Analysis of the ITT-Yasuní Initiative vis à vis Carbon Markets

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Executive Summary

The ITT Yasuní Initiative was originally proposed as an initiative to avoid the oil exploration in the Yasuní National Park in Ecuador and as such avoid the emissions of all fossil fuel that would have been combusted in the business as usual scenario as a result of the exploration. The idea was to seek financial compensation from the international community for a proportion of the forgone revenues from the sale of the crude oil. The financiers from the international community in return would receive Yasuni Guarantee Certificates (CGY: 1 CGY = 1 metric tonne of CO₂) that could be used for compliance in the European Emissions Trading System (EU ETS) to offset emissions from other sectors. The investments would go into a “ITT Trust Fund” from which projects would be financed that would either: a) enlarge the proportion of renewable energy in the energy matrix of Ecuador; or, b) sequester carbon in the Land Use, Land-Use Change and Forestry (LULUCF: afforestation and reforestation and forest conservation) sector of reduce emissions from forest degradation and deforestation (REDD).

A more recent version of the proposal is still pursuing the same objectives but it seeking the recognition of in particular EU member states of the ITT Initiative as pilot project allowing CGYs to be sold in the EU ETS. Revenues would be used to pledge the ITT Trust Fund and the sale of CGYs would continue until the foregone emissions associated with the oil that stays underground is equaled.

This study demonstrates why the original version of the Initiative is not compatible with the constructs under the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol and the EU ETS (e.g. not pumping up the crude oil does not in itself constitute an activity that reduces GHG emissions).

The study also argues that the objectives of the ITT Trust Fund on the other hand are very valid climate change mitigation strategies and that the Initiative should therefore, tailor itself to meet with principles and requirements that match with the current debate on Reducing Emissions from Deforestation and forest Degradation (REDD): the ITT Trust Fund could be well positioned as the center piece of the national REDD strategy of Ecuador.

If Ecuador proactively pursues the implementation of strategies that: a) facilitate forestation (project) activities; b) reduce emissions from forest degradation and deforestation; and, c) actively works together with forest owners (in particular the indigenous communities in the Ecuadorian Amazon) to conserve existing forest, the mitigation potential in the next 20 years is approximately 820 million tCO₂-e. Expressing this in monetary values, taking a low end and high end range of carbon prices of the last quarter and adding a 10-20% premium for forestry credits, the estimated potential annual revenues are 75-984 million USD. If implementation and transaction costs are taken into consideration a strategy as the ITT Initiative could potentially generate an income of 60-970 million USD per year. Both estimates EXCLUDE the costs associated with the national system that has to operationalise the offset potential in the land use, land-use change and forestry sector. Such a national system is of critical importance and a thorough assessment should be made when designing it. Payment for Environmental Services (PES) systems should get an important place in that design.
# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AAU</td>
<td>Assigned Amount Units</td>
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<tr>
<td>ACM</td>
<td>Approved Consolidated Methodology (approved by the CDM EB)</td>
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<td>AM</td>
<td>Approved Methodology (approved by the CDM EB)</td>
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<tr>
<td>A/R</td>
<td>Afforestation, Reforestation</td>
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<td>ARNP</td>
<td>National Afforestation and Reforestation Plan</td>
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<td>BAU</td>
<td>Business as Usual</td>
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<td>CARB</td>
<td>California Air Resources Board</td>
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<td>CCAR</td>
<td>California Climate Action Registry</td>
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<td>CCBS</td>
<td>Climate, Community and Biodiversity Standards</td>
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<td>CDM</td>
<td>Clean Development Mechanism</td>
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<td>CER</td>
<td>Certified Emission Reduction</td>
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<td>CGY</td>
<td>Certificados Garantizados Yasuni / Yasuni Guarantee Certificates</td>
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<td>CMP</td>
<td>Decision of the COP/MOP (syntax)</td>
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<td>CO₂</td>
<td>Carbon Dioxide</td>
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<tr>
<td>COP/MOP</td>
<td>Conference of the Parties to the UNFCCC serving as the meeting of the Parties to the Kyoto Protocol</td>
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<td>DNA</td>
<td>Designated National Authority</td>
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<td>EB</td>
<td>Executive Board (to the CDM)</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>ERPA</td>
<td>Emission Reduction Purchase Agreement</td>
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<td>ERU</td>
<td>Emission Reduction Units</td>
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<td>EU</td>
<td>European Union</td>
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<td>EUA</td>
<td>European Union Allowance</td>
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<td>EU ETS</td>
<td>European Emissions Trading System</td>
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<td>EUR</td>
<td>Euro</td>
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<tr>
<td>FAO</td>
<td>United Nations Food and Agricultural Organisation</td>
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<td>FURE</td>
<td>Future Units of Emission Reduction</td>
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<td>GHG</td>
<td>Greenhouse Gases</td>
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<td>GMO</td>
<td>Genetically Modified Organisms</td>
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<td>ha</td>
<td>hectare</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>ITT</td>
<td>Ishpingo-Tambococha-Tibutini</td>
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<td>JI</td>
<td>Joint Implementation</td>
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<tr>
<td>KP</td>
<td>Kyoto Protocol</td>
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<tr>
<td>kTOE</td>
<td>kilo tonne of oil equivalents</td>
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<td>LPG</td>
<td>Liquefied Petroleum Gas</td>
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<tr>
<td>LULUCF</td>
<td>Land Use, Land-Use Change and Forestry</td>
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<tr>
<td>masl</td>
<td>meters above sea level</td>
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MEER  Ministry of Electricity and Renewable Energy
MW(h)  Megawatt (hour)
NAP  National Allocation Plan
NCC  National Climate Committee
NGO  Non-governmental organisation
PANE  Patrimony of National Areas Ecuador
PDD  Project Design Document
PES  Payment for Environmental Services
PIN  Project Idea Note
PSB  Programa Socio Bosque
REDD  Reducing Emissions from Deforestation and forest Degradation
SELBEN  Beneficiaries Identification and Selection System for Social Projects
SFM  Sustainable Forest Management
SIA  Social or Socio-economic Impact Assessment
SNAP  National Protected Areas System
tCER  temporary CER
tCO2e  Tonne Carbon Dioxide equivalent
UNFCCC  United Nations Framework Convention on Climate Change
URE  Unidades de Reducciones de Emissiones / Emission Reduction Units (ERUs)
UN  United Nations
US  United States of America
USD  US Dollars
VCS  Voluntary Carbon Standards
VCU  Voluntary Carbon Unit
VER  Voluntary Emission Reduction
WCI  Western Climate Initiative
1. INTRODUCTION

1.1 SCOPE

As part of a larger study concerning the ITT Yasuni Initiative, presented by the President of Ecuador Rafael Correa on 5 June 2007 (henceforth the “ITT Initiative”), Silvestrum VoF is asked to assess the possibilities for the ITT Initiative to be associated with the international carbon markets, in particular the EU Emission Trading Scheme ETS (“EU ETS”), in such a way that financial revenues can be made available to the ITT Initiative and related environmental projects in Ecuador. In addition, Silvestrum is requested to analyse the financial concept proposed by the ITT Initiative and its associated “Yasuni Guarantee Certificates”, its secondary effects to mitigate climate change through investments from the “Compensation Fund” (Trust), and the ability of the ITT Initiative and the Compensation Fund to leverage additional resources for the efficient management and conservation of the protected areas and natural woods located within Indigenous territories (Programa Socio Bosque).

1.2 STRUCTURE OF THE REPORT

After a description of the ITT Yasuni Initiative, the context of the ITT Initiative against the backdrop of the United Nations Framework Convention on Climate Change (UNFCCC), the international climate change mitigation regime, is reviewed. The eligibility of the credits resulting from the ITT Initiative – CGY or Yasuni Guaranteed Certificate – is assessed for both the regulated carbon market as well as the voluntary market, both as an expression of a reduction in fossil fuel consumption, as well as an emission reduction through avoided deforestation or forest degradation.

This is followed by a review of possible scenarios with respect to the developments for the period after 2012, when the Kyoto Protocol expires. This chapter also reviews developments in other countries that face challenges similar to those to which the ITT Initiative is exposed. Chapter 5 assesses the eligibility of CGYs under various regional and national carbon regimes and markets, including those of the EU and the US.

The subsequent chapter 6 studies the possibilities to use funding of the ITT Trust Fund for carbon sequestration objectives in the afforestation and reforestation sector and avoidance of emissions from deforestation and forest degradation. To make an adequate assessment the national circumstances and the current state of the Ecuadorian forestry sector are reviewed, as well as some relevant regulations and organizations. The current activity level, in terms of A/R CDM project activities as well as REDD initiatives is analyzed; and, barriers and potential co-benefits are identified. Significant attention is dedicated to the Programa Socio Bosque as instrument to achieve REDD.
Chapter 7 describes the enabling conditions that should exist to operationalise a national system – institutionally and capacity-wise – that is effective and able to facilitate sustainable changes in the land-use change matrix of Ecuador.

Chapter 8 provides an overview of the energy sector in Ecuador to identify where funds of the ITT Trust can be deployed to clean up the energy matrix. It discusses the various strands of energy carriers, including wind, solar, hydro and biomass. Barriers to the implementation of renewable energy projects are presented and recommendations are made how the Trust can be helpful in shifting the balance.

Chapter 9 is the final chapter and presents the conclusions and recommendations.
2 DESCRIPTION OF THE ITT (ISHPINGO-TAMBOCOCHA-TIBUTINI) YASUNÍ INITIATIVE

The Ishpingo-Tambococha-Tibutini ("ITT") oil-field of approximately 190,000 ha is situated in the Ecuadorian national park of Yasuní and as such is part of the Amazonas forests. The Park has a size of 9,820km². It was established in 1979 and declared UNESCO biosphere reserve in 1989. In 1999 and 2006 parts of the park were declared "zonas intangibles", which corresponds to a higher level of protection. With no less than 165 mammal species, 110 amphibians, 72 reptiles, 630 bird species, 1,130 different trees and 280 lianas, the Yasuní Park, although affected by existing and envisaged oil production and illegal timber exploitation within its boundaries, represents a unique ecosystem that has preserved, to large extents, its natural composition. At least two indigenous tribes, the Tagaeri and the Taromenane, maintain their traditional lifestyles here in voluntary isolation. In this isolation, these tribes are the last of their kind; most tribes of the Huaorani civilisation, to which they belong, have been heavily exposed to existing oil activities in the region over the years; much of their culture (hunting, gathering, subsistence farming) has been lost to modern industrial life.

ITT’s proven and probable oil reserves are estimated at 412 million and 920 million barrels, respectively, representing over 20% of Ecuador’s total reserves. Direct and indirect impacts from oil extraction could include, among others, degraded forest ecosystems, spillage of toxic waters, colonization due to road building, illegal logging, hunting, and disruption of tribal isolation.

Originally it was foreseen that at least 50% of the revenues that would be generated through the exploitation of the field (Presidential Order No 882) or USD350 million annually over 15 years (Formal Presentation of 16 October 2008), would need to be generated by third parties to ‘persuade’ the Ecuadorian government to retain the oil belowground, 70% of which was expected to be generated from international carbon markets. The Government of Ecuador originally calculated as follows: The non-exploitation of 846 million barrel crude oil of the present type equals 406.91 million non-emitted metric tonnes of CO₂, assuming that in the reverse case (full exploitation) this amount of CO₂ would be emitted through its combustion. Leaving the carbon stock below soil will be credited via the Ecuadorian Government’s issuance of a so-called “Certificado de Garantía Yasuní” (CGY). Each CGY represents 1 metric tonne of CO₂ that is not emitted because of the non-combustion of the non-extracted crude oil. The CGYS were envisaged to be transferred to one of the pillar regimes of the international carbon markets, namely the European Union Emissions Trading Scheme (“EU ETS”).

1 An environmental impact assessment is said to be under way.
2 On 10 May 2006, the Inter-American Commission on Human Rights granted precautionary measures to protect both tribes from illegal interference, see www.cidh.oas.org/annualrep/2006eng/Chap3b.htm.
3 The Technical Annex to the Formal Presentation of the Initiative of 16 October 2008 refers to a figure of 846 million barrels of extractable crude oil.
CO₂ = CGY (figure of reference is the price for a European allowance (“EUA”) of 16 September 2008), the total value of CGYS (CO₂ emissions withheld through non-exploitation) could amount to USD11.677 billion.

In the original design of the ITT Initiative it was envisaged that the CGYS would be backed by a default guarantee. The buyer of a CGY would receive an indemnity payment in case the Ecuadorian Government would not live up to its commitment of permanent non-exploitation. The amount of the payment would be at least the nominal value of a CGY (not yet defined) but would otherwise be calculated as an aggregate revenue figure from the oil price at the time of the CGY transaction and the oil price at the time of field exploitation. The Ecuadorian Government reckoned that the default guarantee should largely be equivalent to the value of CGYS.

The revenues over 13 years would be deposited in an “ITT Trust Fund”. This would enable the Ecuadorian Government to implement environmental actions such as climate change mitigation and adaptation, diversify renewable energy sources (wind, solar, biomass, geothermal) on its national energy grid and capacity building in many fields - such as eco-tourism, sustainable and efficient management of the National Protected Areas System (SNAP) and fostering an agenda of comprehensive restoration of environmental damages (including health, education and ecological rehabilitation) as well as sustainable projects targeting the indigenous population.

Since the genesis of the concept, the proposal has evolved: the ITT Initiative still aims to forego extraction of the ITT oil-field with the financial assistance of the international community pledging the ITT Trust Fund. The initial pledging of the ITT Trust Fund, will occur through voluntary contributions from various origin, including the auctioning of emission allowances and carbon taxes, debt for nature and other debt swaps, donations for instance of international conservation organisations, and various project types (renewable energy, avoiding deforestation, conservation and social development). And with the interest of the Trust Fund sustainable development projects will be undertaken that amongst other things span the protection of 4.8 million ha natural habitat and 5 million ha of indigenous territory. Those projects will then generate the emission reductions that the CGYS cover. The government of Ecuador intends to continue market CGYS up to a level of 407 MtCO₂, the non-emitted metric tonnes of CO₂ associated with the non-exploitation of 846 million barrel crude oil.

The Trust Fund will be administered by the Ecuadorian Government, Ecuadorian civil society and the donors and it will be deployed to pursue two basic goals: a) transform the energy matrix of the country and enable it to choose not to exploit and extract Ecuador’s large oil reserves; and b) transform Ecuador’s society and environment in a sustainable economy respecting its people and its natural resources. Monetizing the environmental virtues and services of the Ecuadorian territory will assist in the protection and maintenance of these environmental virtues and services itself, so as to realize an intra- and intergenerational equity of access to and benefits from its natural resources. Therefore, the interest of the Trust Fund will be invested in a National Development Plan that has the following objectives:

1. Conserve and protect form deforestation, 40 protected areas, totaling 4.8 million ha of natural habitat and 5 million ha of indigenous territory;
2. Afforestation, reforestation and proper management of 1 million ha of forest managed by smallholder farmers;
3. Expansion of the renewable energy generating capacity in Ecuador;
4. Improvement of the energy efficiency; and,
5. Social development of the areas affected by the ITT Initiative.

The original ‘design’ of the ITT Yasuní Initiative was amended to address some of the potential challenges that the original conceptual design was facing; challenges which are elaborated in the following chapters. The Initiative recognizes that CGYs are not recognized by the regulated and voluntary carbon markets and therefore, require a political decision to support the Initiative as a pilot project.
3 THE ITT YASUNÍ INITIATIVE WITHIN THE FRAMEWORK OF THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

At the global scene, carbon crediting is governed by the Kyoto Protocol of 1997 (“KP”), concluded under the United Nations Framework Convention on Climate Change (“UNFCCC”) of 1992. The Kyoto Protocol established a framework for the creation of carbon credits, in particular Emission Reduction Units (“ERUs”) and Certified Emission Reductions (“CERs”), and put in place flexible mechanisms to help countries achieve their greenhouse gas (“GHG”) emission targets as agreed under Annex B of the Protocol. Both ERUs and CERs are emission reduction units in the sense that they are generated through GHG reducing projects, at a rate of one (1) credit unit per one (1) metric tonne of CO2 reduced. Their function is primarily to offset country emissions that exceed the targets as set by Annex B of the Kyoto Protocol. The two flexible mechanisms under which the carbon credits are generated are Joint Implementation (“JI”), and the Clean Development Mechanism (“CDM”). Article 6 of the Protocol defines the generation of ERU’s for JI, while Article 12 of the Protocol defines the generation of CERs through the CDM.

For purposes of this analysis, the CDM merits further attention. JI refers exclusively to projects within countries that are included in Annex B of the KP, and as such is not applicable to Ecuador. The CDM integrates developing countries, or Kyoto non-Annex I Parties, Ecuador among them, into the compliance system. Its ends are defined as follows (Article 12 (2) KP):

“The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention and to assist Parties included in Annex I in achieving compliance with their quantified emission limitations and reduction commitments...”

The detailed regulation for the CDM was left to the Conference of the Parties to the UNFCCC serving as the meeting of the Parties to the Kyoto Protocol (“COP/MOP”), which has been given delegated power (“authority and guidance”), and an Executive Board (“EB”), which has a supervisory role (Article 12 (4) KP). In 2005, the COP/MOP approved the Marrakesh Accords of 2001 and thereby adopted the “Modalities and Procedures for a Clean Development Mechanism as defined in Article 12 of the Kyoto Protocol” (3/CMP.1). These rules and further delegated legislation govern the central registration of world-wide CDM projects and the issuance of CERs which are transferable and can be used for compliance purposes of Annex I countries.

3.1 CDM ELIGIBILITY AND ACCOUNTING CRITERIA

Certifiable under the CDM are emission reductions that result from “project activities” in developing countries. Any CDM project activity must result in “real, measurable, and long-term benefits related to the mitigation of climate change” and be “additional” in the sense that the emission reductions in question would not occur regardless of the CDM (Article 12 (5) (b) and (c)).
Thus, for the ITT Initiative to be eligible as a CDM project (or to include eligible CDM projects), it would have to meet the general criteria (be a project activity that results in emission reductions; real, measurable and long-term; additional) as well as specific requirements of registration (eligibility of activity, availability of a methodology and formal procedures).

3.2 REDUCTION IN FOSSIL FUEL CONSUMPTION

The first question is whether the ITT Initiative and the non-exploitation of a fossil fuel stock could qualify as project activity under the CDM. There are a number of problems associated with the attribution of emission reductions to the decision not to extract the oil of the ITT field:

- It is difficult to link the non-exploitation of a specific oil to concrete and measurable emission reductions. The (non) activity in question does not in itself constitute an activity that reduces GHG emissions. It is not the avoided exploitation of the oil stock that generates the emissions reductions but the non-combustion of fossil fuels, which is an independent act outside the (prevented) activity in question. It can certainly be argued that without the government’s permit or authorization to extract the fossil fuel, the combustion that would emit the carbon is also impossible. The logic and practice of the CDM is however to account for emission reductions at the moment of avoiding the actual use rather than the supply of the relevant fossil fuel.

