

Energy Efficiency does not always = less emissions

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About this update

This dated news record has been reorganised for clear reading and connected to current guidance.

Publication date: September 5, 2013.

Status note: Present-tense statements, market figures, deadlines and program details in the archived record belong to its publication date. Check current official sources before making a decision.

What this article reported

> A good reminder that energy efficiency can have the opposite effect by reducing prices and driving higher consumption. Why Turnbull knows better than Abbott: Part I

Energy Efficiency

How to use this information now

For current use, confirm the applicable scheme rules, regulator notices, market date and reporting period. Keep historical prices or forecasts separate from present quotes and verified outcomes.

Separate source-reported facts from forecasts, targets and commentary. For a current project, retain the official source, version, effective date, assumptions and decision record in the evidence file.

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What is the main point of the Northmore Gordon article 'Energy Efficiency does not always = less emissions'?

The article is a reminder that energy efficiency can have the opposite effect intended, because improving efficiency can reduce prices and drive higher consumption, which can offset emissions reductions. This phenomenon, known as the rebound effect, means that operational savings from more efficient equipment may not translate into proportional emissions reductions if the efficiency gain encourages increased energy use or if the energy source has low carbon intensity. Understanding this dynamic is critical when evaluating whether an energy project will actually deliver the environmental outcome intended.

Why does energy efficiency not always lower emissions?

Energy efficiency does not automatically reduce emissions because the emissions outcome depends on the energy source being displaced. Reducing grid electricity consumption has a much larger emissions impact in regions powered by coal-fired generation than in regions with renewable energy

generation. Additionally, efficiency gains can lower prices, which may drive higher consumption and offset emissions savings. Our guidance emphasises keeping energy savings, cost savings and emissions reductions as separate benefit lines in investment cases and measurement and verification assessments.

How does fuel switching affect an emissions calculation?

Switching fuel types, such as replacing gas heating with electric heating, changes the emissions calculation entirely. The emissions benefit depends on the carbon intensity of the electricity supply, not the equipment efficiency alone. A change in fuel use does not automatically establish an emissions reduction without understanding the specific energy sources involved and applying an appropriate emissions factor. We recommend separating energy, financial and emissions outcomes when evaluating heat-pump or electrification projects, and using the relevant boundary and factor basis for each calculation.

Why should energy savings, cost savings, and emissions reductions be treated separately when evaluating a project?

These three outcomes should be kept distinct because a project achieving energy savings may deliver financial benefits without proportional emissions reductions, or vice versa. Energy savings are measured in reduced kWh consumption, cost savings are the financial benefit from lower bills, and emissions reductions are the greenhouse gas impact reduction measured in CO₂-e—each requiring its own calculation with an appropriate boundary and factor basis. Our investment case guidance recommends stating energy reduction, tariff effect, maintenance benefits and certificate proceeds as separate benefit lines to avoid overlapping estimates.

What practical steps should an organisation take to ensure an efficiency project delivers actual emissions reductions?

An organisation should establish a clear measurement and verification boundary before implementation to distinguish energy savings from other operating changes. The baseline should reflect actual pre-project conditions and account for production volume, operating hours and weather. After commissioning, measured data should be compared against the baseline to verify that the efficiency improvement was achieved. Our measurement and verification services include project-boundary selection, baseline modelling and savings calculation, helping clients establish credible evidence that the intended energy and emissions outcomes were actually realised rather than assumed.

How does the rebound effect influence the business case for energy efficiency projects?

The rebound effect occurs when cost savings from improved efficiency encourage increased consumption, reducing the net energy and emissions benefit. For example, a more efficient heating system that lowers operating costs may lead occupants to increase indoor temperatures or extend operating hours. When building an investment case, we recommend presenting a base case that assumes consistent operating conditions, then separately modelling scenarios where consumption patterns change. This approach makes the rebound effect visible to decision-makers and helps distinguish the technical efficiency gain from the actual operational outcome.

What role does grid carbon intensity play in determining whether an electricity-saving project reduces emissions?

Grid carbon intensity—the amount of greenhouse gas emissions per unit of electricity generated—directly determines the emissions impact of any electricity-saving project. In regions powered predominantly by coal-fired generation, reducing electricity consumption delivers large emissions reductions. In regions with high renewable energy penetration, the same electricity saving has a much smaller emissions impact. Our carbon accounting guidance emphasises choosing the correct emissions factor for the relevant jurisdiction and grid characteristics when calculating project emissions outcomes, ensuring that claimed reductions reflect the actual energy source being displaced.

When should organisations consider measurement and verification before implementing an efficiency project?

Measurement and verification should be planned during the project assessment stage, before equipment is specified or baseline conditions are lost. Early planning ensures that meaningful pre-project data is collected, the baseline is clearly defined and the implementation record is complete. We recommend raising measurement questions while the project is still being scoped so that evidence gathering, responsibilities and verification boundaries can be agreed in advance. This approach preserves the ability to demonstrate credible savings and positions the project for certificate eligibility if applicable schemes are being pursued.

How can Northmore Gordon help distinguish between forecast efficiency gains and verified operational results?

We separate engineering estimates—modelled expectations before or during project design—from verified energy results achieved under an agreed measurement and verification approach. Our measurement and verification services establish project boundaries, baseline conditions, monitoring intervals and data quality requirements. After implementation, measured post-project consumption is compared against the baseline under consistent operating conditions to quantify actual savings. This structured approach ensures that investment decisions are based on forecasts clearly labelled as such, while operational performance is tracked through independent, credible measurement rather than assumed to match initial estimates.