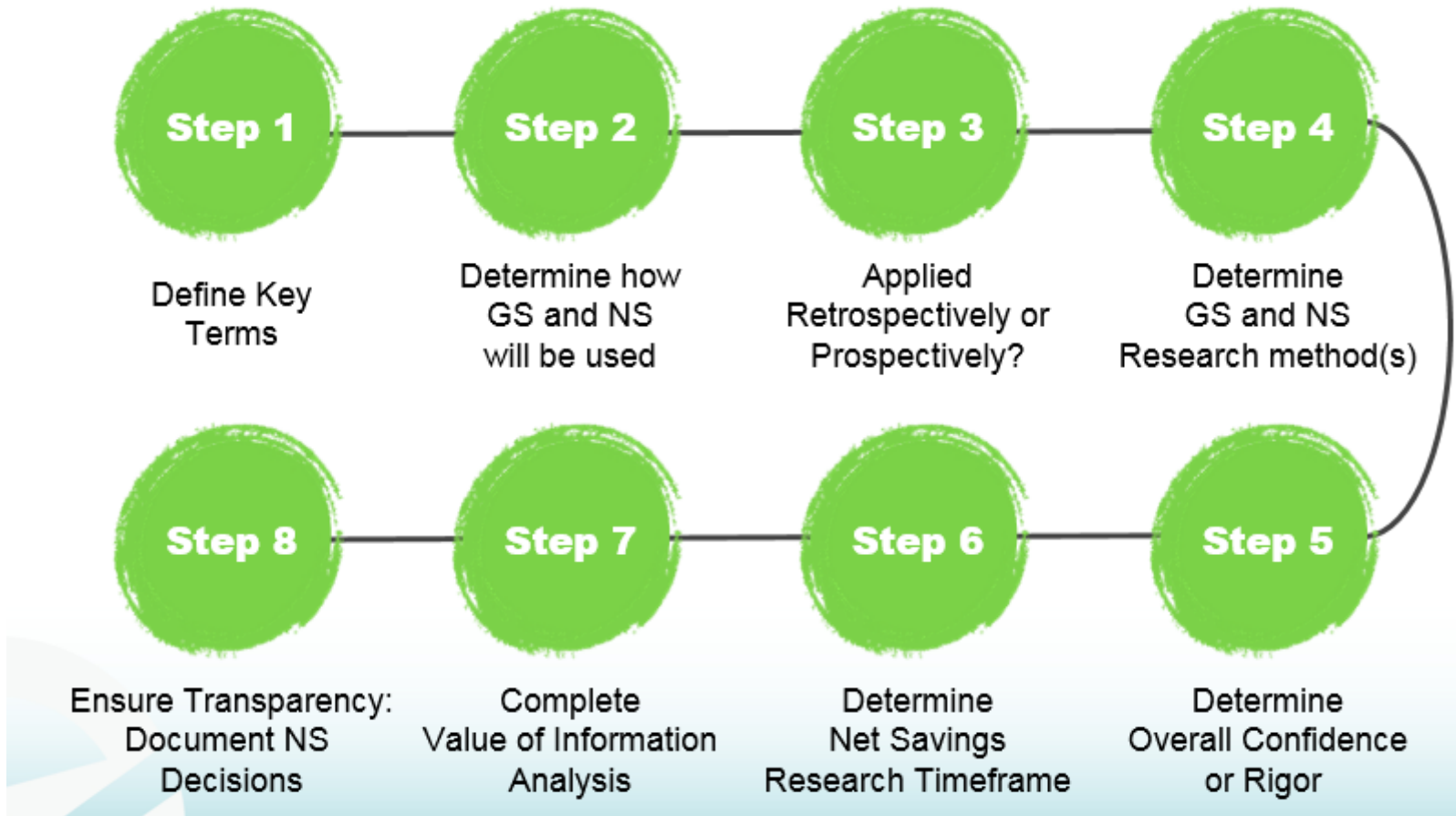
(More Detail in NEEP, 2016)

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Principle 6: Acknowledge that there will be Multiple Views across Stakeholders

- Seek agreement on core principles, but allow for flexibility.

  - Different stakeholders may hold different views.

  - These views can still be consistent with core principles yet reflect differences in basic beliefs.
    - How confident they are about estimating NS component values at a useful level of accuracy.
    - Whether they view EE as a resource investment or as a wider market influencer.

- Recent reviews of practices across jurisdictions are showing trends in the use of GS and NS based on common EE policies.

- Clarity around GS and NS definitions, estimation frameworks, and application of key principles allows for areas of agreement and differences to be identified.

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References

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CONTACTS

DAN VIOLETTE
Managing Director, Navigant
(303) 728-2503 / (303) 903-3035
dan.violette@navigant.com

PAM RATHBUN
Director, Tetra Tech
(608) 316-3639
pam.rathbun@tetratech.com

TERESA LUTZ
Michaels Energy
(608) 416-3895
trlutz@MichaelsEnergy.com

ELIZABETH TITUS
Senior Manager, NEEP
(781) 860-9177 ext. 111
etitus@NEEP.org

navigant.com

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