4.0 THE carbon asset

The main quality concern in the PCF project cycle is environmental additionality and the credibility of a project's future emission reductions. Ensuring the quality of the carbon asset requires at least:

- an excellent understanding of the concepts of additionality and baseline;
- the use of practical methodologies to determine baselines for concrete projects;
- the creation of workable tools to monitor relevant data and calculate ERs; and
- accepted procedures for project validation and verification of ERs.

The PCF's methodological work and experience to date has resulted in a much better understanding of environmental additionality. The often-heard statement that "baselines are complex" is no longer an abstract notion, as numerous issues have had to be addressed in virtually every PCF project. Actually designing and validating projects has helped to clarify these issues. We now understand that:

- There is not one single baseline methodology that works for all projects and all possible situations during a project's lifetime.
- Many projects require the use of several methodological elements to establish a credible baseline, which is reflected in the MVP.
- The baseline study and MVP must be closely linked to ensure project validation and verifiability of ERs.
- The MVP must not only contain the requirements for a monitoring system, but is also a model of the project's performance and can be used to simulate and forecast emission reductions.

BASELINES AND ADDITIONALITY

In keeping with the Kyoto Protocol, the PCF defines additionality as the positive difference between the emissions that would have occurred without the JI or CDM project activity (baseline emissions) and the actual emissions of the project over its lifetime. A project

that credibly promises to generate ERs is therefore additional and, provided it meets all other requirements, can be registered as a CDM or JI project.

Baselines are the lynchpin of JI and the CDM. They are required to demonstrate project eligibility and calculate certifiable ERs.

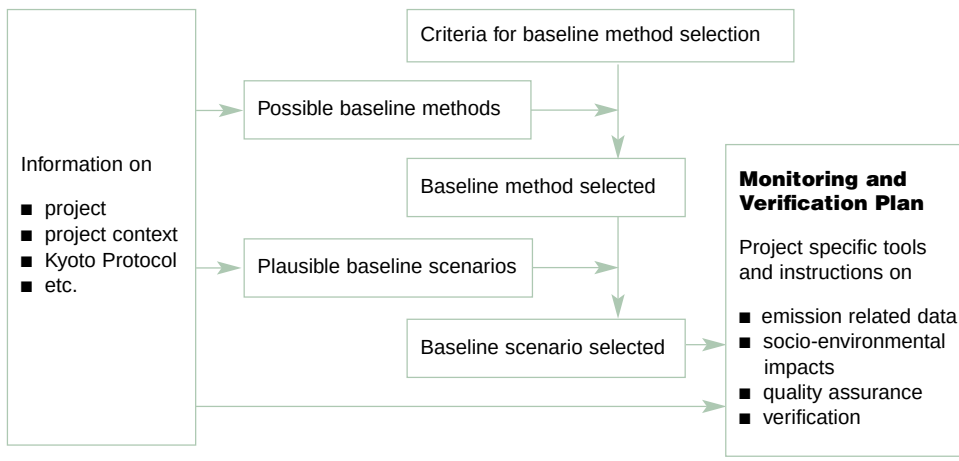
While project emissions can normally be measured, baseline emissions are a theoretical construct. Baseline emissions are associated with a hypothetical scenario that is superseded by the JI or CDM project. Consequently, much of the PCF's work deals with the proper identification of the baseline scenario as it would evolve over time. Using its project pipeline, the PCF develops and tests approaches that help establish practical methodologies for baselines. Such methodological approaches are indispensable because they are the only means for an independent third party to validate the project baseline.

The PCF's estimate of the baseline for a particular project is developed after extensive discussions among PCF staff, project proponents, and outside experts. The PCF then commissions a formal baseline study, which is defined as "a systematic and methodological analysis to determine the most likely development scenario and its evolution in time in the absence of the Kyoto Protocol and its mechanisms."

The PCF has learned to quickly identify realistic baseline claims and to put them to the test of a formal baseline study. Even more importantly, the PCF has learned how the baseline study and the project's monitoring and verification plan must work hand in hand, because details that the baseline study may not be able to resolve may resurface and can often be resolved in the MVP.

Figure 4.1 depicts the process the PCF typically applies in baseline studies. The process involves the selection of an appropriate baseline methodology and its application to a number of plausible development scenarios, one of which is identified by the methodology as

Figure 4.1. PCF Baseline Study



the most appropriate and most likely baseline for this project. The graph also shows that the MVP builds on the baseline study by providing a tool to monitor relevant data and calculate baseline emissions.

