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PERFORMANCE EVALUATION FINAL REPORT: CLIMATE TECHNOLOGY INITIATIVE PRIVATE FINANCING ADVISORY NETWORK

March 12, 2015

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ACRONYMS

ADB	Asian Development Bank
AFD	French Development Agency
BEEF	Bulgaria Energy Efficiency Fund
CE	Clean energy
CO ₂ e	Carbon dioxide equivalent
COI	Conflict of interest
CTI	Climate Technology Initiative
DFID	United Kingdom Department for International Development
dTS	Development and Training Services, Inc.
E3	Bureau for Economic Growth, Education and Environment
EBPD	Everyone but project developers
EE	Energy efficiency
ECP I	Energy Conservation Project I
EGTT	Expert Group on Technology Transfer
FI	Financial institution
GCC	Global climate change
GCC M&E	Global Climate Change Monitoring and Evaluation Project
GEEP	Georgia Energy Efficiency Program
GHG	Greenhouse gas
GIZ	German Agency for International Cooperation
GWh	Gigawatt hours
ICETT	International Center for Environmental Technology Transfer
IFC	International Finance Corporation
IFI	International financial institution
IP	Implementing partner
IRB	Institutional review board
KII	Key informant interviews
LED	Light emitting diode
M&E	Monitoring and evaluation
MT	Megaton
MW	Megawatt
OP	Operational partner
OSO	Operational stakeholder organization
PFAN	Private Financing Advisory Network
PV	Solar photovoltaic
RE	Renewable energy
SDC	Swiss Agency for Development and Cooperation
SEF	Sustainable Energy Facility
SOW	Statement of Work
UNFCCC	United Nations Framework Convention on Climate Change
USG	United States Government

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EXECUTIVE SUMMARY

Introduction

The purpose of the evaluation of the Private Financing Advisory Network (PFAN) activity is to assess the performance, effectiveness, and sustainability of PFAN and its participants. This evaluation, part of the portfolio of evaluations conducted for the United States Agency for International Development's Bureau for Economic Growth, Education, and Environment (USAID/E3) under the Global Climate Change Monitoring and Evaluation Project (GCC M&E), is designed to provide information for future programmatic and policy-related decision-making, offer contextual learning for USAID and other involved partners and stakeholders, and demonstrate accountability for resources. Recommendations on specific program elements in the evaluation may also be used to change or update the program's design or implementation.

Project Background

The PFAN activity is a program designed to assist clean energy (CE) project developers in accessing finance by providing technical assistance and capacity building and introducing them to investors. PFAN is designed to bridge the gap between financiers and project developers, and it provides mentoring to project developers to help them create more robust business plans and communicate effectively with potential sources of financing. PFAN exists for two reasons. The first reason is that market failure creates a number of barriers to increased CE penetration, and PFAN exists to address a combination of those barriers, primarily in the business prong. Second, based on the results of this survey, it is apparent that PFAN services also indirectly addresses some of the financial barriers

PFAN was initiated by the Climate Technology Initiative (CTI)¹ in cooperation with the United Nations Framework Convention on Climate Change (UNFCCC) Expert Group on Technology Transfer (EGTT), and is supported by a number of private sector companies involved in financing CE industries, including renewable energy (RE) and energy efficiency (EE). USAID is a partner of the PFAN alliance and provides support to the program through a cooperative agreement. The agreement is currently supported by a \$5 million budget and lasts from October 2007 to September 2015. PFAN has established regional networks in Latin America, Africa, Asia, and Eastern Europe, as well as dedicated country-specific networks. Documents reviewed indicate that the intention is for PFAN to consider becoming a self-supporting entity.

Evaluation Questions

Evaluation questions are grouped according to issues of performance, effectiveness, sustainability, and replication.

Performance

1. What has been the cost-effectiveness of PFAN in relation to:
 - a. Clean energy technology financing;
 - b. Establishment and maintenance of lender/developer relationships;
 - c. Leveraging private sector resources, such as in-kind services and mentoring; and
 - d. Clean energy technology deployment?

¹ CTI's promotional materials generally reference CTI-PFAN. In this report, CTI is used in reference to the implementer, and PFAN is used in reference to the program.

2. What are the strengths and weaknesses of the PFAN organizational and partnership model?

Effectiveness

3. Why have certain PFAN projects been more or less successful in the speed of achieving financial closure?
4. In what ways and to what extent do project developers credit PFAN for their successfully securing financing?
5. Are there barriers not being addressed or not being addressed effectively by PFAN? i.e., what additional assistance can PFAN offer under its mandate?

Sustainability and Replication

6. What is the performance of PFAN participants post financial closure, including reaching and maintaining operational status, replicating or expanding business, and producing co-benefits for themselves or their community?
7. In what ways can PFAN change or update the program's design or implementation, either its current form or as the program transitions to a self-supporting entity?

Evaluation Methods and Limitations

The evaluation used a convergent parallel mixed methods design, which involved collecting qualitative and quantitative data concurrently and analyzing the two data sets separately. Data sources included administrative and institutional documents, existing performance information, an online survey instrument, and key informant interviews (KII). The online survey included project developers, mentors, operational stakeholders, resource partners, and financial institution representatives. Survey respondents volunteered to be interviewed. An additional request was made of project developers whose projects had reached financial closure, but the response rate for this key subgroup remained low. Some aspects of the analysis were limited by low response rates for closed projects and by the limited time to review additional key documents obtained at the end of the analysis period.

Findings, Conclusions, and Recommendations

PFAN is a unique program. There have been a few projects that target business and also provide finance. Other programs, like the International Finance Corporation's (IFC) Sustainable Energy Facility (SEF), target commercial banks and provide technical assistance and finance. PFAN is focused on providing services to the project developer community to facilitate and increase CE investment.

PFAN is expected to meet or exceed all performance targets and compares favorably with similar projects and programs designed to address barriers to CE investment². To date, 49 projects are estimated to have reached financial closure³, meaning they have been matched with and funded by a financial institution, raising a total of \$561.5 million. Another 255 projects, which would represent \$6.7 billion of investment, remain in the pipeline of projects to be supported. Current indicators in PFAN's collaborative agreement with USAID focus on total financing and total projects and thus more strongly support only one of PFAN's objective, that of getting more projects financed over its objective of broadening access. Compared to investments in similar projects and programs though, funding to PFAN from USAID and US Department of State has

² The data is a priori of actual closing and actual operations.

³ PFAN records 50 projects as closed but one of those can't be attributed to USAID since it closed prior to the USAID financing. These are estimated to have reached financial closure because PFAN does not actually report based on closing but on the intent to close.

leveraged more private sector investment, avoided more tons of CO₂ equivalent per dollar of USAID funding, and provided more megawatts (MWs) of CE of USAID funding.

Table 1: USAID PFAN Expected Outcomes

SUMMARY OF EXPECTED OUTCOMES	Target Low Range	Target High Range	Achieved to Date
# Total Projects inducted into Pipeline	54	92	304
# Total Projects reaching investor maturity	30	58	119
# Total Projects reaching Financial Close	11	27	49
% Project Developers reaching closure ⁴	20%	29%	16.10%
Total Financing Leveraged	\$72,500,000	\$325,000,000	561,539,200
Aggregate Leverage Effect (1 :XX)	41	186	112.31

Source: EEM-A-00-08-00005, Modification 6. Subsequent modifications did not change the targets

The one exception of currently meeting the target is the percent of project developers reaching financial closure. This is due to the fact that the evaluation is taking place while PFAN is still operating and the deadline for achieving these targets is not until September 2015. While PFAN met or exceeded most performance targets, there are insufficient data collected⁵ and survey responses to test whether PFAN contributed significantly to financial closure. In fact, the lack of funding for data collection, monitoring, and evaluation of PFAN prevents PFAN from testing its methods and refining its procedures. For example, no data is maintained systematically on the 85 to 90 percent of applicants not accepted into the PFAN pipeline. Important questions remain unanswered because of the lack of data, the answers for which may help PFAN and its funding partners be more effective and to use its scarce resources in a more targeted manner.

While PFAN represents a cost-efficient vehicle from a funder's perspective, lack of consistent data on projects in the pipeline mean that even cost effectiveness calculations could potentially under-represent actual performance. In the opposite direction, insufficient data exists to definitively conclude the degree to which projects have, have started operations and will remain in operation. Similarly, although there is an apparent basic relationship between the time required to reach financial closure and perceived project risk, insufficient pipeline data are available to draw any meaningful relationships that could inform donors or PFAN, and too few project developers who reached closure responded to the survey. Available data suggest PFAN may have a neutral to positive impact on end-use beneficiaries from a gender perspective, but the data are sufficiently limited that conclusions must be heavily caveated.

In terms of organizational and structural issues, stakeholders predominantly found the PFAN model moderately effective along several dimensions. Project developers who responded to the survey were moderately to completely satisfied with most elements of technical assistance and capacity building

⁴ This is the percentage of projects inducted into the pipeline that reach financial closure. Roughly 20 percent of the projects inducted so far have reached financial closure.

⁵ The collection of data on non-selected projects or on closed projects was not part of the funding of PFAN and this evaluation was meant to provide supporting evidence to the data which PFAN collects which are both before operation and before actual closing.

provided. Project developers and financial partners pointed to strengths in advisor services, such as coaching, and investor relations. Respondents identified as weaknesses the effects of donor prioritization on funding decision making and the robustness of effort to facilitate introductions to finance and investors and early-stage finance. In addition, PFAN advisory services might be expanded to include more thorough screening of potential developers prior to selection and assistance with the process of financial closing following the investor forum.

Overall, PFAN was viewed as being effective, but developers recognize that barriers still remain. PFAN deals primarily with the clean energy business barriers and, within that area, several unaddressed barriers remain. These include such areas of assistance as early stage finance, expanding access to financiers, and assistance in negotiations. PFAN is unique in that it addresses almost exclusively the business barriers, which is where it has its competitive advantage. PFAN does not directly address policy or finance barriers, and doing so would cause it to expend resources on areas where it is not specialized or experienced. In many of the countries where PFAN operates, it also would be duplicating work undertaken through other donor- or IFI-funded projects.

Survey respondents indicated that PFAN was successfully addressing some barriers but that both policy and financial barriers remain important limitations on increased CE investment. Although PFAN is not designed to address directly all these barriers, they affect implications for future programming. Although the basis for PFAN's approach is that there is no shortage of private sector money for the right projects, survey respondents indicate that financial barriers remain the main impediment to increased CE investment. The implications are that PFAN will have relatively greater impact (there will be more right projects) where these barriers have been or are being addressed by other projects. This does not cast doubt on PFAN's track record but has implications for USAID in choosing where and when to deploy PFAN. PFAN is expected generally to have relatively greater impact where policy and financial barriers have or are being addressed than where they are not.

Respondents have indicated areas where PFAN can add value beyond what it is currently providing, as discussed in the body of the report, although tradeoffs could be evident in broadening focus, especially if the plan is for PFAN to become more self-supporting. The results of this survey and other studies point to serious market imperfections in the policy, financial, and business prongs. Based on historical examples and the presence of other donor-funded programs that could serve as competition reducing demand from the better CE projects, moving to a fully self-supporting role likely will mean that PFAN will reach far fewer projects and much smaller, more marginal projects.

Several important recommendations of this evaluation are:

- USAID should consider funding expanded PFAN data collection and monitoring and evaluation. This would allow PFAN to develop an appropriate performance monitoring plan, collect data including during closure proper, conduct routine exit surveys, and evaluate key areas of difficulty – including procedures.
- Assuming both of PFAN's dual objectives of broadening access and increasing projects financed in the developing context remain relevant, USAID may wish to consider revising or adding indicators in the future that focus on broadening access.
- PFAN should consider first addressing the remaining barriers within the clean energy business area such as addressing negotiations and assistance for financial closure to reduce time to closure and improve reliability of data.

