Policy Brief

Capturing the Energy Efficiency Opportunity

Our 2050

This is one of a series of policy briefs to summarize ongoing findings related to the research project, 'Our 2050 – Opportunities for Ireland in a Low Carbon Economy', which is on the economic and societal opportunities arising from the transition to a low carbon economy and the policies needed to achieve this transition

MaREI Centre for Marine and Renewable Energy

EPMG Energy Policy & Modelling Group

IERG Intelligent Efficiency Research Group

eri Environmental Research Institute

UCC University College Cork, Ireland Coláiste na hOllscoile Corcaigh

The Our 2050 project is addressing four key questions:

1. What will Ireland's future energy use look like? In particular, how will we generate electricity? How will we heat our buildings? What modes of travel will we use?
2. What technologies are most likely to play leading roles in Ireland's transition to a low carbon economy?
3. What strengths can Ireland play to, and what opportunities can Irish-based firms avail of?
4. What policies are needed? What do government, firms, universities and individuals need to do, individually and collectively, to achieve the transition?

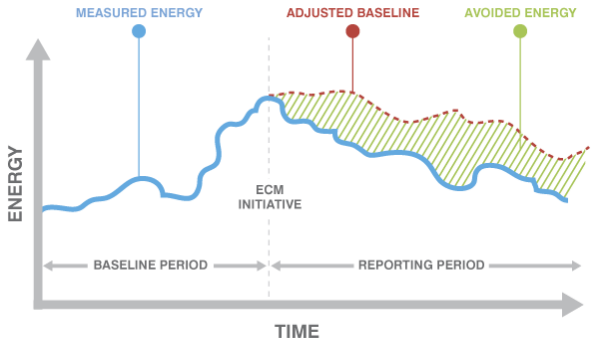
This policy brief addresses the critical challenge faced when answering the second question.

The Energy Efficiency Opportunity

Delivering Demand Side Energy Savings

The Energy Efficiency Directive was issued to maximise the efficiency with which energy is consumed at a demand-side level. Under the terms of the Directive, member states are obligated to achieve 20% energy efficiency savings by 2020. In contrast to other energy related targets, energy efficiency presents a unique challenge for performance verification. Therefore, a resilient and transparent process is required to ensure accurate quantification of progress towards targets.

This process, known as measurement and verification (M&V), ensures that energy efficiency savings are reported in an accurate and reliable manner. Following the implementation of an energy conservation measure, the consumption that would have been used, had the efficiency not been improved, cannot be measured. This is an unknown quantity that must be modelled.



The uncertainty surrounding savings resulting from energy efficiency improvements can act as a barrier to project implementation. Investors will assess the risk that their expected return will not be delivered and the added uncertainty surrounding quantifying the realised savings contributes negatively towards investment.

Traditional M&V approaches rely on guidance documentation such as the International Performance Measurement and Verification Protocol. The lack of explicit instruction on data analysis and key parameter identification has seen a dependence on simplistic energy modelling approaches. These are sufficient in many cases, however, rapidly evolving energy systems in the industrial sector require more advanced approaches to minimise the uncertainty in M&V.

Unlocking the energy efficiency opportunity requires successful project implementation on the demand side. This cannot be achieved with high uncertainty in reported savings, resource intensive processes, and a lack of evidence for persistence of savings in the long-term.

The imminent adoption of Industry 4.0 practices will facilitate digitalisation for energy efficiency. This offers an opportunity that energy policy must ensure is used to evolve performance verification to fully capture the energy efficiency opportunity. A recently agreed 32.5% European Union energy efficiency target for 2030 emphasises the need for solutions to the challenges facing M&V.

10 Key Messages on Performance Verification

The following ten key messages have emerged from research conducted by the Intelligent Efficiency Research Group at the SFI MaREI Centre in University College Cork to identify the challenges facing performance verification and develop solutions to aid its evolution.

The Fundamentals

1. **Importance of performance verification:** All too often M&V is not regarded as the valuable tool it is in many energy efficiency projects. It is critical that it is embedded throughout the project life-cycle. Energy policy must demand more out of M&V and highlight its importance in the energy efficiency industry. A key question is how can this be achieved without making M&V a resource intensive task?

2. **Raising standards:** Current energy efficiency policy on a national level is dependent on the guidance documentation for performance verification. In line with this, S.I. 426 of 2014 does not define a minimum performance verification standard that must be achieved. This standard can be defined in the form of a minimum level of uncertainty required for individual projects. This would ensure a more reliable system of accounting for energy efficiency savings on both macro and micro levels.

3. **Evolving practices:** The current basic statistical approaches implemented for energy modelling in M&V must be built upon. The large quantities of data available and advances in computing can be used to evolve the modelling task for the betterment of model accuracy. This is a challenge that consists of two key areas; educating performance verification practitioners and fostering development of technological solutions.

4. **Ensuring persistence:** Traditional M&V commonly consists of a 12-month period before and after project implementation. It is most often the case that the savings delivered by an energy efficiency measure span far longer than 12-months. The long-term persistence of savings has been neglected by current policy, thus seriously undermining savings reported at all levels of the energy system. Future policy must ensure persistence is guaranteed, thus further guaranteeing the assurances of energy efficiency projects.

Realising the Benefits

5. **Trust in technology:** Technology is becoming an increasingly critical tool in the performance verification industry with international research efforts focused on reducing the resources that accurate M&V requires. As many of these technologies include a black-box approach to energy modelling, it is critical that transparency and trust are maintained. This can be achieved by defining criteria for evaluating data-driven energy models, thus utilising statistical significance to communicate trust in technology.

6. **M&V 2.0**: Performance verification is seeing advancements in the use of large data sets and automated, advanced analytics to streamline a scalable process. This offers the most viable solution to the barriers that arise from complex energy systems in industry.

7. **Energy performance contracting:** Ireland has been particularly slow in adopting a model of paying for services based on performance. The often grey-area of M&V can complicate contracts, thus acting as a barrier to implementation. Energy performance contracting is a powerful means of increasing the rate at which energy efficiency measures are implemented. This opportunity can be unlocked by policy that ensures the uncertainty surrounding energy savings is minimised.

8. **Assess uncertainty in 2020 targets:** An assessment of the uncertainty associated with reported progress towards 2020 targets is required to gain an insight into the true portion of the target remaining and the starting point for action plans aimed at achieving 2030 targets. An estimation of energy savings without an

associated level of uncertainty at a given confidence interval is not sufficient at either a demand-side or national level. Future policy must ensure this is not the case by writing uncertainty reporting requirements into legislation.

9. **Power of auditing:** A system is currently in place that ensures that the M&V of any savings counted towards EU targets is audited. A key drawback of this approach are the weak guarantees of persistence of energy savings. An improved performance verification audit scheme would see projects reviewed throughout the lifetime of savings being realised; not just at the point of credit application.

10. **Energy efficiency obligation scheme (EEOS):** The typical payment model utilised by energy suppliers to acquire energy credits under the EEOS is flawed. Most often, payments are issued for demand-side energy savings at the point at which M&V concludes, however, this is not always the point at which savings cease. A phased-payments framework is required to ensure credits are only awarded for realised energy savings.

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Further Reading

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