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I. Introduction

Initiated in 1993 as part of the U.S. Climate Change Action Plan, the U.S. Initiative on Joint Implementation (USIJI) supports the development and implementation of voluntary projects between U.S. and non-U.S. partners that reduce, avoid, or sequester greenhouse gas (GHG) emissions. Final groundrules for the USIJI Program,[1] published in 1994, describe the purpose of the pilot program, outline the time line for evaluation and reassessment of the program, define eligibility criteria for domestic and non-U.S. participants, establish an Evaluation Panel to review potential USIJI projects, and define criteria for acceptance of projects into the USIJI portfolio.

Projects accepted into the USIJI Program are evaluated against nine criteria and four other areas of consideration. The criteria require that each project accepted into the USIJI Program demonstrate that it:

- has the acceptance of the host country government;
- will reduce or sequester net GHG emissions;
- was developed or realized because of the USIJI Program;
- provides data and methodological information sufficient to measure emissions with and without the project;
- provides for tracking and verifying the emissions reduced or sequestered by the project;
- identifies associated environmental and developmental benefits;
- and provides assurance that benefits gained will not be lost over time.

These criteria are intended to identify those projects that support the development goals of the host country while providing GHG benefits beyond those that would occur in the absence of the joint implementation activity. The criteria have been formulated to ensure that projects accepted into the program will produce real, measurable net emissions reductions. Net emission reductions achieved as a result of USIJI projects will be measured, monitored, verified, and reported.

The USIJI Program is directed by an Interagency Working Group, chaired by the Department of State, which has the primary responsibility for policy development. The USIJI Evaluation Panel is co-chaired by the Environmental Protection Agency and the Department of Energy, and includes representatives from the

Agency for International Development and the Departments of Agriculture, Commerce, Interior, State, and Treasury. The USIJI Secretariat, an interagency staff, supports the day-to-day operation of the USIJI Program. Technical experts are drawn from a variety of organizations to assist the Secretariat in the proposal review process and to provide technical assistance to project developers.

The USIJI Secretariat offers a variety of technical services to support both the development and the implementation of USIJI projects. These technical services include:

(1) technical assistance to aid project developers in calculating emission reduction benefits, developing monitoring and verification plans, and identifying sources of project financing;

(2) capacity building to support human and institutional capacity building for joint implementation in select countries around the world; (3) information resources including technical guidance documents, databases, a fax-on-demand service, an information hotline, and an Internet site; and (4) public recognition to help project participants increase the visibility of their participation in the program.

The USIJI Secretariat accepts project proposals at any time, and will provide limited technical assistance to project developers to help address USIJI project evaluation criteria and other considerations as specified in the USIJI Groundrules. A formal proposal evaluation and acceptance process is conducted approximately three times per year.

The first four years of the USIJI Pilot Program have provided valuable experience in testing and refining methodologies for designing, implementing, and evaluating GHG mitigation projects. A great deal has been learned in working with multiple international partners in the public and private sectors in a number of countries and across several project sectors. For example, host country acceptance is a good proxy for whether a particular project is compatible with that nation's development goals. There is a basis for preliminary criteria for determining whether a project is “additional," for guidelines for assessing non-GHG impacts associated with projects and for a measurement and verification protocol, and for tools to evaluate whether GHG benefits may be lost or reversed over time. Analysis of project cost data indicates that it is not yet meaningful to compare totals across projects in an effort to assess their relative cost-effectiveness. There are simply too many differences in presentation and substance, and project developers have indicated that certain cost data are confidential.