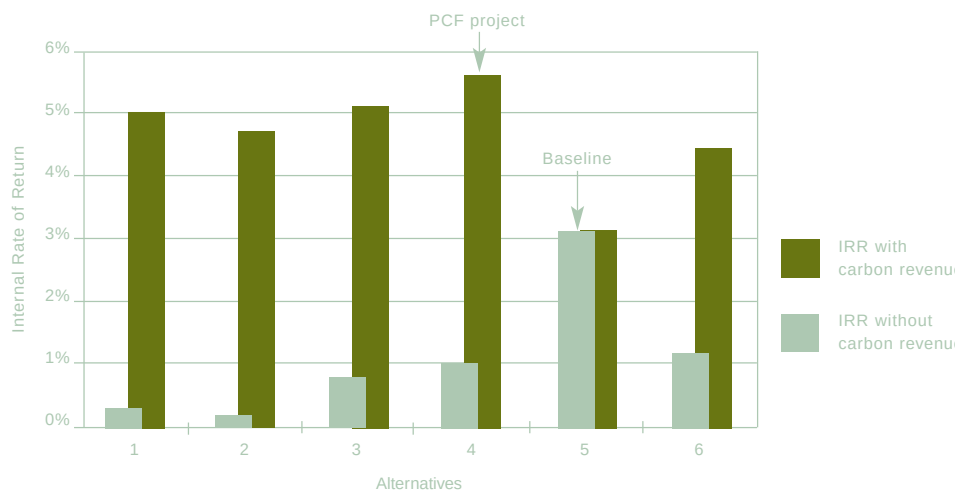
BASELINE METHODOLOGIES FOR PCF PROJECTS

The PCF experiments with a number of baseline methodologies. The methodology applied to a particular project depends on a number of factors, including the type and size of project, data availability, uniqueness, replicability, and costs. To date, the focus has been on project-by-project methodologies such as investment analysis. Project-by-project approaches look at the particular project circumstances as opposed to baseline standards such as benchmarks. Baseline standards are costly to establish, require a high degree of experience with baselines, and require a political agreement among UNFCCC Parties.

The PCF considers a financial or economic investment analysis to be adequate for projects where sufficient information on all plausible project alternatives is available. In fact, such an analysis is often undertaken by World Bank task teams, which must advise Bank client countries on the most beneficial project alternative. This, for instance, was the case for the Latvia Liepaja Solid Waste Management Project, where data was available on the IRRs of a number of plausible waste management solutions and their variants.

Figure 4.2 shows a comparison of IRRs for a number of plausible project alternatives. The applicable baseline is the alternative with the highest IRR without consideration of carbon finance. This alternative does not produce ERs, so IRRs with and without carbon are identical. Hence, the conclusion is that this project alternative is not additional, whereas all other alternatives would be.

Figure 4.2. Liepaja: Economic Analysis of Plausible Baseline Scenarios



The baseline is the alternative with the highest IRR without carbon revenue.

The PCF has used a similar, but more formalized analysis for a wind farm project in Morocco, where the least cost power generation plan (as determined by a power system expansion and dispatch model) was used to determine the baseline scenario. During implementation, actual dispatch data is used to determine what the emissions would have been in the baseline case as well as the ERs in the project case. PCF experience suggests that such models will often play a role in baseline determination for large-scale power projects.

In a third case, the West Nile Hydropower Project in Uganda, extreme risks for long-term investments prevented the use of a straightforward investment analysis. Instead, a risk-based scenario analysis was chosen that looked at various risks, costs, and market conditions for plausible alternatives and, given those factors, selected the least risky alternative as the baseline.

Finally, in Costa Rica, the PCF baseline methodology used the marginal cost of producing power for the national grid as a benchmark to determine additionality. The CO_2 intensity of marginal power in the national grid is used sector-wide as baseline emissions to determine the ERs generated by many small renewable power stations. Once established, the methodology is easy to use and replicable even by non-PCF projects.

SOME LESSONS ON BASELINES AND ADDITIONALITY

A broad variety of issues came up in the relatively small number of projects the PCF has prepared thus far. These issues include for instance:

Baseline shifts. Baseline scenarios and their evolution over time can be significantly affected by unrelated economic developments and political decisions, such as Latvia's preparations to become a member of the European Union. The baseline study must anticipate such developments, and the monitoring plan must make provisions for the necessary adjustments when the anticipated event occurs. The treatment of events that may occur in some distant future and their impact on the baseline is likely to remain a much-debated issue that the PCF intends to study further.

Integrated grid power systems. Integrated grid power systems are a particularly complex case for a number of reasons:

- First, decisions on power system expansion as a whole are very different from decisions on the replacement of specific carbon intensive generation sources. This has been studied in the projects in Morocco and Costa Rica, where Costa Rica presents the additional challenge that the envisaged independent power projects are too small to be part of the system expansion plan.
- Second, international power pools complicate the matter, because at least some of the ERs may physically occur in another country, such as is likely to happen in the planned Central American Grid. This situation can result in monitoring and data problems and may require political agreement between participating countries with respect to the ERs generated.

