Transforming Guyana's economy while combating climate change

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Foreword

The world is running out of time – average global temperatures are rising too fast and our planet is on a trajectory towards human catastrophe of a scale never seen before. The greenhouse gas emissions causing these temperature rises must peak by 2020 and be cut by 80 percent by 2050. It will be impossible to do this without a dramatic reduction in emissions from deforestation – which comprise about a fifth of the global total. Future generations will not forgive us if we fail to act despite knowing these facts.

The people of Guyana are willing to act – as a country where almost 80% of our territory is rainforest, we stand ready to work with others who share our view that the world needs to break the false debate which suggests that a nation must choose between national development and combating climate change. Instead we should be asking how can we forge prosperous low carbon economies where national development and combating climate change are complementary, not competing, objectives.

The international mechanism for delivering a solution is the United Nations Framework Convention on Climate Change (UNFCCC). Parties to the Convention will meet in Copenhagen in December 2009 to agree on a new climate agreement to replace the Kyoto Protocol. When they meet, it is essential that the world's historic polluters make meaningful commitments to reduce emissions; if the current global economic crisis is used as an excuse to pull back from these commitments, it will send a disastrous signal to the developing world that action on climate change can only take place during times of prosperity. However, if the countries of the developed world accept their responsibilities, I believe that the developing world in general and rainforest countries in particular are willing to play their part.

Even though per capita, countries like Guyana already emit far less than the average required to stabilize global temperatures, as we become more prosperous, it is in everyone's interests that we avoid the high pollution path that today's richer countries followed. To achieve this, the international community and developing countries must create a platform for partnership where developing countries are not seen merely as passive recipients of aid, but as equal partners in the search for climate solutions. This is particularly vital in devising solutions for addressing deforestation – which happens almost entirely within today's developing world.

This draft strategy document sets out Guyana's view on how such a platform for partnership can be created, and affirms our commitment to play our part. The strategy is based on three fundamental realities:

First, much deforestation across the world happens because individuals, communities and countries pursue legitimate economic activities – such as selling timber or earning money and creating jobs in agriculture. The world economy values these activities and does not value most of the services that forests provide when trees are kept alive, including the storage of

greenhouse gases. Correcting this market failure is the only long-term solution to deforestation.

Second, the UNFCCC and its Reduced Emissions from Deforestation and Degradation (REDD) program have made valuable progress on agreeing to include payments for forestry climate services within the global carbon markets. However this will not generate the breakthrough required on avoiding deforestation unless there is also first-order political direction and support from Heads of Government around the world. I very much welcomed the opportunity for Guyana to participate in the recent G20 side meeting on deforestation, where national leaders from the world's leading economies and rainforest countries committed to take urgent action on deforestation. It is vital that this leadership is sustained.

Finally, getting started is difficult. Rainforest countries are hesitant to commit to the long-term reorientation of their economies that solving this problem requires – because they are unsure of the predictability of forest payments. The rest of the international community is hesitant to support REDD at the scale required - because they are unsure about the technical and institutional mechanisms to be used to monitor and verify that global deforestation is being reduced. Many international organizations – including non-governmental organizations - are also keen to ensure that the inclusion of REDD in an international carbon market does not become an "escape route" for historic polluters by allowing them to avoid making the necessary cuts in their domestic emissions.

This could be a recipe for a stalemate the world cannot afford. We need to find a way forward, and this draft strategy represents our views on how we can do this. In its current form, it is a starting point to gather the input of all sectors of Guyanese society. The involvement of our indigenous peoples is particularly vital. Our Amerindians have protected our forests for generations; a sizeable component of forest land is under their jurisdiction and their insights will be valuable not only for their own communities, but for the rest of Guyana and the wider world. Similarly, elected representatives from all political parties are critical to long-term success. Despite our other differences, successive Guyanese governments of different parties have long provided strong leadership to the world on the need to protect our forests. Members of Parliament and all other sectors of our society can make extremely valuable contributions to the national consultation of which this draft strategy is part.