- The Kyoto Protocol in general and the CDM in particular, calculate emission reductions against a baseline of emissions rather than a baseline of stocks. It is the reduction of GHG emissions, not the value of carbon stored in a pool such as a fossil fuel bed, that is the focus of climate negotiations and accounting frameworks.

- Emission reductions under the CDM are calculated against a business-as-usual (“BAU”) emissions baseline. Policy decisions are generally not a static BAU, since they are flexible in nature. The CDM EB has therefore decided that policy decisions, guidelines or government regulation would not qualify as CDM project activities.

In addition, CGY certificates, as proposed by the Ecuadorian Government, would differ in nature from CERs. To date, baseline and crediting approaches in use in the carbon markets are based on ex-post crediting, meaning that credits are issued after the emission reductions have been generated. This represents a deviation from the approach put forth in the ITT Initiative, which postulates generating credits ex-ante emissions reductions which are assumed likely to occur under other scenarios.

3.3 REDUCTION OF EMISSIONS FROM DEFORESTATION

The Initiative may instead reduce emissions from forest degradation and deforestation. The ITT grounds in the Yasuní Park represent not only a natural ecosystem but an important carbon sink. Exploitation of the fossil fuel stock would almost necessarily eliminate or degrade at least part of the existing vegetation. CO2 stored in the forest biomass would be released to the atmosphere and

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4 The original design of the ITT Yasuní Initiative was tailored to that area. The current elaboration of the Initiative is generic and applies to all National Parks and other forest areas in Ecuador.
future CO₂ absorption would be made impossible. Thus, provided that there is credible evidence that exploitation would otherwise go ahead and the existing forest be diminished and provided that the problem of deforestation is not just shifted (“leaked”) to another area (within the Yasuní Park, “block 31”, for instance, or elsewhere), maintaining the existing ecosystem would prevent direct emissions and directly reduce the quantity of GHG in the atmosphere over time.

Turned into a “Reduced Emissions from Deforestation and forest Degradation” (“REDD”) program, the Initiative may be able to surpass the difficulties the fuel-stock-approach currently faces. However, while the Modalities and Procedures (see above) explicitly allow afforestation and reforestation projects (“A/R projects”) under the CDM (COP/MOP Decision 5/CMP.1)⁵, provision for deforestation or generally known REDD projects under the CDM has not been made until today. Thus, regardless of whether COP/MOP could or could not, under the authority given under Article 12 KP, include REDD projects in the existing CDM, a positive decision of the COP/MOP is necessary before any project can be registered and issue CERs.

There is expectation that emission reductions from deforestation may be rewarded in a post-2012 international climate framework. The Bali Action Plan of December 2007 encouraged Parties “to identify options and undertake efforts, including demonstration activities, to address the drivers of deforestation”. It is likely that REDD may become an additional instrument or mechanism under the UNFCCC, yet for the time being, REDD is not creditable under the CDM rules or the UNFCCC. Thus the Initiative today would fail to qualify under the Kyoto Protocol both as fossil stock and as forest project.

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⁵ An offset-cap of one percent of any industrial country’s emissions over the first commitment period was set.
4. THE POST-2012 NEGOTIATIONS

The Government of Ecuador's ITT Initiative represents a novel approach towards country commitments to contribute to the mitigation of climate change. As described above, the particular rules of operation of the UNFCCC/Kyoto climate regime that are most pertinent, the CDM rules and procedures, do not apply to the ITT Initiative. The proposed Certificates can therefore neither be commercialized under the Kyoto Protocol's CDM nor under the European Emission Allowances Trading Scheme. The post-2012 international legal framework for incentivizing emission reductions in developing countries could create new opportunities for projects such as the ITT Initiative. The relevant international negotiation text considers the inclusion of REDD into the CDM; this idea has however received little support, in particular if considered outside of a broader REDD accounting framework. In the following we reflect the status of the REDD negotiations with respect to the creation of mechanisms that would make ITT land use based emission reductions eligible.

The international REDD negotiations focus on creating incentives for developing country parties to reduce GHG emissions from deforestation. The emerging system would reward countries for a reduction of their emissions or emission rates against a reference scenario. The negotiations continue to follow the logic established by the Kyoto Protocol which focuses on the reduction of GHG emissions. In the course of the last two years it has however become clear that an exclusive focus on emission reduction activities from land use would fall short of creating sufficient incentives to conserve and manage existing forests. An emission reduction based system would most likely calculate the environmental benefits compared to historical deforestation rates that would then, possibly with applying some adjustment factors, be extrapolated into the future. Such an approach would reward countries with high deforestation rates, thereby possibly shift deforestation to countries with historically low deforestation rates. It would also fall short of rewarding historic efforts to reduce emissions. In light of this, the REDD agenda has been expanded to include not only deforestation but also degradation, forest conservation, sustainable forest management and enhancements in stock. Negotiators are still discussing methodologies to account for environmental benefits from all these land use management categories, and satisfactory policy frameworks.

As regards the original ITT proposal, although a more comprehensive vision of biomass carbon storage (beyond just threatened forests) is now a reality, it is difficult to extend the notion of REDD to the avoided emissions from the oil combustion.

Nonetheless, there are a number of proposals that suggest accounting of environmental benefits on the basis of carbon stocks or forgone profits. This is interesting specifically since the negotiations focus on an emission-based accounting system. The Government of Guyana for instance, has developed a proposal that follows a similar logic as the ITT Initiative.\(^6\) Guyana

proposes that the loss in economic value associated with a decision based on an “economically rational rate of deforestation” to not cut down its forest be compensated by the international community. As such, it represents another government-led effort to seek credit from a policy driven approach that impacts atmospheric emissions of greenhouse gases. It also focuses on foregone revenues more than on foregone emissions. Within the confines of established rules for driven approach that impacts atmospheric emissions of greenhouse gases. It also focuses on 

Another potential ally for Ecuador on the international level is the Government of India. India, which has little current deforestation, has fought hard at the latest Conference of the Parties to the UNFCCC (COP) to include conservation as an eligible category into the REDD negotiations. The ITT Initiative can include conservation activities and therefore, also has a stake in the discussions regarding a reward mechanism for compensating conservation.

In sum, there are good options for the Government of Ecuador and the ITT Initiative to be considered as REDD program in the broader sense towards a post-2012 regime. While the REDD negotiations in general focus on emission reductions, there are a number of countries that wish to access financing for conservation and forest protection. Ecuador could consider joining the negotiation positions of these countries. It has however be said that any post-2012 agreement will see significant competition for financial resources, both for adaptation as well as for mitigation. In that sense, the expectation of the Government of Ecuador should be managed. While there may be conservation funding, it is unlikely to reach the order of magnitude calculated for the ITT Initiative.
5. CREDITING OF THE ITT INITIATIVE UNDER REGIONAL AND NATIONAL CARBON REGIMES/MARKETS

The UNFCCC/Kyoto Protocol rules constitute the most comprehensive (global) climate change regime and provide the most far reaching offset mechanism involving emission reduction credits. Yet, the Kyoto Protocol rules are not the only GHG emission reduction framework. At present, a handful of regional, national and sub-national carbon regimes are in place that foresees the generation and transfer of emission reduction credits. Most of these regimes break the international commitments of States under the Kyoto Protocol down to private sector commitments and involve the participation of private actors. It needs to be assessed whether there is the possibility for the Initiative to sell and forward CGYs or other carbon credits to any of these other markets. We will look at first at the EU ETS. The EU ETS is by far the most liquid carbon market, by the number of participants and value of transactions. In second instance, we will look at other existing or imminent carbon markets, namely Australia, New Zealand and the United States.

5.1 EU EMISSION TRADING SCHEME

Adoption of the EU ETS Directive

The setting up of the EU ETS was preceded by major debates between EU institutions and EU Member States. The EU ETS and the Linking Directive were adopted through the legal instrument through called “Directive”. Directives are framework documents that have to be transposed into national legislation to apply to Member States and their citizens. In the process of transposing EU Directives Member States adapt the content of the Directive to the respective national legislative framework; they are however not authorized to adopt any changes that would substantially alter the Directive. Directives are adopted in a consensus process between EU Parliament (legislative organ) and the EU Council that represents EU Member States. The EU Commission proposes legislative acts and supervises their implementation them on Community level.

All three mentioned institutions were involved in the approval of the EU ETS and Linking Directive. The latter regulates the use of CERs and ERUs under the EU ETS:

The EU ETS (2005-2012)

The EU ETS, based on Directive (EC) 2003/87, commenced in 2005 as EU-wide carbon market and can be considered the cornerstone of the EU climate change policy. With the adoption of the scheme, the European Union has taken a leading role in the international efforts to address climate change. The first trading period of the EU ETS, also known as the ‘pilot period’, started in

7 The Linking Directive was approved according to what is called the co-decision procedure
2005 and ended in 2007. The second (and current) trading period runs in tandem with the first commitment period of the Kyoto Protocol (from 2008 to 2012). The 2009 amendment of the EU ETS Directive will extend the third trading period to the 8 years from 2013 to 2020.

**EU and Member State responsibilities**

The EU ETS Directive forms part of the Community legislation. Under this legislation, it falls on the EU Member States to establish country specific emission caps for the covered EU ETS sectors. Up to 2012, Member States are authorized to:

1. establish the total number of CO2 rights (European Union Allowance or “EUA”s) the country will issue; and,

2. allocate allowances to individual installations.

Member States communicate to the EU Commission their allocation decisions in National Allocation Plans (NAPs). The EU Commission has assessed the NAPs on the basis of criteria established in the current EU ETS Directive with the ultimate goal to prevent competition distortions between sectors and countries.

**Coverage**

The EU ETS installations cover more than 10,000 installations representing about 40% of the EU ETS’ total CO2 emissions (i.e. energy; iron and steel production and processing; mineral industry; and the wood pulp, paper and board industry). Covered installations receive an established amount of “EUAs”, which each represent the right to emit one tonne of carbon dioxide equivalent for a pre-determined trading period.

**Functioning**

Each year of the trading period covered, facilities must demonstrate that they hold a number of allowances equal to their emissions in the preceding year. This means that an installation must either reduce emissions reductions or buy EUAs on the market in order to meet is reduction requirement. An operator defaulting on the obligation has to pay an excess emissions penalty. This penalty was initially set at EUR40 for each tonne of carbon dioxide equivalent and amounts presently to EUR100 per tonne. EUAs have traded for above EUR20, yet the market has not been affected by the recent melt-down of the world economy. The spot-price on 8 January 2009 was EUR14.65 (or USD20.03).

In order to secure proper accounting of emissions, installations are obliged to monitor, verify and report on their annual emissions of greenhouse gases. In addition, under the EU ETS each installation must be in the possession of a permit to emit such greenhouse gases. Such a permit gives a description of emission profile of the installation and of the technology used and defines how greenhouse gas emissions will be monitored and reported.

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8 Source: Point Carbon, 9 January 2009.
European allowances are interchangeable and fully tradable between private entities throughout Europe. The interchangeability (or fungibility as it is often called) with allowances and carbon credits issued by third party states is limited. Even though the EU ETS Directive mentions the aim of linking the European Union scheme to other trading programs in third countries, so far no such link has been established.

**Linking to the CDM**

Originally the EU ETS system did not create a link to the CDM and JI. Such linking was postponed to ensure that prolonged discussions around the use of CDM and JI credits would not delay the adoption of the EU ETS.

In April 2004 the EU approved a new piece of legislation that established a link from the EU ETS to the mechanisms of the Kyoto Protocol allowing the use of certain categories and quantities of CERs and ERUs, the so-called “Linking Directive” (Directive (EC) 2004/101). Through the Linking Directive the EU legislator amended the EU ETS Directive in order to allow covered installations to import, under certain restrictions, CERs and ERUs to assist in the compliance of their emission reduction obligations.

Pursuant to the Linking Directive, each Member State has to specify in its national allocation plan a cap (which must then be endorsed by the European Commission) on the number of CERs and ERUs that its installations are allowed to import and use for compliance purposes. Member States need to include as well the total number of CERs and ERUs that the Member State intends to use to meet its international emission reduction commitments. Member States define thus for themselves if and to what extent CERs and ERUs the operators active in the respective Member States may use for compliance as an EUA substitute. For the ongoing EU ETS phase (2008-12), for instance, Slovakia allows operators the usage of a number of CERs/ERUs that amounts to 7% of its allocated allowances; Spain 20%; and Ireland 21.9%.

In addition to this quantitative restriction, the EU ETS also distinguishes CERs and ERUs in relation to the nature of the projects from which they are produced: CERs and ERUs from land use, land-use change and forestry activities (“LULUCF”), are excluded from the EU ETS altogether (Article 1 (3) (b) of the Linking Directive). The European Commission was invited to review the exclusion of forestry credits from the European scheme, but it recommended not making amendments as recently as 2008 when it found that leakage, reversibility, unreliable monitoring and market flooding risks all prohibited deciding otherwise.9

In sum, the EU ETS legislation did not provide for the integration of other carbon offset credits (apart from Kyoto credits) in the EU ETS. Moreover, the EU ETS has, at least for now, barred the use of Kyoto forestry credits into the scheme. This means for the Initiative that even if transformed into a pure forest-related Initiative, the integration of the Initiative’s CGY credits with the EU ETS market is not an option.

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The amended EU ETS (2013-2020)

The amended EU ETS as approved by the EU Council on 9 April 2009 translates the EU commitment to reduce Community emissions of at least 20% below 1990 levels by 2020 into a concrete policy to reduce industry and energy emissions. The text of the new directive also previews that in case of an international agreement the EU will review the directive to incorporate an even more ambitious emission reductions objective.

The main elements of the reviewed EU ETS are:

1. The allocation of allowances through auctioning\(^\text{10}\) gradually replaces the free allocation to installations;
2. The EU Commission will establish the total quantity of allowances to be auctioned as well as the quantities free of charge;
3. Possibility of allocating 100% allowances free of charge to certain energy-intensive sectors that are subject to international competition;
4. Extension of the scope of the scheme to new sectors and gases;
5. Installations for capture and geological storage are included in the revised EU ETS.

With respect to the use of CERs and ERUs for compliance in the period from 2012-2020, the new EU ETS Directive provides two scenarios, one in case that no international agreement is reached on post Kyoto and one in case such international agreement is reached. In case that no post-2012 international agreement is reached any installation covered by the EU ETS can use CERs and ERUs for compliance purposes to the extent that:

1. the number of CER/ERU allowed by the Member State where the installation is located has not been fully used in the second phase (2008-2012); and
2. the carbon credits are derived from projects which are eligible for use under the second phase (2008-2012); and

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\(^{10}\) In the process that led to the 2009 amendment of the EU ETS Directive, the European Parliament, supported by the European Commission, suggested that EU Member States should earmark a portion of the proceeds that they would earn from auctioning EU allowances to international climate activities. More specifically, the European Parliament suggested dedicating some of the proceeds to international forestry activities. The proposal of earmarking of auctioning proceeds was rejected by the Council representing European Member States. National Governments argued that any binding recommendation on how Member States would spend auction proceeds would fall outside of EU competences and that decisions related to the use of EUA auction proceeds was a national matter. Consequently, EU legislation does not bind Member States with respect to the use of auction proceeds which falls under national sovereignty. Some countries remain committed to use auction proceeds for international climate change and a few, such as Germany, have started earmarking funds for such activities. Instead of flowing to recipient countries directly, the new funds are however, channelled through development cooperation programs, such as, in the case of Germany, through KfW and GTZ. This is expected to be the rule rather than the exception and it is unlikely that direct financial support to developing countries will be made on the basis of earmarked auction proceeds. An additional uncertainty is that these funds are exposed to budgetary cycles: with emissions and therefore, the need for EUAs in the EU decreasing, and the public budget severely depleted, it is unclear what will remain of such funds come 2010.
3. the carbon credits are issued (i) during the second phase; (ii) or from projects registered in the second phase; (iii) or from new projects started from 2013 onwards in Least Developed Countries.

The amended Directive also states that if no international agreement is reached the EU can enter into bilateral agreements with third countries that provide for the use of carbon credits or allowances generated and/or issued in these countries.

The revised EU Directive confirms the ban of Land Use, Land-Use Change and Forestry (LULUCF) credits from the Community scheme. The EU will however, review the inclusion of additional credits, including REDD offsets, in the light of a post-2012 agreement. At the same time, it reserves its rights to define additional and more stringent rules that offset credits have to comply with in order to be eligible for compliance under the EU ETS.

**Member States’ authority to accept CDM and JI projects**

In the transposition of the EU ETS Directive as well as the Linking Directives, Member States have the right to decide whether or not they want to approve certain CDM or JI projects. They also have – in the limitations of national and Community law - the authority to allow or prohibit operators to use CERs or ERUs. They are however not authorized to permit the use of credits which fall outside of the authorization of the Directive. Member States are, for example, not authorized to permit the use of CERs stemming from LULUCF or nuclear activities. These conclusions can be drawn from Article 11a of the (current) EU ETS Directive:

1. Member States have competence to allow their national operators falling under the EU ETS to use or not the CERs and ERUs (...Member States may allow operators to use CERs and ERUs from project activities in the Community scheme...)
2. Member States do not have competence to authorize the use of credits different from the ones referred to in Article 11a of the Linking Directive;
3. Subject to the exclusion of forestry and nuclear activities, the only accepted credits under the EU ETS are those ones that are accepted under the UNFCCC and Kyoto Protocol or subsequent international agreements (...All CERs and ERUs that are issued and may be used in accordance with the UNFCCC and the Kyoto Protocol and subsequent decisions adopted thereunder may be used in the Community scheme...)

Consequently, Member States do not have the capacity to accept the use of CGYs by its national operators in order to fulfill with the EU ETS because CGYs are not credits recognized under the UNFCCC and Kyoto Protocol Regime.

## 5.2 AUSTRALIA

The Australian Emissions Trading scheme is expected to be launched in 2010. On 15 December 2008, the Australian government published a White Paper on this future national emissions...
trading scheme. Similar to the EU ETS approach, the Australian scheme will be aligned with the Kyoto regime. Australian Allowance Units will shadow Assigned Amount Units and the Kyoto CER and ERU credits will be convertible to Australian allowances, thus allowing full offset (with no quantitative restrictions). However, the White Paper argues that CERs that carry “contingent obligations” and associate “high administrative costs”, i.e. temporary and long-term CERs such as generated by A/R projects, should not be transferrable into the Australian system.