- While there is already a high level of coordination among PFAN operational partners, PFAN might consider expanding coordination efforts with their country-specific programs or projects that are addressing barriers in policy and finance, which could reduce costs for other FIs and PFAN, mitigate risks, and increase the number of FIs eligible for work with PFAN.
- PFAN should not attempt to directly address policy or financial barriers, since business barriers remain a formidable obstacle and there are many other donor programs addressing those other barriers.
- In order to better use PFAN as a vehicle to promote gender equality and inclusion, the easiest solution is for USAID to fund additional coaching services for woman developers. When considering promoting greater inclusion of female project developers, USAID should weigh the tradeoffs on commercial viability and the impact that is expected to have on CE investments. USAID may consider altering its collaborative agreement with PFAN with instructions on including gender, having gender-related targets (developed together with PFAN), and recommending how best to include USAID's gender considerations and targets. dTS has given several ways that this might be accomplished without accepting marginally viable projects and thus affecting PFAN's reputation. It is believed that PFAN is in a better position to recommend to USAID which of these is best suited for results.
- Consideration should be given by donors and stakeholders to PFAN moving to a partially self-supporting model as an alternative to moving to a fully self-supporting model to better maintain effectiveness and achieve intended outcomes. Doing so would require continued underwriting of PFAN's services in some areas and expanding the fee model for some services, while CTI determines appropriate pricing to avoid becoming uncompetitive.

1 EVALUATION PURPOSE AND EVALUATION QUESTIONS

1.1 EVALUATION PURPOSE

The evaluation of the PFAN activity aims to assess the performance, effectiveness, and sustainability of PFAN and its participants. This evaluation provides information for future programmatic and policy-related decision-making, offers contextual learning for USAID and other involved partners and stakeholders, and demonstrates accountability for resources. Recommendations on specific program elements in the evaluation may be used to change or update the program's design or implementation, either during ongoing program implementation or as the program transitions to a partially self-supporting or fully self-supporting entity.

The evaluation is intended to ascertain whether PFAN has been cost-effective and to determine if “successful” projects and project developers share characteristics that make them more likely to achieve financial closure and help CE projects become operational. These findings may assist CTI and USAID in more accurately targeting their assistance. The performance evaluation should elucidate whether developers perceive PFAN to be sufficiently addressing the barriers and challenges they face in gaining access to sources of CE finance and/or how PFAN can address these issues further.

The performance evaluation also creates an opportunity to gain greater insight into the longer-term impacts of the mentoring and financing support that PFAN provides. The PFAN activity collects information on project developers related to the anticipated financing, greenhouse gas (GHG) emission reduction benefits, location, and technology type of their projects. One of the purposes of the evaluation was to collect additional information outside of the scope of the cooperative agreement, such as the status of PFAN projects after initial financing, developers' success on other projects independent of PFAN, and the co-benefits that developers and/or their communities receive.

The results of the evaluation can be used to adjust the design of the PFAN program within the scope of its mandate, determine the cost-effectiveness of USAID's investment and PFAN's approach, and provide insights that can be used to showcase this program in USAID and PFAN communications products.

1.2 EVALUATION QUESTIONS

To aid in the design process, the evaluation questions have been organized to assess performance, effectiveness, sustainability, and replication.

Performance

1. What has been the cost-effectiveness of PFAN in relation to:
 - a Clean energy technology financing;
 - b Establishment and maintenance of lender/developer relationships;
 - c Leveraging private sector resources, such as in-kind services and mentoring; and
 - d Clean energy technology deployment?
2. What are the strengths and weaknesses of the PFAN organizational and partnership model?

Effectiveness

3. Why have certain PFAN projects been more or less successful in achieving financial closure?
4. All projects admitted to the pipeline remain in the pipeline until reaching closure or until being withdrawn from the pipeline for reasons of project termination and or changed circumstances. This question thus is reframed in the analysis as follows. "Why have certain PFAN projects been more or less successful in the speed of achieving financial closure?"
5. In what ways and to what extent do project developers credit PFAN for having successfully secured financing?
6. Are there barriers not being addressed or not being addressed effectively by PFAN? i.e., what additional assistance can PFAN offer under its mandate?

Sustainability and Replication

7. What is the performance of PFAN's participants after financial closure, including reaching and maintaining operational status, replicating or expanding business, and producing co-benefits for themselves or their community?
8. In what ways can PFAN change or update the program's design or implementation, either in its current form or as the program transitions to a self-supporting entity?

2 PROGRAM BACKGROUND⁶

PFAN was initiated by the CTI in cooperation with the UNFCCC EGTT and is supported by a number of private sector companies that finance CE industries. CTI is responsible for coordinating the PFAN program while the International Center for Environmental Technology Transfer (ICETT) is responsible for administering the program. USAID is a partner of the PFAN alliance and provides support to the program through a cooperative agreement. The agreement is currently supported by a \$5 million budget and lasts from October 2007 to September 2015.

PFAN activities started in 2006 as a pilot project and expanded in 2008. During the project expansion phase, PFAN established regional networks in Latin America, Africa, Asia, and Eastern Europe, as well as dedicated country-specific networks. Currently, the program is funded through various international partners that may also offer support in the form of discounted service rates and fees. Documents reviewed indicate that the intention is for PFAN to become a partially self-sustaining entity, and preparations are underway to facilitate this transition.

The projects accepted into the program are showcased on the PFAN website in a project pipeline summary report and tracked through financial closure. As of December 2014, 304 projects had been inducted in the development pipeline, representing \$6.7 billion of investment. Forty-nine projects that can be credited to USAID assistance have reached financial closure, raising \$561 million.

⁶ This section is equivalent to and satisfies the GCC M&E contractual requirements to include a section on activity description.

PFAN's main objectives are to:

- Broaden access to financing for climate-friendly and technology transfer projects in the RE/EE sectors in developing countries and economies in transition; and
- Secure private sector financing for more Clean Energy and climate-friendly projects to accelerate technology transfer under the UNFCCC.

PFAN targeted the lack of access to financing by bridging the gap between financiers and project developers. By providing coaching, PFAN helps project developers create more robust business plans and communicate effectively with potential sources of financing.

The first aspect of the program is providing advice and guidance on:

- Overall project structure;
- Finance structuring, and sourcing and procuring financing;
- Technical and engineering issues; and
- Preparation and presentation of investment proposals.

The second aspect of the program consists of connecting potential investors and project developers through investor matchmaking, usually in conjunction with regional workshops where project developers can present their proposals directly to investor members of the PFAN network.

The program targets midsize projects in the \$1 million to \$50 million range although one pipeline project has been valued up to \$800 million. In order to qualify for PFAN support, a project must undergo a rigorous selection process based on initial description, proposal, and other relevant information. Projects accepted into the program go through three more stages of review that cover:

- Project economics and viability;
- Technical and engineering aspects; and
- Problem solving and marketing.

Each review stage is summarized in a formal written memorandum that provides an analysis of the strengths and weaknesses of the project proposal and suggests next steps for improvement.

As stated in the CTI-PFAN Cooperative Agreement for the period 10/2007-9/2015, PFAN's illustrative goals in line with USAID indicators are:

- Percent of inducted projects reaching closure – 20 to 29 percent;
- Total public and private dollars leveraged by USG for energy infrastructure projects – between \$72.5 million and \$325 million; and
- Number of commercially and concessionally-financed projects as a result of USG assistance – between 11 and 27.

PFAN's Cooperative Agreement also states that USAID activities and goals may benefit from PFAN's support via the:

- “Creation of a new financing resource for USAID, especially for country missions, the Asia Pacific Partnership, Methane to Markets: acceleration of the implementation of priority projects by the creation of expanded access to financing;
- Promotion of sustainable development in developing countries in the areas of CE/RE and EE, achieved by the innovative PFAN approach which is explicitly designed to ensure capacity building (especially in financing) thereby further promoting economic and social stability;
- In the course of their capacity building efforts the PFAN Consultants will be actively using and promoting the use of the UNFCCC Guidebook on Preparing Technology Transfer Projects for Financing;
- Promotion and acceleration of the technology transfer process in key areas to help developed and developing countries meet their UNFCCC obligations and to mitigate climate change.”

2.1 THE PFAN APPROACH

The basic hypothesis behind PFAN is that a “multipronged approach” aimed at the “missing middle” will catalyze clean energy investment, as shown in Figure 1. The three prongs are business, finance, and policy. The missing middle “is a term used to describe the gap between financiers looking for bankable investments

Figure 1: PFAN Model



and bankable companies that are looking for funding.”⁷ In essence PFAN helps the developer bridge this gap by providing technical assistance and introducing investors.

⁷ Source: Asian Development Bank (ADB)’s Energy for All, Project Development Facility.

Financial barriers arise because of imperfect capital markets and result in suboptimal investment. Financial barriers include:

- Loan tenures that do not match the economic life of assets
- The risk perceived by financial entities is greater than the actual risk
- Rules of capital repatriation
- Lack of access to credit for consumers
- High Transactions costs
- Financial entities unfamiliar with clean energy
- Small deal size
- Balance sheet financing when most SME developers have no balance sheet
- Collateral requirements in excess of the project cost.

Policy barriers arise because either the existence of certain policies or the lack of enabling frameworks for clean energy result in suboptimal investment in clean energy, and usually greater investment in fossil fuel based energy. Policy barriers include:

- Subsidies for fossil fuels
- Subsidized grid extension
- Tax policies that favor extractive industries
- Government ownership of conventional energy sources
- Trade barriers (unequal treatment in custom duties, etc.)

PFAN focuses primarily on CE business and projects, one of the three areas where efforts are needed to overcome the barriers to CE finance. It does this by providing assistance to CE business and projects and then introducing prescreened projects to interested financial entities.

PFAN provides commercial and technical services to assist project developers to:

- Develop and refine project concepts and business plans;
- Review project structuring;
- Review technical and engineering aspects;
- Make investor presentations;
- Advise on business growth strategy; and,
- Meet investors, including at investor fora where PFAN projects that excel in business plan competitions are presented to potential financiers.

In limited cases, PFAN does provide financial assistance for feasibility and technical studies.

3 EVALUATION METHODS AND LIMITATIONS⁸

3.1 RESEARCH DESIGN⁹

The evaluation uses a convergent parallel mixed method design that allows for the collection of qualitative and quantitative data concurrently as well as analysis of the two data sets separately. The quantitative instruments are needed for obtaining and analyzing generalizable statistical data. Qualitative instruments are well suited for explaining processes and impacts. Together, the two parts provide both analytical and explanatory power, while validating the findings through triangulation of data from multiple sources. Given the challenges with data collection as well as the importance of learning lessons, as opposed to merely measuring differences, this mixed method approach is considered both appropriate and essential.

3.2 DATA COLLECTION METHODS

The evaluation design matrix found in Appendix IV provides an overview of the evaluation questions, measures and indicators, methods, and data sources required to answer those questions. The list of indicators provides the background context on the types of information that the evaluation collects.

3.2.1 DATA SOURCES

Four data sources were used to collect the cross-sectional data. The two primary sources were qualitative KIIs centered on subjective data and a confidential, primarily quantitative, electronic survey open to most PFAN stakeholders. The secondary sources included administrative and institutional data in documents provided to dTS by either CTI or USAID that address the organization and administration of PFAN. The evaluation team has also accessed PFAN's official website and has collected other relevant documents, reports, and publicly available data.

3.2.2 DATA COLLECTION

Using SurveyMonkey, an online software tool, the evaluation team developed a survey for project developers,¹⁰ coaches, operational stakeholders, resource partners, and financial institution (FI) representatives.¹¹ Based on the respondent's role within PFAN, the survey was piped to direct respondents to specific subsequent questions based on their answers, and customized to gather information specific to each of the subgroups. At the end of the survey instrument, respondents could choose to participate in a KII. In-depth KIIs were conducted when possible to provide further insight into collected quantitative data in terms of attitudes and behaviors. The KIIs were used to provide additional detail in areas that could not be

⁸ This section is equivalent to and satisfies the contractual requirements to include a section on research design and evaluation methods.

⁹ What follows is a condensed version of this section; for the full text, see Annex IV.

¹⁰ Project developers include individuals, companies, communities, and NGOs.

¹¹ Coaches are individuals who provide business coaching to developers on a cost-share basis. Resource partners are organizations, such as non-governmental organizations or government-owned CE entities, which have a vested interest in promoting CE and see PFAN as assisting them in achieving their objectives. Operational stakeholders are donors, implementers, country coordinators, and other PFAN project personnel.

adequately dealt with in the survey. The KII guide consisted of general questions for all informants and distinct and targeted interview guides for each of the sub-groups.