I am deeply conscious of the enormous scale of ambition that Guyana's low-carbon vision represents. But the world needs ambition that is commensurate with the challenge we face. I am confident that our consultation will show the world that the people of Guyana stand ready to play our part – I hope that the international community is ready to do the same.

Bharrat Jagdeo

President of the Republic of Guyana

Executive summary

Guyana is reaching a new stage in its national development. Over the past two decades, the country has re-established a market-led economy within a multi-party democratic system. The economy has been restructured to support progressively increasing levels of social sector and infrastructural investment alongside private sector-driven economic growth. As this first generation of reforms and infrastructural development nears completion, the Government is embarking on a new wave of reforms, coupled with further expansion of the country's strategic economic infrastructure. These aim to build on previous reforms to further stimulate investment, economic growth and job creation as well as to improve security and social services, protect vulnerable sections of society, and deal with increased climate change-induced flooding. Harnessing the nation's assets to continue to develop the economy and fund these and other social and economic needs must be the Government's top priority.

Guyana's pristine forests are its most valuable asset – the majority of the 15 million hectare rainforest is suitable for timber extraction and post-harvest agriculture, and significant mineral deposits exist below its surface. The value of this forest - known as Economic Value to the Nation or EVN - is estimated to be the equivalent of an annual annuity payment of US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world. The deforestation that would accompany this development path would reduce the critical environmental services that Guyana's forests provide to the world – such as bio-diversity, water regulation and carbon sequestration. Conservative valuations of the Economic Value to the World (EVW) provided by Guyana's forests suggest that, left standing, they can contribute US$40 billion to the global economy each year.

However, no trading markets exist for these environmental services – and as a consequence, individuals and companies in rainforest countries face powerful incentives to deforest. In turn, national and local governments face political pressure to use the forest for economic and employment benefit. Reconciling this tension between protecting rainforests and pursuing economically rational development is the core challenge that must be addressed to make forests worth more alive than dead.

There is increasing global recognition of the fact that protecting forests is essential to the fight against climate change – forestry causes about 17% of global greenhouse gas emissions. Yet movement from *recognizing* the need for action to *actual action* continues to be too slow. Guyana's Low-Carbon Development Strategy seeks to provide insights on how to stimulate the creation of *a* low-deforestation, low-carbon, climate-resilient economy, whereby:

- With the right low-deforestation economic incentives, Guyana will avoid emissions of 1.5 gigatons of CO_2e (carbon dioxide equivalent which includes other greenhouse gases) by 2020 that would have been produced by an otherwise economically rational development path. These incentives will be generated through interim forestry payments from Guyana's partnership with the Norwegian Government and other sources, and the REDD program.

- These payments can enable Guyana's economy to be realigned onto a low-carbon development trajectory. Guyana can generate economic growth at or in excess of projected Latin American growth rates over the coming decade, while simultaneously eliminating approximately 30 percent of non-forestry emissions through the use of clean energy. To achieve this, Guyana must:
    - Invest in strategic low carbon economic infrastructure, such as: a hydro plant at Amelia Falls; improved access to unused, non-forested land; and improved fiber optic bandwidth to facilitate the development of low-carbon business activities.
    - Nurture investment in high-potential low-carbon sectors, such as fruits and vegetables, aquaculture, and sustainable forestry and wood processing.
    - Invest in other low-carbon business development opportunities such as business process outsourcing and ecotourism.
    - Expand access to services and new economic opportunity for indigenous peoples through improved social services (including health and education), low-carbon energy sources, clean water and employment which does not threaten the forest.
    - Improve services to the broader Guyana citizenry, including improving and expanding job prospects, promoting private sector entrepreneurship, and improving social services with a particular focus on health and education.
- Guyana's people and productive land can be protected from changing weather patterns. Investments in priority climate adaptation infrastructure can reduce the 10 percent of current GDP which is estimated to be lost each year as a result of flooding.