While the USIJI Program is pleased with the progress of USIJI and the AIJ pilot phase, it is clear that in the absence of credits, investments in JI projects will not reach the level necessary to fully realize the potential of this concept. Although the experience gained from the 25 USIJI projects accepted to date

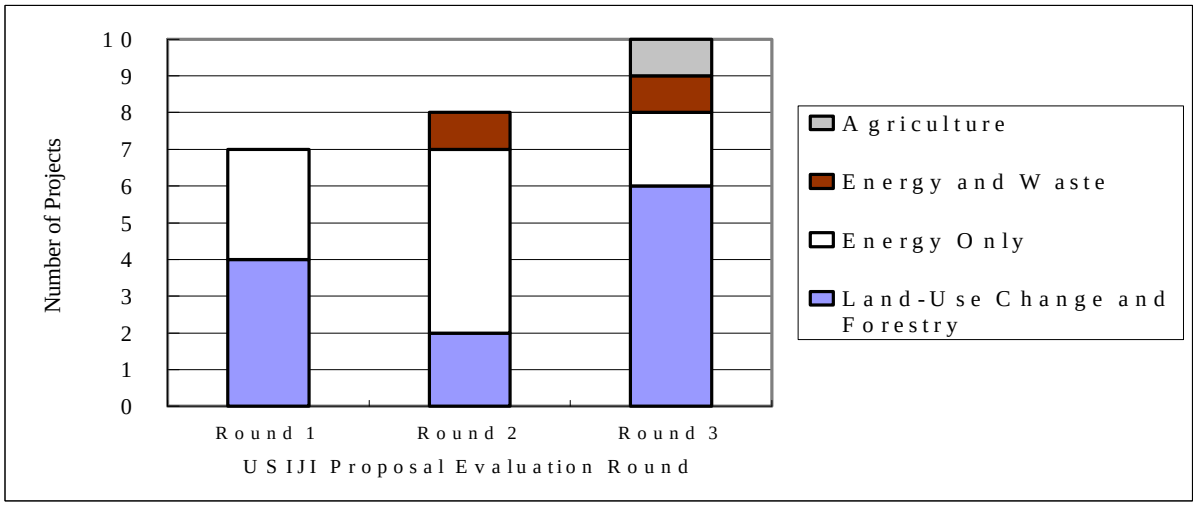
provides a useful foundation for developing criteria for crediting GHG reductions achieved by JI projects, additional work will be needed to develop standard criteria that can be applied successfully to a broad range of projects. However, this should not prevent making a decision to adopt credited JI in the near future.

II. Summary of USIJI Projects

As of June 30, 1997, the USIJI Program had conducted three rounds of proposal evaluations and accepted 25 projects from 11 countries. Seven proposals were accepted in Round 1 (announced in February 1995), eight in Round 2 (announced in December 1995), and ten in Round 3 (announced in December 1996). The following countries are currently hosting USIJI projects: Belize (2), Bolivia (1), Costa Rica (8), Czech Republic (1), Ecuador (1), Honduras (3), Indonesia (1), Mexico (2), Nicaragua (1), Panama (1), and the Russian Federation (4).

As the USIJI Program has grown, it has continued to diversify in terms of both the number of participating host countries and the type of project activities. The third round of proposal evaluations resulted in the addition of projects in five new countries-Bolivia, Ecuador, Indonesia, Mexico, and Panama-to the USIJI program. The 25 USIJI projects accepted to date span four principal sectors: twelve projects are classified as land-use change and forestry projects, ten are classified as energy projects, two are classified as both energy and waste projects, and one is classified as an agriculture project. Figure 1 presents the types of USIJI projects according to the evaluation round in which they were accepted.

Figure 1. USIJI Projects by Sector and Proposal Evaluation Round



Within each sector, many types of project activities are used to achieve GHG emission benefits. In the land-use change and forestry sector, project activities range from forest preservation, forest regeneration, afforestation, and silviculture to agroforestry, sustainable timber harvesting and the manufacture of durable wood products. In the energy sector, project activities include fuel switching, energy efficiency

improvements, cogeneration, capture of fugitive emissions, and alternative energy generation. The two multi-sector projects involve the conversion of biomass waste to energy. The agriculture project involves crop management for the accumulation of soil carbon.

Although carbon dioxide ($C0_2$) is the primary greenhouse gas addressed in most USIJI projects, one project exclusively targets methane (CH_4) emissions and another reports both $C0_2$ and nitrogen oxides (NO_x) emission benefits. Over a 60-year period, the 25 USIJI projects are anticipated to generate GHG benefits totaling at least 136 million metric tonnes of $C0_2$,[2] 1.3 million tonnes of CH_4, and 4,900 tonnes of NO_x. Individual project benefits are expected to accrue over project lifetimes that vary from 12 to 60 years.