3.2.3 DATA ANALYSIS

An analysis map was developed that linked each evaluation question and/or sub-question to the corresponding survey question(s) for quantitative data and to the corresponding KII guide question(s) for related qualitative data, in order to efficiently organize data and track correlations across the population as a whole. The evaluation team used Excel's pivot tables (cross tabs) and IBM's SPSS predictive analytics software to analyze quantitative data. Qualitative data provided as part of the online survey was used primarily for descriptive, anecdotal information and further analysis, depending on the length of the narrative. Qualitative data collected as part of KIIs were analyzed in depth for emergent patterns of perceptions, representations, portrayals of utility and effectiveness, and aspects that suggest potential sustainability.

3.2.4 STAKEHOLDERS SURVEYED AND INTERVIEWED

For the survey, the evaluation team sent out 687 emails that included the survey invitation and instructions, with 674 invitations delivered successfully, generating a total of 156 responses. Subpopulations surveyed include project developers, FIs, coaches, operational stakeholders, and resource partners. Appendix IV includes detailed information on and analysis of the demographics of those surveyed by subpopulation, response rates, and motivation for including in the survey.

Seventy-one persons were interviewed. There are three broad categories of project developers – developers with closed projects, developers still in the pipeline, and developers that were deemed not qualified or are not selected for funding reasons very early on and excluded from PFAN assistance. Of the developers that responded to the request for interviews, two had reached financial closure, and a third was listed in the pipeline as having reached financial closure but funds had not yet been disbursed.

Only five representatives of FIs responded to the survey, and all were involved in the CE finance business prior to participating in PFAN. Eleven coaches out of 46, representing 24 percent of the PFAN coaching population, participated in the survey. Operational stakeholders included representatives from USAID, CTI, ICEETT, United States Department of State, the Renewable Energy and Energy Efficiency Partnership, the Energy and Climate Partnership of the Americas, International Development Research Centre, and other PFAN managerial and funding stakeholders. Representatives from these organizations were interviewed in order to obtain insights into the multi-lateral interagency partnership, management and operations, and program design and execution. Resource partners tend to be government agencies in developing countries that have been set up to support CE investments in their countries. They help to ensure that efforts are aligned with governments and project objectives. They provide local context and support in terms of investment climate and CE technology needs and gaps.

3.3 DATA QUALITY

dTS' evaluation team has designed the quantitative and qualitative data collection instruments and methodologies in order to meet expectations for data quality.¹² Key steps taken by dTS' evaluation team to promote data quality include pre-testing of survey instruments, performing multiple mock KIIs, training and

¹² Expectations for data quality are specified in the USAID Automated Directives System 203, *Assessing and Learning*. These are namely validity, integrity, reliability, precision, and timeliness.

close supervision of enumerators as needed, data entry controls, qualitative data recording, summarizing, transcribing, and use of mixed methods.

3.4 EVALUATION LIMITATIONS

Independent Verification. The evaluation team was not able to independently verify the population characteristics within each stratum, as some individuals may have been included in more than one category and so many not be truly representative of the population. Precision of the estimates for online surveys may also be an issue. The specific findings of the evaluation may not apply to the diverse PFAN population. However, since a mixed-methods approach is used, a degree of certainty can be attached to more general findings and recommendations presented to CTI and USAID because they will be supported through more than one data source. Many of the metrics in this report will not accurately reflect the long-term potential since PFAN is still an on-going project. Two examples of this discrepancy include the following.

Cost-effectiveness. The cost effectiveness of the activity, in terms of investment leveraged, MWs, and GHGs avoided, is provisional in that it measures investment leveraged and MWs at reported financial close¹³, not at project operation. GHGs avoided are based ex ante on assumptions for capacity factors and using default emission factors, and do not represent verified ex post reductions. Additional project benefits not currently represented in the pipeline data could result from scale up and operation, resulting in an understatement of the projects' effectiveness.

Sustainability and Replicability. It is difficult to measure sustainability and replicability in a reliable manner in the short run. Many of these projects have been undertaken by new businesses and it is hard to determine now whether they will weather the course of time and be sustainable. Measuring replicability is complicated by the fact that it takes time to build capacity, change minds, penetrate markets, and have an impact on business and financial institutions.

Conflicts of Interest. Discussion of conflicts of interest can be found in Appendix VII.

4 FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

4.1 GENERAL PROGRAM

4.1.1 USAID PFAN TARGETS

Conclusion 1. PFAN has exceeded the targets for the USAID Cooperative Agreement and modifications.

¹³ PFAN does not report at financial closure but rather when their assistance to project developers end; when there is an agreement to finance but not when actual financing is consummated.

USAID began with three quantifiable targets with respect to its assistance to PFAN, and with time these have increased in amount. The summary outcomes or expectations upon which USAID assistance is predicated are shown below in Table 2.

Table 2: USAID PFAN Expected Outcomes

SUMMARY OF OUTCOMES	Target Low Range	Target High Range	Achieved to Date
# Total Projects inducted into Pipeline	54	92	304
# Total Projects reaching investor maturity	30	58	119
# Total Projects reaching Financial Close	11	27	49
% Project Developers reaching closure ¹⁴	20%	29%	16.10%
Total Financing Leveraged	\$72,500,000	\$325,000,000	\$561,539,200
Aggregate Leverage Effect (1 :XX)	41	186	112.31

Source: EEM-A-00-08-00005, Modification 6. Subsequent modifications did not change the targets.

It should be noted that PFAN reports financial data that can only be attributed directly to their efforts. Thus, if a small developer gathers funds from friends or family or provides in-kind contributions then these are not reported. Similarly, if the project brings in funds from a source outside of the financial institution that is working with PFAN, then this will not be counted. It is unclear how large this additional investment might be. For the purposes of this evaluation, it is noted that the financial results will be undercounted.

4.1.2 PFAN GENERAL ASSUMPTIONS AND OBJECTIVES

Conclusion 2. Based on the survey results, PFAN's current pipeline favors one of the primary objectives, as stated in the collaboration agreement with USAID, over another putting the objective of getting "more projects financed" ahead of "broadening access to finance".

PFAN's stated primary objectives are to:

- "broaden the access to financing for climate friendly and technology transfer projects in the RE/CE sectors in developing countries and economies in transition; and
- get more RE and climate friendly projects financed in the private sector and thereby to accelerate technology transfer under the UNFCCC."¹⁵

Moreover, PFAN is to provide assistance to projects "...whose developers would not otherwise have access to, or resources to pay for commercial consulting services. These sorts of projects were being largely ignored by the private sector."¹⁶

¹⁴ This is the percentage of projects inducted into the pipeline that reach financial closure. Roughly 20 percent of the projects inducted so far have reached financial closure.

¹⁵ USAID PFAN Collaborative Agreement, pages 14 and 15.

¹⁶ USAID PFAN Collaborative Agreement, pages 14.

Together the objectives and the statement above might suggest balanced performance criteria focusing on both broadening access as well as getting more projects financed. However, the indicators from the cooperative agreement with USAID are focused on total financing and total projects; thus, they more strongly support the second objective. Broadening access would mean putting an emphasis on cultivating more developers. But the criteria focuses on projects, not developers or entities. Note that an individual developer/entity could have more than one project in the pipeline. Moreover, assuming that PFAN's services are raising the capabilities of developers, a strategy of serial investments (allowing developers to have more than one project in the PFAN pipeline) could reduce costs per project, especially if capacity building services are reduced after the first project.

The survey results provide some support that serial investment is taking place. In some cases, PFAN is assisting project developers that: (1) already had other CE projects, and (2) have already had successful experience accessing finance.¹⁷ According to the survey, 75 percent of developers have "pursued multiple clean energy projects," and 37 percent of those have obtained financing prior to applying to PFAN. Additionally, slightly more than 16 percent of developers reported that they had two or more projects in the PFAN pipeline.

Including developers who already have successfully accessed financing for CE projects is not in violation of the agreement between USAID and PFAN. It does, however, raise questions regarding how best to meet PFAN's own stated objectives with regard to broadening access to financing relative to its objective to increase the number of projects financed, as well as USAID's role in promoting those objectives. Further, this tension highlights that the objective to increase the number of projects financed can compete with the objective to broaden access.

Broadening access to finance might also include increasing the number of financial entities that are not just stakeholders of PFAN but also participating in financing PFAN projects. Additionally, this might suggest increasing the involvement of commercial banks in PFAN. The survey listed the low participation of finance entities at investor fora as an issue. Others respondents indicated that the general lack of investor contact was a major barrier not being addressed by PFAN.

4.1.3 UNDERLYING HYPOTHESIS

Conclusion 3. One of the hypotheses underlying the PFAN approach remains untested and results of the survey present contradictory views. Understanding this is important because it has implications for USAID's assistance to PFAN; where it gives, how much, in conjunction with what other conditions and the results it can expect.

The basis for PFAN's approach is that there is no shortage of private sector money for the right projects. Yet financial barriers are, according to survey respondents, the main impediment to increased CE investment. The survey results and external evidence strongly suggest that the "number of right projects" is small and that both policy and financial barriers are important limitations on increased CE investment.

¹⁷ In some cases, the developer has acquired partial financing for the project prior to joining PFAN and is looking for PFAN to provide the remainder. In some cases, this is a developer's first CE project. In other cases, the developer has had an earlier successful CE project that was financed.

The survey asked the following question, framed as a hypothesis, to operational stakeholders because they would have access to and understand the genesis of PFAN, whereas other respondents would not. An early hypothesis of PFAN was that, "Finance is available: there is not a shortage of private sector money for the right projects." In other words, the main obstacle to increased penetration of CE was not the availability of finance for the "right" projects.

Operational stakeholders were asked, "In your opinion has [the availability of finance] turned out to be the case?" An overwhelming majority (87 percent) indicated that it is the case that financing is available, and the remaining 13 percent answered that they did not know. Yet these same respondents, when asked to identify the major barriers to CE investment, ranked financial and policy barriers as the most important.

How can it be that there is "no shortage of money for the right projects" and yet survey respondents indicate that financial barriers are a major impediment to increased CE investment? This evaluation had neither the resources nor access to data to conduct a thorough analysis of what underlies this seeming contradiction. However, we believe that it can be partly explained by the following factors.

First, it hinges critically on how one defines "right". What defines a right project and is that a small number of projects or a large number of projects? The term right is ambiguous. The fact that donors are interested in subsidizing services to bring projects to financial closure indicates that there is a difference between the number of "right" projects as defined by donors and the number defined by investors.

The expectations of different PFAN participants differ on the number of right projects. Similarly, it will differ on the "ready supply", the second hypothesis: "While there is a ready supply of good potential projects, there is a shortage of good project financing proposals meeting the standards and criteria of the international financing community." This would lead to the conclusion that there is a ready supply of projects that can be made right through PFAN assistance. But again, how big is ready?

It comes down to a difference between what is the "right" number of projects for investors (given the market conditions) and what is the right number for donors. There is a divergence between the social optimum for donors and the market optimum in any PFAN countries. And this divergence also helps to explain why the supply of finance might not be sufficient for the right number of projects: different participants believe the "right" number is different.

Additionally, PFAN acknowledges working primarily through equity investors. The capacity of those investors is limited. While they may have ample funds compared to the opportunities that reach their attention, their funds available are quite small compared to the market demand for CE investment.

Second, the number of right projects is a function of many factors including:

- market size (the number of right projects will be higher in India compared to Malawi, with the familiar *ceteris paribus* conditions);
- the presence of fossil fuel subsidies and rural electrification by grid extension (the number of projects will be higher in Cambodia compared to another country where only these differences prevail);
- the number of alternatives;
- the current level of CE penetration; and
- the degree of local funding sources.

The number of right projects hinges critically upon the presence of other barriers including policy and financial barriers.

The following are important financial barriers that are present in PFAN countries:

1. The number of right projects may mean the number of projects that investor would fund in the presence of other barriers. For example, investors have been willing to finance rice gasifiers in Vietnam, but far fewer than the number financed by investors in Cambodia over the same time period. This was due to a variety of factors including the lack of subsidies for conventional energy in Cambodia, the larger market of Vietnam and the difference in banking laws.
2. Similarly, if the number of right projects is those that the investors will fund in the presence of other barriers, then it is quite likely that developers, resource partners and donors will believe the number of right projects is higher.
3. In many developing countries, banks have loanable funds but the conditions are not right for investment.
 - a For example, collateral requirements can be over 200%.
 - b In most countries loan tenure is quite short and does not match the life of the investment.
 - c CE is not an option (bank does not loan in that area).
 - d Transaction costs are too high for large scale investors.
 - e "Limited information of clean and efficient technology options and associated benefits of SEF investments by companies and end-users;
 - f Limited access to long-term finance by corporations and SMEs;
 - g Unfamiliarity of financial intermediaries (FIs) with green growth and climate change financing business, combined with limited technical capacity to test and develop a new business line and products"¹⁸
4. Survey respondents indicated that too few investors and too few different kinds of investors were present at fora.
5. Early stage finance¹⁹ is lacking on insufficient.

