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## THE MODIFIED TECHNOLOGY MATRIX

The development of greenhouse gas emission baselines that are accurate and incur low transaction costs is crucial to the success of market-based mechanism emission reduction projects. The National Energy Technology Laboratory (NETL) has developed a modified version of the technology matrix approach, which is described in the recent NETL report *Developing Emission Baselines for Market-Based Mechanisms: A Case Study Approach*. It represents a cost-effective approach to emission baseline estimation that minimizes additionality classification errors, thereby enhancing the credibility of emission reduction credits. It also recommends a flexible protocol, allowing application of the project-specific approach to projects utilizing conventional technologies, and the modified technology matrix to projects utilizing advanced technologies.

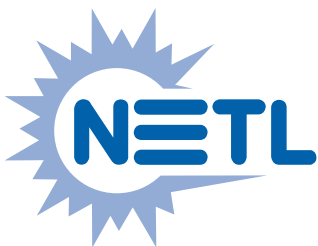
**The modified technology matrix is developed by subjecting a list of technologies to a rigorous additionality test, and then developing a stipulated emission benchmark for each of the qualifying technologies.**

### The Early Version of the Technology Matrix

The concept of the technology matrix was originally created as an extension of the benchmarking approach whereby creditable emission reductions of a project are determined based on a comparison with a selected group of technologies. Following this approach, the average emissions performance of a number of pre-defined default technologies, which have already reached a predetermined market threshold, would be selected to represent a technology benchmark. Projects utilizing technologies that reduce emissions below the benchmark would be considered additional and would automatically receive credit for the amount of emissions reduced.

In sum, the technology matrix is based on a benchmark derived from current and widely implemented technologies. Any projects that improve upon this benchmark are considered additional.

In essence, the technology matrix is very similar to the benchmark approach. However, like the latter, the technology matrix is not a panacea. First, it raises the question of which technologies should be included in the benchmark. Moreover, significant questions surround the treatment of additionality under the technology matrix (and benchmarking). Under both approaches, the project's emission rate is compared with a preselected benchmark. If the project's emission rate is higher than the benchmark, the project is deemed non-additional; if it is lower, the project qualifies as additional. This simple numeric comparison does not directly address the key question determining additionality: Is the project viable absent market mechanism incentives? Because this question is addressed only indirectly, it is anticipated that the technology matrix and the benchmark approach will



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result in the mis-classification of a large number of non-additional projects as additional (and vice versa). Furthermore, it is anticipated that project developers seeking emission reduction credits will preferentially invest in the mis-classified, non-additional projects at the expense of additional projects. By definition, the latter projects will tend to be less viable than the former projects.

## The Modified Technology Matrix

NETL has adopted a modified technology matrix approach to eliminate some of the problems associated with the early version of the technology matrix. This modification will provide a more effective additionality screen and will also eliminate the problem of which technologies to include in the benchmark.

The modified technology matrix, proposed by NETL and illustrated in Table 1, consists of a selected list of greenhouse gas abating project technologies. Whereas the technologies listed in the original version of the technology matrix in effect represent the project counterfactuals, the technologies listed in the modified technology matrix correspond to those utilized by the project itself. For a technology to be included on the list, it must first be subjected to a rigorous additionality test. This test should be based on factors such as the commercial viability and market penetration of the candidate technology. The test will be designed to ensure that only advanced, non-commercial technologies qualify for inclusion in the matrix.

Once a technology has been qualified for inclusion in the matrix, a stipulated benchmark will be developed for that specific technology based on the emissions performance of a selected group of counterfactual technologies. To qualify their projects for credits, project developers would simply demonstrate that the proposed project technology is included in the matrix. The stipulated benchmark from the matrix would be used to calculate the project's emission reductions.

The modified technology matrix does have one significant drawback. Because it focuses exclusively on advanced technologies still under development, it will automatically disqualify all projects utilizing conventional commercial technologies. For this reason it is suggested that the project-specific approach, in which baselines are developed on a project-by-project basis, be used in conjunction with the modified technology matrix. Specifically, the project-by-project approach should be used to assess the additionality of projects utilizing conventional technologies.

## Conclusions

The modified technology matrix represents a cost-effective approach to emission baseline development that incorporates the best aspects of the benchmarking approach (low transaction costs, transparency, objectivity) while providing an effective additionality screen. More information on the approach taken to modify the technology matrix is provided in the NETL report *Developing Emission Baselines for Market-Based Mechanisms: A Case Study Approach*.

**Table 1. Example of a Portion of the Technology Matrix**

Qualifying Technologies	Countries				
	India	China	Argentina	Indonesia	Brazil
Coal-Fired IGCC	B	B	B	B	B
Pressurized Fluidized Bed Combustion	B	B	B	B	B
Phosphoric Acid Fuel Cells	B	B	B	■	■
Photovoltaics	B	B	B	B	B

Notes:

- 1) B = Benchmark value for estimating project baseline emissions.
- 2) Shaded areas represent technology/country combinations that do not qualify as additional.