The USIJI projects involve a broad range of participants and are funded through a variety of mechanisms. The project participants include government ministries and agencies, non-governmental organizations, private-sector companies, universities, research institutes, and financing organizations. The sources of project funding include the sale of carbon offsets; revenues generated directly by project activities, such as the sale of timber, other biomass resources, and energy; investment capital from private-sector companies; loans provided by commercial banks and multilateral organizations such as the International Finance Corporation; government incentives; endowments; and grants.

All 25 USIJI projects have been formally accepted by the government of their host country, a requirement for their acceptance into the USHI Program. In each case, host country acceptance has been documented in a letter from the designated national authority of the host country. Of the 25 projects, 15 are classified as “in progress," indicating that activities associated with project implementation have begun on site. This could mean, for example, that although project implementation activities (e.g., construction and planting) have begun, GHG benefits have not yet necessarily begun to accrue. The remaining projects have not yet initiated on-site activities, and are classified as “mutually agreed." In several cases, difficulties in obtaining funding and/or overcoming logistical or technical obstacles have delayed project implementation.

A summary of the 25 USIJI projects is presented in Table 1 .

[2] *The total GHG benefits will be determined by the level of project funding received.*

Table 1. Summary of USIJI Projects

Tile of Project	Type of Activity	Stage of Activity[1]	Remarks Project life[2]	GHG Benefits(tonnes)[3]			
				CO2	CH4	N2O	Other
Belize							
BEL/Maya Biomass Power Generation Project	Energy: alternative energy generation (biomass)	Mutually agreed	31 years	3,418,444			4,860(Nox)
Rio Bravo Carbon Sequestration Pilot Project	Land-use change and forestry : forest preservation, sustainable harvesting, reduced impact logging, silviculture, fire management, manufacture of durable wood products	In progress	40 years	6,023,992			
Bolivia							
Noel Kempff Mercado Climate Action Project	Land-use change and forestry : forest preservation, reforestation, park expansion, and sustainable forest product enterprise development	In progress	30 years	53,190,152			
Costa Rica							
Aeroenergia S.A. Wind Facility[4]	Energy: alternative energy generation (wind)	In progress	21 years + 1 month(with possible extension)	36,194			
Dona Julia Hydroelectric Project[4]	Energy: alternative energy generation (hydroelectric)	In progress	15 years (with possible 5 year extensions)	210,566			
ECOLAND: Piedras Blancas National Park	Land-use change and forestry : forest preservation and natural regeneration	In progress	16 years	1,342,733			
Klinki Forestry Project	Land-use change and forestry : afforestration, reforestation, silviculture	In progress	46 years	7,216,000			
Plantas Eolicas S.A. Wind Facility	Energy: alternative energy generation (wind)	In progress	21 years + 5 months	397,173			

Tile of Project	Type of Activity	Stage of Activity[1]	Remarks Project life[2]	GHG Benefits(tonnes)[3]			
				CO2	CH4	N2O	Other
Project BIODIVERSIFIX	Land-use change and forestry : reforestation, fire management, anti-poaching operations	Mutually agreed	51 years	18,480,000			
Project CARFIX: Sustainable Forest Management[4]	Land-use change and forestry : forest preservation, forest regeneration, reforestation, silviculture, sustainable harvesting, reduced impact logging	In progress	25 years	21,776,749			
Tierras Morenas Windfarm Project	Energy: alternative energy generation (wind)	Mutually agreed	13 years + 11 months(with possible 5 year extensions)	296,761			
Czech Republic							
City of Decin: Fuel-Switching for District Heating	Energy: fuel-switching, energy efficiency improvements, cogeneration	In progress	26 years + 8 months	607,150			
Ecuador							
Bilsa Biological Reserve	Land-use change and forestry : forest preservation	Mutually agreed	30 years	1,170,108			
Honduras							
Bio-Gen Biomass Power Generation Project, Phase 1	Energy, waste: alterative energy generation (wood waste)	In progress	21 years	2,373,940			
Bio-Gen Biomass Power Generation Project, Phase 2	Energy, waste: alterative energy generation (wood waste)	In progress	21 years	2,373,940			
Solar-Based Rural Electrification in Honduras	Energy: alternative energy generation (solar)	Mutually agreed	24 years	17,192			
Indonesia							
Reduced Impact Logging for Carbon Sequestration in East Kalimantan	Land-use change and forestry :reduced impact logging	Mutually agreed	40 years	134,379			