4.2 PERFORMANCE

This section deals primarily with cost-effectiveness. Specifically, it addresses the following question and sub-questions.

Evaluation Question 1. What has been the cost-effectiveness of PFAN in relation to:

- a CE technology financing;

¹⁸ <http://www.ifc.org/wps/wcm/connect/32102a804fd330648d60ef0098cb14b9/SEF-Factsheet-Final.pdf?MOD=AJPERES>

¹⁹ Financing in the very early stage of development including finance for concept development ore refinement, engineering, environmental and other feasibility studies, and permitting.

- b Establishment and maintenance of lender/developer relationships;
- c Leveraging private sector resources, such as in kind services and coaching; and
- d CE technology deployment?

Evaluation Question 2. What are the strengths and weaknesses of the PFAN organizational and partnership model?

4.2.1 INTRODUCTION

Examples of cost-effectiveness calculations include dollars of technical assistance (TA) spent per MW of CE or the dollars of TA spent per ton of CO₂e avoided. By itself, a single measure tells little about whether \$4 per ton of CO₂e avoided is cost-effective. To know this, calculations must be compared to a baseline or to other projects. Baseline data were not available in this instance. Thus, the evaluation team developed measures from publicly available data on other donor-funded projects and their work with some CE projects. Performance metrics for projects or programs identified for comparative purposes are presented in Table 3.

Few donor-funded programs are designed similarly to PFAN. Most of these projects carry some form of project finance commitment and others work directly with banks. For example, most of the IFC's SEF projects focus on the finance prong in the PFAN model but also provide limited developer services as they seek to expand the investment pipeline. Others, like the World Bank's China Energy Conservation project I, are aimed at strengthening the business prong but also include direct loans and sometimes grants. Yet, comparisons are valid because ultimately the examination focuses on money spent and the outcome. These different projects reflect different models, markets, and approaches.

The program with the closest approach and public data was E+CO, which was supported by USAID, IFC, the Rockefeller Foundation, and others. E+CO focused at the project- or developer-level by providing many of the same services that PFAN offers and also including limited finance. It offered both services and capital to companies, staying with entrepreneurs throughout the investment, operations, and maturity process. However, it targeted much smaller entities and transactions.

Other programs that make apt comparisons include the World Bank's Energy Conservation Project I (ECP I²⁰) in China, the Bulgaria Energy Efficiency Fund (BEEF²¹) and EBRD's Georgia Energy Efficiency Program (GEEP). E+CO managed the IFC Sustainable Energy Facility.²²

²⁰ Implementation Completion and Results of ECP I, 2007, p.12

²¹ BEEF Implementation and Project Completion report 2010

²² SEF Midterm Evaluation report 2009.

Table 3: Performance Comparison²³

Project	Watts of capacity per dollar of technical assistance	\$ of funds mobilized per dollar of technical assistance ²⁴	Avoided GHGs per dollar of technical assistance (tCO ₂ e/\$) ²⁵
E+Co SEF	14.71	6.09	0.35
ECP I	NA	20.95	1.00
BEEF	NA	39.67	1.12
GEEP	NA	6.77	2.5
PFAN	77.5	112.31	4.20

The measures in the table above are based on projects in which donor funding and donor-funded activity has been completed. The exception is SEF, for which the measures represent a mid-term evaluation. USG assistance to PFAN is ongoing. Many of the projects currently in the pipeline will reach closure and will improve the measures in Table 3 relative to the other projects. The MWs and GHGs may be overestimated because they are projected, not actuals, and may not occur. They may be underrepresented because they do not track future projects that occurred as a result of the TA.

4.2.2 COST EFFECTIVENESS OF PFAN IN CLEAN ENERGY FINANCING

Conclusion 4. From a funder’s perspective, PFAN represents a cost-efficient vehicle. USAID spent less on technical assistance per projected MW of capacity than other funders, and USAID funds supported more tons of CO₂e avoided per dollar of technical assistance than all other programs.

As of December 2014, USAID had obligated almost \$5 million for PFAN, and \$3.93 million had been expended. As a result of the assistance provided to developers through this funding, 49 projects have closed that be credited to USAID²⁶. These projects are credited annually by PFAN with 388 MW of electricity-generating capacity, saving almost 100 Gigawatt hours (GWh) of generation per year via EE projects, and avoiding 1.8 million tons of CO₂e annually. These benefits do not include all of the 49 projects²⁷. In fact, greater CE benefits have been generated but are not included in these measures of supply (MW, GWh), such as those resulting from the use of biofuels and the generation of steam. A total of 15 closed projects,

²³ These numbers are prior to actual operation for PFAN and for many of the other projects and, therefore, assume that projects will achieve the results that they predict they will.

²⁴ Technical Assistance spending was chosen rather than donor contribution to make the programs comparable in terms of USAID’s contribution. This is because in addition to TA these other donors also provided some form of financing. USAID’s spending was used for roughly the same kinds of activities that the TA was used on these other projects.

²⁵ These are life of project benefits and so PFAN was converted assuming a very conservative ten years for benefits to endure.

²⁶ One project closed before USAID funding began and is excluded from these calculations.

²⁷ Fifteen projects do not report MWs and 10 do not report GHGs avoided.

almost a third of those reaching closure, create inaccuracy in the estimates produced here by having provided no measure of MW of generating capacity added for the calculations of cost effectiveness. Similarly, ten of the closed projects provided no measure of CO₂e avoided.²⁸ Thus, these routine measures of CE performance likely understate the true impact of PFAN in terms of measures based on cost per MW and CO₂e avoided.

Further, the total MW of generating capacity claimed by the 49 closed projects supported by USAID assistance²⁹ totals 387.9 MW.

Given the limitations discussed above, to date PFAN's cost of TA per MW has been \$12,889. This equates to approximate 1% of the average total cost of installation per MW of CE³⁰. Generally, the lowest cost for CE generation technologies averages \$1.2 million per MW but can be substantially higher depending on the technology and resource availability.³¹ MT of CO₂e avoided per \$1 = 4.2

4.2.3 COST EFFECTIVENESS OF ESTABLISHMENT AND MAINTENANCE OF LENDER-DEVELOPER RELATIONSHIPS

As data were not provided on an activity basis, dTS cannot determine the cost effectiveness of the isolated element of PFAN that involves establishment and maintenance of relationships between lenders and developers. However, some general comments can be made on this issue, which are not based on data. Some resources must be dedicated to contacting prospective participants and holding fora and other events where project developers and lenders meet and eventually conclude business. However, the overwhelming reason that lenders and developers will maintain relationships with PFAN is that (a) stakeholders continue to see potential and (b) the expected benefits of participating outweigh the costs. Maintenance of the relationships is then a function of all activities and thus all costs. If projects are not well designed and presented, developers and financiers will not reach closure. If closures are not reached in sufficient time and quantity to justify costs, either at this point or in the future, relationships would not be maintained.

USAID's assistance has supported 304 projects at varying stages with 49 reaching financial closure as of this evaluation. Table 4 provides calculations related to cost effectiveness from the perspective of FIs, which shows one measure of the effectiveness of establishing and maintaining lender-developer relationships.

Table 4: Cost Effectiveness of Developer-Investor Relationships

Cost per Project	Spending Per Financial Institution	Prospective Investment per \$ Spent
\$16,382.01	\$73,478.15	\$1,337.12

²⁸ The data identified is simply not available because of the nature of the projects concerned – eg rural electrification or biofuels projects where there is no electricity generation and projects for which there is no established methodology for calculating CO₂e mitigation potential.

²⁹ While a total of 50 projects have closed, one reached closing before USAID funding was provided. They have been excluded from the calculations.

³⁰ Based on dTS estimates of the cost of CE from various reports including the Renewables Global Status Report and estimates by IRENA.

³¹ \$1.2 million per MW is based on a review of studies for all clean energy technologies in the size range of PFAN. \$1.2 million is for run-of-river hydro from the Canadian RetScreen.

4.2.4 LEVERAGING PRIVATE SECTOR RESOURCES

Conclusion 5. USAID funds leverage \$112.31 per dollar of USAID funding, significantly more money per dollar than other similar programs.

PFAN is designed to leverage both financial and coaching or resources for coaching. Financial entities provide funds for equity or loans, and coaches provide in-kind contributions of time to assist developers. Based on the project pipeline data, total financial sector resources leveraged amounted to \$561,539,200

In-kind contributions are made by coaches and other private sector resources. Data was abstracted from the PFAN quarterly reports and amounts to \$2.97 million to date. This is in tandem with USAID funds expended to date and it is anticipated to continue to match USAID on a one to one basis. Although an attempt was made to verify this through the survey information on the time and in-kind value provided by coaches, unfortunately, only one coach answered the contribution questions and that answer was deemed inapplicable.

In terms of financial sector resources leveraged, USAID funding of almost \$5 million to PFAN have leveraged \$112.31 per dollar contributed. This appears to be quite large particularly in comparison to the results presented in

Table 3: Performance **Comparison**. This difference between PFAN and comparison programs would be expected to narrow with time because those chosen for comparison (with the exception of the E+CO SEF) were designed to strengthen the capacity of financial entities or businesses that will continue to invest in clean energy projects well beyond the end of donor funding. This continued investment has in fact happened. Examples include the IFC's investment in the Bank of the Philippine Islands or the ECP-I work with energy service companies in China. Nonetheless, PFAN would be expected to leverage more funds than the other comparison programs.

4.2.5 COST EFFECTIVENESS OF TECHNOLOGY DEPLOYMENT

Conclusion 6. To date, the one wind power project represented in the pipeline has been deployed at far less cost to USAID per MW than any other technology that PFAN is assisting and has the highest ton-per-dollar yield of any form of USAID assistance. *This is an anomaly based on the fact that a large amount of the funds for this project came from a non-PFAN source.*

Cost-effectiveness of CE financing addresses the overall PFAN program, while this sub-section focuses on the individual technologies deployed through PFAN. A limitation of this analysis is that the data are not publically available to allow comparison with the programs shown in Table 3: Performance Comparison. Similarly, the records provided to dTS are not sufficient to break out costs among the various technologies, nor are all costs separable without some arbitrary assignment. For example, fora are not technology specific and benefit all technologies and projects involved equally. Thus, this analysis assumes the most equitable approach to allocating costs across technologies is to allocate costs evenly on a per-project basis, with each project or PFAN client being accorded the same use of resources. Table 5 presents the measures of cost-effectiveness by technology that result from this allocation approach along with other metrics. The two measures reviewed are USAID cost per MW of CE and tons of CO₂e avoided per dollar of USAID spending.

Table 5: Cost Effectiveness by Technology

Technology	# Closed Projects	MW Capacity	tCO ₂ e/yr	Total Investment	Cost of TA per MW ³²	tCO ₂ e/\$ of TA ³³
Hydro	8	70.6	170,780	178,910,000	\$11,562.70	2.09
Biomass	9	79.1	517,220	135,450,000	\$11,610.21	5.63
W2E	3	14.5	128,300	62,500,000	\$21,111.89	4.19
Wind	1	140	840,000	2,800,000	\$728.86	82.32
Biofuels	4	1.5	56,830	5,150,000	\$272,108.84	1.39
Solar	5	50	92,516	70,950,000	\$10,204.08	1.81
EE	8	21	82,369	40,360,000	\$20,459.31	1.01
Biogas	9	12.95	224,353	49,954,000	\$70,916.40	2.44
Clean Transport	2	0	37,980	15,465,200		1.86
Total	49	388	2150348	561,539,200	\$12,895.21	4.30

Source: PFAN Pipeline data

Putting aside the wind project, solar projects have proven to be by far the most cost-effective technology deployed through PFAN. This conclusion does not indicate that PFAN should target wind over other technologies. Technology choice is driven by many factors, and some areas simply are not suitable for wind. Moreover, this does not represent the entire cost of the technology but only that amount raised by PFAN.

