INTRODUCTION

• European Union ‘Winter Package’
  - Binding 30% energy efficiency target by 2030 (yet 40% cost-justified)
  - Governance regulation recognises role of energy efficiency but doesn’t address enforcement or penalties

• Sense of urgency
  - The time is now to consider a radically different evaluation, measurement and verification (EM&V) scheme for Europe to ensure Member States are delivering real savings

• Refresher course
  - Overview of basic and advanced EM&V approaches
  - European examples, including EM&V methodologies for efficiency obligation schemes and white certificate schemes

Source: Navigant
EM&V IN THE ENERGY EFFICIENCY PROGRAM LIFECYCLE

Source: Navigant
ENERGY EFFICIENCY PROGRAM EM&V IN CONTEXT

Policy, Legislation & Regulation

Portfolio

Program

Project

Measure / Action
WHY EVALUATE ENERGY EFFICIENCY PROGRAMS?

- **Document the impacts** of a program and determine whether the subject program (or portfolio of programs) has met its goals.

- **Identify ways to improve current and future programs** by determining why program-induced impacts occurred; attribution of program theory and logic ‘did the program induce changes in the market as planned?’

- **Support energy demand forecasting and resource planning** by understanding the historical and future resource contributions of energy efficiency compared to other energy resources.

Objectives of Energy Efficiency EM&V


SELECT THE RIGHT TOOLS TO ASSESS IMPACTS

Engineering
- Tracking System Review
- Engineering Review
- Customer Surveys
- Onsite Verification
- End-use Metering

Modeling
- Calibrated Building Energy Simulation
- Site Specific billing analysis with Energy Simulation

Econometric
- Billing Analysis
- Survey Based Approach

Source: Navigant
# Protocols and Methods Comparison

## Evaluation Methodology

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PRIORITIZING EVALUATION EFFORTS: ANALYZE TRADEOFFS

Level of Rigor

Accuracy

Evaluation Approach

Timeliness

Cost

Budget

Scenario 1: ISO Bid – Accurate, Explicit Deadlines, Expensive

Scenario 2: New Program – Less Rigor (Process Focused), Well-timed, Lower Cost
ISO New England’s Forward Capacity Market

- ISO New England runs an auction process, setting a total required capacity and a floor clearing price
- Energy efficiency capacity competes with electricity generation and demand response capacity
- Approx. 1.8 GW of energy efficiency resources cleared in the last auction rounds, accounting for approx. 5% of total cleared capacity

Energy Efficiency Program Administrators

- Program administrators can secure revenue stream 3 years in advance for the full expected life of the energy efficiency measure
- Revenue from ISO-NE’s Forward Capacity Market can cover 10% of the budget of a typical energy efficiency portfolio

Customer-Level Energy Efficiency Measures

- Capacity bid for by program administrators needs to be aggregated to reach the minimum threshold of 100 kW – equivalent to peak savings of 20,000 compact fluorescent lamps
- Typical energy efficiency measures include residential lighting, commercial lighting, efficient appliances

• UK Energy Company Obligation (ECO) Scheme
  – Monthly assessment of reported measures
  – Duplication review (across different schemes)
  – Compliance review
  – Monitoring & inspections (QC)
  – Audits (QC & savings risk)
  – Support & guidance
  – Reporting

http://www.iea.org/media/workshops/2017/S5HemmesOfgem_IEA_PresentationREVISED.pdf
• Catalogue of standard measures

Annual updates taking into account changes in building code, for example
3rd parties’ databases can be linked to deemed saving catalogue

1. Usability
2. Avoid cheating
3. Additionality (some deemed savings 0)
4. Technical accuracy of savings
5. Keeping cost of developing deemed savings to a minimum

http://svk.teknologisk.dk
### Deemed savings

The method is easy to use and facilitates the evaluation.

Savings are not measured and monitoring can be complex if multiple solutions are considered.

Required documentation: choice to go easy or bureaucratic, which usually implies a failure, unless the incentive is very high.

On field controls are expensive.

Effort required to evaluate baselines, additionality, and other needed information.

High cost-effectiveness.

Possibility to pre-evaluate EE products in order to ensure the required performance.

### Scaled savings

The method is easy to use and facilitates the evaluation.

Savings are measured.

Required documentation: choice to go easy or bureaucratic, which usually implies a failure, unless the incentive is very high.

On field controls are usually a viable option.

Effort required to evaluate baselines, additionality, algorithms and meters to be used, and the other needed information.

High cost-effectiveness.

Simplified monitoring plans?

### Metered savings

The method is usually complex, especially if additionality or detailed adjustments are present.

Savings are measured.

Required documentation: is usually substantial, but the size of the project allows it.

On field controls are usually a viable option.

Effort required to evaluate baselines, additionality, algorithms and meters to be used, and the other needed information for both the proponents and the evaluators. Shall data be available for everybody?

Very flexible, but potentially costly and complicated (viable for high targets).

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### SUMMARY OF EM&V ISSUES & GAPS IN EUROPEAN CONTEXT

| **EM&V Level** | Verification schemes  
Deemed measures  
Little primary data collection  
Few process evaluations |
|----------------|----------------------------------------------------------|
| **EM&V Protocols** | No common EU standards  
Top down v. project-specific focus  
Improve cost-effectiveness methods |
| **Attribution** | No defined EU policy  
Varying attitudes about importance of net savings |
| **Understanding of Product Markets** | Well developed energy performance standards & codes  
Need for market data, pooled commercial data |
| **EM&V Budgets** | Not sufficient  
Not high priority |
| **EM&V Capacity** | Lack skills and resources  
Scale needed  
Consumer decision-making |
SUMMARY

- **Independent EM&V** of EE investments provides assurance to funders/regulators/stakeholders that the EE resource is reliable.

- **Common evaluation protocols** help assure metrics & methods are consistent across jurisdictions, allowing for comparisons of impacts/success:
  - UMP (DOE), IEPPEC (NA, Europe, and now Asia) share best practices.
  - Similar programs may require different evaluation approaches depending on stakeholder needs, the EE scheme & the regulatory environment.

- **What else is needed to assure EE targets are being met?**
  - More **real-world data** (to compare ex-ante assumptions to ex-poste measure, program, portfolio savings – improving estimates for next cycle).
  - Determine proper **baselines** in fast changing markets (e.g. LED lighting).

- **Are other policy goals** being considered in evaluation planning?
  - Is detail needed on additionality, societal considerations, multiple impacts?

- **Governance**: who needs to be at the table to determine specific evaluation requirements & to review findings?
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