To support this strategy, Guyana will institute a number of new organizational units and systems, to include an Office of Climate Change (to coordinate all climate-related activities for the nation), a Low Carbon Strategy Project Management Office (to drive major low-carbon program priorities), and a Guyana Low-Carbon Finance Authority (to manage forest payments and related investment flows into the country and promote investment efficiency to the benefit of Guyana's economy). In addition, safeguards and systems will be developed to ensure the continuing protection of Guyana's tropical rainforests through globally-verified forest and other land use governance standards and transparent, accountable deployment of forest payments.

The strategy in its current form is a draft for discussion by national stakeholders to seek support for the proposals to protect Guyana's State Forest Estate (which does not include forests under Amerindian jurisdiction). It will also kick-start the next phase of consultation among forest communities, following earlier sensitization meetings. Over the coming years, forest-based Amerindians – who total approximately 9.1 percent of Guyana's population and own approximately 14 percent of the land – will have a choice of whether to put their forests into a forest compensation program (side-by-side with the State Forest Estate). No deadline is being set for when communities must "opt in" – it is envisaged that the process will move at different speeds in different communities, as consultations proceed in line with the Amerindian Act and international norms that seek to gather prior and informed consent from impacted communities.

1. A Low-Carbon economic development strategy for Guyana

Guyana's economic development opportunities and challenges

Guyana is reaching a new stage in its national development. As the country's first generation of reforms and infrastructural development nears completion, the Government is embarking on a new wave of reforms, coupled with further expansion of the country's strategic economic infrastructure.

Over the past two decades, Guyana has transitioned to a multi-party democracy and market-based economy. Since 2001, far-reaching constitutional reform has included the establishment of six constitutional commissions and four parliamentary standing committees to promote greater inclusivity in national politics; the introduction of presidential term limits which prevent a President from being elected to more than two consecutive terms; and the restoration of parliamentary oversight to the National Budget process. An independent Office of the Auditor General reporting to the National Assembly is charged with ensuring transparency of Government expenditures, and parliamentary participation in the police, teaching, public service and judicial appointment commissions has been enabled in law.

The country's macro-economic foundations have been transformed and remain strong[1]. Guyana has experienced positive growth in almost every year over the past two decades – growth rates in 2006, 2007 and 2008 were 5.1%, 5.4% and 3.1% respectively[2] (growth in 2008 was 5.9% if the sugar industry is excluded[3]). Inflation has been kept under control, and monetary policy is implemented by an independent Central Bank. Recent years have seen the Government's stock of debt reduced significantly – with external debt now less than half what it was in the early 1990s[4]. This has enabled considerable expansion in social sectors, most notably in education, where investments are now about a third of all Government revenue[5].

The framework for private investment has been progressively modernized, and all major political parties within the National Assembly support market-based approaches to economic growth. The corporate tax regime allows the full repatriation of profits, and the 2004 Investment Act was introduced to modernize the regulatory and legislative framework to protect private investment. There is no discrimination between foreign and domestic investors.

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[1] The 2008 Executive Board of the International Monetary Fund (IMF) Public Information Notice states "Directors...welcomed the authorities' commitment to sound macroeconomic and structural policies, as evidenced by the perseverance with adjustment and reform and the cautious use of external financing." Available at: http://www.imf.org/external/np/sec/pn/2008/pn0845.htm

[2] Ministry of Finance, Budget Speech to the National Assembly, 2009

[3] The sugar industry accounts for about 15% of Guyana's GDP. In 2008, it experienced major disruptions in production modalities, in part because of the transition to a new factory which experienced start-up problems.

[4] Ministry of Finance, National Budgets

[5] Ministry of Finance, National Budgets

Strategic economic infrastructure has been upgraded – including almost all of the national road network, the main international airport and hinterland air-strips. The Berbice Bridge now links some of the country's most productive land to Georgetown, and the bridge across the Takutu provides Guyana with its first-ever land border with any of its neighbors – in this case, linking Guyana to Brazil and through Brazil to the rest of South America.