These results are counterintuitive for energy efficiency. EE projects worldwide generally represent the low hanging fruit and routinely result in lower cost-per-unit of energy than do supply projects. The reason that PFAN results do not reflect this can be explained partly by the fact that 50 percent of the EE projects have no estimate for energy saved, and 38 percent indicate no CO₂e avoided.³⁴ The reason that hydro deployment shows a low CO₂e avoided per dollar of USAID funding may be that many of these were off-grid projects, and the CO₂e avoided is often not registered because the carbon avoided is black carbon.³⁵

³² USAID cost spread evenly over all projects.

³³ Lifetime CO₂e avoided / USAID cost per technology. This is based upon the assumption that project benefits last ten years. Clearly this is low for some technologies such as hydro and wind. However, even using this conservative measure, benefits are significant.

³⁴ Given the country and industry where these EE technologies were deployed, it is clear that CO₂e was avoided, even if PFAN accounting did not capture it as a result.

³⁵ Black carbon is soot, and, although black carbon is often not registered, recent scientific work finds double the impact of black carbon on global warming relative to carbon dioxide.

4.2.6 STRENGTHS AND WEAKNESSES OF THE PFAN ORGANIZATIONAL AND PARTNERSHIP MODEL

Conclusion 7. Stakeholders rated the PFAN operational structure as effective but still weak in areas. In particular, the presence of donors is seen as a great strength while donors’ prioritization of their own project areas (e.g., specific technology or country) was seen as a weakness, as such bias may affect funding decisions for reasons other than cost-effectiveness or directly meeting PFAN’s objectives.

Each stakeholder group understands the PFAN organization model differently and thus different questions were asked of each group. Operational stakeholders were anticipated to be the only stakeholders that would fully understand the PFAN organizational and partnership model based on their background, exposure to the general problem, and experience. The interviews confirmed this. Coaches had a limited understanding and interaction with the broader structure. To other stakeholders, the idea of the “art of the deal” and the associated technical assistance and capacity building to bring the deal to closure was their basis for response.

4.2.7 GENDER CONSIDERATIONS

Data collected as a part of PFAN’s processes in terms of and relevant to ownership by sex are insufficient to make strong assertions about the performance of PFAN with respect to gender considerations. Survey responses have been aggregated by gender where meaningful and practical and reported below.

4.3 OVERALL EFFECTIVENESS

4.3.1 OPERATIONAL AND COACH STAKEHOLDERS

Two questions were asked to get at the overall effectiveness of PFAN. The results, as shown in Table 6: PFAN Structural Effectiveness, are somewhat mixed. Seventy-two percent of coaches surveyed think PFAN’s operational structure is moderately to completely effective. A key element of this structure is a public-private partnership. Sixty-eight percent of coaches believe that PFAN would be effective if run as a commercial international assistance project.

Table 6: PFAN Structural Effectiveness

Structural Effectiveness Rating by Respondents (in percent)		
Level of Effectiveness	How effective is the three-part ³⁶ operational structure of PFAN?	How effective would PFAN be if it were conducted like a commercial international assistance project?
# of Respondents	n = 19	n = 20
Completely ineffective	0	0
Moderately ineffective	16.67	15.79

³⁶ The three parts are Alliance Partners like USAID and ICETT for administration and finance, and PPL for implementation

Moderately effective	44.44	36.84
Completely effective	27.78	31.58
Don't know	11.11	15.79

Source: PFAN Survey

4.3.2 PROJECT DEVELOPERS

To gauge developers' rating, the analysis looked at the level of satisfaction with technical assistance and capacity building. For presentational purposes, responses were assumed to be ordinal³⁷ with the "completely dissatisfied" rating as 4, "moderately dissatisfied" as 3, "moderately satisfied" as 2, and "completely satisfied" as 1. Table 7, ordered by average rating, provides the individual responses by category as well as an average rating that results with a score of 1, meaning that 100 percent of the respondents rated their level of satisfaction with the coaching services as completely satisfied. A score of 4 would indicate that all respondents were completely dissatisfied. On average, developers were satisfied with all technical assistance and capacity building, but they were most satisfied with assistance on the business plan and least satisfied with the role of technical assistance and capacity building in introduction to investors. This may reflect the fact that most of the developers answering the survey had not reached financial closure.

Table 7: Project Developer Satisfaction with technical assistance and capacity building

Answer Options	Completely Dissatisfied	Moderately Dissatisfied	Moderately Satisfied	Completely Satisfied	Response Count
Business plan	8.5%	5.1%	30.5%	55.9%	59
Coaching on overall project structure	7.7%	5.8%	42.3%	44.2%	52
Project datasheet	8.0%	12.0%	36.0%	44.0%	50
Coaching on commercial/finance aspects	9.3%	16.7%	33.3%	40.7%	54
Investor presentation	14.3%	14.3%	28.6%	38.8%	49
Investor forum	6.8%	31.8%	27.3%	34.1%	44
Advice/guidance on technical aspects	16.3%	14.0%	46.5%	23.3%	43
Introduction to investors	23.1%	28.2%	28.2%	20.5%	39

³⁷ As there is no formal hypothesis testing across time or versus an expectation, the assumption of ordinality does not affect the findings.

4.3.3 FINANCIAL PARTNERS

Given that PFAN is based on a premise of the availability of financing and the need for solid project proposals to use this funding, PFAN financial partners were asked to rank by value the services PFAN provides to project developers. Table 8 presents the ranking of PFAN services by FIs as they see the services helping developers prepare for financing. FIs value the coaching on commercial and financial aspects of projects the most and advice on the technical/engineering aspects the least.

Table 8: Financial Partners' Value of PFAN Services

As a financial partner of PFAN, which of these services to prepare project developers do you value the most? Rank these with 1 being the most important variable and 8 the least important.		
Answer Options	Average Rating by FIs	Response Count
Coaching/mentoring on commercial/finance aspects	2.40	5
Introduction to investors	3.40	5
Business plan	3.60	5
Investor forum	4.40	5
Coaching/mentoring on overall project structure	4.50	4 ³⁸
Investor presentation	4.60	5
Project datasheet	5.00	5
Advice/guidance on technical/engineering aspects	7.50	4
Number of respondents		5

4.4 STRENGTHS AND WEAKNESSES

Many of the questions asked in the survey and the interviews are designed to be closely related. Responses were categorized into major areas where possible. The top responses among survey respondents³⁹ about PFAN's strengths were:

- Advisory services: PFAN's coaches prepare developers to present their project to potential investors.
- Investor Relations: The fact that PFAN has activities related to investor relations generally is seen as a strength in that there is an opportunity for developers to showcase their projects and to meet investors. However, PFAN's performance in making the connection between investors and project developers is seen as somewhat of a weakness.

³⁸ Respondents left some items blank.

³⁹ This excludes resource partners since they would not have direct knowledge of this in relation to PFAN.

The top three responses about PFAN's weaknesses among survey respondents, including from open-ended responses and interviews, were:

- PFAN does not sufficiently address access to financiers, including the number and type of financiers such as venture capital and mezzanine finance, and provides limited access to early-stage finance.
- PFAN does not address policy areas.
- PFAN advisory services need attention in areas such as more screening of potential developers and assistance with the process of financial closing following the investor forum.

Another interesting response from several of the operational partner respondents was that the goals of funding partners may lead PFAN to focus on projects to satisfy funding partner targets rather than projects that may expand the overall PFAN footprint.

4.5 EFFECTIVENESS

Under the rubric of effectiveness, the evaluation sought to answer three principal questions:

Evaluation Question 3. Why have certain PFAN projects been more or less successful in the speed of achieving financial closure?

Evaluation Question 4. In what ways and to what extent do project developers credit PFAN for their successfully securing financing?

Evaluation Question 5. Are there barriers not being addressed or not being addressed effectively by PFAN? i.e., what additional assistance can PFAN offer under its mandate?

In addition, this section covers general issues required to be considered under any USAID-contracted evaluation, such as gender inclusion.

4.5.1 CLOSURE CHARACTERISTICS

Conclusion 8. There is an apparent relationship between the time required to reach financial closure and project risk. However, there is insufficient data to draw any meaningful relationships that could inform donors or PFAN.

One of the original evaluation questions sought to address why some PFAN-supported projects were successful in reaching closure while others were not. However, CTI informed dTS that once a project is accepted in the pipeline, it will stay there until it reaches closure or until it is removed from the pipeline for reasons of changed circumstances. Instead, the evaluation team sought to address the question of why some projects reach closure more quickly than others.

The average project has reached financial closure almost nine months after being inducted in the PFAN pipeline. While the most effective method for determining those factors responsible for speedy closures would have been detailed analysis of individual project documents, appropriate data were not readily available and the scope of the evaluation was not appropriate to undertake this data collection from primary sources.

Thus, a basic statistical analysis of pipeline data from PFAN was undertaken to understand the role of potential risk of the project with time to closure. The analysis constituted a simple linear regression of the time to closure of projects in the pipeline as the dependent variable, or outcome, against a single independent, or explanatory, variable that could be gleaned from the data available. That variable was

developed as a binary, or indicator, variable that represents a qualitative measure of repayment risk. The indicator measures 0 if the risk appears low and 1 if high. The equation that results is presented below.

Let $Y_i = \beta_0 + \beta_1 X_i + \epsilon_i$, where

Y_i = time to closure of the i th project measured in days,

X_i = a qualitative assessment of risk of the i th project,

β_0 = x-axis intercept,

β_1 = coefficient on X , and

ϵ_i = error term

The coefficient of the intercept terms is 354 ($p < 0.001$), which represents the predicted days to closure. The coefficient on the explanatory variable, X , is - 152.7 days ($p = 0.0013$), which indicates that projects that have reduced risk are predicted to close 153 days, almost a half year, earlier than those that do not. The R-square value of 0.2 indicates that the explanatory variable of subjective risk alone explains about 20 percent of the variation in closing.⁴⁰ While the intercept and explanatory variable are strongly significant, the low correlation coefficient predictably indicates that other forces are at play that cannot be measured at this time given the limited data available.

The only apparent relationship based on data made available was between time to closure and a binary variable representing the degree to which the investor can understand repayment potential. For example, projects connecting to the national grid with a power purchase agreement appear to have closed more quickly than those that are off-grid or do not have a buyer whose credit characteristics are easy to ascertain. Similarly, EE projects, where the developer was the entity accruing the savings and has a proven track record, are easier to assess in terms of risk than are projects where either the developer or the buyer does not have an established track record.

Another factor that may be in play in determining the speed of closure is the extent to which the developer had been successful in obtaining finance before PFAN or, perhaps, had tried and failed, as opposed to developers that had no previous experience. The team wanted to test that relationship but only two of the 50 closed developers completed the survey and, thus, there was insufficient data for analysis.

4.5.2 THE ROLE OF PFAN IN FINANCIAL CLOSURES

Conclusion 9. There is insufficient survey data to determine PFAN's role in financial closure, as only two project developers who reached closure answered this question, with one indicating they could and one that they could not have reached financial closure without PFAN assistance. However, developers rated the coaching service they received in coaching services as important to financial closure.

As discussed above, one of the main concepts behind the PFAN model is that developers need coaching services in order to bring their proposal up to standard for financing. Developers were asked to rate the services they received.