Regarding non-Kyoto credits, the Australian Government takes the general position that (i) the linkage of international markets for internal compliance purposes would help abatement options and lower costs; and (ii) that REDD project crediting deserves special attention. However, on the ground that the international markets are not yet stable, robust and credible enough; that non-Kyoto backed compliance would risk the liability of Australia as a Kyoto Party (non-Kyoto credits cannot offset emissions for Kyoto purposes); and that there are not yet robust REDD methodologies available, the Australian market will not allow foreign, non-Kyoto carbon credits. Thus, buyers of CGYs could not import them into the Australian scheme. It is however expected that Australia would embrace REDD credits generated under a future international agreement.

5.3 NEW ZEALAND

The New Zealand emissions trading scheme (Climate Change Response (Emissions Trading) Amendment Act 2008 of 26 September 2008), currently suspended by the recently appointed government for review purposes, generally allows Kyoto credits for compliance purposes under the national cap. Domestic forests and deforestation (if in any given case larger than two ha) fall under the scheme with an obligation for landowners to report on changes and to submit allowances, so called NZ Units. Yet, since forestry projects are confined to forest activities in New Zealand and Kyoto eligible units, the ITT project or the trade with CGYs will be ineligible for the scheme. Similar to Australia, New Zealand is however generally more supportive of international forestry credits than the EU.

5.4 UNITED STATES

There is not yet an emissions trading scheme at federal level in place but President Obama has pledged to draw up a US economy-wide cap-and-trade program to reduce GHG emissions to 1990 levels by 2020 and by 80% in 2050. However, legislation will hardly pass before 2010, once the depth and duration of the current economic crisis can be better assessed and when the outcome of the Copenhagen negotiations over a post-2012 agreement in the Kyoto framework is known. If the future Act will be oriented along the lines of the (unsuccessful) Lieberman-Warner Proposal of 2008 (Senate Bill 3036), international offsets will play an important role. The cap of this Proposal

22 http://www.carbonpositive.net/viewarticle.aspx?articleID=1323. A review period of nine months was announced together with the suspension; this period has hitherto slipped into one year.
started with a 7% reduction of the US CO2 output for 2012 (reference year: 2006), leading up to a 72% reduction by 2050. At least 15% of an entity’s emission reduction obligations could have come from international offsets, i.e. 10% from international forestry credits and 5% from other reductions attained in developing countries (through CDM for instance). As a default function, allowances from other emissions trading schemes would be allowed. The Bill would instruct the US Environmental Protection Agency to establish detailed rules to guarantee that offset credits represent “real, verifiable, additional, permanent, and enforceable” GHG reductions or increases in sequestration (3036, Title III, sec 302c (2)). Whether the discretion given would include the power to include REDD projects in the portfolio of admissible offset credits, is not clear yet. For US internal offsetting projects only afforestation and reforestation projects could qualify under the program. There is however a mounting lobby group for international forestry credits in the US.

At the state level, several schemes exist already. The US Regional Greenhouse Gas Initiative (“RGGI”), a cooperation of ten Northeastern and Mid-Atlantic States, commenced on 1 January 2009 as the first mandatory effort within the US to reduce GHG through a cap-and-trade regime. It targets the power sector (about 225 region-wide fossil fuel-fired electric power plants 25 MW or greater in size) and aims at reducing this sector’s emissions by 10% in 2018, compared to the CO2 output at the start of the program. The participating States distribute allowances primarily through regional auctions (clearing price of an allowance in the most recent auction of 17 December 2008 was USD3.38). Compliance periods stretch over three years. Offsetting is allowed in the system, but a phased approach on quantities applies. The program starts with a restriction of 3.3%. If the allowance price exceeds USD7 or even USD10, the restriction will be loosened (5% offsetting allowed if the 12 month average price exceeds USD 7, 10% if it exceeds USD10). Offsetting credits can initially come only from within the US. Third-country offset credits (which function as “CO2 emissions credit retirements”) may be accepted once the second offset stage (USD10 / 10%) has been triggered. However, from LULUCF only A/R projects are eligible for credit retirement. Furthermore, other than the Kyoto credits ERUs and CERs, the credits need to come from a program “that places a specific tonnage limit on greenhouse gas emissions”, i.e. which itself applies a cap. CGY credits qualify under none of these conditions.

Other US state level cap-and-trade systems have been announced or are in the process of discussion. At the individual state level, California adopted in 2006 the Global Warming Solutions Act (AB 32) which caps the State’s GHG emissions for 2020 (reduction by then to 1990 levels). The California Air Resources Board (“CARB”) is authorized to investigate and adopt, through a “Scoping Plan” various market-based compliance mechanisms. As part of this Scoping Plan, on 11 December 2008, CARB introduced a cap-and-trade program covering 85% of the

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14 Participating states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

15 The Midwestern Greenhouse Gas Reduction Accord is an initiative of the Midwestern Governors Association by Iowa, Illinois, Kansas, Manitoba, Michigan, Minnesota, and Wisconsin (observers are Indiana, Ohio, Ontario, and South Dakota). Recently, also 16 southern governors started discussions over how this last, high-emitting region might collectively address greenhouse gas reductions, see Patrick, Regional Trading in the United States, IETA greenhouse Gas Market Reports 2008, p 32.
state’s emissions. The details of the program will be developed in conjunction with the Western Climate Initiative (“WCI”), a cooperation of Western and Canadian states launched in February 2007 to tackle global warming through cross-boundary cooperation. However, guidelines regarding offsets from GHG emissions reductions projects are already set out in the Scoping Plan. In general, offsets will be allowed in the system, as long as the related emissions reductions are “real, permanent, quantifiable, verifiable, enforceable, and additional”. Offsets may be used for compliance purposes for up to 49% of the required reduction. However, at first only projects implemented within the jurisdiction of WCI member states are eligible for an offset in California. The integration of projects implemented elsewhere in the world, especially in developing countries, is still to be further evaluated. Specific agreements would need to be concluded for such international cooperation and crediting. As regards LULUCF projects, the Scoping Plan refers to “enhancing sequestration through eligible forest carbon activities”. Whether or not this points to an exclusion of REDD projects is not clear. In this context, version 3 of the Forest Sectoral Protocol is in final stages to be adopted by the California Climate Action Registry (“CCAR”). The protocol includes a scheme to verify GHG reducing forest management projects in California; two projects have been verified to date. With the future trading scheme likely to accept any such projects as offset mechanisms, activities under the Forest Sectoral Protocol can be expected to intensify. Be that as it may, at present a crediting system from Ecuador would not be eligible either under the Forest Sectoral Protocol or under the foreseen Californian cap-and-trade system.

5.5 SUMMARISING KEY CHARACTERISTICS OF THE TRADING REGIMES

The table below gives an overview over international offsets/forest offsets allowed under the emissions trading schemes that have been discussed in the previous sections.

Table 1: Key Characteristics of Existing Trading Schemes

<table>
<thead>
<tr>
<th>Scheme</th>
<th>International Crediting</th>
<th>International Afforestation/Reforestation</th>
<th>REDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyoto Protocol</td>
<td>AAUs, ERUs, CERs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>EU ETS</td>
<td>ERUs and CERs</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Australia</td>
<td>ERUs and CERs</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>New Zealand</td>
<td>ERUs and CERs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>US-based RGGI</td>
<td>ERUs, CERs, credits from capped systems</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>California (US)</td>
<td>Not yet decided</td>
<td>Not yet decided</td>
<td>Not yet decided</td>
</tr>
</tbody>
</table>

17 WCI member states are Arizona, British Columbia, California, Manitoba, New Mexico, Ontario, Oregon, Quebec, Utah, and Washington. The WCI will take effect on 1 January 2012 with an emissions reduction target of 15% below 2005 levels by 2020.
6 COMPENSATION OF THE TRUST FUND TO CLIMATE CHANGE MITIGATION IN THE FORESTRY SECTOR

As stated before, the original ITT Initiative has the objective to forego extraction of the ITT oilfield in exchange for international financial compensation that amounts to at least 50% of the revenues that would be generated through the exploitation of the field, 70% of which is expected to be generated from international carbon markets. The envisaged revenues of USD 350 million annually over 13 years will be deposited in the ITT Trust Fund. This will enable the Ecuadorian Government to implement environmental actions such as climate change mitigation and adaptation, diversify renewable energy sources (wind, solar, biomass, geothermal) on its national energy grid and capacity building in many fields - such as eco-tourism, sustainable and efficient management of the National Protected Areas System (SNAP) and fostering an agenda of comprehensive restoration of environmental damages (including health, education and ecological rehabilitation) as well as sustainable projects targeting the indigenous population. This chapter analyses the forestry component of the plan. It reviews the situation in the forestry sector where related to afforestation/reforestation followed by an analyses of the dynamics in the field of Reducing Emissions from Deforestation and forest Degradation (REDD).

6.1 AFFORESTATION / REFORESTATION

6.1.1 Current state and advances of forest projects for climate change mitigation

Since 1992, Ecuador has been actively engaged in the international discussions on environmental issues and climate change. Ecuador joined the UNFCCC on November 7th, 1994 (R.O. 562) and some years latter ratified the Kyoto Protocol the 20th of December 1999 (R.O. No. 1588).

The national environmental policy was enforced by the Environmental Management Law (No. 245/99) which designates the Ministry of Environment as the National Environmental Authority. At the same time, the National Climate Committee (NCC) created in 1999, designated the Ministry of Environment as the National Environment Authority for the CDM and the UNFCCC. This political high level Committee is composed by the Presidency of the Republic, Ministers of Economy and Financing, Environment, Mining and Oils, Electricity and Renewable Energy and Foreign Affairs, SENPLADES, CEDENMA (NGOs environmental organization), CONESUP (National Universities Council), Productive Private Chambers from the Sierra and Coastal regions and INAMHI (Methereological National Institute, as Secretary). The main functions of the NCC are the following: to propose and design policies and strategies related to climate; to give political support for the enforcement of policies and strategies related to climate change processes; to build up national capacity to face variability on climate change; to coordinate the compliance of international agreements on climate change and specially to the UNFCCC; to propose institutional means for the application of the CDM under the Kyoto Protocol; and, to coordinate actions among which climate change issues when related to biodiversity, desertification and in general terms, with environmental global matters.
Two national institutions are associated with the work related to the CDM:

(i) The Designated National Authority (DNA) is the Ministry of Environment through its Climate Change Direction. Its main task is to assess, accept and approve the contribution of CDM projects to national sustainable development. Also, issuance of letters of support and approval of CDM projects, project registration at the national level and follow up on the implementation of CDM projects.

(ii) The National CDM promotion office – CORDELIM. Its mayor task is the promotion of CDM projects as well as to provide training, capacity building for CDM projects (forest, energy, biofuels, conversion, and others), and to offer technical support to proponents of CDM projects.

So far, the Ecuadorian DNA has issued 20 support and approval letters to CDM projects, amongst which 16 approvals for energy projects and 1 approval for a reforestation project (CORDELIM, 2008).

Under the CDM forest sector, only activities related to afforestation and reforestation (A/R) can be considered. A/R projects can only be eligible and established on lands where there was no forest before January 1990 and after this date until the initiation of the project. In order to comply with the UNFCCC - CDM requirements, Ecuador defined ‘forest’ on the 7th of September 2007 (UNFCCC, 2008) as follows:

(i) A single minimum tree crown cover value of 30 per cent
(ii) A single minimum land area value of 1.0 hectare
(iii) A single minimum tree height value of 5.0 meters.

Other requirements are that A/R projects have to be additional, meaning that it has to be demonstrated that any A/R project could not been implemented, only with incentives and benefits obtained from the CDM. These projects also have to contribute to the country’s sustainable development and poverty alleviation.

Reforestation projects in Ecuador have been implemented since the late 1980s and according to the National Afforestation and Reforestation Plan (ARNP) of the Ministry of Environment, there are currently around 167,000 ha planted, predominantly in the sierra and the coastal regions. The annual rate of reforestation in the country is around 5,000 ha (Ministry of Environment, 2006).

According to CORDELIM’s website, currently a large number of projects are related to electricity generation from non-conventional renewable resources such as small and medium size hydro electrical power projects. Small numbers of projects are included in the forest sector, four of which are at the Project Design Document (PDD) level, meaning that these projects comply with all the CDM requirements and have made technical and financial feasibility analyses. One of these projects, supported by Conservation International, has already been approved nationally and internationally, has been validated and is being implemented in the field (La Perla – Maquipucuna, 300 ha) and its methodology was approved by the CDM Executive Board (EB; R-AM007/02-07). The remaining three projects were elaborated by PROFAFOR S.A. (www.Profafor.com) and are lacking funds for implementation. International contacts have been made for trading their carbon, but nothing has been reported officially to date. Together the
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initiatives sum up to less than 5,000 ha (two projects in the coastal region and two in the sierra (source: CORDELIM website)).

Currently four projects are at the PIN (Project Idea Note) pre-feasibility level and they have been there at least for the last 3 to 4 years, reflecting the difficulties that exist in upgrading them to the PDD level and finding funds for implementation. The proponents are one private reforestation company, two NGOs and one provincial government. The total area is 22,700 ha with sites in the coastal region (2), the Ecuadorian Amazon (1) and the southern Sierra (1).

The earliest development stage includes private and public initiatives that have been subjected to a preliminary assessment by CORDELIM but none of them have gone to the PIN or PDD level. Reasons for this are manifold, but lack of funds for the design and implementation are the overriding causes. The five projects have different goals (reforestation, agroforestry and rehabilitation of conservation corridors), cover around 40,000 ha, and are located in the coastal region (2), the sierra (2) and one in the foothills of the Amazon region (CORDELIM website).

There are two major private initiatives that have been active for the last 15 years but have been operating in the voluntary market. These are PROFAFOR S.A. that has established around 22,000 ha in the sierra region; and, Catun Sacha Foundation/Climate Trust-Conservation International that has rehabilitated 275 ha of grasslands into indigenous forest within the Mache Chindul Natural Reserve (Bilsa sector) in the coastal region.

Efforts on forestation activities for climate change mitigation under the CDM – UN framework are insignificant compared to the need of the country, either to compensate the rate of deforestation (198,000 ha/year) or to contribute on the sequestration and fixation of carbon dioxide emissions. This is against the odds of the huge potential of land for reforestation in the country mentioned by the Afforestation and Reforestation National Plan – ARNP (2006): 1.6 million hectares. Hence, land availability should not be the problem.

In 2008, the government decided to transfer the responsibility of the execution of the ARNP from the Ministry of Environment to the Ministry of Agriculture, residing in the PROFORESTAL unit. This office has started by establishing a goal of 30,000 ha for 2008 and 50,000 for the following years, reflecting the decision in the National Development Plan 2007-2010 (SENPLADES, 2007) that reforestation should be a priority and that the government should assign sufficient resources to reach these goals.

6.1.2 Difficulties and obstacles for the design and implementation of forest carbon projects

According to experience from some project developers, there are difficulties and obstacles to overcome when designing and implementing forest carbon projects. These can be categorized in different clusters:

Technical aspects:
- Lack of basic forest information such as yield tables, site indexes and expansion factors for main forest species.
• Insufficient geographic information (topographic digital maps and air photography’s) at an adequate scale (at least 1:50,000), high costs of remote sense and satellite images.
• Limited access to tools and manuals for project design in terms of carbon calculations, eligibility analysis, additionality, leakage, base line, etc.
• Very few methodologies approved by the CDM board in order to be applied in the national context.
• Small amount of lands eligible due to the stringent CDM requirements.
• Lack of technical capacity to design and implement projects and to manage the national procedures.

Social aspects
• Significant amount of confusing and inconsistent information in relation to carbon benefits, as well as misinformation related to carbon markets.
• Great expectation from land owners in relation to carbon benefits.
• Difficulties on the dissemination of carbon knowledge to Indian communities because of, amongst others, language barriers.
• Yearly change of board members in Indian communities and therefore, lack of continuity and follow-up.

Economical and financial
• In most cases reforestation projects lack funding for its implementation.
• No national experience on the negotiation of carbon certificates.
• The elaboration of PINs and PDDs need technical capacity and financial resources.
• The relatively small size of the projects is not very attractive to investors because of high transaction costs.

Legal and normative
• There are no clear procedures for issuing the letter of support and approval for CDM forest projects at the Climate Change Direction, Ministry of Environment.
• The government has not defined the sustainability criteria for CDM projects, procedures for the Environmental- and Social Impact Assessments (EIA and SIA), poverty criteria, and has not provided the list of Genetically Modified Organisms (GMOs), etc. All issues that need to be addressed, according to the rules of the UNFCCC, the Kyoto Protocol and the CDM.
• Bureaucracy and slow processes at the Ministry of Environment.
• Land tenure is not sufficiently clear in remote areas where A/R CDM projects could be established; overlapping land titles are very common when dealing with community lands. This also implies that bundling land of small land owners to generate larger areas is complicated due to the lack of legal or conflicting land titles.
• The country lacks legal regulations in terms of property and taxes related to the carbon market and specifically to CDM.
• The government has to regulate the new Political Constitution of Ecuador, basically Article 74, related to Environmental Services. This Article says: “Environmental services are not susceptible of appropriation. The State will regulate the production, use, services and management of environmental services. An Environmental Code is being developed with new regulations and is expected shortly to be implemented. Only few senior staff
from the Ministry of Environment has access to such document, but it seems that Art. 74 will not be included in the Code.

Political

- There is no guarantee for long term investments in the country: changes on regulations, long-term contracts and decision from the government, have created a non-attractive environment for foreign investors.

6.1.3 Potential (co-) benefits of CDM AR projects

There is no doubt that one of the main reasons for the low number of A/R CDM project initiatives is the lack of funds; as was shown above. Therefore, a number of benefits can be identified from the possible financial support to projects through the ITT Trust Fund.

A/R CDM projects can contribute to mitigate impacts of greenhouse gases (GHG) emissions, both at the national as well as the global level; magnitude being depended on the amount of area to be forested. These projects can generate more revenues from CERs once they are already validated, deposited with national and international registries and certified. These revenues could benefit the participants and land owners. Revenues obtained from the CERs could be returned back to the ITT Fund for investment in other forest initiatives, if the government decided to establish a profit sharing scheme from environmental services (Article 74 of the 2008 Political Constitution of Ecuador, to be regulated). In this manner the ITT Trust Fund would become a self-propelling revolving fund.

A/R CDM projects fit perfectly with what is established as priority in the National Development Plan (2007-2010) because CDM projects have to contribute to poverty alleviation, they promote the incorporation of degraded lands into the local economy, they generate employment and avoid migration.

On the other hand, by implementing massive A/R CDM projects, the Ministry of Environment and other governmental entities will be forced and pressed to elaborate clear and specific regulations and procedures for processing project approval, registration and monitoring of A/R CDM projects. The new Climate Change Direction within such Ministry has to be strengthened and create additional capacity in order to assist the implementation of the National Development Plan 2007 - 2010, objective 4, policy No. 4.4. On the other side, the Ministry has to decide a clear policy, criteria and procedures for EIA and SEIA for forest projects depending on the scale of the A/R CDM projects.