Coupled with the country's as yet-untapped further potential for economic development – including agricultural potential, valuable natural resources and a young, educated and English-speaking workforce - the foundations are now in place to stimulate the next wave of economic growth. This will require Guyana to seize the opportunities present in today's changing global economic environment. This means continuing the modernization of the traditional economic sectors which have generated Guyana's historical growth and employment, while simultaneously diversifying the economy into new sectors where Guyana possesses comparative advantage[6]. Guyana's National Competitiveness Strategy prioritizes the modernization of four traditional sectors: sugar, rice, forestry, and mining. It also identifies five additional sectors with the greatest opportunities for new growth and diversification: non-traditional agriculture, aquaculture, manufacturing, business process outsourcing/information technology, and tourism.

Considerable progress has been made in building domestic capability in several of these new sectors. Yet to fully realize the potential of each, the country also needs to invest in a second generation of reform and infrastructural development to attract this higher-value investment. These reforms and investments need to address a set of challenges which include:

- Much of Guyana's several hundred thousand hectares of non-forested land available for higher-value agricultural development requires either costly drainage and irrigation (e.g., the Canje Basin) or significant road and utility investments to provide access (e.g., the Intermediate Savannahs). This makes Guyana's non-forested land less attractive than available land in other countries such as Brazil.

- Guyana's oil-dependent electricity supply is more expensive to end users than in neighboring countries (e.g., Suriname), and both cost and reliability concems have led many major users to operate off the grid. This makes Guyana less attractive to industrial investors.

- Limited fiber optic capacity and sub-standard telecommunications infrastructure make the cost of bandwidth and other telecommunications services among the most expensive in the world, impairing Guyana's ability to develop its business process outsourcing enterprises.

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6 The policy framework to achieve these twin objectives is summarized in Guyana's National Competitiveness Strategy (NCS) – which was published in 2006. The NCS updates key aspects of the economic strategy first outlined in the National Development Strategy (NDS). Both the NDS and NCS were prepared after extensive consultations between the Government, private sector and other civil society stakeholders.

- Much of the population and economic activity in Guyana exist at or below sea-level, and in-land flooding represents a significant and growing risk to investors. Major floods in 2005 caused damage equivalent to 60 percent of GDP[7].

- Guyana is not well known to major investors outside of its traditional industries. To be a catalyst for Guyana, leading international players require a business rationale to invest. Given the lack of awareness that exists, the corresponding higher perceived country-risk and the new investment required in industry-specific infrastructure, substantial incentives will be required to attract investors in these industries.

Guyana also needs to invest in further improvements in its social sectors – for example, to increase access to quality healthcare and education; to help businesses and citizens improve their access to safe and affordable water and electricity; to enhance the security of all Guyana's citizens; to protect vulnerable sectors of society; and to alleviate poverty. Furthermore, Guyana must develop the workforce which is required for a modern economy, and attract and retain skilled people – including skilled immigrants from other countries and members of Guyana's "Diaspora".

Meeting these challenges will require significant resources to transform the economy. In doing so, Guyana's policymakers have a prime responsibility to harness the value of the country's assets to promote economic and social development.