Tile of Project	Type of Activity	Stage of Activity[1]	Remarks Project life[2]	GHG Benefits(tonnes)[3]			
				CO2	CH4	N2O	Other
Mexico							
Project Salicornia: Halophyte Cultivation in Sonora	Agriculture: Salicornia cultivation and crop management, technical analysis of soil carbon accumulation and commercial feasibilty of Salicornia cultivation	In progress	59 years + 7 months	1,080			
Scolel Te: Carbon Sequestration and Sustainable Forest Management in Chiapas	Land-use change and forestry : agroforestry, reforestation, sustainable harvesting, silviculture	In progress	30 years	55,000-1,210,000			
Nicaragua							
El Hoyo-Monte Galan Geothermal Project	Energy: alternative energy generation (geothermal)	Mutually agreed	37 years + 6 months	14,119,469			
Panama							
Commercial Reforestation in the Chiriqui Province	Land-use change and forestry : reforestation	Mutually agreed	25 years	57,640			
Russian Federation							
Reforastation in Vologda	Land-use change and forestry :assisted natural regeneration	Mutually agreed	60 years	858,000			
RUSAFOR-Saratov Afforestation Project	Land-use change and forestry : afforestation and reforestation	In progress	40 years (Sites 1 & 2); 60 years (Sites 3 & 4)	292,727			
RUSAGAS: Fugitive Gas Capture Project	Energy: capture of fugative methane emmissions	In progress	27 years + 7 months		1,263,500		
Zelenograd District Heating System Improvements[4]	Energy: energy efficiency improvements	Mutually agreed	30 years	1,575,840			
TOTAL				136,025,229-137,180,229[5]	1,263,500		4,860(Nox)

(1) The following definitions are used for these categories:

Mutually agreed = accepted USIJI proposal; activity is agreed between all Parties involved (designated national authorities), but project activities have not begun on site.

In Progress = any stage of activity between “mutually agreed” and “completed”

Completed = Project is finished/terminated

(2) Project life refers to the estimated functional lifetime of the project, not necessarily the period over which GHG reductions are estimated to occur.

(3) Reduction estimates are made by project developers. Estimates are in metric tonnes, full molecular weight basis. The USIJI Program does not accept these estimates per se, but will be monitoring and verifying emissions reductions as they are attained.

(4) Although the information on this project that is contained in this report is based on the project proposal and other material provided by the project developer, the developer has not yet reviewed this report.

(5) Actual reductions achieved will depend upon the amount of funding received.

III. Discussion of Key Issues

One of the primary goals of the ongoing Activities Implemented Jointly (AIJ) pilot phase of Joint Implementation (JI) is to test and evaluate methodologies for the design, implementation, monitoring, and verification of GHG mitigation projects involving multiple international partners in the public and private sectors. The practical experience gained by developing 25 pilot AIJ/JI projects involving the United States and 11 other countries offers valuable insight into the potential benefits offered by AIJ/JI and the challenges that must be addressed in order to achieve those benefits. The following issues have been identified as particularly critical to designing and implementing successful AIJ/JI projects; (1) determining the compatibility of the project with host country development goals; (2) determining the additionality of project benefits; (3) quantifying project costs; (4) measuring GHG emission benefits; (5) identifying non-GHG project impacts; (6) monitoring and verifying project results; (7) preventing the loss or reversal of project benefits; and (8) crediting emission reductions.

Although the USIJI Program requires that project proposals address most of these issues, the program does not mandate the approaches that must be taken. Therefore, different strategies are currently being used, even by projects with similar activities in the same sector. The comparative effectiveness of these strategies will become clearer as the projects reach maturity and as the program, consultants, academics, and others continue to conduct research on these issues. The following discussion highlights some of the questions raised, strategies applied, and lessons learned to date.