A/R CDM projects will produce wood for the local and national markets, reducing pressure on natural forests, avoiding deforestation and degradation, and contributing to the protection of biodiversity. These projects can be deployed for the rehabilitation of natural ecosystems; the reestablishment of natural corridors that connect wildlife and flora populations, contributing to gene flow and exchange of genetic materials; and contribute to the rehabilitation of biodiversity by using local or indigenous species.
Large pieces of land without vegetation cover that currently do not have any productive use because of their biophysical restrictions, can be incorporated into the local, regional and national economy by providing wood, generating employment, improvement of soil conditions and protection of water streams.

It is important to promote the design and implementation of A/R CDM projects at a national scale, once promoters and developers from private and public sectors have been trained. Many private and state initiatives have been affected by lack of funding to continue with the last part of the process. Contribution to fund validation and registration processes as well as for the implementation of forest projects already at the PDD level, will increase the chances of CERs to be sold to the existing and emerging international markets.

Promotion campaigns for indigenous communities for a better understanding of carbon issues related to projects, their participation and enrollment, benefits and restrictions, agreements among stakeholders and different actors, clear description and participation on activities such as implementation, validation, registration, and monitoring, are essential for the A/R CDM projects success.

6.1.4 (Mitigation) potential and costs from CDM AR project activities

According to Encofor (2005), land available for A/R CDM projects - considering the definition of forest elected by the Ecuadorian Government for CDM and mentioned above, and excluding water bodies, natural forests, swampy and urban areas, all surface considered within the National Protected Areas System (SNAP) and areas with less than 500 mm of rainfall per year and above 3,500 masl, the suitable area would be around 24% of the country's total surface (6.06 million ha). The above estimation was based on satellite imagines and digital maps at a scale 1:250,000 which have limited accuracy (Encofor, 2005). This is a tremendous potential for the implementation and development of forest lands for A/R projects, but has to be assessed on more accurate and detailed scales (at least 1:50,000), in order to exclude other agricultural use, cultivated grasslands and areas where land tenancy is not very clear. If it is assumed, that 50% of this potential area is not eligible for A/R projects, still 3.0 millions ha with high potential for A/R activities.

With the current area for A/R CDM projects at the PDD level (5.000 ha approx.) mentioned before, and considering a total amount of CO2 fixed in living biomass (stem, crown and roots), considering tCERs (temporary CERs; accumulative) at a 20 years rotation period of 1000 tCO2e/ha on a forest plantation, the total amount of CERs that could be obtain could amount up to approximately 5 million tons. The costs of implementing these four projects (establishment, maintenance, monitoring, technical assistance, verification and forest certification, excluding
land costs) in the coastal and sierra regions, will be approximately US$11.5 m.\textsuperscript{18} The transaction costs, which include ERPA contract, tCERS trading, validation, national and international approval and registration and verification, will be approximately US$300,000. The ARNP (2006) established a total goal of 1.0 million ha of forest plantations for the next 20 years; 75% for industrial and commercial purposes, 10% for ecosystems recovery purposes and 15% for agroforestry activities addressed to small land owners. If we just consider 10% of this amount (100,000 ha) to be established for carbon sequestration and fixation purposes and the same average amount of CO2 absorbed and fixed in a 20 years rotation period, the total amount of tCERS obtained could be close to 100 million tons, which is a significant figure in terms of mitigation, and from the economical point of view very attractive for investors. The costs of implementing (establishment, maintenance, monitoring, technical assistance, verification and forest certification, excluding land costs) of this area on a 20 years period of time will be around US$200 million. The transaction costs depend on the size and location of the project, but taking an average of 2500 ha average per project, the figure could be near to US$3.0 million. This option can be funded jointly with PROFORESTAL Unit from the Ministry of Agriculture, which is responsible for executing the AFNP, in terms of sharing implementation and transaction costs (validation, registration (national and internationally) and monitoring of the projects). PROFORESTAL budget for 2008 was around US$5.0 millions for the production of seedlings and for 2009 is US$19 million for the establishment of 7,000 ha of plantations. This shows the political willingness given by the current government to support the establishment of forest plantations for different purposes in the country, fact that had not happened for the last 20 years. Although, PROFORESTAL has to make substantial changes on its working and contract scheme, since it is not very attractive for land owners. In general terms, PROFORESTAL offers the land owner to cover 100% of the establishment and maintenance costs through the plantation rotation period, while the owner just contribute with its property. At the end of the contract period, PROFORESTAL will take 70% of the total income from wood sales and leave only 30% to the land owner.

It has to be noticed that the above assumptions are realistic considering the current development state of the national forest sector and the slow decision making at the governmental level. From the political and legal point of view, if the government establishes clear rules in relation to environmental services, sharing benefits from CERs sells to all projects; it can be an option to recover part of the initial investment on A/R CDM projects.

6.2 Reducing Emissions from Deforestation and Forest Degradation (REDD)

According to the Intergovernmental Panel on Climate Change (2006), deforestation and degradation including land-use change contributes between 15 and 20% of the global GHG emissions.

\textsuperscript{18} For forestry plantations in the coastal region the average costs are US$2 700 ha\textsuperscript{-1} for the entire length of the rotation and for the sierra US$2000/ha. This includes the establishment, seedlings, transportation costs, maintenance for the entire rotation (pruning, fire break maintenance, thinning, fertilization), monitoring and verification visits post validation, forest management certification, follow up and technical assistance.
According to FAO (1997) in Sánchez (2006), Ecuador occupies the ninth position on the ranking of the highest deforestation rates worldwide, with an annual rate of 1.6%. The same author made an exercise to determine the deforestation rate within the period 1991 and 2000 by using Lansat images and interpretations on 1:250.000 maps. The results are similar to those reported by FAO (1997), as the annual average rate for the 9 years period reached 1.47% which represents 198,000 ha per year. The tropical dry forest is the most affected in this period (2.18%) followed by the tropical rain forest (1.49%). Chimborazo Province presented the highest rate (6.0%) followed by Bolivar, Manabi and Esmeraldas Provinces. These figures are high in these Provinces because the low amount of forests left. The most intensive deforestation on tropical rain forest was located on the coastal and Amazon region basically on Esmeraldas, Napo and Sucumbios Provinces with annual rates of 4.07%, 2.38% and 1.61%, respectively; the remaining provinces have annual rates less than 1% between 0.33% to 0.68%.

During the Conference of the Parties of the Kyoto Protocol in Bali (December 2008), Reducing Emission from Deforestation and forest Degradation (REDD) was recognized as a way to mitigate climate change in particular in relation to the negotiations for the post-Kyoto regime. This has caused a lot of expectation among non-Annex 1 countries, since the possibilities to reduced deforestation through an economical compensation mechanism is very attractive. Obviously, there is still significant debate going on in relation to: how this mechanism should be designed and implemented, how the emissions accounting should be done, if national or sub-national approaches would be best, and what the potentials effects of such mechanism on biodiversity conservation, climate change, indigenous peoples and local communities could be.

It is well recognized that Ecuador is considered among the 12 mega-diverse countries representing all together between 60 and 70% of the total biodiversity in the world. Ecuador has almost 10% of total “hot spots” identified world wide, represented by the tropical Andes and the Galapagos Marine Reserve. Almost a quarter of a million poor people live within the National System of Protected Areas (SNAPs)\textsuperscript{10} belonging to 17 different ancestral indigenous communities and depending on the richness and biodiversity of the ecosystems. The SNAP area supplies the country with environmental services: 60% of the total amount of water used by hydropower plants and drinking water consumed by Ecuadorians and 80% of water used by agriculture come on way or another from SNAPs areas. In 2003, 40% of the total international tourists that came to Ecuador visited at least one protected area (Ministry of Environment, 2007).

The SNAP is constantly affected, also by deforestation, even though there are restrictions on logging activities within them. The Ministry of Environment through the Policy and Strategy Plan

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\textsuperscript{10} The Patrimony of National Areas Ecuador (PANE) was created in 1981 as it was defined within the Forest Law and Conservation of Natural Areas and Wildlife (2004). In the 1998 Political Constitution of the Republic, it was declared of national public interest to establish of the National Protected Areas System (SNAP). The Ministry of Environment was appointed as responsible of the PANE and SNAP. The SNAP include 33 protected areas that cover almost 4,8 million hectares of terrestrial surface (18.7% of total country area) and 14.1 million hectares of marine surface, both including the following categories: national parks, geobotanical reserve, ecological reserve, fauna production reserve, recreational national area, biological reserve, marine biological reserve, wildlife refugee and bi-national park.
for SNAP (2007) has identified deforestation and land-use change among eleven major problems that affects the SNAP management. This Plan does not mention figures on deforestation on SNAP areas, but it is evident in some specific cases. The main objectives of the mentioned Plan are:

- To guarantee the conservation and representatively of terrestrial, marine and marine coastal ecosystems.
- To strength the technical, administrative and financial capacity of the Ministry of Environment and other regional and local entities responsible for the sustainable management of SNAP.
- To promote recognition of the biological biodiversity importance of SNAP areas, as elements for the sustainable development of the country.
- To promote the SNAP integral management through the participation of main stakeholders related to protected areas management.
- To promote the establishment of a regulatory, political, institutional and financial frame work that benefits the SNAP management.
- To design financial sustainability in the long term for the PANE and applied it to SNAP areas.
- To generate technical and scientific information to support decisions for the adequate management of SNAPs.
- To improve PANE governance, through land tenure conflict management with the support of the new political Constitution and Laws, as well, as national and international instruments.

The prospective results of the Plan (2007-2016) are: a) to integrate in an efficient way, the main ecological and biological gap of representation in the marine-coastal, marine, and terrestrial environments; b) to be the most efficient instrument of conservation at the national level, based on a strengthened entity, with high management capacity; c) a growing social recognition and awareness on the contribution of protected areas to national development; d) a national policy that promotes, stimulates and address social participation in the management of protected areas; d) there will be policy and regulative coordination among national, sectoral and local authorities that intervene in the SNAP management e) once the financial requirements for the basic scenario have been satisfied, and integral scenario will focus its efforts on other relevant PANE protected areas; the application on innovative financial mechanisms will be considered for other SNAP subsystems; f) main actors linked to SNAP management will be well informed and up dated concerning the state and quality of natural resources within the protected areas; finally, there will be mitigation on land tenure conflicts occurring within areas of PANE, through the adoption of diverse mechanisms (Ministerio del Ambiente, 2006).

The predicted budget for the Strategy Plan is about of US$ 63.1 million, distributed in a ten years period. This figure is just referential and approximate, it does not include inflation rate. Most of the budget required (89.97%) will be used to strength the environmental authority (Ministry of Environment) and secondly, to use economical resources and efforts trying to solve land use conflicts and management in PANE areas (4.1%).

6.2.1 Current REDD initiatives in Ecuador

Fundación Natura started in 1998 the conservation and reforestation of the Chongón Colonche Protected Forest located in the provinces of Guayas and Manabí in the central coast region. It has
been supported financially by the German Bank ‘KfW’ and the approval of the Ministry of Environment. The project is about to finish and its main objective is the protection and conservation of the tropical dry forest in the Chongón Colonche Protected Forest through deforestation control of natural forest and sustainable agricultural production on the buffer zone. The success of the project has been focused on an innovative community control and surveillance system of natural forests, where members of different communities within and around the forest participate actively in the protection of the forest. The project contributes with an economical incentive given directly to the communities for such activities. By this mean, there are 71,000 ha completely protected and 154,000 managed through community rules and agreements. Even though the project has not considered the calculation of the GHG emissions from avoiding deforestation, there is an effective contribution to the reduction of GHG emissions from deforestation and the conservation of biodiversity of the tropical dry forest which is highly threaten and most affected in the country.

PROFAFOR has started the elaboration of two PDDs (Project Design Document) for REDD activities, concentrating on the Voluntary Carbon Standards (VCS) and the Carbon Climate and Community standards with Kitshwa and Shuar communities in the Orellana and Zamora provinces, respectively. Three Kitshwa communities have been selected in Orellana and an association of Shuar community centers in Zamora, have been identified, with areas covering 20.000 to 30.000 ha and 10.000 to 15.000ha, respectively. The PDDs will be completed in the second half of this year.

6.2.2 Difficulties and obstacles for the design and implementation of REDD projects

As a result of the short experiences with REDD projects in the country, some issues have already been identified that affect the efficient and effective development of this activity. As with CDM projects, lack of technical, administrative and financial capacity at the national level limit the design of REDD projects. The country has not worked sufficiently on territorial zoning at a national or regional scale (e.g. on the basis of endemism, highly threatened species, etc). This makes it difficult to allocate efforts and resources for development or conservation of specific areas. Most of the effort has been concentrated on the SNAP areas, even though there still problems on the representation of specific and special ecosystems.

The long term governance and institutional infrastructure is weak, fragile and not continuous to guarantee long term contracts or commitments. This has been demonstrated also on the approval and implementation of A/R CDM projects, where only one forest project has been approved by the DNA so far.

Land tenure is not clear enough to ensure the project success and communities benefits from it. In most cases, community land has no mapping and because borders are not clear enough, and not even clear at the land title level, there are conflicts among communities. In relation to the organization of the communities, annual changes of board members cause lack of continuity and follow-up, complicating effective project development. There are huge amount of expectations that have been generated regarding REDD projects among indigenous communities, concerning potential benefits of such projects, resulting from (dis-) information that has been spread on the
subject. Some of which has been used by national and international NGOs to take advantage of the communities

Lack of technical and geographical information at the right scale related to forest and land tenure, limit the design of REDD projects. One of the requirements is the definition of project borders and reference area; with out appropriate geographical information will be difficult to comply with this issue. There is no rural cadastre on forest lands.

So far, very few methodologies have been developed for REDD; there are general standards (e.g. VCS and CCBS) for application on REDD scheme and generic methodologies (World Bank) that have to be adjusted and modified according to local technical, social and economical conditions. The development of new methodologies, definition of baselines, calculation of avoided carbon stock, leakage estimation, monitoring systems, among others, has not been carried out since this is an expensive exercise (time consuming and requires of specialized staff (technical capability)).

The national baseline and the estimation of amount of carbon stock of forest ecosystem indicators at the national level have not been carried . On the sub-national level, estimation of leakage and its effects on wood market is difficult to calculate since very little local or regional statistical information is available. The Ministry of Environment do not have a statistical office or department, so very little information regarding movement of wood, prices, consumers, volumes, species, etc. can be obtained. On the other hand, the government has not decided officially which approach will be pursued for REDD initiatives (national, sub-national, nested). This is essential to address and guide public and private initiatives ongoing in the country.

As mentioned above, the Ecuadorian Government has to regulate Article 74 of the new Political Constitution (2008). This is related to the production, use and rights of all environmental services, including carbon.

Finally, there is huge uncertainty related to carbon prices and conditions and how would the market evolve for credits obtained from REDD projects. There is still lot of discussions on the accounting of CERs and VERs from this new mechanism.

6.2.3 Opportunities for and the potential of REDD projects

With great expectations all eyes are now on the 15th Conference of the Parties that will be held in Copenhagen (December 2009), where the establishment of a possible REDD mechanism as a means to avoid deforestation and GHG emissions will be discussed. The main issues to discuss are related to the incentives structure, the eligible implementation scales to obtain direct incentives at the national, sub-national and/or nested approach, technical and methodological aspects (depending on scale), baseline setting, leakage, monitoring, permanence, forest and degradation definitions, etc.

Some characteristics of the national approach include the following:

- It will cover all natural forests and not only specific forests or forest areas.
- Incentives will be given to the country, only if the country as a whole keeps its emissions level from forest degradation and deforestation below a set threshold.
Incentive obtained from the mechanism will be received and managed by the government or a delegated authority.

The government would have to establish a ‘carbon infrastructure’ and/or a carbon team or teams that would include at least entities and staff for the monitoring of forest cover, forest fires, carbon, etc. But also possibly entities for the identification of potential buyers and/or international funds, commercial transactions, bundling and distributing resources, etc. all depended on the modalities that will be decided in Copenhagen. In addition, national programs focused on the reduction or avoiding forest fires need to be developed, as well as the improvement and clarification of land tenure situations, intensification of agricultural practices, improvement of employment outside the forest sector, and pilot programs for reducing deforestation.

The sub-national approach could have the following characteristics:

- The incentives will be given directly to the projects that demonstrate reduction of deforestation or forest degradation, using any scale (individual project, projects program, municipalities’ initiatives, etc.)
- Structures could be similar to those operating under the CDM, focusing on markets but not on funds.
- It does not imply national commitments for the country as a whole.
- It could use expertise and increase the activity level based on CDM projects experiences and institutional capacities.

In this structure the following methodological aspects should be taken into account:

- The baseline construction (historical data, deforestation prognosis, model design, etc) and the overall design of activities have to facilitate possible different scenarios. Possibly national baseline information will be required because the areas under the PSB are scattered throughout the country.
- The same goes for the identification and quantification of leakage (GHG removals or emissions that could occur outside de project activities boundary and that happen due to project implementation). 
- Monitoring (ex-ante/ex-post) could be an expensive activity since the areas are large and scattered.
- Because not all of the country's territory is included some mechanism to deal with permanence and additionality should be in place.
- Currently there are no approved methodologies, which need to be elaborated for specific circumstances.
- Land tenure and boundaries of properties should be clear in those areas/projects considered for the implementation of the Programa Socio Bosque (PSB). Activities related to mechanisms for the resolution of conflicts should be considered.
- Carbon ownership has to be clear before any project can start. The state has to regulate entitlements to environmental services of forest ecosystems for this purpose.
- Benefit sharing or funds generated by REDD projects, including the design of contracts, should be clear and agreed among actors, as well as the participation of relevant stakeholders.
• A risk analysis has to be carried out and the rights and responsibilities of participants to reduce or minimize risks (forest fires, illegal logging, etc.) should be defined.
• Project participants have to be empowered and take ownership of the project in order to enhance the chances to success, especially with respect to permanence and monitoring. The communities’ organizations should be strengthened, with solid governance practices considering all the actors involved within the project area (private and public sectors, civil society, etc.), formulate policies and a regulatory framework, harmonized individual, sectorial and society perspectives and keep and improve ecological, productive and social systems.
• Local knowledge, especially from ancestral communities should be assessed, valued and protected.
• Technical and institutional capacities should be strengthened for the compliance of national commitments under any approach. This includes the identification of clear roles for each governmental entity.
• Strategies to get the best prices for carbon credits on the international markets should be implemented.