Economic value of Guyana's forests

Guyana's pristine forests are its most valuable asset. Almost 80%[8] of Guyana's territory consists of tropical rainforest that is still largely untouched. The great majority of the forest is suitable for timber extraction and post-harvest agriculture, and significant mineral deposits exist below its surface. The Office of the President, based on an independent assessment by McKinsey & Company, estimates the value of Guyana's rainforest[9], if harvested and the land put to the highest value subsequent use, to be between US$4.3 billion and $23.4 billion[10]. The wide range of estimates is driven by fluctuating prices for commodities such as logs, rice and palm oil – but the most likely estimate is US$5.8 billion. This forest value known as Economic Value to the Nation (EVN) is the equivalent of an annual annuity payment of between US$430 million and $2.3 billion, with the most likely annuity payment being US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world. The deforestation that would accompany this development path would reduce the critical environmental value which Guyana's forests provide. Conservative valuations of the Economic Value to the World (EVW) provided by

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7 See www.eclac.org

8 Guyana's rainforest covers an area in excess of 15 million hectares.

9 This estimate includes the State Forest Estate, and excludes lands under the jurisdiction of indigenous peoples, who will be able to "opt in" to the forest protection program through the national consultation process.

10 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

Guyana's forests suggest that, left standing, they contribute US$40 billion to the global economy each year.[11]

However, no trading markets exist for these environmental services today – they represent a market "externality" where the public good provided by the forests in rainforest nations is not paid for. Consequently, because forested land can generate greater economic value when put to other uses, individuals and companies in rainforest countries face powerful incentives to exploit these opportunities. In turn, national and local governments face understandable political pressure to permit and even encourage economic activity which leads to deforestation. Many of today's richest countries actively pursued deforestation and land conversion to agriculture in early phases of development for precisely these reasons. Reconciling the tension between protecting its rainforest and pursuing economically rational development is the core challenge that Guyana is seeking to address through its Low-Carbon Development Strategy.

Protecting Guyana's rainforests while furthering economic development

Since 2006, the Government of Guyana has been calling for bold action by rainforest nations and international partners to address deforestation. President Jagdeo has stated that if the right economic incentives are created, Guyana would be willing to consider placing almost its entire rainforest under internationally verifiable protection, provided national sovereignty and the rights of all Guyanese are not undermined.

As set out in the Office of the President's "Creating Incentives to Avoid Deforestation" memorandum, Guyana has recognized that although standing forests provide enormous EVW through environmental services such as bio-diversity and water regulation, in practical terms there is currently only one potential market of real importance for an environmental commodity - the carbon market. [12,13]

However, the existing carbon market (or markets, there are a number of different mechanisms permitted within the Kyoto Protocol) does not include any meaningful mechanisms to combat deforestation at the scale required[14]. This is despite the fact that forestry contributes around 17 percent of global greenhouse gas emissions – about the same as the United States, and more than the entire global transport sector.[15] Moreover, a report for the British Government has estimated that the global economic cost of climate change caused by deforestation could

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11 Based on 2030 marginal abatement cost from McKinsey & Company. "A Cost Curve for Greenhouse Gas Reduction", *McKinsey Quarterly*, 2007 Number 1

12 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

13 A ton of carbon emissions avoided from reducing or preventing deforestation provides essentially the same ecosystem services as a ton of carbon emissions abated by other means so the world's willingness to pay for this service should be the same.

14 The Kyoto protocol included the Clean Development Mechanism which had limited possibilities to create incentives for afforestation and reforestation projects, but none for countries which had avoided deforestation in the past, such as Guyana

15 Eliasch, J. "Climate Change: Financing Global Forests" (Eliasch Review), Office of Climate Change, Government of the United Kingdom (2008)

be as high as $1 trillion by 2100[16]. Yet extensive deforestation continues – every day, at least 32,000 hectares of rainforest disappear in countries across the world. No realistic solution to climate change is possible without incentives that quickly lead to a dramatic decrease in global deforestation.

