TECHNICAL facts

U.S. Department of Energy
National Energy Technology Laboratory

Global Climate Change

11/2001

Additionality Classification Errors

Errors in classifying projects according to their additionality status are of fundamentally greater concern than other types of greenhouse gas emission reduction estimation errors. This is one of the main conclusions drawn in the recent National Energy Technology Laboratory (NETL) report *Developing Emission Baselines for Market Based Mechanisms: A Case Study Approach*. Based on this conclusion, rigorous screening for additionality is recommended as the best means of guarding against large systematic biases in emission reduction estimates. Why? Here we summarize three main reasons that are further developed in the report.

The Basic Dilemma

A fundamental dilemma presents itself when assessing potential tests for additionality. This dilemma is illustrated in Figures 1 and 2. Here, we imagine the potential universe of emission reduction projects, distributed according to the relative ease or difficulty of demonstrating additionality. In Figure 1, a rigorous test for additionality is applied; only those projects to the left of the dashed line will qualify to receive emission reduction credits under this test. As shown, many additional projects will be misclassified as nonadditional. In Figure 2, the test for additionality is relaxed. As a result, most additional projects now qualify for credits, but a large number of nonadditional projects will be misclassified as additional.

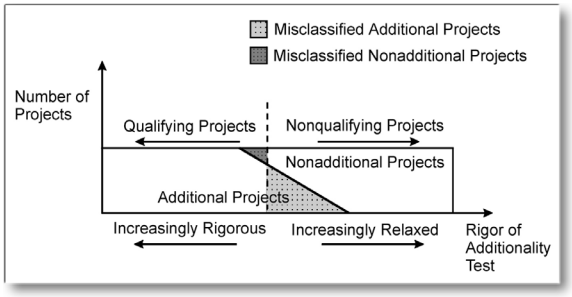

Figure 1. Projects Qualifying as Additional Under a Rigorous Additionality Test

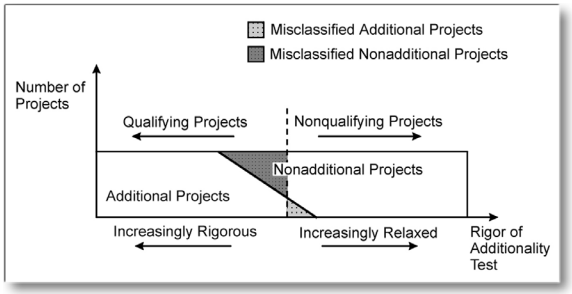

Figure 2. Projects Qualifying as Additional Under a Relaxed Additionality Test

Faced with this dilemma, it might be thought that the best additionality test is one that is not too rigorous and not too relaxed. Such an approach, illustrated in Figure 3, will lead to a random distribution of classification errors, in which the number of nonadditional projects misclassified as additional will approximately equal the number of additional projects misclassified as nonadditional.

CONTACT POINTS

James Ekmann
U.S. Department of Energy
National Energy Technology Laboratory
626 Cochrans Mill Road
Pittsburgh, PA 15236-0940
(412) 386-5716
james.ekmann@netl.doe.gov

CUSTOMER SERVICE

(800) 553-7681

CLIMATE CHANGE POLICY SUPPORT WEBSITE

www.netl.doe.gov/products/ccps/index.html

NETL WEBSITE

www.netl.doe.gov

Additionality Classification Errors

Reason No. 1

This approach might be regarded as the ideal, because the classification errors will cancel each other out. But a closer analysis will reveal that the errors will not cancel. In fact, random errors in the classification of projects according to their additionality status will lead directly to systematic errors in emission reduction estimates.