High transaction costs. Projects in developing countries, particularly small-scale projects, may not yield sufficient ERs to justify the relatively high costs of project preparation. Complicated institutional and political circumstances in the host country and insufficient data may contribute to this problem. For developing countries to benefit from the CDM, simplified procedures are of utmost importance (as has now been agreed among UNFCCC Parties). In the coming 12 months, the PCF will work to simplify procedures for small projects and on standardization of baselines.

Development assistance. The Parties to the UNFCCC have been considering whether projects that are partly financed with official development assistance (ODA) should be eligible for the CDM. This question also raises significant methodological problems. In essence, it is virtually impossible to provide conclusive proof that ODA financing would make the project happen, as this depends on intangible political decisions. If such proof were required to determine the baseline, it would exclude many useful projects from the CDM. The PCF has faced this situation in Uganda and has argued that baseline determination should be based on commercial viability, and should not consider ODA, which should be treated as financing of last resort to fill gaps after the project has used ERs to generate income. This approach is consistent with the notion of the CDM as a private-sector-driven and market-based instrument.

Policy framework. Other issues the PCF will invariably have to deal with in the next 12 months are related to the impact of policy decisions—for example, regarding energy subsidies—and perverse incentives on the acceptability of a proposed baseline. These issues are subtle, potentially highly controversial, and very difficult to deal with in a methodological way. Examples of such issues are described in Table 4.1, next page. In each case, a reason could be presented why the political plan is not decisive for the baseline. The ongoing World Bank dialogue with the host country will be particularly helpful in providing clues on how to best address these issues.

MONITORING AND CALCULATION OF ERS

The PCF prepares an MVP for each project, which serves as a project-specific performance standard that is validated and used to guide the monitoring and verification process *(See Figure 2.1)*. The MVP is also a performance monitoring and measurement tool. It contains the monitorable indicators for the project and provides instructions to the project entity on how to monitor and measure these indicators. The MVP also contains the technical parameters and equations as well as a spreadsheet model that the project entity must use to record data and calculate ERs.

MVPs often address problems that cannot be resolved in the baseline study, such as defining observable indicators for a shift in the baseline scenario. Such a shift is expected for Latvia, which will have to observe EU solid waste management standards after the country joins the EU and after expiry of any possible transition period. In fact, the MVP often employs elements of control groups to provide real-time details to further specify the baseline scenario and calculate baseline emissions.

Table 4.1. PCF Projects, Baseline Methodologies and Issues

Project	Baseline methodology	Important issue	Solution
Latvia Landfill gas (LFG) collection and renewable power generation	*Investment analysis:* baseline is project alternative with the highest IRR	When will EU waste management standards become applicable in Latvia?	MVP indicator identifies deadline for EU compliance and shift in baseline.
Uganda Hydropower displaces diesel-based power generation	*Risk-based scenario analysis:* baseline is least risky supply alternative considering costs and market structure	Could project happen with ODA alone, and is this relevant?	Not consistent with development objective: baseline based on commercial scenarios. ODA fills remaining financing gap.
Morocco Wind energy displaces thermal capacity extension	*Investment analysis:* baseline is least-economic-cost marginal generation based on expansion and dispatch model	Would Morocco go ahead with project anyway to increase supply security?	Baseline work confirms that Morocco would only proceed with concessional financing.
Costa Rica Small-scale renewable generation displaces thermal and hydro generation	*Economic analysis of power sector:* sectoral "standard" defined as baseline for small-scale projects	How can a large number of small-scale projects be brought into the CDM?	Umbrella project with multi-project baseline and procedures: sectoral cost benchmark determines additionality. Sectoral carbon intensity determines baseline emissions. Simple MVP.

Furthermore, the MVP contains a section on the project's social and environmental performance. The host country can use the information to assess whether the project meets the CDM objective of assisting the host country in achieving sustainable development. In addition, a PCF project's social and environmental performance is an important aspect of the quality of the project's ERs as a green commodity.

The MVP requires the establishment of a monitoring management and operational system to ensure that the project entity will be able to monitor and provide the necessary data to the verifier. The management system includes, for instance, provisions for training and proper management oversight. The MVP also contains the instructions and procedures that should be followed during the verification process.

