Working Group Report Out

This Working Group convened more than 15 industrial organizations to learn how to assess, characterize, and present the value of industrial energy efficiency and emissions reduction projects. The group discussed cost analysis, techno-economic analysis, non-energy benefits, marginal abatement cost curves, and various pricing scenarios, building towards a holistic structured financial assessment framework to help manufacturers capture the full value of the projects they are considering.

Key Working Group Takeaways

Common financial analysis metrics such as simple payback period and return on investment (ROI) do not fully capture the costs and benefits of energy or emissions reduction projects. To more effectively assess these projects, organizations should utilize a robust, structured financial analysis framework. Such a framework should:

- **Account for the time value of money** using discount rates to assess the present value of future costs and benefits.
- Incorporate principles of both **techno-economic analysis** (TEA) and **life-cycle cost assessment** (LCCA):
  - Techno-economic analysis (TEA) assesses the costs and benefits of new technology, including engineering design, process modeling, and economic evaluation. Using TEA helps ensure that any additional costs or benefits of adopting a new technology when compared with the current technology are captured in the analysis.
  - Life-cycle cost assessment (LCCA) focuses on costs throughout the full life cycle but may not always consider technical feasibility. It is widely used when a technology's performance is proven and allows for the inclusion of costs or financial benefits that may occur at any point within the project's life.
- **Evaluate and quantify non-energy benefits**. Common examples include increased production rate, reduced defect rate, and improved plant safety.
- If relevant, **incorporate an internal carbon price** to internalize the pressure many organizations face to lower emissions in order to remain competitive in global markets.

Discussion Topics

Throughout five working group meetings, Better Climate Challenge partners provided significant input on past experiences, challenges, and organizational goals, including:

Decision Making Metrics:

Participants currently use various metrics to advise organizational decisions on energy and emissions projects, with most participants leveraging basic financial metrics such as simple payback period or return on investment as their primary measure for which projects are selected to move forward. Some participants use non-financial, sometimes subjective, evaluations to consider other organizational priorities such as safety in their assessment of projects – but few actively quantify these benefits.

Internal Cost of Carbon:

To stay competitive in global markets (consider, for example, the European Carbon Border Adjustment Mechanism), many manufacturers face significant pressure to reduce emissions. However, this pressure is rarely captured in project-level analysis, leading to underinvestment in the projects necessary to achieve those goals. One solution several participants use is an internal carbon price that can be applied to individual projects, though companies use a wide range of values ($7 - $80 per metric ton of CO2e), and incorporate it at different points in the decision-making process. Other organizations pin their internal carbon price to benchmarks such as the cost of reducing emissions some other way (e.g., by the purchase of renewable energy credits or carbon allowance values from regulated markets like the European Union and California).

Project Development Challenges:

Partner challenges to getting approval for projects included meeting stringent ROI criteria, competition for funding, and technology and infrastructure constraints. Projects often compete with other corporate initiatives such as new product development or satisfying regulatory requirements. Participants expressed a need for tools that will help them capture the value of necessary energy projects in order to make the case for allocating scarce capital to fund them – as well as decision making processes that are not tied to overly simplified or stringent financial metrics.

Financing Resources:

A range of financing mechanisms, including Energy Saving Performance Contracts (ESPCs), Efficiency-as-a-Service (EaaS), and Power Purchase Agreements (PPAs), were discussed as avenues to support energy and emissions projects. These can augment using corporate capital to fund projects, particularly if capital becomes constrained. Additional resources are available on the Better Buildings Solution Center, including the Better Buildings Financing Navigator and the Funding and Incentives Resource Hub.

Impacts of Non-Energy Benefits (NEBs):

Energy and emissions projects can impact plant operations in areas beyond energy use, which are often relevant to organizational key performance indicators (KPIs) and long-term action plans. These non-energy benefits (NEBs) can include safety, product quality, productivity, reduced raw material use, and operating and maintenance expenses. By quantifying NEBs relevant to a given project, organizations can significantly improve the financial viability of that project. Participants indicated that while these are sometimes considered, they are rarely quantified, even though they can significantly improve business performance. Quantifying their value can greatly improve the financial feasibility of energy and emissions reduction projects.

Structured Financial Analysis Framework

Over the course of the Working Group, participants built towards a shared understanding of what a framework for structured financial analysis should look like for industrial energy and emissions projects. Generally speaking, such an approach includes four main steps:

Step 1: Determine Structural Parameters

- Define parameters to organize financial decision-making and the minimum project performance (e.g., if net present value (NPV) is used as the base metric, determine a minimum NPV required for projects to proceed). Other metrics may be relevant and should be determined at this stage, such as marginal cost of abatement.
- Establish values for key calculation parameters and project impacts (e.g., emissions factors for energy use, equipment lifetime, or internal carbon price).

Step 2: Identify Options and Estimate Impacts

- Identify potential system alternatives (e.g., energy efficiency, electrification, fuel-switching) and evaluate their technical feasibility.
- Compare the baseline system and alternatives for expected capital/operating costs, along with estimated energy and/or emissions impacts.

Step 3: Quantify Additional Impacts

- Identify additional project costs and benefits (e.g., non-energy benefits like productivity or quality improvements from alternative technologies).
- Quantify these costs/benefits as financial flows where possible.

Step 4: Determine Total Lifecycle Cost and Develop Recommendations

- Apply an appropriate discount rate to each alternative being considered.
- Sum all costs and benefits for each alternative from year zero through the project's expected lifetime
- Identify the alternative with the highest present value after incorporating all costs and benefits.

Follow Up Activities

As an outcome of this Working Group, two primers will be published, one which delineates the fundamentals of structured financial analysis (in greater detail than the section above), and one that expands on the concept of evaluating non-energy benefits. Accompanying these primers will be a calculator tool built to help partners perform the kind of structured financial analysis discussed in the Working Group.