1. Determining the Compatibility of the Project with Host Country Development Goals

The developers of all 25 projects have demonstrated that their projects are compatible with the development goals of the host country. A broad range of development goals may be relevant to, and affected by, USIJI projects; these goals can include national targets for GHG emission reductions, improvements in energy efficiency, forest conservation, biodiversity and watershed protection, and sustainable economic development. The foremost method for documenting the compatibility of USIJI projects with host country development goals is obtaining a letter of host country acceptance of the project. As discussed above, this letter is a requirement for acceptance of the project by the USIJI Program. In addition, some project developers have further demonstrated how their project is consistent with host country regulations, laws, and policies, as well as with any bilateral agreements between the host country and the United States to cooperatively promote GHG emission reductions and sustainable development. This is a pivotal requirement

for a successful project and data on existing projects indicate that assuring this criterion is met can be accomplished using existing procedures.

2. Determining the Additionality of Project Benefits

Several of the USIJI project criteria are intended to ensure that the GHG benefits associated with USIJI projects are additional to what would have occurred otherwise. This concept, known as “additionality", is critical to determining whether commitments to achieve net emission reductions have been met specifically through the implementation of USIJI projects. As with the determination of a credible reference scenario, the determination of additionality involves analysis of past and current trends that are extremely complex and difficult to identify and document. For the purpose of analysis, the USIJI Program has divided the concept of additionality into three components: emissions additionality, financial additionality, and program additionality. The technical issues surrounding additionality and its components are also areas where the USIJI program is currently conducting and sponsoring research. The primary goal of this research is to develop widely applicable methods for the determination of additionality.

Emissions Additionauty

In order to demonstrate emissions additionality, project developers are requested to develop emissions estimates for the reference and project scenarios. To be credible, the reference scenario projections should be consistent with (1) prevailing standards of environmental protection in the country involved; (2) existing business practices within the particular sector of industry; and (3) trends and changes in these standards and practices. Project developers must clearly demonstrate that the project will generate GHG benefits above and beyond those in the reference scenario. Some of the challenges associated with developing credible emissions estimates for the reference and project scenarios are discussed in the section “Measuring GHG Emission Benefits" below.

Financial Additionality

USIJI projects should not represent the simple repackaging of federal or multilateral funds that would have been available in the absence of the USIJI Program. Therefore, project developers are requested to demonstrate that their project funding is independent of, or in addition to, funding from the financial instrument of the FCCC (i.e., the Global Environment Facility), Official Development Assistance (ODA), U.S. government funding available in fiscal year 1993, and funding from multilateral development banks.

In some cases, the process of demonstrating financial additionality has been complicated by the use of ODA, GEF, or other non-USIJI-related funding sources either for components of the USIJI project or for a broader initiative from which the USIJI project was developed. For example:

- Several USIJI projects, particularly in the land-use change and forestry sector, are components of larger regional projects funded by ODA, multilateral sources, or grants for activities such as biodiversity or forest conservation. In these cases, the project developers were asked to distinguish clearly between funding used for USIJI and non-USIJI activities. The project developers can claim GHG benefits only for those activities supported by funding that meets the criterion for additionality. In some cases, projects that had used funding from multilateral development banks or ODA in the past were able to satisfy the additionality criterion because that funding had been discontinued and USIJI project activities were to be supported by additional funding from other sources.

- The project developers for one land-use change and forestry project used non-U.S.ODA-funded research to aid in project design, but did not use any of this funding directly for project implementation. Because the research element was separate from project implementation in terms of both the funding source and the funding management, this project was found to meet the USIJI criterion for financial additionality.

- Two related projects funded by loans from the International Finance Corporation were determined to meet the criterion of financial additionality because these loans are provided at or near market rates and are not considered ODA by the U.S. Government or under the standard international definition of ODA adopted by the OECD' s Development Assistance Committee.

Program Additionality

Project developers are asked to demonstrate that their project “was initiated as a result of, or in reasonable anticipation of, USIJI.” Therefore, project developers must demonstrate that, given prevailing regulations, policies, technologies, practices, and trends, their project would not have been introduced in the absence of USIJI.