6.2.4 Nested approach

The nested approach was originally created as an approach that links the national and the sub-national levels, and allows for various structures. It enables a wide participation and could be adopted by all developing countries. Countries could start REDD activities immediately using a convenient scale, according to their interests and capacities. Countries that are not willing to start at a national level, could group projects with different scales, but these should be consistent with the national conservation and development objectives. Projects could increase in number by improving their capacities and reach the national scheme by: having a certain percentage of forest cover under REDD projects and after a period of time (years), considered from the implementation date of the first project in the country. This approach implies more countries could participate in the international climate change mitigation regime but they may have to reach the national approach in a pre-determined period of time.

6.2.5 Potential benefits and costs from REDD projects

Considering the figure given previously of 198,000 ha per year of deforestation in Ecuador, and taking into account the potentialities of REDD on the national context, there is a huge potential to work on the REDD scheme. If we assumed that REDD projects at the sub-national scale could contribute avoiding 25% of the current deforestation rate (49,500 ha), meaning complete land use change and an amount of approximately 600 tCO2 e/ha only from living biomass in primary tropical forests, the total amount avoided in a 20 years period of time will be around 600 million tCO2 e (30 million/year). The implementation costs (PDD elaboration, technical assistance, monitoring and follow up) considering an average size of 10,000 ha per project, could be around US$6.0 million and the transaction costs (ERPA contact, tCERs trading, validation, verification and forest certification) will be approximately US$0.5 million. It has to be clear, that the success of these projects is related to the amount of resources that the communities will receive as compensation for not cutting down trees and producing land use change.
6.2.6 Programa Socio Bosque (PSB)

PSB is a national program designed and implemented by the Ministry of Environment (Ministerial Agreement No. 169 of November 14, 2008). The main objectives are: to achieve the conservation of native forests areas, highlands (páramos) and other native vegetable formations of Ecuador; to reduce GHG emissions caused by deforestation; and to contribute to the improvement of livelihoods of rural populations settled in those areas. The program provides an economical incentive to farmers and indigenous communities that commit voluntarily to the conservation and protection of their native forests. The goal of the PSB is the conservation of approximately 4 million hectares of natural forest and other native ecosystems including 1 million of beneficiaries. The pilot phase of the program started in 2008 by the subscription of 67 agreements covering 179,750 ha which benefit 14,751 local people from six provinces (Esmeraldas, Morona Santiago, Imbabura, Carchi, Napo, Sucumbios).

The PSB has established the following basic criteria for the selection of potential areas:

- Threat level: it is defined through two variables: access distance to different types of roads and base on this, it defines high, medium or low accessibility. The second variable is deforestation historical patterns from 1990 to 2007, where information is available.
- Environmental services: include three variables: biodiversity outside the SNAP, hydrological regulation for water potential use and amount of carbon storage in different ecosystems.
- Poverty level based on the Beneficiaries Identification and Selection System for Social Projects (SELBEN) established by the Government.

The combination of all these criteria will define the selection priority of potential beneficiaries. Additionally, the program considers other variables such as scale of the project and technical information availability.

The amount of the incentive given by the program is related to the surface to be protected. The maximum amount per ha per year is US$30.00.

Private properties belonging to natural persons, local or ancestral communities or nationalities containing natural forests, highlands (páramos) and other natural ecosystems, are eligible for the program.

The following documentation has to be presented by natural potential beneficiaries (land owners) to PSB offices: PSB format, identity card copy, election card copy, land title copy, number of bank current or saving account, map (if possible digital with real coordinates) and description of access to the place. For local communities, all the mentioned documentation are requested, plus legal constitution certificate, name and identification card copy of legal representative and zoning of their territory (wood lands, agriculture, agroforestry, etc.)

The PSB and the efficient management of the protected areas (SNAP) could be considered under the sub-national approach, where the government functions as the project proponent.
6.2.7 Potential of REDD projects financed through ITT Fund

As mentioned above, one of the difficulties to develop REDD projects is the lack of funds for their elaboration, design and implementation. There are significant opportunities for REDD projects if these funds were available and some ideas are describe next.

Indigenous communities’ land tenure can be guarantee in the long term, through REDD mechanism, since resources obtained from carbon investor(s) will enable communities to carry out conservation and protection activities of their forests and have presence in all their territory. In addition, through the development and implementation of other carbon-related activities such as sustainable forest management, improvement of agricultural and agroforestry practices and reforestation under the CDM requirements, their income could be increased without the need to relocate people to other places, keeping their ancestral and cultural believes and avoiding the migration to urban areas.

Most natural forests in the Amazon and Northern coast of the country belong to local communities from different ethnical groups. These are large areas and many of them are under continuous threat by middlemen wood sellers, forest companies, road construction from oil companies and local governments and settlers penetrating the area. Large blocks of land and just one organization as land owner (comuna) will make conservation and sustainable land management more effective and can lower transaction costs in case of undertaking (project) REDD activities.

Many indigenous community’s organizations are weak and not well structured. Consequently, community members or families sell their wood directly to middlemen that take the timber to the trade centers in town. Unfortunately, cutting trees and producing beams and planks on the spot, and having them collected at the river or road side are a very inefficient and unsustainable system. Through sustainable forest management, improving logging techniques and organizing communities and community members (cooperative or association), wood sales can take place at better prices and the product quality can go up. This also implies that timber can be sold directly to wood consumers or forest industries in main cities. At the same time, by improving sustainable agriculture practices and lowering emissions from fertilizers and manure management, food production could be secured and surpluses can be sold or interchanged among community members.

As mentioned above, the most important forest land owners are indigenous communities, with little or no access to basic public services, isolated from infrastructure facilities, a low level of education and low access to health centers or hospitals. These people lives under extreme poverty conditions and any income from the conservation scheme proposed, will directly benefit them, improving their living standard. This part of the population of Ecuador has rarely been able to benefit from national, regional or even local development plans.

Through the conservation of vast areas of natural forest, biodiversity and other ecosystem services (watershed, landscape, genetic resources, among others) will be maintained and some of them restored. In the long term, these services can be valued and traded, becoming another source of income to these rural communities and the government of Ecuador.
Sustainable forest management would be a new concept among forest communities. This concept will provide them with a long term view, a better understanding of how forest can be logged whilst maintaining its productivity, guarantee the communities involved with a permanent income from wood harvesting, organizing the forest compartments either for their conservation or harvesting, and organizing members among the forest to sell wood well transformed and at better price.

As mentioned for the A/R CDM projects, funding the elaboration, design and implementation of REDD initiatives (resources from ITT Fund), will have a multiplier effect since REDD projects will generate CERs or VERs for their trading on international markets once they have been approved and register at national and/or international level. This action will benefit the forest communities’ owners where most of the natural forests are concentrated, large pieces of natural forest are still untouched but highly threaten will be conserved, fragile and valuable forest ecosystems will be protected and income from CERs will be received directly by community members.

Investment on REDD initiatives will definitely contribute to decrease the vast amount of emissions from deforestation (first place in the country with 67% of total emissions generated nationally). If a reduction goal of 25% of the deforestation emissions controlled by REDD is pursued, this means almost 50,000 ha/year, which could represent avoiding a total of 40 million tons of CO2 to the atmosphere by land-use change (from forest to no forest) only from living biomass (carbon from soil, dead wood and litter not included). This annual amount of carbon could be sold at international markets and obtain income to compensate communities that will conserve natural forests. Another amount of emissions could be avoided from forest degradation (selective cutting of most valuable forest species in natural forests) since a high proportion of wood (legal and illegal) is obtained from this activity. In this case, the amount of carbon could be less, but still attractive for foreign investors: the figure could be between 5 and 7 million tons of CO2 per year.

If the government decides to switch PSB into national REDD program, a national approach would need to be implemented and basically the following tasks need to be work to achieve what it has been discussed internationally. Since PSB includes high lands (páramos) and other native natural vegetation (shrubs, non woody species) and natural forests, the first two ecosystems have to be excluded since they are not considered as forest according to the national forest definition (see above).

As all the approaches considered so far need requirements, beneficiaries and forest owners have to demonstrate to PSB clear land titles and register ownership certification; clear land boundaries or borders of the property; definition and description of base line of each property or group of properties; accounting system of carbon stock given by different types of natural forests already identified; estimation of carbon stock lost due to historical deforestation according to different types of natural forests already identified and projection of this lost with out a REDD project (business as usual); design of a monitoring system for keeping information on the carbon stock from avoided deforestation and leakage; calculation of leakage outside the country (if any); permanency of the project which is associated to risks (environmental, social, technological, political and infrastructure).
Methodologies for REDD projects have not been approved yet at the UNFCCC but some kind of generic methodologies have been developed by the World Bank and project initiatives (Brazil, Bolivia). International recognized carbon standards have been developed and are available, such as the Voluntary Carbon Standards and the Community, Carbon and Biodiversity Standards. This methodological issue related to the elaboration of new methodologies according to regional and local situation and patterns of deforestation requires trained staff and specialized professionals.

Since the Ecuadorian Government will act as project developer and/or proponent and will receive resources form avoiding deforestation, it has to design and structure a financial mechanism in order to guarantee the private and local communities the carbon incentive or compensation for avoiding deforestation in their properties. Also, it would be advisable if the government could design a financial mechanism in order to start an upfront payment scheme to private or local community forest owners, since most of the carbon trading schemes have an ex-post nature. On the other hand, if one of the PSB general goals is to diminish deforestation, complementary measures have to be designed and implemented such as more strict forest controls for illegal logging; a well based control of internal or national leakage; additional activities to guarantee the project permanence; implementation of sustainable forest management, agro-forestry, agricultural improvement activities; socialization and participation of community members in order to let them know clear their obligations and responsibilities within the contract framework; the design of a risks monitoring and mitigation program, among the most important.

As mentioned before, there is lot of noise related to carbon projects and benefits from them. Socialization and education campaigns have to be carried out to let potential beneficiaries and local communities know what a REDD project is, their benefits from carbon income, but also from complementary activities described above, how could this kind of project could cover their expectations and how the agreement or contract will be settle. One of the issues discussed internationally is related to additionality. The PSB has to work intensively on this issue, looking out for solid and objective argumentation to comply with international requirements. On the same line, as mentioned before, technical and scientific information have to be generated, complemented and compiled in order to justify and document well the REDD program at a national approach.

Finally, the institutional aspects have to be designed in such a way that the administrative, financial, legal and technical structure of the Ministry of Environment is amended; it has to be more efficient, fast decision making, and improvements on the procedures and timing are required. Technical and financial support should be given to the Climate Change Division particularly in relation to capacity building for international negotiations on CC, carbon trading systems, management of carbon projects, and relation with international carbon brokers, among others.

6.3 Potential Value Represented by the LULUCF Sector

Summarizing the potentials as presented in the previous sections, the following overview emerges:
Table 2: Mitigation potential and associated costs of various AFOLU options

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mitigation Potential Million tCO₂-e over 20 years</th>
<th>Implementation costs(^a) Million USD over 20 years</th>
<th>Transaction costs Million USD total(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/R</td>
<td>100</td>
<td>200</td>
<td>3</td>
</tr>
<tr>
<td>REDD</td>
<td>600(^c)</td>
<td>6</td>
<td>0.5</td>
</tr>
<tr>
<td>Forest degradation through PSB</td>
<td>120</td>
<td>108(^d)</td>
<td>?</td>
</tr>
<tr>
<td>Total</td>
<td>820</td>
<td>314</td>
<td>3.5</td>
</tr>
</tbody>
</table>

\(^a\) this includes the establishment, maintenance, monitoring, technical assistance, verification and forest certification, excluding land costs.

\(^b\) transaction costs are one-off costs and depend on the size and location of the project. An average of 2500 ha per project is assumed here.

\(^c\) based on deforestation of 198,000 ha per year and the assumption that a quarter of that can be countered effectively through REDD projects; 600 tCO₂-e ha\(^{-1}\).

\(^d\) based on the approximately 180,000 ha enrolled in 2008, 20 years and 30 USD ha\(^{-1}\) yr\(^{-1}\).

Obviously the costs listed above do not include those associated with the running costs of the national system. Those should not be underestimated as it is a known fact that government organizations and ministries are not known for their cost efficiency!

If we want to value the emission reductions and base that on the current prices of carbon credits from the forestry sector, we need to assess the prices in the voluntary market, where trading in credits is more lively compared to the CDM AR market. Looking at movements of prices overtime, it shows that carbon prices in general (not just forestry) do not only fluctuate significantly over time but also differ quite strongly depending on who is trading where. The Forest Carbon Market Update of April 2009 (a product from TerraCarbon) reported the following carbon prices based on a survey of New Carbon Finance. These are general carbon credit prices. Forestry credits trade at 10-20% premium in comparison to other projects.

Table 3: Forest carbon credit prices in the voluntary market

<table>
<thead>
<tr>
<th>Standard</th>
<th>Instrument</th>
<th>Dec 08</th>
<th>Jan 09</th>
<th>Feb 09</th>
<th>Mar 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCX</td>
<td>CFI, V2009(^{20})</td>
<td>$1.65</td>
<td>$2.15</td>
<td>$2.25</td>
<td>$2.00</td>
</tr>
<tr>
<td>VCS</td>
<td>VCU(^{21})</td>
<td>$6.2</td>
<td>$3.70</td>
<td>$3.70</td>
<td>n/a</td>
</tr>
<tr>
<td>CAR</td>
<td>CRT Futures, Dec 2009(^{22})</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>$6.20</td>
</tr>
<tr>
<td>US Federal</td>
<td>CFI Futures, Dec 2013(^{8})</td>
<td>$12.00</td>
<td>$12.25</td>
<td>$12.25</td>
<td>$11.75</td>
</tr>
</tbody>
</table>

\(^{20}\) Source, CCX (Chicago Climate Exchange); CFI reflects a mix of allowances/credits

\(^{21}\) Source: New Carbon Finance, Voluntary Market Research Note, February 2009 (VCU: voluntary carbon unit)

\(^{22}\) Source: CCFE (Chicago Climate Futures Exchange; CAR: Climate Action Reserve; CRT: Climate Reserve Tons; CFI reflects a mix of allowances/credits)
Taking the lowest price of 1.65 USD the 820 MtCO$_2$-e emission reductions represent a theoretical value of 1353 million USD over 20 year or nearly 68 million USD per year.

If we take the spot-price for tCO$_2$-e of installations covered by the EU ETS on 8 January 2009 was 20.03 USD\textsuperscript{23} this equals 16400 million USD over a 20 year period, or 820 million per year.

As stated, according to The Forest Carbon Market Update of April 2009, forestry credits trade at 10-20% premium in comparison to other projects. Therefore, the final range that can be calculated is 75 - 984 million USD per year.

Implementation costs are 15.7 million USD per year and total transaction costs are 3.5 million once-off, excluding the costs associated with running the national system to operationalise this potential.

The possible net revenues from a strategy as the ITT Initiative could therefore, potentially generate an income of 60 – 970 million USD per year, excluding the costs associated with the national system that has to operationalise the LULUCF offset potential.

\textsuperscript{23} Source: Point Carbon, 9 January 2009.
7 NATIONAL SYSTEM REQUIREMENTS FOR THE IMPLEMENTATION OF A REDD STRATEGY

As indicated in chapter 6, a diverse palette of activities can be undertaken to reduce the emissions profile of the country as a whole. At this moment there is much talk of measuring and rewarding average national deforestation against a single national baseline. But in reality it is likely that countries will operationalise REDD through a package of both policies and measures, and at least in part, on the basis of a set of sub-national, or even local projects, whose effectiveness would need to be compared and evaluated, and which would require infrastructure and decision-making on sharing of financial compensation.

The ITT Yasuní Initiative and in particular the Trust Fund, is in a very strong position to assist Ecuador in developing its national REDD strategy, and even to realize (at least partially) the implementation of it. This chapter is written believing that the Trust Fund can become the centre piece of the national REDD strategy of Ecuador.

A list of some of the activities, policies and measures that can be deployed by Ecuador to operationalise REDD includes, but is not limited to, the following options:

1. Improved land-use planning and integrated conservation and development programmes (like PSB, but also related to the National Parks’ System);
2. Improved farming techniques (less new agricultural land required);
3. Stronger enforcement of the shift from conventional, high impact forestry practices to Sustainable Forest Management (SFM);
4. Transfer of responsibility for open-access forest to community authorities;
5. Projects financed by NGOs, bilateral assistance, multi-lateral donor funds and the private sector;
6. Increase the monitoring and data base capacity in forest departments;
7. Increase staffing in local forest offices; and,
8. Taxation schemes and public awareness campaigns.

The net emission reduction on the national level is then a composite of the results of all of the above action taken.

A solid REDD strategy for Ecuador can only be developed after a thorough analysis has been made of all stakeholders and all drivers of deforestation and forest degradation. The next section will briefly assess some of the specificities of the different drivers of deforestation and forest degradation, to be able to determine which measures hold most promise in the combat against the emissions.
7.1 Drivers of deforestation and forest degradation

Two different types of deforestation can be distinguished - ‘governed’ and ‘ungoverned’. Forest degradation should be tackled as a separate process. It is important to understand that degradation is not always necessarily an earlier stage in the process of deforestation; degradation may be caused by quite different drivers and carried out by quite different actors.

7.1.1 Governed deforestation

‘Governed’ deforestation concerns forest that is cleared because of planned expansion of agricultural area, permitted logging, oil exploration, urban expansion and construction of infrastructure (roads, electricity grid, reservoirs etc). The decision to clear has been made rationally by the appropriate authorities and it is seen as an essential element of the country’s strategy for modernisation and economic growth. It is also dependent on events which change the international market: changes in the soy bean subsidies to US farmers and the Chinese decision to reduce logging domestically because of risks of floods and to purchase timber abroad instead, are likely affecting the rate of governed deforestation in the Amazon basin.

Governments can work towards rationalising it by comprehensive land-use planning and coordination across sectors to minimise unnecessary losses (particularly as regards road construction), and stimulate types of agriculture which have higher per area output and/or are more carbon conserving or sustainable logging.

The primary stakeholders involved in processes of governed deforestation, in addition to the national and regional governments themselves, tend to be medium and larger agricultural concerns, industries, construction companies, timber companies and municipalities.

Changing the rate of governed deforestation would require policy changes at various levels as regards permits and concessions, not just in theory but also in practice. But doing this is very difficult because of the high economic stakes and the political pressure applied by the organisations concerned, some of whom will also be supported from outside the country.

7.1.2 Ungoverned deforestation

Ungoverned deforestation is clearance which is not sanctioned, and usually takes place at the frontiers of forest. The stakeholders are individual farmers or small agricultural concerns working more or less on their own accord although in many cases an ‘agent’ organises the deal, and it sometimes occurs with corrupt complicity and a ‘blind-eye’ from local authorities. These farmers are not necessarily the poorest of the poor, but have some capital to work with.