The PCF considers the MVP as a key project document. The MVP allocates clear responsibilities of all those parties involved in the monitoring process. It provides a clear framework, and thus some degree of certainty, for the project entity and PCF regarding the ERs to expect. It is used to project the stream of ERs and later calculate them. Finally, whether the amount of ERs purchased can actually be delivered is also a matter of the quality and reliability of the baseline and the MVP. Therefore, the project sponsor is required under the ERPA to abide by the MVP.

In addition to helping to combat climate change, many CDM and JI projects will have significant local and regional environmental benefits. PCF monitoring plans can include indicators for environmental and social benefits.

The MVP the PCF developed for the Latvia Liepaja Solid Waste Management Project has by now become a model for many CDM and JI projects. Indeed, preliminary experience indicates that a project MVP can be a fairly standard document that is easy to replicate and adjust to new projects.

VALIDATION, VERIFICATION, AND CERTIFICATION

The PCF requires the validation of the project design by an independent third party, or "validator." The validator is expected to acquire the status of a UNFCCC-accredited entity as soon as this becomes possible. Validation, if successful, results in the confirmation that the project meets all relevant CDM or JI criteria and requirements and is thus eligible for registration as a CDM or JI project. The validation process is based on the project design document, baseline study, MVP, and ER projections. The validator conducts a rigorous check of all claims made in those documents, while taking comments from stakeholders into consideration, before he issues a public validation report and opinion.

The PCF has completed the validation process for projects in Latvia and Uganda. In both cases, validators have demonstrated their ability to quickly identify the issues on which the credibility of the project hinges, and have required improvements both to the project's design and documentation. They have thus contributed considerably to the quality of the project and to the quality assurance process, giving comfort to the PCF, its participants, the host country and UNFCCC Parties that the project is likely to generate real and verifiable ERs. Based on this validation experience, the PCF has developed a Preliminary Validation Manual (PVM), which is updated and which validators are invited to use.

Independent third-party verification occurs throughout the lifetime of PCF projects and ensures the quality of the ERs achieved by the project. A reputable and experienced environmental auditing firm (verifier), which must be an UNFCCC-accredited entity (when this becomes possible), performs verification in accordance with the validated MVP and best practice industry standards. Before the PCF accepts ERs from a project, an independent third party must verify that the project is, indeed, ready to monitor performance and achieve ERs in accordance with its MVP ("initial verification"). Thereafter, verification is repeated periodically to audit monitoring records and to confirm the calculation of ERs and the project's continued compliance with the MVP and other relevant requirements. The verification process results in a public verification report and, if successful, in a certificate that confirms the number of ERs that have been generated and verified.

TIME SCHEDULE AND COSTS

The time required and the costs incurred to operate the PCF project preparation and quality assurance system are closely monitored by the PCF. PCF is trying to bring these costs down as the experience grows and projects can become more routine.

The time required for work on baseline and MVP has varied greatly, reflecting the variety of project types, sizes, circumstances, and countries, and the complexities of establishing a baseline. New and unexpected issues emerge in virtually every transaction that the PCF develops. Although the format and contents of the baseline study and MVP are now better understood, there is still insufficient experience to identify a full spectrum of issues and to provide uniform and comprehensive guidelines to address them. As a result, preparation times for a formal baseline study and MVP continue to exceed the ideal 2 month target *(See Figure 2.1)*. However, one is expected to approach this target as experience expands and standardized approaches evolve.

The PCF experience so far indicates that the cost for a baseline study and MVP combined is in the order of $55,000. These costs include not only the formal baseline study and drafting of the MVP, but also preparatory work and staff time spent on baseline and related issues prior to drafting the Project Concept Note.

The validation process is already more standardized and can normally be completed within one month unless major issues are discovered in the process. Validation services typically cost in the order of $25,000.

No experience exists yet with the project performance monitoring and verification process. The PCF expects that it may need to assist project entities with the monitoring system and with preparations for initial verification. Monitoring costs are generally absorbed by the project entity. The PCF tries to keep those costs as low as possible by aligning the MVP with the performance monitoring and quality assurance system, which can be operated routinely by a well-managed project. The PCF also expects that verification activities will have to be more intense and more frequent in the early years of a project's life. PCF estimates that verification and supervision would require a minimum of $10,000 per year.

LOOKING AHEAD

With the anticipated work program for fiscal year 2002, the PCF will gain significantly more experience with baselines for various types of projects, in particular with small-scale demand side and energy conservation projects. Coupled with ongoing research, this experience will contribute to a better understanding of control groups as a baseline methodology, the eventual development of standardized baselines, and simplified procedures for small projects.

With the increase in PCF projects, significant progress in the development of a standard MVP template for PCF projects is also anticipated.

PCF experience can significantly help resolve difficult issues concerning baselines as the JI and CDM modalities and methodologies continue to evolve. PCF is well positioned to contribute to this process.