The Government of Guyana believes that the replacement to the Kyoto Protocol which will be negotiated in Copenhagen in December 2009 must address the exclusion of forestry from the carbon markets. The Government supports international proposals that Kyoto's replacement should include incentives to cut tropical deforestation in half by 2020, and make the global forestry sector carbon neutral by 2030 – where greenhouse gas emissions from deforestation are balanced by new forest growth. Over the past 18 months, significant progress has been made in building the international partnership needed to make this a reality:

- The UNFCCC has included reduced emissions from deforestation and degradation (REDD) as part of the emerging overall climate change framework. Importantly, REDD[17] recognizes the importance of protecting standing forests in countries with low historic rates of deforestation. As such, there is agreement in principle to generate international payments for forest protection.
- An emerging consensus is developing for immediate, interim funding to begin to protect the world's rainforests. While REDD mechanisms are the key to a long-term solution, transitioning to REDD will take years – and so will not generate sufficient funding quickly enough. In April 2009, Guyana joined leaders of key G20 countries at a meeting hosted by the Prince's Rainforest Project, where the leaders agreed to examine options to look at interim / emergency measures to help save tropical forests. While there are a number of proposals for how this might be structured, some form of transitional funding is needed to immediately slow and avoid deforestation, while supporting the longer-term emergence of an at-scale REDD mechanism.[18]
- The Governments of Norway and Guyana have agreed to work together to provide the world with a model of how to quickly implement policies to avoid deforestation by progressing Guyana's Low-Carbon Development Strategy. In February 2009, the Prime Minister of Norway, Jens Stoltenberg, and President Jagdeo announced a partnership to support "the creation of low-carbon employment and investment opportunities in Guyana, sustained efforts to avoid deforestation and forest degradation, strengthening transparent forest governance, and establishing an international monitoring, reporting, and verification system for Guyana's forests. A financial mechanism run by a reputable international organization will be established through which performance-based

16 Eliasch, J. "Climate Change: Financing Global Forests" (Eliasch Review), Office of Climate Change, Government of the United Kingdom (2008)

17 Some refer to the inclusion of Avoided Deforestation within REDD as REDD-plus. For the purpose of this document, the phrase REDD refers to incentives to reduce emissions from deforestation, degradation and avoided deforestation.

18 See http://www.princesrainforestsproject.org/what-the-projects-doing/news#meeting-0104

compensation can be channeled to support the implementation of Guyana's low-carbon development strategy."[19]

Toward a low-deforestation, low-carbon, climate resilient economy

This draft strategy sets out how Guyana can work within the emerging international partnership to provide the world with a model for how immediate action can stimulate the creation of a low-deforestation, low-carbon, climate-resilient economy:

- Section 2 outlines how Guyana's forest helps the world, and how transitional payments from Guyana's climate change partnership with Norway and others, followed in the longer term by payments under the REDD mechanism, can create the platform for an effective strategy to avoid deforestation. This can enable Guyana to avoid emissions of 1.5 gigatons of CO_2e (carbon dioxide equivalent which includes other greenhouse gases) by 2020 that would have otherwise stemmed from an economically rational development path).[20]
- Section 3 outlines how transitional payments and REDD can enable Guyana's economy to be realigned onto a low-carbon development trajectory. Guyana can generate economic growth at or in excess of projected Latin American growth rates over the coming decade, while simultaneously eliminating approximately 30 percent of its non-forestry emissions through the use of clean energy - approximately 12 megatons of CO_2e by 2020.[21]
- Section 4 outlines how investments in priority climate adaptation infrastructure can reduce the 10% of Guyana's current GDP which is estimated to be lost each year as a result of flooding.[22]
- Section 5 outlines how the Low-Carbon Development Strategy can be implemented, and sets out the institutional framework through which transitional payments and REDD would be administered.
- Section 6 outlines how long-term support for the LCDS and REDD can be built in Guyana through a transparent, inclusive, multi-stakeholder consultative process. It specifically addresses how forest communities can choose whether to participate in the international partnership to access transitional and REDD payments.