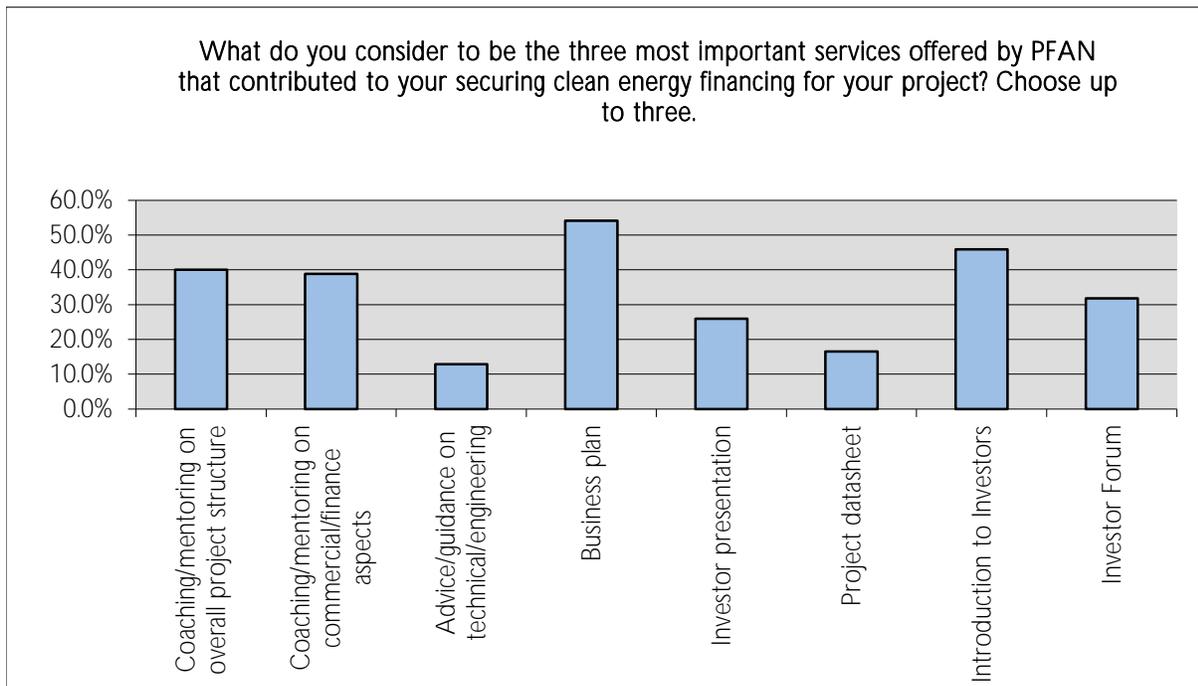
⁴⁰ The overall $F = 11.93$ with a $p = 0.0015$.

Seventy-four percent of developers sought financing prior to coming to PFAN, and 63 percent of those were not successful in obtaining finance. When asked the reasons they could not secure funding, the four most cited reasons were:

- Lender/investor not familiar with CE;
- Collateral requirements too high;
- Lender/investor considered risk too high; and/or
- Could not complete application to investor/lender satisfaction.

Almost two-thirds of project developers indicated that they were in need of PFAN's services. Each of these reasons, shown in Figure 2, was listed as a barrier to increased CE investment and as one the barriers that PFAN helped them to overcome.

Figure 2: Services that Contribute to Securing Financing



Coaches and PFAN provide a variety of services ranging from assistance in project structuring to the investor forum. Overwhelmingly, developers find the assistance effective, as shown in Table 9: Project Developers' Satisfaction with Coaching Services.

Table 9: Project Developers' Satisfaction with Coaching Services

Satisfaction with Coaching	Percent
Completely ineffective	9.1%
Moderately ineffective	9.1%

Moderately effective	40.0%
Completely effective	41.8%

Source: PFAN Survey. n=66.

Finally, developers were asked similarly to rank the services that contribute to reaching financial closure in order of importance. The most important service in their view was coaching on commercial aspects followed by coaching on the overall project structure and then coaching on the business plan, as shown in Figure 2.

However, a different pattern emerged when developers were directly asked if they believe they would have reached financial closure without PFAN.

As of December 2014, 50 projects have reached financial closure through PFAN; 49 as a result of USAID's assistance. Project developers are split evenly between those that believe they would have reached financial closure without PFAN and those that could not have.

4.5.3 BARRIERS TO CLEAN ENERGY INVESTMENT

Conclusion 10. Overall, PFAN is viewed by all stakeholder groups as successfully addressing the barriers to CE investment.

Conclusion 11. Important barriers that PFAN is not addressing successfully generally fall into two areas: policy and financial barriers. This is not to infer that PFAN was supposed to address these barriers or should directly address these barriers. Rather, it states that even with PFAN assistance in the business prong and indirectly in the finance prong that significant barriers outside of PFAN's domain exist and thwart increased investment.

Conclusion 12. Women want more and expanded coaching services.

Introduction

As part of the survey, participants were asked to select those barriers (from among the three PFAN "prongs" listed in Figure 3 and in Table 10) that they considered to be the most important to increased CE investment. Table 10 presents the relative importance of these three prongs as rated by the survey respondents based on their rating of the barriers. Prongs are discussed here as these constitute the underlying basis of the PFAN model.

Table 10: Importance of the Three Prongs

PFAN Prong	Raw Score ⁴¹	Normalized Score ⁴²
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⁴¹ The raw scores total the number of "votes" cast by respondents in the barriers that are subsumed in each prong. For example, government subsidizes conventional energy, and lack of favorable government policies would be totaled into the raw score of government.

⁴² Normalization is a routine procedure that was used to essentially give an equal weighing to each stakeholder group. At times, this is the appropriate way of comparing stakeholder responses when there is a justification to equally weight the input of all stakeholders.

Government	99	3.7
Financial	99	7.0
Business	70	5.5

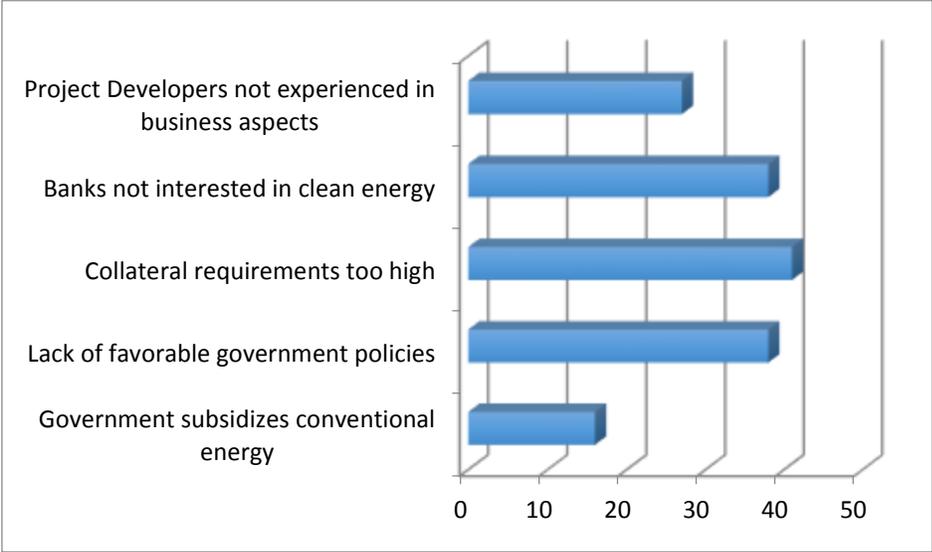
Note: n=156

This result is heavily influenced by the number of project developers responding to the survey, as there were far more developers responding (111) than all other groups combined (45). When the results are normalized, then a different rank ordering is revealed, with financial barriers constituting the most important, followed by business and lastly government.

Within the financial barriers, collateral requirements and lack of bank interest in CE are the two main subcomponents. Other barriers include the lack of early-stage finance, the lack of more advanced financial mechanisms such as mezzanine finance⁴³ and risk adjustment mechanisms, and the large gap between actual and perceived risk.

Project developers cited five major barriers within the three prongs. They are outlined in Figure 3.

Figure 3: Major Barriers for Developers



Source: PFAN survey

PFAN Effectiveness in Addressing Barriers to Clean Energy Investment

The starting point for the analysis of the question of whether PFAN is effectively addressing the barriers to CE investment was to directly ask, “Is PFAN adequately addressing the barriers to clean energy investment?”

⁴³ Mezzanine finance is a hybrid of debt and equity financing that is typically used to finance the expansion of existing companies. Mezzanine financing is essentially debt capital that gives the lender the rights to convert to an ownership or equity interest in the company if the loan is not paid back in time and in full. It is generally subordinated to debt provided by senior lenders such as banks and venture capital companies. Source: Investopedia.

That is, the survey asks the respondents the barriers in their own estimation. Excluding developers who do not yet have projects admitted to the PFAN pipeline, the results were moderately positive that PFAN is successfully addressing the barriers to CE investment (Table 11) with 67 percent of respondents indicating “yes.” Including developers who were rejected by PFAN, the overall success rating drops to 57.1 percent. Only 34 percent of the group that was not accepted into PFAN thought that PFAN is successfully addressing the barriers.

Table 11: Is PFAN Successfully Addressing Barriers to Clean Energy?

Stakeholder	Yes	No
Total All Respondents (n=88)	63.4%	36.6%
Developer (n=65)	66.2%	33.8%
Other (n=23)	56.5%	43.5%
Developers Not Accepted (not included in Total)	34.0%	66.0%

FIs appear to be the most optimistic that PFAN is successfully addressing the barriers. This may be reflective of the views of the FIs or it may be due to a low response rate, with only 7.4 percent of PFAN financial partners having participated in the survey.

The 91 project developers in the PFAN pipeline who responded to this question listed a variety of barriers, which the evaluation team then grouped into three categories:

- Investor experience;
- Assistance on the business plan; and
- Strengthening capacity of project developers.

These three are groups to which the evaluation team assigned individual, open-ended responses. Investor experience mainly refers to the investor network that PFAN brings to the process, the opportunity to meet investors through PFAN, and the chance to see first-hand how financial entities work and make decisions. Assistance with the business plan is hands-on and covers the entire process of developing a business plan. Finally, strengthening the capacity of project developers covers all types of assistance, from coaching to standardized templates.

What barriers are not being effectively addressed by PFAN?

The assessment by project developers of the barriers not being addressed by PFAN (Table 12) depends heavily on where each developer is in the PFAN process. Developers that reached financial closure identify very different barriers than those who have not reached closure and those who were not qualified for PFAN.

For those project developers who have not reached financial closing, policy barriers are ranked as the most important barrier PFAN is not adequately addressing. Advisory services (including business plan assistance, coaching, and technology advice) and finance (such as collateral requirements, lack of interest in CE on part of banks, and general lack of investment funds for CE) were identified as the second most important

barriers that are not being adequately addressed. This includes the mix of investors, the number of investors at events, and investor perception of CE viability.

It is interesting to note that women saw advisory services as a major area where PFAN was not adequately addressing the barriers. A detailed analysis of the answers indicates that is more the quality of coaching services that women are unhappy with. Responses included:

- Involvement of project conception, business plan mentoring
- More detailed mentor involvement at the business plan level
- Technology analysis and scrutiny

Developers that have achieved financial closing cite investor relations as the most important barrier that PFAN is not adequately addressing. This covers the mix and number of investors, and matching investors and projects in the early stage. Table 12 shows responses from developers who have and have not reached financial closure.

Table 12: Barriers Not Adequately Addressed⁴⁴

Major Barriers According to Project Developers	Not Yet Closed n = 70	Woman Owned & Not yet closed n = 9	Achieving Financial Closure n = 2
Policy	21.1%	11.1%	0%
Finance	15.8%	22.2%	33.0%
Advisory Services	15.8%	44.4%	0%
Investor Relations	14.0%	0%	66.0%
PFAN Selection Criteria	10.5%	11.1%	0%

While respondents indicated that addressing collateral requirements was an area where PFAN was not adequately addressing barriers, a further analysis of the surveys responses in multiple questions tends to support that PFAN is addressing collateral barriers indirectly through its choice of financial partners and through the advisory services it offers. Women and mixed-gender ownership developers that had previously sought financing unsuccessfully listed the major reason that they were turned down was that they could not meet collateral requirements, but yet they are now in the PFAN pipeline. PFAN may reduce collateral requirements by reducing risk, i.e., PFAN’s coaching services may produce better business plans and other work that reduces the risk gap.⁴⁵ At this time, there is insufficient data to fully explore the reasons behind

⁴⁴ Percent of total developers responding to specific issue. Note that Advisory services, Investor relations and Early stage are part of Finance barriers but they were listed separately by respondents.

⁴⁵ This is the gap between the actual risk on clean energy investments and that perceived by financial institutions.

this finding, but given their inclusion in the pipeline, it can reasonably be assumed that PFAN is making some positive contribution in this area of financial barriers.

What additional assistance can PFAN offer under its mandate?