This criterion required careful consideration in those projects that were a continuation, extension, or component of an existing program that was not initiated as a result of USIJI. In these cases, the project developers had to clearly demonstrate that the particular activities being proposed as USIJI projects had been

initiated in response to USIJI, or that participation in the USIJI Program would uniquely enable the project developers to overcome barriers to implementation, such as a lack of funding, lack of government support, need for technical assistance, or difficulty identifying project partners.

The element of additionality is critical to ascertaining the environmental benefits of a JI project. From projects initiated to date, preliminary criteria may be established, although these will clearly not apply to all projects. A dual scheme, with general standardized additionality criteria and a separate process for individual assessment of promising projects that do not readily meet the standard guidelines, may ultimately be needed.

3. Quantifying Project Costs

The USIJI project criteria do not set any specifications for calculating and reporting project costs. In proposal materials. project developers are requested to provide information on project budgets and actual and potential funding sources only to the extent necessary to determine the additionality of project funding and to demonstrate the viability of the project. The FCCC Secretariat however, is now requesting cost information for JI projects. Ideally, this type of information would enable potential developers and investors, policy analysts, and other interested parties to evaluate the cost effectiveness of GHG mitigation projects, possibly in terms of the cost per ton of CO_2 equivalent emission benefits generated by the project. Although the USIJI Program has encouraged project developers to provide cost information for project development and implementation and has reported this information to the extent it is available, a number of challenging issues need to be resolved before this information can be used to evaluate the cost effectiveness of different JI projects on a consistent basis. These issues include the following:

- Further discussion is needed to define the types of relevant project costs and revenues and to differentiate between the costs and revenues associated with project development and those associated with project implementation.

- Further discussion is needed to develop a uniform cost reporting method that addresses such issues as how to account for variable interest, exchange, and depreciation rates and what discount rate should be applied.

- Some project developers wish to maintain the confidentiality of some or all of their cost data. The provision of partial cost information could complicate project comparisons on the basis of cost.

Because these issues have not yet been resolved, the USIJI Program has not attempted to validate the cost information presented to date on USIJI projects. Therefore, this information should not be used to compare the cost-effectiveness of these projects. The USIJI Program questions whether this may be a private-sector issue, with project costs being irrelevant for JI determination, and cost determination ultimately established by the market.

4. Measuring GHG Emission Benefits

The USIJI project criteria require that project developers provide sufficient data and methodological information to establish estimates of current and future GHG emissions in the absence and presence of project activities (i.e., emission estimates for the reference and project scenarios). This process is often challenging. For example, many projects lack site-specific data and the methods for determining the reference and project scenarios and calculating associated emission benefits vary widely. The USIJI Program is currently conducting research on the technical issues surrounding the measurement of GHG emission benefits. The primary goals of this research include the development of credible, transparent GHG emission benefit estimates for the 25 accepted USIJI projects and the development of widely applicable methods for the measurement of these benefits. Some of the technical issues referenced above are discussed more specifically below.

Data

In many cases, project- or site-specific data on GHG emission sources and sinks were not available to project developers during the proposal preparation process. In these cases, project developers had to rely upon default data obtained from regional, national, or international sources. To correct for inaccuracies resulting from the use of default data, many developers included in their proposal the collection of site-specific emissions and sequestration data as an anticipated USIJI project activity. In some cases, the GHG benefits projected by the developers in the project proposals have been, or will be, revised following the collection of site-specific data

A lack of site-specific data regarding GHG sources and sinks can lead project developers to exclude from their assessment the sources and sinks for which data are not available or which the developers assume to be relatively insignificant. Excluding GHG sources and sinks from project assessments can reduce the accuracy and credibility of the GHG emission benefits attributed to USIJI projects. On the other hand, focusing project

assessments on the most significant and most accurately quantifiable GHG sources and sinks reduces both the reporting burden placed on project developers and, in some cases, the amount of uncertainty and error in the emission calculations. The determination of criteria for identifying “significant" GHG sources and sinks on a project-by-project basis is an important area for further development.