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[19] Joint statement issued after a meeting between the President of Guyana, Bharrat Jagdeo, and the Prime Minister of Norway, Jens Stoltenberg, in Oslo on February 3, 2009. See http://www.regjeringen.no/en/dep/smk/Whats-new/News/2009/norway-and-guyana-cooperate-to-reduce-gr.html?id=544712

[20] Assumption is loss of above and below ground biomass, at 418 tCO_2e per hectare, from FAO Forest Resources Assessment 2005 (cited in OSIRIS v2.2)

[21] Guyana's National GHG Inventory (1998 UNFCCC Reporting); McKinsey & Company, "Global GHG Abatement Cost Curve v2" (2009)

[22] Office of the President, Republic of Guyana, "Economic Impact of Adaptation" (unpub.)

This draft document is part of the process to seek support for Guyana's low-carbon development strategy and REDD from the people of Guyana, including those who live in and depend on its forests. It is supported by the "RPlan" – a document produced by the Guyana Forestry Commision which sets out more details about Guyana's participation in the REDD process. In their current form, this document and the RPlan are supporting the initial phase of the national consultation, which is taking place in June, July and August 2009.

2. Deploying Guyana's forests in the battle against climate change

Building an International Partnership

The higher priority now given to the role of forestry in climate change represents significant progress in global efforts to combat climate change. However, to build on this, both non-rainforest members of the international community and rainforest nations need to understand what it will take for others to be willing to participate in bold action to combat deforestation. Non-rainforest members of the international community need to recognize that rainforest countries cannot be expected to fundamentally re-orient their economies unless they can rely on a predictable flow of compensation for the services their forests provide to the world. Rainforest countries need to recognize that the rest of the international community cannot be expected to facilitate this compensation unless they can rely on a permanent and predictable slow-down in global deforestation. To generate a willingness to participate from all parties, four crucial questions need to be answered:

- Will funds be available to provide incentives for avoided deforestation?
- How will these funds be distributed?
- What technical capabilities must be built in rainforest countries?
- What is the best way to get started quickly?

The Government of Guyana believes that each of these questions can be answered.

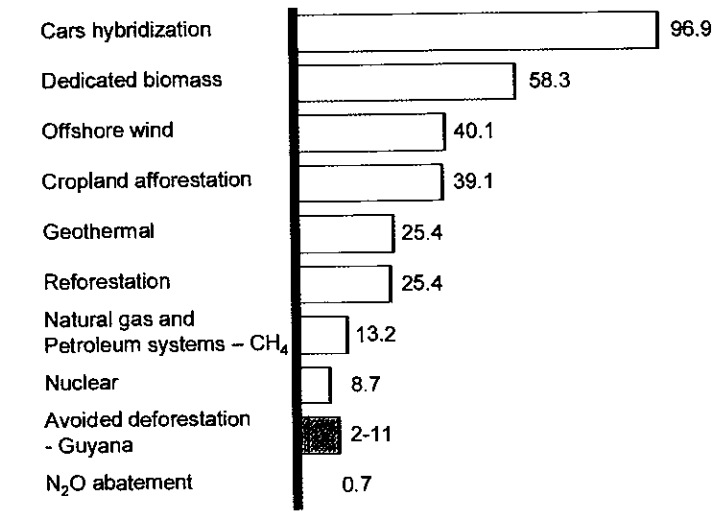
Will funds be available? The rationale to provide sufficient funding quickly is clear - global estimates to halve deforestation range from US$15 billion per year to US$60 billion per year – even at the higher end of this range, it is one of the lowest cost abatement options. Compensation for Guyana at EVN would represent a price per ton of avoided emissions in the range of US$2-11 per ton by 2020, which is far lower than most abatement options as illustrated in Exhibit 1.[23] However, to actually generate these funds over the long term, the forestry sector must be included within the global carbon trading system (or a series of linked regional trading systems). The Eliasch Review estimates that including REDD and action on sustainable forestry management (SFM) in a properly-designed carbon market could generate incentives to reduce deforestation by up to 75% by 2030. With the addition of afforestation, reforestation and restoration (ARR), this could make the forestry sector carbon neutral – in line with the over-arching goal for the forestry sector which the Government of Guyana supports.