PFAN is focused primarily on the business prong in its model, represented by the project developer. PFAN brings investors to meet developers and assists developers in preparing and presenting their case to investors. This is important and does, as has been shown, address some of the barriers to increased CE penetration. Generally, survey respondents from all groups agree that additional assistance is needed in better engaging investors and governments. This tracks with the information in Table 18 and with the barriers that other stakeholders identified as not adequately addressed by PFAN.

Table 13: Additional Areas for PFAN Assistance⁴⁶

Areas for PFAN Assistance	Coaches n = 10	Financial Institutions n = 5	Developers n = 72	Female Developers n=9	Operational Partners n = 19
Market Advice for FIs	80.0%	60.0%			
Policy/Regulatory Advice	60.0%	60.0%	38.2%	54.6%	14.9%
Technical Studies	20.0%		51.7%	63.4%	
Early Stage Funding	60.0%		12.4%	33.3%	
Advice/Training to FIs		60.0%	46.7%	54.6%	42.9%
Greater Public Awareness					57.4%
Financial Mechanisms			5.0%		40.0%
Expanded Coaching Services				50.0%	

Note: Columns can sum above 100 percent, as respondents could select multiple areas.

The principal areas where developers see the need for additional assistance are technical studies and advice, and training to FIs. This includes either direct provision by PFAN for prefeasibility studies or environmental impact assessments, for example, or grant funding for this kind of work. Recognizing that technical studies are an important barrier, PFAN began a small effort in this area. In effect, developers are calling for an expansion of the technical studies that PFAN is already doing. This may reflect the fact that 91 percent of the 46 developers citing technical studies as a major barrier are from Africa. As a region, Africa has been later and slower than other PFAN regions in developing CE, including resource mapping, technology assessment, and other information that facilitates project planning and development. Additionally, while PFAN began a program of technical assistance in Central America and the Caribbean, it only recently became active in Africa.

⁴⁶ Respondents were allowed to list all the areas where they believed additional assistance was needed. Each respondent could list more than one item. Therefore the totals can sum to more than 100 percent.

Female developers to all categories and included an additional category which can be term expanded coaching services. Some of the services requested are: Project costing on a more realistic terms; Legal assistance; HR and manpower planning for project implementation from a long term sustainability and profitability; making commercial bidding documents and contractual expertise and having more technical coaches.

Project developers listed specific areas in which they believe that financial institutions need assistance:

- Developing standardized commercial agreements;
- Developing risk management practices;
- Training on CE technologies and due diligence; and
- Investor education.

FIs themselves list standardized templates for commercial transactions and CE underwriting guidelines, a risk management tool, as major areas where assistance is required.

4.5.4 PFAN AND GENDER

Conclusion 13. Neither the PFAN program nor the cooperative agreement are designed to broaden access specifically in a way that facilitates setting social targets, because the model does not include subsidizing financing nor is it designed to correct for social targets.

PFAN selects CE projects primarily on the basis of financial viability and size. PFAN is designed on the basis of providing business skills to financially viable projects where the basis of selecting a project is size and likelihood of reaching financial closure. It was not designed to address gender issues nor inclusion concerns for other disadvantaged groups. The cooperative agreement is not designed with financing subsidized in a way that might account for social targets nor does USAID provide funding specifically for that purpose (which also would affect cost-effectiveness).

Further, sex of ownership does not translate directly into financial viability. The collaborative agreement between USAID and PFAN does not mention gender nor have any subsequent modifications. This does not mean that PFAN will not have a measurable gender impact. Thus, gender differences to the extent they are measurable cannot be attributed to PFAN but rather the underlying conditions of the countries in which PFAN works.

Conclusion 14. It was not possible to separately report the quantitative measures of performance and effectiveness on a gender basis because (a) PFAN does not collect and report data on that basis and (b) too few closed projects answered the survey to provide meaningful estimates.

The quantitative measures of performance and effectiveness need to come from survey responses or PFAN data sources on closed projects. There were too few survey responses to develop any quantitative measure, and the evaluation had to rely on the PFAN pipeline data. PFAN does not collect or report data on a gender basis.

This did not mean that other quantitative or qualitative data was not available. Where data permits, we describe the gender characteristics of PFAN and answers to important qualitative areas disaggregated by gender.

Overall, female participation⁴⁷ in the PFAN survey is 11 percent, as depicted in Table. The highest representation of females is in the area of coaches (18 percent), and the lowest is among FIs, where no female representatives took part in the survey.

Table 20: Gender Representation in the PFAN Survey

	Operational Partner	Coaches	Resource Partner	Developer	Financial Partner	Total
	n = 20	n = 19	n = 10	n = 72	n = 5	
Female	5.0%	18.2%	11.1%	11.7%	0.0%	10.9%
Male	95.0%	81.8%	88.9%	88.3%	100.0%	89.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Some notable differences appear in the characteristics of these developers based on gender as shown in Table 19 below. Fewer woman owned developers have obtained financing prior to PFAN, but as a group more are pursuing multiple CE projects than male only owned or mixed ownership developers.

Table 14 Selected Characteristics by Gender

Characteristics	Male	Female	Mixed
Sought & Obtained Financing Prior to PFAN	54%	44%	46%
Percent Pursuing Multiple CE Projects	70%	92%	83%

More telling is how they see barriers to CE investment. Table 15 indicates an interesting difference. Women acknowledge that the lack of experience in developers is a major obstacle and see collateral requirements as the major barrier to CE. Neither male nor mixed ownership see lack of experience in developers as a major issue. Both view the lack of interest of banks in CE as the major barrier.

Table 15 Ranking Barriers to CE Investment⁴⁸

Barriers	Male	Female	Mixed
Lack of favorable government policies	2		2
Collateral requirements too high	3	1	2
Banks not interested in clean energy	1	2	1
Project Developers not experienced in business aspects such as completing a business plan		2	

⁴⁷ Clearly gender deals with more than just differences in sex but these differences are not directly encompassed in PFAN data.

⁴⁸ A rank of 1 means that more respondents chose this barrier than any others. In some cases, there were an equal number of respondents per barrier and so they have been equally ranked.

Finally, when we asked if PFAN was successfully addressing the barriers to CE, 64% of women developers answered yes compared to their male counterparts (59%) and the mixed ownership at 54%. This does not provide a clear implication that PFAN's approach to addressing barriers to CE are more helpful by sex of ownership.

Conclusion 15. Available data suggest PFAN may have a neutral to positive impact on end-use beneficiaries from a gender perspective.

While PFAN was not designed to directly address gender issues, by focusing on the triple bottom line, PFAN will address some aspects of gender-related issues. For example, projects that target rural energy access or projects that focus on cooking technology and fuels will generally disproportionately impact women and children. dTS's analysis of the pipeline indicates that there are at least 42 projects⁴⁹ with benefits that are disproportionately female-oriented. This represents a little more than 10 percent of the total investment value of the pipeline. Aside from the end-use beneficiaries of PFAN projects, PFAN has gender implications in project ownership. According to the survey, 11 percent of project developers are female and another 32 percent of projects are jointly owned by male and female partners.

4.6 SUSTAINABILITY AND REPLICATION

Evaluation Question 6. What is the performance of PFAN participants post-financial closure, including reaching and maintaining operational status, replicating or expanding business, and producing co-benefits for themselves or their communities?

Evaluation Question 7. In what ways can PFAN change or update the program's design or implementation, either in its current form or as the program transitions to a self-supporting entity?

This section focuses on several types of sustainability and replication. The two types of sustainability are from the investment or project side and from the program side, or PFAN itself. Replication examines replication or expansion by the project beneficiaries, the financial institutions, and coaches.

4.6.1 PERFORMANCE OF PFAN PARTICIPANTS AFTER FINANCIAL CLOSURE

Conclusion 16. Insufficient data exists to definitively conclude the degree to which the closed projects have started operations and will remain in operation.

PFAN does not keep records on the number of projects that begin operations, nor is it required to do so. In general, projects that reach financial closure will start operations. In the case of many of these types of CE projects, the start of operations is not nearly as important as the continued operations over the midterm. This is when the issues of service delivery, maintenance, and consumer valuation of service come full stage and when the project developer and the concept are severely tested. This information had to be determined by survey.

⁴⁹ These include projects for cookstoves, biogas dedicated for rural poor, off-grid generation for the poor, and similar access projects. The evaluation erred on the side of undercounting gender benefits.

When projects are commercially financed, as they are through PFAN, the financiers have an incentive to work with the project to ensure that it continues to operate and service its financial obligations.

Only four of the 49 closed projects responded to the survey and none responded to dTS's post-survey outreach to gather the required information. Both of these projects having reached financial closing also have started operations.

4.6.2 UPDATING OR TRANSITIONING PFAN TO A SELF SUPPORTING ENTITY

This section discusses the “updated” PFAN as a self-supporting or self-financed entity. In this context, updated means that the basic public-private nature of PFAN is maintained but its scope is changed. First, updating within the existing focus on the project developer is addressed and then this section looks at where PFAN can expand. The last section looks at PFAN as a self-supporting entity financed entirely or mainly from services.

Conclusion 17. If the objectives of PFAN remain valid (both to broaden access to and increase the financing of CE projects), then stakeholders should consider “updating” PFAN as an alternative to transitioning it to a self-supporting entity. The results of this survey and other studies point to the fact there are serious market imperfections in the policy, financial, and business prongs. Addressing directly only one of these, as PFAN does will mean that a fully self-supporting PFAN will reach far fewer projects.

Conclusion 18. There are several important ways that PFAN can be updated: by expanding the current business role to include assistance in financial closing, including negotiations; expanding PFAN to work in one or more of the remaining prongs, (policy and finance); or aligning PFAN to support other donor- and IFI-funded projects that focus on the policy or finance prongs.⁵⁰

An Updated PFAN⁵¹

There are several important areas where PFAN could be “updated.” First, it is clear that just as developers need assistance with formulating a business plan, structuring the project or meeting investors, they lack strong skills in financial negotiations. PFAN's coaching could continue through this to final financial closure. This would give PFAN greater influence over the entire process and would lead to more accurate reporting. In an example of problems with accurate reporting, at least one project reported by CTI to have reached financial closure indicated, when contacted about the survey, that they had not yet closed.

Second, PFAN is mainly addressing one prong of the CE challenge. The penetration or replication from PFAN investment depends upon the capacity of the developers and financial institutions that appear to be quite limited. Much of what PFAN does or attempts to do is to compensate for market failures, account for externalities, and address the divergence between socially optimal CE investment and market outcomes.

Third, it is clear that barriers remain in the other prongs. One option is for PFAN to continue the work it does so well in the business prong while simultaneously working in markets alongside other programs that address financial and policy barriers, i.e. programs that are aligning their work with other donor projects that address these other barriers.. For example, the IFC has a sustainable energy finance program in the

⁵⁰ PFAN has begun this to a limited extent in its cooperation with Renewable Energy and Energy Efficiency Partnership in the Phased Financing Facility. This facility is an early-stage funding mechanism and gets at the barriers mentioned by many of the survey respondents but does not directly address investment financing.

⁵¹ Any discussion of an updated PFAN that considers an expansion of its role will of necessity need additional funding.

Philippines with Bank of the Philippines Islands and Banco De Oro. PFAN might work with those Banks as financial partners for some of its Philippine projects. This combined effort could reduce time to closure and bring additional projects into the pipeline at the same time.

Finally, there is the question of payment. It is clear that PFAN services are valued and, judging from the interviews, that partners are willing to pay some fee to participate. While this may be insufficient to cover all of PFAN's costs, it could defray a portion of expenses. A successful program paid jointly by financial partner and project developer at the time of closing is one alternative that is recommended based on the experience of E+CO (see below).

Transitioning PFAN to Stand Alone

To address if and how PFAN can be transitioned to a self-supporting entity, it is important to understand why PFAN exists. Why isn't the private sector providing these services or providing them to the extent that the PFAN project is providing them?

PFAN exists for two reasons. The first reason is that market failure creates a number of barriers to increased CE penetration, and PFAN exists to address a combination of those barriers, primarily in the business prong. Based on the results of this survey, it is apparent that PFAN services also indirectly address some of the financial barriers.

The second reason is that donors and IFIs believe that the socially desirable level of CE investment is greater than what the market would produce. PFAN is one of the programs designed to achieve a socially desirable outcome.

PFAN Services

On the surface, PFAN is about providing assistance to CE project developers. It is readily apparent that PFAN builds capacity in CE businesses to develop projects and complete the investment application process in a manner acceptable to investors and lenders. It does this through coaching services that it offers at a subsidized rate.