Ungoverned deforestation tends to correlate spatially with drivers such as (a) roads (b) population density and it is linked to market forces, in that it takes place where the financial returns to the individual from conversion of forest to crops, to plantations and to grazing are far
higher than the financial returns to forestry. In addition there are areas of tropical forest that are being stripped for logs, by other stakeholders: companies (which may be small or large) operating illegally or semi-legally, again because of the high returns that can be obtained. In these kinds of systems there are also beneficiaries among intermediaries (traders, transporters, officials). It is well known that construction of roads for oil exploration and/or logging is a stimulus to further forest clearance by individuals for agriculture. Human-induced fire may be another factor which results in ungoverned deforestation. Dealing with ungoverned deforestation is difficult because standard rules and regulations are by-passed by the stakeholders, and there would have to be a strong economic motive against the deforestation to halt it.

7.1.3 Forest degradation

In addition to wholesale loss of forest biomass due to clearance of whole patches (deforestation) there is also major loss of biomass as a result of degradation, in which biomass in the forest is progressively thinned out, although the area would still be considered ‘forest’ until a particular threshold has been passed (e.g. when canopy cover drops below 30 - 10%, which it may never do).

Degradation is not being given much consideration in the REDD debate to date, possibly because emissions from degradation have not been quantified. It is much more difficult to detect than deforestation, as it does not show up so easily on remote sensing images, and unlike deforestation it may take place far from roads and is not therefore, easily visible from the ground either. But it has been shown that selective harvest practices results in high levels of canopy damage, resulting in high deforestation rates in the 1st five years after an area has been selectively logged.

Degradation is not necessarily correlated with infrastructure, but may relate to population density and lack of alternative job opportunities. The process is gradual, and ungoverned, and can both be the result of single decisions made by particular individuals or companies for their own maximisation of profit on individualised land, as well as gradual over-use by landowners themselves or by people exploring what is considered ‘no man’s land’. Some of the direct causes include selective logging, over-cutting of particular species, firewood and poles, and shifting agriculture in cycles which do not give sufficient time for recovery.

The stakeholders are local people who are generally very aware of the long run effects of these processes on the forest but are driven to continue them (a) because they are necessary for their livelihoods; and, (b) because in most cases there is no locally operating authority which could halt the process. Since the stakeholders operate as individuals, there is often very little that can be done to reduce degradation, but if they are organised into units which can manage the forest collectively, and if the rights and responsibilities over the forest are effectively handed over to such units, then there is considerable scope for change (Poffenberger 1990 and Hobley 1996 in Trines et al. 2006). The returns to degradation are usually not very high in economic terms for the forest owners, and experience has shown that communities can often be encouraged to reverse it once they are put in charge of the forest and have more direct access to the income generated from the activity.
Trines et al. (2006) made a general analysis of measures that can be taken to combat these particular types of emissions from deforestation and forest degradation and assessed their effectiveness against a number of criteria; effectiveness, cost efficiency, practicability/acceptability, and poverty alleviation and equitability issues.
Table 4: Assessment of various measures to combat deforestation and forest degradation (source: Trines et al. 2006)

<table>
<thead>
<tr>
<th>Main stakeholders</th>
<th>Specific measures</th>
<th>Effectiveness</th>
<th>Cost efficiency</th>
<th>Practicability acceptability</th>
<th>Poverty and equity</th>
<th>General and enabling measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governed deforestation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural companies/large and medium farmers</td>
<td>Restrict planning permission</td>
<td>Very effective if seriously applied</td>
<td>Breakeven price depends on market prices of carbon as compared with market prices for timber &amp; agricultural products.</td>
<td>Uncertain. Political and economic pressures for land for development will be hard to resist. Views of major stakeholders will depend on various factors, including carbon market prices.</td>
<td>Depends greatly on specific circumstances in implementing nation. Employment may shift from logging/land conversion to SFM/carbon measurement and monitoring</td>
<td>Comprehensive land use planning New forest legislation protecting more forest areas Heavy national taxes on forest land clearance PES systems, which may be bundled with SFM programmes</td>
</tr>
<tr>
<td>Industry, building contractors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logging companies</td>
<td>Restrict concessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bundling PES carbon purchase with SFM certification and/or conditional concessions</td>
<td>Not yet tried; depends on developments in market for sustainably produced timber</td>
<td>Unclear. Economies of scale will be important. Carbon will offer only a small topping up on overall sales value</td>
<td>If voluntary, should be acceptable; conditional concessions may be difficult to introduce</td>
<td>Shifts may occur</td>
<td></td>
</tr>
<tr>
<td>Lower tiers of government</td>
<td>Share in revenues/fines</td>
<td>Moderate</td>
<td>Could be considerable</td>
<td>Good</td>
<td>Probably no change</td>
<td></td>
</tr>
<tr>
<td>Main stakeholders</td>
<td>Specific measures</td>
<td>Effectiveness</td>
<td>Cost efficiency</td>
<td>Practicability acceptability</td>
<td>Poverty and equity</td>
<td>General and enabling measures</td>
</tr>
<tr>
<td>----------------------------</td>
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<td>--------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Ungoverned deforestation</td>
<td>Medium farmers</td>
<td>Might encourage more carbon storage in agricultural systems (agroforestry) but unlike to stop clearance completely</td>
<td>Returns to clearance will be higher than financial value of carbon in most cases</td>
<td>Heavy overheads and transaction costs but baseline simple (based on full clearance)</td>
<td>Experience shows that larger farmers will participate more than smaller, poorer farmers; NGOs can however play an important role in bundling small-scale projects</td>
<td>Greatly increased on-the-ground monitoring Fast track land tenure Alternative employment creation in danger areas Land tenure</td>
</tr>
<tr>
<td></td>
<td>PES carbon purchase system (output based)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PES carbon purchase system (area based)</td>
<td>Ditto</td>
<td>Ditto; moreover overall cost effectiveness probably lower than output based systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediaries</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Will strongly resist unless registered and 'retrained' as intermediaries for PES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logging companies</td>
<td>Bundling carbon payments with SFM certification</td>
<td>Combined value of certified timber and carbon may in some cases be attractive</td>
<td>Unsure</td>
<td>Voluntary participation</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Local governments</td>
<td>Financial incentives to monitor and reduce forest clearance</td>
<td>Could be significant</td>
<td>Unsure</td>
<td>Good</td>
<td>Smaller, less powerful farmers/companies will be targeted first</td>
<td></td>
</tr>
<tr>
<td>Main stakeholders</td>
<td>Specific measures</td>
<td>Effectiveness</td>
<td>Cost efficiency</td>
<td>Practicability acceptability</td>
<td>Poverty and equity</td>
<td>General and enabling measures</td>
</tr>
<tr>
<td>-------------------</td>
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<td>---------------</td>
<td>----------------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Degradation</td>
<td>Rural communities as units</td>
<td>PES community carbon purchase system (output based)</td>
<td>Limited experience up to now, but could be effective in countries where degradation is a major contributor to carbon stock loss</td>
<td>Transaction costs could be a problem, but opportunity costs are generally much more in line with value of carbon delivered</td>
<td>Voluntary participation. Transaction costs could be reduced if communities are involved in the measurement and monitoring of carbon themselves. Baselines could be simplified by using horizontal projections from point data and top-down/bottom up expert knowledge systems</td>
<td>Brings funds to poorest and most remote communities Unclear how funds will be distributed within the communities themselves</td>
</tr>
<tr>
<td></td>
<td>PES community carbon purchase system (area based)</td>
<td>Not yet tried, in principle less effective than output based system</td>
<td>Transaction costs will be lower than in output payment system but overall cost effectiveness probably lower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bundling carbon with SFM certification</td>
<td>Could be effective in larger community forests, but depends on markets for sustainable timber</td>
<td>Transaction costs for SFM are high so could only be cost effective in large scale units</td>
<td>Voluntary participation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table: Analysis of the ITT – Yasuni Initiative

<table>
<thead>
<tr>
<th>Main stakeholders</th>
<th>Specific measures</th>
<th>Effectiveness</th>
<th>Cost efficiency</th>
<th>Practicability acceptability</th>
<th>Poverty and equity</th>
<th>General and enabling measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICDPs</td>
<td>Have not been found very effective in the past; unlikely to result in huge carbon savings</td>
<td>Experience indicates not very cost effective</td>
<td>There has not been a problem of acceptability as such. Transaction costs and baseline as for PES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil society/NGOs</td>
<td>Training and registration of local organisations to support PES (carbon measuring and monitoring etc)</td>
<td>Works well where supported by a project. Unclear whether costs could be supported out of carbon revenues in a purely market system</td>
<td>Much more cost effective than external ‘professional’ or government support</td>
<td>Creates work for environmentall y active groups</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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7.2 REDD mitigation measures

Table 4 illustrates which measures are required to effectively reduce emissions from deforestation and forest degradation. These include the following:

1. Raise serious national taxes on forest land clearance, irrespective of causes (logging, oil exploration, etc.)
2. Determine the national, sub-national and local emissions baseline of deforestation and forest degradation;
3. Implement comprehensive land-use planning, incl. zoning and identification of priority areas;
4. Introduction and enforcement of Sustainable Forest Management (SFM) Systems;
5. Strong(er) on-the-ground monitoring and monitoring of remote platforms (satellite imagery and/or aerial photography);
6. Set up the capacity to implement PES systems – both administrative as well as on the ground – which may also be bundled with community SFM programs;
7. Clarify/formalise unclear land tenure situation, incl. the establishment of community tenure rights over forest areas;
8. Create alternative employment opportunities in deforestation and forest degradation danger zones; and,
9. Create the capacity to implement and enforce for all of the above!

These mitigation efforts require particular institutions and capacities of the stakeholders and stakeholder organisations involved in REDD. It is key to identify which different groups of stakeholders are involved in the measures and assess whether they have those capabilities and capacities.

Because it is widely accepted that the effectiveness of ‘command and control’ measures in forestry is limited, it is necessary to actively involve ‘stakeholders’ – those people, communities, companies, organisations and authorities who are de facto using forest land, regardless of its formal ownership – by using largely positive policies and measures (incentives, persuasion) which encourage the desired end result (reduced deforestation/degradation). The challenge is to find combinations of incentives, including carbon payment, which are effective in changing behaviour of these stakeholders because they make economic sense.

Obviously, a further relevant question is to what extent the costs of such policies and measures can be covered by the financial resources that international sales of or funding related to, carbon offsets could generate.24

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24 This is quite independent of the question about how such international finance is arranged. We assume here that the ITT Trust Fund will in some way receive finance for REDD carbon savings from outside purchasers or donors, and use at least part of these financial resources to fund the policies and measure via a revolving fund construction.
7.3 System requirements of REDD mitigation measures

The conditions that are required to operationalise the REDD mitigation measures identified in the previous section are various. It is beyond the scope of this report to discuss all of them in all of their detail but those requirements that are unique to the forestry sector are elaborated here.

Taxes on forest land clearance
To recoup some of the ‘costs’ of losing forest cover it makes sense to assess the taxing system in such a way that those who clear the land, actually pick up some of the costs. Types of costs that could be assessed include: foregone income from tourism, loss of biodiversity, watershed protection and of course last but not least, the climate regulatory function of forest expressed in tonnes carbon lost. All of these are traditionally non-paid for benefits that could be expressed in monetary terms and generate income for the state that can be use to undo the damage elsewhere: paying for ecosystem services (PES).

Determine emission baselines for deforestation and forest degradation
To be able to determine improvements in terms of reduced emissions, the emission levels at some fixed point in time must be known: emission reductions are measured against a baseline, as explained in the earlier chapters. Because the net balance of the entire country could be zero, with still significant amounts of ecosystem services going lost (e.g. in the case of converting natural forest area to plantations) it is good practice to determine regional or sub-national baselines for logical entities of land where dynamics are uniformly enough to cluster the landholdings. Determining the (sub-) national baselines requires a good understanding of the dynamics in the land-use sector, modelling skills, etc. This is one of the most critical and most complex elements of a national REDD strategy.

Comprehensive land-use planning and zoning
Land-use planning is an exercise that should look at the overall picture, lead to a land-use system that still meets all the needs and still delivers all the good and services as before, but identifies an optimal land-use matrix where all ecosystem services find a proper place. This will automatically highlight areas that require special attention, for instance where deforestation threats are very high, or biodiversity assets are extra strong represented. Such areas of specific interest must be given the attention that is warranted. Of course indigenous peoples and their customary rights must be respected.

Introduction and enforcement of Sustainable Forest Management (SFM)
All too often, unfortunately, still, land use is not sustainable. And land use that is unsustainable in one way (for instance conventional logging practices) often has additional detrimental impacts in other areas (in this case for instance biodiversity loss or carbon emissions). SFM is a safe but not always easy system to apply in that respect. It needs careful assessment of assets and planning. It requires professional knowledge and coordinated execution of what was planned. Although the current system does require forest management planning, it is often concentrating on timber extraction and not so much on safeguarding the next ‘crop’. Also the monitoring aspects are relevant in SFM: see below. SFM is however, a very strong weapon in the battle against forest degradation and should receive ample attention. In particular SFM through working with communities has already led to very promising results worldwide.
**Monitoring**

Only one word, yet such an important aspect. Since a national approach of REDD must cover large forest areas at repeated intervals, with results available on a time scale that is relevant for decisions about carbon markets, a robust and effective monitoring systems for establishing base periods or reference levels, monitoring and verification of forest cover, and quantification of emissions from deforestation and degradation is required. Emissions quantification, in turn, is based not only on the area of forest change, but also the associated biomass loss.

Systems for monitoring deforestation at a national level must measure changes throughout all forested areas, use consistent methodologies at repeated intervals, and verify results with ground-based or very high resolution remote observations. Consequently, for monitoring deforestation at national levels, the interpretation of remotely-sensed data, backed up by ground-based observations, is "the only practicable approach". (DeFries et al., 2006 in Trines et al., 2006)

Monitoring degradation, which may also occur over large areas and may give rise to significant emissions, is more difficult. However, using new algorithms in the analysis of high resolution images and very high resolution data, a variety of approaches have been developed and are currently being tested around the world. To take the next step, i.e., to move from two-dimensional calculations of forest loss (deforestation), to the carbon stock changes (3-dimensional; forest growth or degradation) and emissions that occur as a result of deforestation/forest degradation, the IPCC has compiled inventory methods and good practice guidance (IPCC, 2003; IPCC, 2006).

Monitoring capacities need to be built in government institutions, or institutions that have been put in charge of particular monitoring functions. This is – besides the implementation and enforcement side of the equation – probably the most important and at the same time, one of the most complicated elements of a new national system that needs to be build. It is for that reason that the “readiness” of countries to operate such systems receives ample attention in the international community when it comes to increasing the opportunities for developing countries to enter into the carbon market through REDD.

**Payment for Environmental Services (PES)** will be dealt with in more detail in the next section.

**Clarification of land tenure issues and devolution of land-use rights to communities**

In many parts of Ecuador there are unclear situations when it comes to land tenure. Farmers have been settling in forest areas, forest reserves and national parks and have gradually moved the forest frontier to give way to agriculture and homesteads. Customary rights and illegal settlement are diffusing into each other without clear demarcation of legality. Any participation in an official national REDD mechanism however, will require this to be clarified.

The government may also wish to consider giving the right to manage forest areas to local communities, since it has shown that transferring the responsibility (and some of the benefits) for managing forest areas potentially results in sound land-use strategies. This has advantages for all parties involved: the government is more effective in reducing emissions for forest degradation and deforestation and resolves some of the un-clarities regarding land tenure; and, the local communities have access to resources and income derived from the forest area over which they have been given the custody. Even though this – in practice – is not achieved overnight, it is a sound long-term strategy.

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Alternative employment in deforestation/degradation hotspots
In areas that are particularly vulnerable or that have high population densities, it may be warranted to fight deforestation/forest degradation by developing other economic activities in the area. This takes pressure off the forest sector, because local people are not dependent on the natural resource to make a living or survive.

Create capacity
This is key. To run a good national REDD system many functions and institutions need to collaborate as all levels of society and government are involved. The international developments under the UNFCCC need to be translated in a national REDD plan and all the activities that affect the implementation, monitoring, reporting, verification, and enforcement as well as the policy setting and regulating functions need to be well coordinated. In chapter 6 all areas that require specific capacities for afforestation/reforestation, the PSB, forest management and REDD have been identified throughout the sections.

7.4 Payment for Environmental Services (PES) Systems

PES departs from the general concept that payments for environmental services will on one hand generate funds to implement activities that are necessary to safeguard the environmental services; and, on the other hand, reward those stakeholders that implement the protective measures. Obviously local communities potentially play a pivotal role in this. The livelihoods of the communities living closest to, or dependent on the forest, are often basic and associated with subsistence farming, fishing, hunting and gathering, topped-up with small incomes from selling crops, and sometimes timber, fire wood and charcoal to local markets. This is particularly attractive in areas where forests are already scarce and of poor quality due to earlier unsustainable uses such as un-managed logging; grazing in the forest etc. PES, and in particular payments for REDD could offer a source of income and enable these communities to sustain their way of living, and potentially improve it, by protecting the natural resources on which they depend.

A PES system however requires not only significant funds, but also an institutional framework for management and administration. If PES is to be successful it is of critical importance that issues related to governance and the design and capacity of the institutional infrastructure are solid and effective. It is impossible to give a blueprint here of what such a system should look like without further study. But it is clear that the system must ensure that payments are made to those who achieve the actual emission reductions: that is, the local people.

Although PES needs to be further developed and refined to fit national and local circumstances, it has proven its potential as an instrument for compensating local land users for the opportunity costs of sustainable forest management or the cost of specific agricultural practices. Most existing PES systems are set up as individual projects with international finance or at watershed level as arrangements among local stakeholders, but there is no reason why countries could not run their own internal PES systems, as experience in Costa Rica and Mexico shows. In Costa Rica, a national carbon tax on fossil fuel consumption is the most important source of finance of the national PES system.
Two different types of PES may be distinguished: PES systems in which payments are essentially based on qualitative changes in the way forest is managed, and paid on an area basis; and, PES in which payment is based on quantitative assessment of product or output. The differences between these measures are significant. For instance, CDM afforestation and reforestation projects are paid on output, strictly on the actual volume of carbon offsets that are produced. The Fondo Bioclimatico (Scolel Té) project in Mexico in which farmers earn from carbon credits through agroforestry in their coffee plantations is another example. However, in most PES systems participants are paid simply on the basis of area and activity, for example, the Costa Rican FONAFIFO PES forest protection programme pays farmers per hectare of forest they retain. Although there are checks made to ensure the forest is still standing, the payment is a flat rate. In the Mexican PES system under FONAFOR, a similar payment system is used, even for the case of forest protection for maintenance of carbon stock, although the proposals submitted do have to make estimates of the amount of carbon that will be saved.