Methodological Information

In order to establish credible reference and project scenarios, project developers must identify the factors likely to influence emissions and sequestration in both scenarios and predict how these factors will evolve during the lifetime of the proposed project. In land-use change and forestry projects, these factors can include the variable demand for land and land-based resources (e.g., timber, food crops, and grazing pasture) due to population growth or migration, changes in the local and national economy, and changes in government land-use policies. In energy projects, these factors can include changes in the demand for, and the supply and cost of, various fuel sources as well as the development of new technologies and government energy policies.

The reference scenario is particularly difficult to formulate and verify because it represents the prediction of future activities that will not take place if the project is implemented. Project developers have generally selected one of three approaches to defining the reference scenario: (1) analyzing past trends and making a credible case that these trends are likely to continue in the future if the project is not implemented; (2) identifying the factors likely to influence future emissions and modeling their effects; and (3) selecting a control area outside the boundaries of the project that can be used to represent and evaluate the reference scenario over time. There remain some outstanding issues regarding the reference scenario. One issue is the extent to which the reference scenario should remain static for the lifetime of the project or should be revised to reflect unanticipated changes in local, regional, or national conditions affecting the project.

In addition to identifying the factors that influence the emissions without and with the project, project developers must attempt to determine the timing of the GHG benefits generated by their projects. This type of information is of particular interest to potential investors. In the cases where project developers estimated only cumulative GHG benefits in the proposal materials, the USIJI Program has worked with the developers to report the flow of GHG sources and sinks on an annual basis. In some cases, annual emission and sequestration estimates reported for USIJI projects are averages derived from estimated cumulative totals over a period of several years. In other cases, emissions and sequestration estimates are developed directly on an annual basis.

Another challenge facing project developers is defining the spatial and temporal boundaries of a project and its associated GHG benefits. Although the projects accepted to date have a discrete lifetime, some of the projects, particularly those involving forest regeneration and preservation and the construction of energy-generating facilities, could have long-term GHG impacts that continue after the USIJI project activities have officially ended. In addition, several of the developers of land-use change and forestry projects anticipate that the demonstration and education elements of their projects will generate GHG benefits in a secondary “zone of influence" outside the project area. Because these types of GHG benefits are difficult to predict, measure, and verify, project developers have generally provided a qualitative, rather than quantitative, assessment of these benefits.

The initial measurement of GHG benefits is obviously critical to the success of a JI regime. While project-specific circumstances may limit the applicability of a single general rule for emission measurement, adequate information now exists to construct guidelines for international use in this area.

5. Identifying Non-GHG Project Impacts

The USIJI project criteria require project developers to identify the non-GHG impacts of their project. The projects accepted to date are anticipated to generate a number of benefits that are additional to GHG emission mitigation, including biodiversity conservation, watershed protection, reduced consumption of nonrenewable resources, increased availability of electricity (including in areas not connected to a grid system), public education and training, local economic development, and technology transfer. Project developers have also evaluated the potential negative impacts of their projects, such as ecosystem impacts resulting from establishment of monocultures or the use of land for facility construction; the operation of vehicles for ecotourism and land-management activities; and the generation of solid, liquid, and airborne wastes by facility construction and operation. In cases where these impacts are deemed significant, project developers have outlined steps for their mitigation. In most cases, developers have been able to provide only qualitative, rather than quantitative, information about the positive and negative impacts of their projects. Although further work is needed to develop effective methods for measuring and verifying the non-GHG impacts of USIJI projects, existing project experience can be used to establish some preliminary guidelines to help identify where such impacts are likely to occur for any given sector.

6. Monitoring and Verfying Project Results

The USIJI project criteria require that project developers include provisions for monitoring and

externally verifying project results. The monitoring and verification of project results are areas in which many project developers have requested technical assistance from the USIJI Program. In the case of land-use change and forestry projects, the monitoring plans can be complex, involving the collection of a broad range of data necessary to track changes in on-site carbon stocks and GHG emissions as well as data pertaining to local land-use trends and socioeconomic factors. Data collection activities range from analyzing satellite imagery to conducting on-site biomass stock surveys, establishing permanent plots for periodic biomass sampling, and collecting information on socioeconomic indicators. In some projects, this monitoring is conducted by separate organizations with specialized expertise. In other projects, local project participants are specifically trained to conduct monitoring activities. In the case of energy projects, the monitoring plans typically include record keeping on national trends in energy supply, fossil fuel consumption, and energy production.