But the program has other benefits as well. The capacity of coaches is developed and their reputation strengthened as successful providers of business advice. One hundred percent of coach respondents indicated that their participation with PFAN had improved their ability to help bring projects to financial closure, and 60 percent reported that their business had increased as a result of their participation with PFAN.

Further, PFAN is reducing the search costs for developers, coaches, and financial entities. Financial institutions listed some form of reduced cost as their major reason for participating in PFAN.

Finally, PFAN is providing a service to donors. Donors believe that the ideal level of social investment in CE is greater than what the market will deliver, so they invest in programs like PFAN.

Are Markets Ready?

The demand for PFAN services is a function of the cost of its services, the presence of substitutes for its services, the demand for clean energy compared to traditional energy, and many other factors.

There are a number of substitutes at both the financial entity and project level for PFAN. First and foremost are competing PFAN platforms like USAID direct PFAN contracts. These offer similar services to this cooperative agreement. Second, there are programs like IFC's Sustainable Energy Finance facilities that work through commercial banks and offer free or subsidized technical assistance. Third, there are numerous clean

energy donor projects from a large variety of donors including the German Agency for International Cooperation (GIZ), USAID, United Kingdom's Department for International Development (DFID), the Swiss Agency for Development and Cooperation (SDC), the French Development Agency (AFD), and international finance institution projects such as the World Bank and Asian Development Bank. While these are not perfect substitutes to PFAN, they address CE market barriers, provide finance and technical assistance, and would compete with a fully self-supporting PFAN.

Conclusion 19. The presence of donor- and IFI-funded CE promotion programs is likely to reduce significantly the demand for PFAN services from the better CE projects, as stronger and price-sensitive project developers instead attempt to get more heavily-subsidized assistance elsewhere. At the same time, the need to become 100 percent self-financing will force PFAN to look at the best of the projects, those which could likely obtain financing independently, albeit at a slower pace, while leaving the majority of projects behind. It is likely that fewer and smaller projects will be the result.

Learning from Past Experience

E+CO was close to the PFAN model except that it was able in some cases to provide financing itself, and in many cases the cost of debt or equity to the developer was at market rates. The hallmark of the program was its technical assistance designed not only to bring projects to closure but to stay with projects to make sure that they were operational and profitable. Similarly, E+CO focused on the triple bottom line. The company won numerous finance awards, was cited as a model for innovation, and was a favorite of the donor and IFI community. Evaluations of E+CO implemented projects were solid. Yet, in 2012, E+CO went into reorganization.

"[The] core issue was how to finance the technical assistance that entrepreneurial ventures in developing countries need to be successful and repay their bills....The challenge is how do you fund the technical assistance to de-risk these investments?"⁵²

This is not to say that PFAN will necessarily go the same way if funding is reduced entirely or significantly. PFAN is, however, likely to encounter the same problems faced by E+CO. Those problems were the following.⁵³

- E+CO was viewed by some developers as an extension of donors, so developers believed they did not need to pay for assistance even when they agreed to do so;
- As E+CO became more successful, the next tier of projects was smaller and per-unit transaction costs increased significantly; and
- As E+CO moved from technical assistance provided through donor grants or paid for by donors to a model that required E+CO to recover funding, the "better projects" transitioned to donor-funded assistance where available.

⁵² Quote from Christine Eibs Singer former CEO of E+CO: "E+CO Avoids Liquidation, Barely, and Emerges Persistent," by David Bank, *Huffington Post*, 10/03/2012, last referenced 01/21/2015 at http://www.huffingtonpost.com/david-bank/eco-avoids-liquidation-ba_b_1932503.html.

⁵³ Source: M.W. Addison notes from the evaluation of E+Co, 2009.

4.7 RECOMMENDATIONS

Most of the recommendations revolve around the collection of data and the need to occasionally evaluate the PFAN model and approach. The implicit assumptions in the way that PFAN has operated are that the underlying basis, the operating procedures, and PFAN's performance are optimal. These assumptions need to be empirically verified.

4.7.1 MONITORING AND EVALUATION

Recommendation 1. Consider funding PFAN to develop an appropriate performance monitoring plan, collect data, evaluate key areas of PFAN, and make mid-course corrections if necessary.

As illustrated throughout this report, there were limits on data available to thoroughly address all evaluation questions. Thus, there are a number of areas where additional data⁵⁴ should be maintained so that performance can be monitored to better or further evaluate, on issues such as:

- Testing the key hypotheses underlying PFAN's model;
- Determining if all projects accepted into the pipeline should remain there;
- Better maintaining separate costs for activities to allow for measuring the cost effectiveness of establishment and maintenance of lender/developer relationships;
- Understanding the application rates or rejection rates; and
- Determining where greater weighting in service areas will reduce time to closure, increase the number of closings, or attract additional financiers to the program.

To facilitate better evaluation of these issues, PFAN needs to collect additional general operational and financial data on all projects that apply in addition to those projects it supports, on closures and not just pre-closures, and on closed projects until they reach stable operations. One way of collecting the information is a contractual agreement to continue to provide data after closure in return for PFAN services or even in return for consideration for PFAN services. The latter approach, if feasible, could help build a database for a counterfactual at least at the bottom end of the quality distribution.

4.7.2 PERFORMANCE

Recommendation 2. USAID and other PFAN supporters should decide if both of PFAN's objectives are still relevant and then use the performance indicators to specifically address the outcome of this exercise.

Considerable thought likely went into developing the two PFAN objectives. USAID's performance indicators may support only one of PFAN's two objectives, secure more private sector finance for CE projects. Securing more private sector finance might lead PFAN to choose developers that already have some finance, already have projects in the PFAN pipeline or already have successful experience with closing projects over other developers. The full implications of this have not been investigated. USAID and other PFAN supporters should decide if both of PFAN's objectives are still relevant, use the performance indicators, and, if necessary, tailor new, appropriately-scoped and manageable performance indicators.

⁵⁴ This data, hopefully ex post, includes ownership by gender, co-benefits, and other GCC metrics such as MWs installed capacity and GHGs avoided.

4.7.3 EFFECTIVENESS

Recommendation 3. PFAN should attempt to collect data on closures from the parties that actually sign the closure documents.

Recommendation 4. PFAN should consider adding to its process routine exit interviews or surveys with closed projects to ascertain their performance and issues surrounding startup and operations.

This evaluation attempted to measure PFAN's role in financial closures but insufficient data was provided from PFAN and too few closed projects participated in the survey or the interview to objectively evaluate how to improve effectiveness and speed in reaching closure. PFAN should consider adding to its process routine exit interviews or surveys with closed projects. This feedback can allow PFAN to ascertain their performance and issues surrounding startup and operations and address inefficiencies in project implementation. PFAN should also collect data on closures not from the coaches but rather from the parties that sign the closure documents – the financial institutions and project developers – as the coach leaves the process before closure is reached.

Recommendation 5. USAID should considering additional funding that would allow PFAN to address remaining barriers in the business area such as negotiations and assistance for financial closure.

4.7.4 SUSTAINABILITY AND REPLICATION

Recommendation 6. Consideration should be given to a scenario in which PFAN moves to a partially self-supporting model. Moving to a fully self-supporting model would diminish the reach of PFAN.

There are two aspects of sustainability that PFAN needs to address. The first aspect is the sustainability of the clean energy investments. The response rate on closed projects was too low to draw any meaningful conclusions on sustainability given the lack of additional data on projects after closure. The second aspect is the sustainability of the PFAN program itself.

To move to a purely self-supporting model for PFAN is likely to cause a significant shrinkage in PFAN's impact and a loss of much of the effectiveness from the structure that has been built. By viewing PFAN components separately rather than as a whole, a model of continued support of key elements of PFAN is likely to better leverage donor investments, maintain institutional structures already installed, and continue the impact on the underlying issue of CE finance barriers. Partial assistance would also allow CTI to test how far PFAN can be self-sufficient before becoming uncompetitive relative to other donor-funded programs. It might do so, for example, by offering variable cost-shares to study elasticity of demand for its services.

The very existence of PFAN acknowledges the fact of social objectives of donor countries that are not borne out in markets; the basis of the PFAN program is on this market failure. The former can be considered at least partial justification for maintaining some continued assistance unless and until the markets in developing countries reflect the social values of donor countries, and something that PFAN could not recoup in fees until such time. The latter, the assumption of market failure in investing in clean energy projects in the developing and transitional context, is an area where PFAN can begin to collect fees.

4.7.5 GENDER

Recommendation 7: There are several ways USAID could consider to promote gender in PFAN, but each has restrictions, costs and ramifications for PFAN as a program that USAID should weigh.

First, it is clear that female developers want and need additional coaching services. USAID could provide additional funding to strengthen the services. This might mean more coaching time and might include coaching areas where PFAN does not normally work such as legal advice.

Second, PFAN's reputation is one of the reasons of its success. That reputation is founded on selecting, improving, and uniting viable CE projects with serious financiers. Anything that results in PFAN attracting and promoting marginally viable projects can result in damage to that image.

If there are times when the supply of viable projects exceed PFAN resources and some projects are not accepted into the program, preference could be given on the basis of sex of applicant(s). This would be one way of promoting empowerment of female developers in the delivery of PFAN services without damaging its reputation. One way to do so would be selection on an ownership basis with a gender weighting. Another method is not in the selection based on ownership but rather on the downstream benefits of the project, based on gender impacts. Viable projects having greater benefits specifically for women, children and/or disadvantaged groups (e.g. improved morbidity and mortality rates in women and children due to reduced pollution from clean cooking fuels) could be given greater weighting. Similarly, in the selection of coaches, preference could be given on a gender basis with additional training as needed.

In those cases where the number of viable projects is not restricted due to funding constraints, inclusion as selection criteria of additional factors not linked to project viability (such as gender), by definition would result in the selection of less-financially viable projects. There are a few ways that gender consideration could be considered without damaging PFAN's reputation for selecting viable projects. One, PFAN might seek to target some social/green funds where gender is a consideration in their portfolio selection. Generally, these social/green funds expect lower rates of return and thus what would be marginal for purely for-profit financiers may not be marginal for these entities. PFAN would entail search costs to locate and then convince these funders of the value of looking for projects graduating from its program. CTI and USAID would need to consider whether this requires additional funding for this effort.

Two, USAID could set aside funds for PFAN both for the business TA and for financing these marginal investments at a subsidized rate. This would mean that PFAN's reputation for meeting the needs of investors would remain intact. However, the challenge here is to find a vehicle to administer the fund. It would not be PFAN, because that is not PFAN's specialty.

Three, CTI could examine whether additional focus on female-led or co-led projects could be provided at existing investor fora or through organizing additional investor fora highlighting only those projects. Finally, USAID could attempt to get PFAN to attract more marginally-viable projects on a gender basis. That may cause PFAN to consider whether or not to accept USAID funding and could call into jeopardy the work that USAID and PFAN are doing together.

Recommendation 8: USAID should consider how women's empowerment and disadvantaged people could be meaningfully integrated in follow-up activities for PFAN or similar programs in future cooperative agreements. This consideration should account carefully for the tradeoffs between promoting consideration of additional social inclusion factors and commercial viability and the likely effect on CE investments given the context of clean energy project finance.

As discussed in greater detail above, PFAN's reputation is founded on a track record of finding, promoting and uniting financially viable CE projects with financiers. Any approach that USAID takes to promoting gender considerations that move PFAN's focus away from the most viable projects will require additional resources and attention from PFAN both in terms of mentoring and perhaps for financing less viable

projects. If USAID is interested in setting social targets, USAID should review how its cooperative agreement is designed and consider subsidized financing that might correct for social targets. However, to the extent that the supply of right projects is larger than that which PFAN could fund, PFAN could weight more heavily during its selection process gender of ownership in its decision criteria.

Recommendation 9: USAID could alter its collaborative agreement with PFAN. This update could include instructions on considering gender, having gender related targets (developed together with CTI), provide the additional funding for PFAN to undertake the analyses and to recommend how best to include USAID's gender considerations and targets. dTS has given several ways that this might be accomplished without accepting marginally viable projects and affecting PFAN's reputation for promoting financially viable CE projects. It is believed that PFAN is in a better position to recommend to USAID which of these is best suited for results.