There are a number of enabling conditions which are necessary if a PES system directed at community forest management is to be successful. As stated, a legal framework for empowering communities over forest is essential. A database focussing on deforestation and forest degradation and carbon losses would have to be set up and maintained at national level, and need to be fully mapped, which would allow better planning and prioritisation of areas to be included (see also the land-use planning section above). Quite possibly elements in this data system would have to be modelled. In addition, there would be need for an administrative system by which changes in carbon stock monitored by local communities could be verified and rewarded.

Setting up any PES system brings with it costs and this means that part of the ITT Trust Fund would be required for overheads if no alternative funding for this (for instance from the FCPF) was to be found. The larger the programme however, the greater the economies of scale. It is almost impossible to estimate what the real costs will be, in advance, until some experience with carbon payments is gained in order to judge how effective they may be as incentives for reducing degradation. One should however not underestimate the practical difficulties of designing a PES system which is both effective from a climate point of view and locally fair/equitable/acceptable. Not all forest is equally threatened by deforestation and degradation, and systems would have to be devised to target those forest areas which in the absence of such a system, would be most likely to be lost. This means that in addition to national baselines, local baselines are needed.

Since increased carbon storage is a by-product of most forms of SFM, the possibility arises of the national government adding the financial value of this additional carbon into the equation, thus making certified SFM more economically attractive. Essentially, this boils down to adding PES onto an existing or new SFM initiative. If this were done for an individual CDM-type project there might be questions regarding additionality, but if it is part of a national-wide sectoral approach, then this should not be an issue. Adding certification costs to timber does lower the profit margins however. If such costs are factored into the sales prices, competition with “traditional” grown or harvested timber may be tougher, leading to negative incentives for good forest management and potential carbon leakage.

A schematic representation of one possible approach for a PES system, bridging the various layers in society and the economy, is presented in figure I below.
Although there is no internationally agreed set of overarching principles guiding the development of sound PES systems, early lessons can be drawn from a programme that runs in 7 countries called “Kyoto: Think Global, Act Local” (K:TGAL): a research and capacity building program investigating the possibilities and potential for community-based forest management of existing natural forest to be included as an eligible carbon mitigation activity under international climate change agreements in the future (see also their Policy Paper no. 3: Payments for Environmental Services In Papua New Guinea on [www.communitycarbonforestry.org](http://www.communitycarbonforestry.org)). In general terms these governing principles read:

1. Respect national laws, including traditional, customary and indigenous peoples’ rights.
2. Design the PES system in a participatory and transparent manner.
3. The country should not incur any debt in setting up the institutional system and building the capacity to implement and administer the PES system.
4. The PES system should be fair and transparent and the majority of the benefits should directly contribute to the welfare, security and sustainable livelihood of local communities.
5. The PES system should have a clear governance structure and appropriate representation of stakeholder groups and resource owners.
6. There shall be no political discretion for decisions made in relation to the PES system.
7. A national multi-stakeholder institution should oversee the operations of the implementing actors; e.g. government departments and agencies, service providing organisations and companies, etc.

8. Agreements for PES activities can only be made with legitimate resource owners and must respect the customary system of land ownership. 75% of the owners of the resource must have indicated their free and prior informed consent. Land registration should not necessarily be a precondition for participation if that is not an element of the customary system of land ownership.

9. Existing logging permits can only be eligible for PES if demonstrably compliant with principle 8 above. Forest conversion permits (e.g. natural forest to plantations) are not eligible for PES.

The biggest challenge and risk for failure is that governments see PES systems as money-makers for the State itself. This is a serious pitfall. In principal, governments should facilitate the implementation of the PES system and not expect to generate revenues with it. Obviously the whole system should be budget neutral, including all overheads and facilitating organisations and administrative functions. If PES is to generate additional resources it will be through the sale of carbon credits to third parties at prices that exceed the costs of generating them.
8 OVERVIEW OF THE ENERGY SECTOR

According to the GHG Emissions Inventory for the Ecuadorian energy sector developed by the Ministry of Energy and Mining and the Ministry of Environment (published 2001, data set from 1994) Carbon Dioxide (CO₂) emissions in the energy sector accounted for roughly 15 million tons. While 13.8 million of tons were generated by the consumption of fossil fuels, 1.1 million tons were generated by the consumption of biomass. The most important sectors contributing to these emissions were: (a) Transportation (54.65%); (b) Industries and construction (15.51%), (c) Energy Industries (13.71%) and (d) Residential (10%).

More recent data on GHG emissions for the whole energy sector is currently not available. However, the MEER’s (Ministry of Electricity and Renewable Energy) document on policies and strategies to change the Ecuadorian energy matrix provides an idea of changes in the period from 1994 to 2006. In addition, the document outlines different scenarios on future trends, as well as policies and measures.

Overall, the period from 1994 to 2006 is characterized by an important increase of the consumption of energy. While in the late 90s the aggregated consumption of various sectors added up ca. 6000 kTOE, the same sectors added up approximately 8000 kTOE in 2005. The share of the transportation sector was 55%; the shares of the industrial and residential sector were 20%, and 19%, respectively.

Due to an increment of the automobile fleet, the sector with the most paramount increase was the transportation sector. In the residential sector there is no significant increase recorded. A particular reason for this might be the decrease of the energy intensity in this sector. However, the (important) shift from firewood to Liquefied Petroleum Gas (LPG) and electricity continued. In 2008 estimates, LPG accounted for approximately 1096 kTOE in the residential sector. In the industry sector consumption increased significantly in the early 2000’s. It seems this phenomenon is related to the increase of consumption of fuel oil. However, no further details are provided. Most energy requirements are linked to issues of process heat, etc.

Currently, the most important source of energy of the above referred sectors is fossil fuels, namely hydrocarbons (fuel oil, diesel, gasoline, etc.). In 2006 the demand for fossil fuels added up 7632 kTOE, according to the MEER.

26 Second National Communication of Ecuador is currently under development
27 Políticas y estrategias para el cambio de la matriz energética del Ecuador
28 Residential, Industry, Construction, Transport, Commercial, and Agriculture
29 TOE: Tons of Oil Equivalent; 1 TOE = 0.041 TJ
On the supply side, in the period from 1991 to 2006 changes took place in the sector related to electricity generation. These changes were recorded by CONELEC. According to this institution in 1990 a total of 6974 GWh were generated. Renewable sources (hydroelectric and sources using fossil fuels (thermoelectric generation) accounted for 5075 GWh and 1898 GWh, respectively. In the referred period an important increase in the demand took place. Due to various reasons, the response led towards an increase of the installed capacity of thermoelectric generators. Thus, in 2006 hydroelectric power plants provided 7129 GWh and thermoelectric power plants generated 7682 GWh. Based on the emissions factor calculations for the Ecuadorian grid for the period 2005-2007 CO₂ emissions averaged approximately 4 million of tons/year. The document of the MEER indicates various policy measures in order to curb the rapid growth of energy consumption and to increase the share of renewable energies in the matrix. On the supply side various measures related to renewable energies are envisaged, inter alia: a) a significant expansion of the hydroelectric generation; b) the introduction of solar water heaters in the residential and commercial sectors; and, c) various pilot projects for the production of biofuels.

8.1 Hydro-electricity
Ecuador has an important hydro electrical potential. According to the document of the MEER there is a potential (economic and technical feasible) to install 21122 MW. Currently, 1997 MW are installed. This means only 8.5 % of the existing potential has been developed. The MEER and/or public companies are currently developing a series of important hydroelectric power projects. Table 2 summarises projects (> 50 MW installed capacity) listed on the MEER's website.

Table 2: Indicative list of biggest hydroelectric project currently under development

<table>
<thead>
<tr>
<th>Name</th>
<th>Installed capacity (MW)</th>
<th>Annual generation (mean) (GWh)</th>
<th>Cost (Millions US$)</th>
<th>Start of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mazar</td>
<td>194</td>
<td>800</td>
<td>461</td>
<td>August 2009</td>
</tr>
<tr>
<td>Toachi Pilatón</td>
<td>228</td>
<td>1120</td>
<td>470</td>
<td>December 2011</td>
</tr>
<tr>
<td>Sopladora*</td>
<td>400</td>
<td>2700</td>
<td>322</td>
<td>July 2012</td>
</tr>
<tr>
<td>Coca Codo*</td>
<td>1500</td>
<td>1500</td>
<td>1590</td>
<td>March 2013</td>
</tr>
<tr>
<td>Total</td>
<td>2322</td>
<td>16120</td>
<td>2843</td>
<td></td>
</tr>
</tbody>
</table>

* Run of River projects

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30 Consejo Nacional de Electricidad – National Council for Electricity
31 Information provided by CORDELIM (National CDM Promotion Office); Emissions Factor of the Ecuadorian grid calculated according to the approved CDM methodology ACM0002 and the Tool for calculating the emissions factor for an electricity system
32 Information based on the “Catalogue of Hydroelectric projects” of the INECEL (1983), at that time regulator of the electric sector
33 http://www.meer.gov.ec
Furthermore, the MEER has conducted a series of feasibility studies for small hydroelectric projects and has elaborated an inventory of small hydro power plants out of operation. Additional to the projects of the MEER, CORDELIM has elaborated an indicative project portfolio of 21 hydro power projects (last updated April 2008)\(^{34}\), mostly promoted by the private sector. These projects add up to 340 MW of installed capacity and 1427 GWh of energy output. With a grid Emissions Factor of 0.56053 tCO2/MWh\(^{35}\) these projects would reduce approximately 800000 tons CO2e/year\(^{36}\). It is noteworthy that additional to these projects 7 Ecuadorian hydroelectric projects have already been registered under the CDM; 3 projects are currently under validation. Actually, the 7 registered projects reduce 533025 tCO2e/year.

New renewable energy projects have entered the grid the last 2-3 years. Hence this trend is going to continue and energy efficiency measures are being deployed (e.g. energy efficient lamps), it is expected that the grid will be less carbon intensive. At the latest when the Coca Codo project starts operations carbon emissions are expected to be marginal for a period of time. Hence the vast majorities of projects are run of river and in exceptional cases projects have small reservoirs no significant methane emissions are expected.

To canalize resources from Carbon Markets towards hydroelectric projects the tool most commonly used is the CDM. Therefore, a project has a) to apply an approved methodology, has b) to demonstrate it is additional, and has c) to contribute to the sustainable development of the host country. Various steps (national approval, validation) have to be achieved in order to successfully register a project under the CDM.

Renewable energy projects that generate electricity for a grid – like the hydroelectric projects referred before – match applicability criteria of the approved methodologies ACM0002\(^{37}\) and AMS I.D.\(^{38}\) (for projects with an installed capacity less than 15 MW). The emissions factor of the grid is required to estimate emission reductions.\(^{39}\) The most recent EF (\(\rightarrow 0.56053 \text{tCO2/MWh}\)) was calculated for the period 2005-2007\(^{40}\). Subsequent EF’s (e.g. EF 2006-2008) are going to reflect the ongoing process, of the grid becoming less carbon intensive. Therefore new projects should not expect as much Certified Emissions Reductions (CERs) as projects currently registered or under validation.

The projects will have to demonstrate their additionality, i.e. they have to demonstrate that without the benefits from the CDM the project would not have taken place. In this context, projects will face important hurdles if their financing is ensured without having included the CDM.

\(^{34}\) The Project portfolio consists of projects at an early stage of the CDM project development: Project Idea Note (PIN) or project brief

\(^{35}\) Grid emissions factor for the period 2005-2007 weighted 50% OM and 50% BM

\(^{36}\) ER (CO\(_2\)) = EF (tCO2/MWh) * Energy Output (MWh)

\(^{37}\) ACM002: Consolidated methodology for grid-connected electricity generation from renewable sources

\(^{38}\) AMS I.D.: Grid Connected renewable energy generation

\(^{39}\) ER (CO\(_2\)) = EF (tCO2/MWh) * Energy Output (MWh)

\(^{40}\) EF calculated by Deuman and validated by CORDELIM
8.2 Other sources with potential to connect to the grid

Beyond hydroelectricity, potentials of wind energy and geothermal energy are briefly summarized. These two sources could also provide electricity to a grid.

Ecuador is not a country with an important potential for developing wind projects. In general, the wind is not steady and it doesn’t have a high velocity. However, there are certain locations in the Inter Andean region or at the coastline, where interesting potentials have been identified\(^{41}\). Furthermore, currently some (6) projects are under development\(^{42}\), or have already been implemented (e.g. San Cristóbal, implemented also as a CDM project). These projects add up to 121.5 MW of installed capacity and 289 GWh of energy output. With an EF of 0.64621 tCO2/MWh\(^{43}\), these projects would reduce 187000 tCO\(_2\)/year.

Hence Ecuador’s geological characteristics, interesting geothermal reservoirs can be assumed. CONELEC conducted in 2001 a study to confirm previous information. Three potential sites for the generation of Electricity were identified (potential to install up to 534 MW); as well as other 17 sites of geothermal interest. \(^{44}\)

8.3 Solar power

According to the assessment of MAE – IADB, Ecuador has an interesting potential for applications using sun power. The mean radiation is estimated to be 3.98 kWh/m\(^2\) (2000 hours of sunshine/year).

Due to the relatively high costs of the photovoltaic technology on-grid applications are not common. However, off-grid applications are interesting to provide electricity to rural communities not connected to the Ecuadorian grid. The MEER has developed two small projects into this direction (installation of 604 and 619 residential photovoltaic systems for communities in Esmeraldas and Napo Provinces, respectively). The program Euro-solar promotes photovoltaic off-grid applications. Emission reduction would occur in case the energy provided replaces other energy sources. In this case approved methodology AMS I.A.\(^{45}\) would be appropriate.

As seen previously, LPG has currently an important position in providing energy to households (main applications are water heaters and gas cookers). The MEER assumes that in households 25% of the LPG is used for water heating. With a well-developed promotion strategy this source

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\(^{41}\) Satúe, D (ICAE) and Sánchez S. Presentation Energetic efficient and renewable technologies in Ecuador

\(^{42}\) Salinas, Villonaco, Ducal, Huascachaca, ERGAL, Las Chinchas.

\(^{43}\) EF for the period 2005-2007 weighted 75% OM and 25% BM for wind and solar projects

\(^{44}\) According to the assessment El MDL en Ecuador, un diagnóstico rápido de los retos y oportunidades en el Mercado de Carbono developed by the Ministry of Environment (MAE) – Interamerican Development Bank (IADB).

\(^{45}\) AMS I.A.: Electricity generation by the user
could be replaced by solar water heaters up to 30%. This sets a prospect of reducing approximately 217000 tCO2e.

Solar water heaters are small applications which reduce relatively small amounts of GHG emissions; an average household will certainly reduce less than 1 tCO2e/year\textsuperscript{46}. Due to high transaction costs, each single application will not be feasible as a stand alone CDM project. However, applicable methodologies (AMS I.C.\textsuperscript{47}) and instruments for bundling and aggregation are available under the CDM. Therefore, aggregating solar water heaters to a sole project or program is an eligible activity under the CDM.

A study conducted in India\textsuperscript{48} showcases an initiative that promotes the implementation of solar water heaters. The study analysed whether the current size of the project (8600 solar water heaters\textsuperscript{49}) is significant enough to be feasible under the CDM. The Programmatic CDM was identified as the most adequate tool. However sustainability would substantially increase if a Program of Activities under the CDM (PoA) would, for example, cover 25000 solar water heaters.

## 8.4 Biofuels and Biomass

A mentioned previously, the transportation sector generates the main part of GHG emissions in the Ecuadorian energy sector. The document of the MEER indicates three pilot projects aiming to curb fossil fuel consumption in the transportation sector: a) pilot project for the production of ethanol in order to distribute a 5% blend in the city of Guayaquil, b) pilot project for the production of biodiesel based on palm oil, and c) the production of oil from seeds of \textit{Jatropha curcas} for the displacement of fossil fuels in Galapagos.

The MEER is aware of possible risks entailed by the implementation of large scale activities to produce biofuels. To avoid environmental and social risks it recommends caution and a nationwide dialogue aiming at compromises.

Biofuels as an option to mitigate GHG emissions require a detailed analysis. The production could entail emissions from different sources (e.g. emissions from deforestation, leakage due to the shift of activities, emissions from fertilization, and emissions due to energy consumption at the production plant).

Currently, two methodologies for biofuels projects have been approved (AM0047\textsuperscript{50} and AMS III.T.\textsuperscript{51}). These methodologies have incorporated safeguards regarding the above mentioned

\textsuperscript{46} 1 kg LPG = 2.7 kg CO\textsubscript{2}. For each kg of LPG avoided by the implementation of solar water heater 2.7 kg of CO\textsubscript{2} are reduced.

\textsuperscript{47} AMS I.C.: Thermal energy for the user

\textsuperscript{48} A viable CDM model for solar water heaters; prepared for UNEP/RISOE Centre by SVK-CDM Technologies Private Limited

\textsuperscript{49} ER: 5984 CO\textsubscript{2}e/year

\textsuperscript{50} AM0047: Production of biodiesel based on waste oils and/or waste fats from biogenic origin for the use as fuel
issues. For example: AMS III.T. is applicable only if the oil is extracted from seeds and not transesterified (i.e. converted into biodiesel), and if the project proponent demonstrates that the area where the biomass grows is not a forest and has not been deforested 10 years prior to the implementation of the project. Furthermore, in order to avoid double counting, project proponents of biofuel projects are required to get engaged contractually with the final users of the biofuel. At the current stage of methodological development only the project using *Jatropha curcas* seems to have conditions to be eligible as a CDM project.

Biomass is another source of renewable energy mentioned briefly in the present context. The assessment of IADB and MAE roughly estimates that the direct combustion of all biomass residuals (e.g. rice husk, bagasse, palm oil and plane tree waste) could generate an equivalent of ca. 4300 GWh. If these residuals were converted into methane, an equivalent of ca. 2155 GWh could be generated.

In order to provide a notion of the GHG emissions that the use of biomass could reduce, the assessment illustrates the replacement of diesel with rice husk. Industries requiring thermal power for the production of e.g. water vapour usually use diesel. If the whole rice husk production of the Ecuadorian agricultural sector would replace diesel for the production of water vapour, ca. 346000 tCO2e would be reduced. Currently, one Ecuadorian cogeneration project (cogeneration with bagasse) has been registered as a CDM project. ACM000654, AM003655 and AMS I.C.56 are approved methodologies which can apply to projects in the context of biomass residues.

### 8.5 Barriers to the implementation of renewable energy projects

Although the potentials of renewable energy and therefore the potentials to reduce emissions in the energy sector of Ecuador are important, the existence of barriers to the implementation of projects has to be mentioned.

Renewable energy projects often face important barriers regarding their financing. In particular, projects with high capital costs and where the return is expected in the long run – like hydroelectricity projects – face these kinds of barriers. Most local and international banks do not provide long term credits (e.g. 7 to 9 years) required for these types of projects, due to the perceived risks.