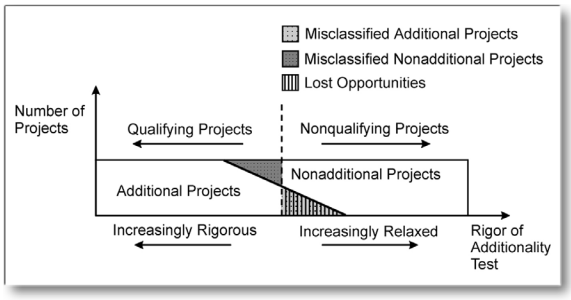

Figure 3. Classification Errors and Lost Opportunities Under a "Mid Range" Additionality Test

Why? If a nonadditional project is approved as additional, it will be undertaken, and it will be awarded credits. However, if an additional project is misclassified as nonadditional, it will not be undertaken, because by definition an additional project will not be implemented absent the awarding of credits. The resulting "lost opportunities" (Figure 3) will drive up the costs of meeting emission reduction goals, but the estimation of total emission reductions will remain unaffected. However, when a nonadditional project is misclassified as additional, emission reductions are overestimated, and global reduction efforts may consequently fall short of potential targets. This asymmetry, arising from the very definition of additionality, ensures that even randomly distributed classification errors will lead to biased emission reduction estimates.

Reason No. 2

But this is not the only source of biases. Given a relatively "loose" additionality test, that misclassifies significant numbers of nonadditional projects as additional, project developers will preferentially invest in these nonadditional projects at the expense of additional projects. By definition, additional projects require the financial and other aid provided by project developers in order to be viable. Nonadditional projects, by definition, do not require this aid in order to be viable.

In short, nonadditional projects will tend to be more economically attractive than additional projects, and the former will be preferred over the latter. These investor biases will lead to further lost opportunities (Figure 4), and further systematic errors in the estimation of emission reductions.

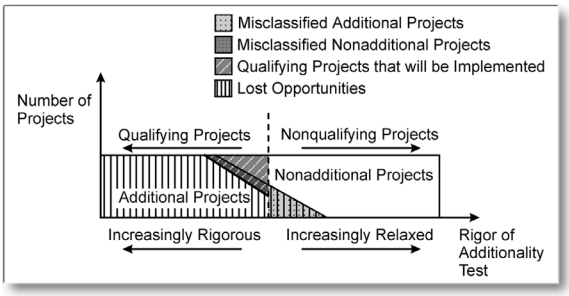

Figure 4. Investor Preferences for Qualifying Nonadditional Projects

Reason No. 3

Finally, for all projects that are ultimately implemented, additionality classification errors always lead to emission reduction estimation errors equal to 100 percent of the estimated project reductions.

To summarize, additionality classification errors lead to estimation errors that are highly systematic and very large in magnitude. Thus it is particularly important to minimize these errors, through the application of rigorous additionality tests (as illustrated in Figure 5).

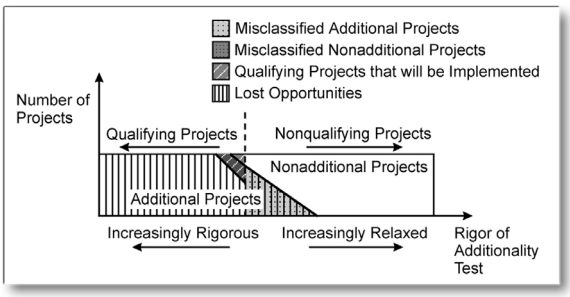

Figure 5. Use of Rigorous Additionality Test to Minimize Emission Reduction Errors

Cost Considerations

The costs of rigorous testing, measured in terms of "lost opportunities," should not differ greatly from the costs of "looser" testing. This can be seen by comparing the lost opportunities shown in Figure 4 with those shown in Figure 5. These figures illustrate that, regardless of the rigor of the additionality test, the "borderline" additional projects falling in the middle third of the diagram are to a large extent lost opportunities. Given rigorous additionality rules, these projects will fail to qualify for crediting; given more relaxed rules, they will be foregone by project developers in favor of nonadditional projects. It is true that transaction costs will be lower under less rigorous testing regimes, but these low costs will primarily benefit project developers seeking to qualify nonadditional projects.

Conclusion

Rigorous additionality testing should prove both cost effective, and the best means of guarding against large systematic biases in project reduction estimates. The modified technology matrix, described in the above referenced NETL report, is one emission baseline development approach that provides a rigorous, cost effective additionality test.