The USIJI projects accepted to date generally include procedures for internal verification of data generated by monitoring activities, and all hate agreed to submit the results of their projects for external verification upon request. Some project developers have proactively -published their initial project results for review by interested parties. The USIJI Program is currently conducting and sponsoring research on the issues of monitoring and verification. The primary goal of this research is to develop guidelines for the development of monitoring plans and verification methods, and to apply these guidelines to existing joint implementation projects. While some USIJI projects have developed sound and p6tentially replicable monitoring and verification plans, there are not yet enough in place to address the monitoring and Verification needs of all types of projects.

7. Preventing Loss or Reversal of Project Benefits

The USIJI project criteria require that project developers provide adequate assurance that GHG benefits generated by their project will not be lost or reversed. One particular issue of concern is the potential for leakage of project benefits: on-site GHG benefits generated by the project may be offset by a project-related increase in emissions outside the project area. Project developers must demonstrate that any changes in land uses or other activities resulting from the project will generate a net GHG benefit and will not simply result in the displacement of those land uses or activities from the project area to another area. To further demonstrate that project benefits will not be lost or reversed, project developers should address the disposition of the project area or activities after the end of the project lifetime.

Potential causes of loss or reversal of project benefits vary according to the project sector. In the case of

land-use change and forestry projects, loss or reversal of project benefits can result from the leakage of benefits due to displacement of land uses from one area to another; natural disasters (e.g., fire, flooding, and hurricanes) that destroy carbon stocks; lack of commitment of landowners in project activities due to factors such as cultural traditions, political unrest and changes in the local economy; and lack of control over land disposition after the project has ended. In the case of energy projects, which generally consist of alternative energy generation or capture of fugitive emissions, loss or reversal of project benefits already achieved is not an issue. Estimated benefits, however, may not be achieved due to factors such fluctuations in the energy market or plant disruptions.

One problem that has faced many project developers is how to set appropriate spatial and temporal boundaries for assessing leakage. In some cases, leakage of project benefits can occur due to local, regional, or national developments that are beyond the control of the project developer. The USIJI program recognizes that there is a tradeoff between the level of effort that can be reasonably expected of a project developer, and the additional cost of eliminating or accounting for leakage.

The USIJI projects accepted to date have adopted a variety of strategies for addressing the issue of loss or reversal of project benefits. In the case of projects involving forest preservation, project developers have tried to prevent leakage by providing direct compensation, alternative income sources, and alternative land-use training to discourage local populations from relocating their deforestation activities to non-project areas. Many forest management projects have included measures to mitigate the impact of natural disasters, particularly in the form of fire prevention and fire preparedness activities. To encourage local participation in land-use initiatives, some project developers have worked closely with the communities involved to design project activities that are consistent with their cultural and economic needs. To ensure that forests preserved or regenerated during the course of the project will not be cleared after the project bas ended, project developers have presented information about the possession of land titles and trends in government land-use policies. In the case of energy projects, developers have demonstrated that there is a sufficient market for the energy they will produce. Some projects have entered into power purchase agreements to ensure continued demand for their product.

8. Crediting Emission Reductions

Under the pilot phase for AIJ, credit for emission reductions is currently not granted. Experience in the USIJI Program has shown that, in the absence of credits, potential project developers are less likely to invest in a USIJI project. In general, this has greatly reduced the ability of USIJI projects to attract investment and,

ultimately, to achieve GHG emission reductions. Several USIJI project developers, however, in preparing project proposals, have established credit sharing arrangements among themselves in the event a crediting system should be implemented in the future.

An international system of crediting would provide an overwhelming incentive for JI. Without crediting, many of the broader benefits of JI, such as technology transfer and sustainable development, will not be achieved. Further research, coupled with the experience being gained under the USIJI and other countries' JI programs, will provide the foundation for developing simple implementation guidelines for an international crediting system.