In the context of financing it has to be mentioned that the government has pledged financial resources for the construction of some hydroelectric projects developed by public sector companies. However, the volume of governmental investment depends to certain degree on oil

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51 AMS III.T.: Plant oil production and use for transportation applications
52 As per DNA forest definition. Current DNA forest definition in Ecuador: (i) Minimum crown cover: 30%, (ii) Minimum height: 5 m, (iii) Minimum area: 1 ha
53 Assumed in the MAE-IADB assessment
54 ACM006: Consolidated methodology for electricity generation from biomass residue
55 AM0036: Fuel switch from fossil fuels to biomass residues in boilers for heat generation
56 AMS I.C.: Thermal energy for the user with or without electricity
prices. Therefore, with the current slump of commodity prices, it could be expected that a certain prioritization of the governmental investment will take place.

Renewable energy projects can also face social barriers. In Ecuador, in particular, hydroelectric projects have faced these kinds of barriers. In certain cases local communities have opposed the implementation of these project types, leading to delays and increased costs. As indicated by the MEER, large scale implementation of activities related to bio fuels could entail social and environmental risks. Therefore, bio fuel projects are certain to face social barriers.

As seen, there are sources of renewable energy in Ecuador which have almost not been used yet (e.g. geothermal energy). Due to the fact, that there is few experience with the technologies required to use these sources, barriers in this regard can be expected.

Barriers to the implementation of projects can also come from prevailing practices. For example, the implementation of solar water heater projects can face deficits of acceptance hence households are used to LPG water heaters. Furthermore, these kind of prevailing practices are certainly strengthened by the subsidies to fossil fuels existing in Ecuador.

8.6 Investments from the Trust Fund in carbon market activities

A Compensation Fund established via Executive Decree 847 will administer funds raised by the ITT Initiative. Given the Government’s goal to continue to diversify and strengthen its national energy portfolio, the interest earned or portions of these funds could be directed at supporting critical actions required to achieve a more balanced energy portfolio. It could also be used to promote forestry activities (A/R, sustainable forest management) to further strengthen the primary objectives of ITT. The Initiative itself defines the imperative of investing in sustainable social and environmental development in the ITT area, but use of Funds from the Compensation Fund can also be used to strengthen similar activities in other parts of the country.

A comprehensive analysis of the possible future investments will need to be made on a case by case basis as the needs arise. What follows are some simplified guidelines regarding some potential valuable uses.

8.6.1 Emission Reduction Projects for the Clean Development Mechanism

The Compensation Fund could decide to promote CDM project activities in the ITT area. These activities could include LULUCF and other project categories. Providing full investment for CDM projects would limit the use of the funds to very few projects. It is therefore, advisable to leverage existing funding by supporting CDM project development, feasibility studies, business plans and CDM documentation. Supporting the direct analysis of eligibility of a potential project can be a useful investment, as is supporting the development of technical data and information needed to substantiate good projects and programs. The Compensation Fund could further facilitate the access private project developers have to financial resources by issuing guarantees or provide low interest loans. Depending on the social and economic structure in the ITT area, project activities could consist in small scale renewable energy projects (biomass, hydro) or forestry activities.

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A full analysis of the composition, structure and operation of this Trust Fund from a legal and institutional perspective will be provided in a separate document.
8.6.2 Emission reductions Projects for the Voluntary Carbon Markets

Project categories such as REDD that do not qualify for the generation of credits under any regulated market could be developed under voluntary carbon market initiatives. Since investors and buyers of carbon offsets in voluntary markets are often being motivated by corporate social responsibility, their threshold for investing in projects or activities in Ecuador may be driven primarily by being able to present a positive story about social and environmental benefits to their stakeholders. The development of any voluntary carbon market project should therefore prioritize small scale project activities that directly benefit local communities. The ITT Initiative could team up with one or several NGOs to develop these projects.

Often additionality and eligibility of carbon emission reduction is questioned within natural protected areas under the argument that because government support exists, or regulations already limit deforestation activities. In many cases, the continued deforestation in these protected areas could be reduced or averted via investments that help strengthen management activities, thus use of the Compensation Fund for such activities provided they are well documented and designed, may not necessarily threaten additionality requirement for REDD project activities.

8.6.3 Payment for Ecosystem Services Schemes

The ITT Initiative could further support its primarily goals by designing payment for ecosystem services system that reward local stakeholders and communities for acting as stewards not only of the carbon stored in the forest above the ITT field, but also of water and biodiversity services.

As seen, there are important potentials for renewable energies in Ecuador. However, it can not be expected – due to its volume – that the Trust Fund can finance all required activities to clean the energy matrix. Nonetheless, the Trust Fund can make significant contributions (a) providing capital to leverage other financial resources, (b) providing seed capital for the kick off of certain activities, and (c) provide financing to remove existing barriers, and improve the overall framework for the implementation of projects. In case projects apply to the CDM, additional income could feed into the Trust Fund.
9 CONCLUSIONS and RECOMMENDATIONS

COMPATIBILITY OF THE ITT INITIATIVE WITH EXISTING CARBON MARKETS

The ITT Initiative is not eligible under the CDM because:

1. The non-exploitation of a specific oil to concrete and measurable emission reductions is difficult to link. Not pumping up the crude oil does not in itself constitute an activity that reduces GHG emissions: it is not the avoided exploitation of the oil stock that generates the emissions reductions but the non-combustion of fossil fuels. The logic and practice of the CDM is to account for emission reductions at the moment of avoiding the actual use rather than the supply of the relevant fossil fuel;

2. The Kyoto Protocol in general and the CDM in particular, calculate emission reductions against a baseline of emissions rather than a baseline of stocks. It is the reduction of GHG emissions, not the value of carbon stored in a pool such as a fossil fuel bed, that is the focus of climate negotiations and accounting frameworks; and,

3. Emission reductions under the CDM are calculated against a business-as-usual (“BAU”) emissions baseline. Policy decisions are generally not a static BAU, since they are flexible in nature. The CDM EB has therefore decided that policy decisions, guidelines or government regulation would not qualify as CDM project activities.

CGY certificates differ in nature from CERs. To date, baseline and crediting approaches known in the carbon markets are based on ex-post crediting, meaning that credits are issued after the emission reductions have been generated. This represents a deviation from the approach put forth in the ITT Initiative, which postulates generating credits ex-ante emissions reductions which are assumed likely to occur under other scenarios.

The ITT Initiative today would therefore, fail to qualify as ‘project’ under the Kyoto Protocol both as fossil stock and as forest project.

It is still recommended that the ITT Initiative presents itself as a REDD project. The ITT grounds in the Yasuní Park represent not only a natural ecosystem but an important carbon sink and the exploitation of the fossil fuel stock would almost certainly lead to deforestation or forest degradation. At this point in time REDD projects do not generate carbon credits that can be traded in the UNFCCC regulated market but there is a significant chance that emission reductions from deforestation may be rewarded in a post-2012 international climate framework.

CGY credits cannot be traded under the EU ETS, even if transformed into a forestry/REDD project, and even when eligible under the UNFCCC or Kyoto Protocol, because the EU ETS has, at least for now, barred the use of Kyoto forestry credits into the scheme. Also in relation to the reduction targets towards 2020, LULUCF projects remain outside the EU ETS. The EU will however review the inclusion of additional credits, such as REDD offsets in the light of a
post-2012 agreement. With respect to the CGY itself, the EU ETS only admits credits recognized under the Kyoto Protocol and UNFCCC and consequently the EU ETS cannot accept the CGY within the EU ETS.

**CGY credits can also not be traded under the Australian and the New Zealand emission trading schemes.** The Australian scheme is to be launched in 2010 and may have possible options for REDD in post 2012 (but not CGYs). Both Australia and New Zealand have a more positive attitude towards sinks than the EU.

The potential for REDD credits to enter a future US emissions trading market is **hitherto unclear.** There is a mounting lobby group for international forestry credits in the US and it is possible that international offsets will play an important role. As a default function, allowances from other emissions trading schemes would be allowed.

**It may be beneficial for the ITT Initiative to team up with Guyana,** Guyana is pursuing a government-led effort to seek credit from a policy driven approach that impacts atmospheric emissions of greenhouse gasses. It also focuses on forgone revenues more than on foregone emissions. It concentrates on compensation by the international community for the loss in economic value associated with a decision based on an “economically rational rate of deforestation” to not cut down its forest be compensated.

While there may be funding for REDD post-2012, it is unlikely to reach the order of magnitude calculated for the ITT Initiative. Besides that, there will be significant competition for financial resources.

**USE OF THE TRUST FUND FOR FORESTRY**

**Afforestation / Reforestation**

Funds from the ITT Trust can have a positive effect on the number of successful CDM A/R project activities.

Funds from the ITT Trust dedicated to A/R project activities will potentially generate a large number of co-benefits, including the increase of income from A/R CERs, poverty alleviation, rehabilitation of degraded lands, providing employment, boost up local and regional economies, avoid deforestation and forest degradation, protect biodiversity, soils and water bodies, and build capacity in Government institutions.

With the current area for A/R CDM projects at the PDD level (5.000 ha aprox.) the total amount of tCERs that can be generated could amount up to approx. 5 million tons, when the total amount of CO2 fixed in living biomass (stem, crown and roots) is
considered, as well as cumulative tCERs at a 20 years rotation period of 1000 tCO2e/ha on a forest plantation.

The total amount of CERs that can be generated can be close to 100 million tons. The ARNP (2006) established a total goal of 1 million ha of forest plantations for the next 20 years; some 75% for industrial and commercial purposes. If we consider 10% of this amount (100,000 ha) to be established for carbon sequestration and the same values for CO2 absorbed in a 20 years rotation are applied as above, the total amount of CERs to be generated can be close to 100 million tons. This option can be funded jointly with PROFORESTAL from the Ministry of Agriculture which is responsible for executing the ARNP, in terms of sharing transaction costs for implementation, validation, registration (national and internationally) and monitoring of the projects.

The realization of the potential of AR is severely hampered due to barriers and constraints in the following areas: technical aspects; social; economical and financial; legal and normative; and political limitations.

To lift these barriers and to operationalise some of the potential of the A/R sector, it may be beneficial to use part of the ITT Trust Fund to develop regulation in the Ministry of Environment to process CDM A/R approvals, build capacity amongst project proponents and land owners (including indigenous communities), develop guidelines for EIAs and SIAs, improve geographic information and make this information publicly available.

Reduce Emissions from Deforestation and forest Degradation

Ecuador occupied the 9th position on the world ranking of deforestation rates, with an annual rate of 1.6% according to the FAO (1997, in Sanchez 2006) and in the period 1991-2000 the rate was 1.47% (Sanchez, 2006) with the highest rates occurring in the tropical rainforest in the coastal and Amazon regions of Ecuador.

The SNAP areas are also greatly affected by deforestation and the Policy and Strategy Plan for SNAP (2007) has identified deforestation and land-use change amongst the 11 most important problems affecting the SNAP management and defined a list of recommendation how to counter this.

The continued deforestation in protected areas could be reduced or averted via investments from the ITT Trust Fund that strengthen management activities. Such use of the Trust Fund - provided the activities are well documented and designed - may not necessarily threaten additionality requirement for REDD project activities.

The ITT Trust Fund could support the design of a Payment for Environmental Services (PES) system to further support its primary goals: reward local stakeholders and
communities for acting as stewards not only of the carbon stored in the forest above the ITT field, but also of water and biodiversity services.

An impressive list of barriers has been identified that limit the take off of effective REDD projects. These include: lack of technical, institutional, administrative and financial capacity; lack of territorial zoning to identify “hot spots”; lack of clarity on land tenure; lack of technical and geographical information; lack of guidance and methodologies; lack of understanding related to the potential market for REDD credits; etc.

REDD can be implemented as national approach, sub-national approach, at project level, or as a mix of all the above in the “nested approach”. The ITT Yasuní Initiative and in particular the Trust Fund, is in a very strong position to assist Ecuador in developing its national REDD strategy, and even to realize (at least partially) the implementation of it.

At the sub-national level a number of challenges arise that are familiar to those associated with project-based activities, such as: baseline issues and additionality, leakage, lack of methodologies, etc. But there are also some features that pose complications in any case, irrespective of whether we are dealing with a national or sub-national approach, such as: permanence, land tenure and boundary disputes between landowners, unclear situations with respect to the ownership of carbon, and a lack of capacity in its broadest sense amongst all stakeholders and actors.

The Programa Socio Bosque and the efficient management of the protected areas (SNAP) can be considered a sub-national approach, where the government functions as the project proponent.

There are significant opportunities for and co-benefits resulting from REDD projects if sufficient funds are available for the elaboration, design and implementation, leading to a large quantity of co-benefits, including:

- **Long-term conservation of natural resources** guaranteed by the fact that the indigenous communities are the land owners;
- **Improvement of livelihoods of indigenous people** through additional income and better land- and forest management practices;
- **Reduction of illegal forestry activities** resulting from or incentivized by timber trade through middlemen;
- **More efficient forest management** and better production methods because indigenous people are organized and coached;
- **Increase of access to basic public services and infrastructure** that is introduced to remote areas if the involvement of indigenous people in the carbon trade goes up;
- **Conservation of many eco-system services**, an investment in the future, if the forest is preserved;
- **Ability to leverage a significant amounts of foreign co-financing** due to the interest of the international community in this type of project/activities; and,
- **Potentially a reduction of GHG emissions of 45-47 million tons CO₂ per year.**
A NATIONAL SYSTEM TO IMPLEMENT A REDD STRATEGY

The drivers of deforestation and forest degradation must be known in order to effectively combat them. Different measures must be deployed to fight different types of drivers. Appropriate measures can be chosen amongst other criteria on the basis of: effectiveness of the measure, its cost efficiency, the practicability and acceptability, its impact on poverty alleviation and equity aspect. (see table 4, chapter 7)

Deployable measures and required enabling conditions include: determination of reference emission and removal levels; comprehensive land-use planning; zoning; taxes on carbon emitting forest practices (incl. its enforcement!); sustainable forest management; sound monitoring system; clear land tenure situations; capacity to implement and enforce all the previous.

Payment for Environmental Services (PES) is a critical instrument to reward those land managers that implement the measures that reduce emissions or increase removals. Those net emission reductions itself can generate the funds required to stimulate action if they can be traded.

A PES system requires an institutional framework for management and administration. Issues related to governance and the design and capacity of the institutional infrastructure must be solid and effective.

If no alternative funding for setting up a PES system would be available, a part of the ITT Trust Fund could be required to finance this. Other possible sources of finance include the World Bank's Forest Carbon Partnership Facility (FCPF) or bilateral development assistance (e.g. through GTZ or KfW).

PES systems are not money-makers for governments: governments should facilitate the implementation of PES systems and not expect to generate revenues with it. A good PES system is however, as a minimum budget neutral, including all overheads and facilitating organisations and administrative functions. If PES is to generate additional resources it will be through the sale of carbon credits to third parties at prices that exceed the costs of generating them.

Monetary Value embedded in the Climate Change Mitigation Potential

The mitigation potential of afforestation/reforestation, REDD and forest conservation together in Ecuador in the next 20 years is estimated to be 820 million tCO2-e. Taking the lowest current carbon price of 1.65 USD the 820 MtCO2-e emission reductions represent a theoretical value of 1353 million USD over 20 year or nearly 68 million
USD per year. If the spot price of the EU ETS is used the potential revenues are estimated to be 820 million USD per year.

If implementation and transaction costs are taken into consideration the ITT strategy could potentially generate an income of 60 – 970 million USD per year, excluding the costs associated with the national system that has to operationalise the LULUCF offset potential.

**IMPACT OF THE TRUST FUND ON THE ENERGY MATRIX**

Carbon Dioxide (CO₂) emissions in the energy sector accounted for roughly 15 million tons: 13.8 million tons generated by combustion of fossil fuels and 1.1 million tons through the consumption of biomass.

Funds from the ITT Trust can be used to lever co-financing by supporting CDM project development, feasibility studies, business plans and the preparation of CDM documentation. Project types could include both LULUCF and other project categories.

There is an important potential for renewable energy in Ecuador, however, it cannot be expected – due to its volume – that the Trust Fund can finance all required activities to clean the energy matrix.

The ITT Trust Fund could issue guarantees or provide low interest loans to facilitate the access private project developers have to financial resources. Project activities could consist of small scale renewable energy projects (biomass, hydro) or forestry activities.

**RISKS ASSOCIATED WITH THE TWO SCENARIOS FOR THE ITT INITIATIVE**

The two basic scenarios include pursuing the ITT as currently defined and pursuing development of the ITT Initiative as a REDD program. Basic risks of the scenarios are presented below.

1) Pursue the ITT initiative to obtain funds for avoided emissions from avoided oil exploration
a) Via regulatory carbon markets it is highly improbable that this scenario will be successful for the reasons outlined in previous sections and chapters. The risks of the approach thus include lack of eligibility of project activities and non issuance of credits.

b) Outside the context of a market-based financial source it is much more probable to be successful given the interest of some international parties in supporting novel models of climate change control, and the additional social and environmental co-benefits that the action could have as a spin-off. Risks of the approach include an inability to obtain the entire magnitude of investment that has been calculated to be required to not exploit the oil field.
2) **Pursue the ITT initiative as a REDD program**

The ITT Initiative can be pursued as a REDD program, it being understood that the Government would support the inclusion of conservation as an eligible activity under REDD. The Government would have to work, best in coordination with other UNFCCC Parties, on the development of a methodology to account for conservation benefits. It is unlikely that such benefits would be quantified on the basis of forgone profits from oil exploration.
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The following methodologies and tools approved by the CDM Executive Board have been reviewed:

- ACM002 Ver. 8: *Consolidated methodology for grid-connected electricity generation from renewable sources*
- ACM006 Ver. 6: *Consolidated methodology for electricity generation from biomass residue*
- AM0036 Ver. 2.1: *Fuel switch from fossil fuels to biomass residues in boilers for heat generation*
- AM0047 Ver. 2: *Production of biodiesel based on waste oils and/or waste fats from biogenic origin for the use as fuel*
- AMS I.A. Ver. 13: *Electricity generation by the user*
- AMS I.C. Ver. 13: *Thermal energy for the user*
- AMS I.D. Ver. 13: *Grid Connected renewable energy generation*
- AMS III.T. Ver. 1: *Plant oil production and use for transportation applications*
- *Tool for calculating the emissions factor for an electricity system – Version 1.1*

Public available information from the following websites has been reviewed:

- UNFCCC: [http://cdm.unfccc.int/Projects/index.html](http://cdm.unfccc.int/Projects/index.html)
- CORDELIM: [www.cordelim.net](http://www.cordelim.net)
- Sistema de información para la gobernabilidad democrática: [http://www.sigob.gov.ec](http://www.sigob.gov.ec)