23 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

Exhibit 1

Cost of carbon abatement

USD per tonne of CO_2



Source: Vattenfall, McKinsey

However, the global carbon markets are still at a very early stage of development, so including the entire forestry sector in these markets in the near future is unlikely. At the same time, excluding forestry from carbon markets would erode the willingness of rainforest nations to participate. To balance these conflicting positions, the Government of Guyana believes that a dual approach is necessary.

First, forestry should be introduced to the carbon markets progressively over time. Starting in 2013, a portion of each country's rainforest should be assigned forestry emissions quotas or carbon credits (known as AAUs)[24] as offsets to trade within the carbon markets. Over years, the portion of rainforest for which AAUs are assigned should be progressively increased in line with a trajectory which prevents "flooding" the markets.[25] The Eliasch Review suggests that the carbon markets should be able to meet 22 percent of forestry abatement costs by 2020 and as much as 75 percent by 2030. This implies that the protection of approximately 2 million hectares of Guyana's forest could be funded by a REDD mechanism within the global carbon markets by 2020.

Second, to ensure national scale action and prevent leakage, a transitional funding mechanism will be needed to address the significant short-fall between what can be generated via the market and compensation levels that out-compete EVN as outlined in

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24 Assigned Amount Units: cited in the Eliasch Review as "tradable sovereign allowances to emit CO_2e"

25 Market flooding involves an excessively large supply of credits (AAUs) into the market and may result in reduction in carbon price and/or deterrence of investment in low-carbon technologies and other abatement options

Section One. This shortfall will have to be resolved via a transitional funding mechanism – which can cover the portion of a country's forest not included within REDD.[26]

How should these funds be allocated? In the near term, allocation of funds will be done through bilateral partners and other transitional mechanisms. Over the longer term, funds will be allocated through REDD. In both cases, compensation should be performance-based – where rainforest countries are compensated for services they provide against negotiated indicators in accordance with globally accepted standards. The exact performance metrics will need to show that deforestation and degradation are being reduced or avoided – in the long term, this will require sophisticated carbon measurement, but in the short-term, proxy indicators (such as area of forest preserved) should be utilized to encourage early action.

Any long-term REDD payment mechanism must be designed to maximize and sustain the participation of a critical mass of forest nations. The REDD Options Assessment Report prepared for the Government of Norway highlights the importance of participation: "if only a subset of forest nations participate in an international REDD mechanism, there is a risk that deforesting activities will shift to non-participating countries."[27] The REDD mechanism developed must therefore create incentives that recognize that countries have different historical deforestation rates, amounts of forest cover, and development trajectories. Since EVN reflects the actual economic pressures on the forest, an emissions baseline that provides forest payments at or above the level of EVN is more likely to out-compete other potential uses of the forest.

What in-country technical capabilities are needed? If rainforest countries are not confident that forest payments will be accessible and predictable in the near-term, they are unlikely to want to develop capacity to sell a service that is not going to be paid for – this is why proposals that REDD should start with a "capacity building phase" are unlikely to generate sufficient willingness to participate quickly enough. By contrast, if capacity building is supported *in parallel with* performance-based payments for early action, rainforest nations will recognize that they need to build the capacity to monitor deforestation activity, report performance against deforestation baselines, and verify that international commitments are being followed (known as Monitoring, Reporting and Verification or MRV). In this situation, rainforest countries will need to put in place strong governance institutions for the effective deployment of forest compensation payments and seek to ensure the equitable use of these payments. Leakage – where slowing deforestation in one area of a country leads to deforestation in another – needs to be avoided, and commitments need to permanent, so that rainforest countries cannot take payments for a period of time only to later reverse their policies on forest protection.

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[26] If the carbon markets are used to support small-scale, sub-national pilots, they will not generate the national incentives that are critical to prevent "leakage" – where stopping deforestation in one area leads to its displacement to another.

[27] Meridian Institute. 2009. "Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report." Prepared for the Government of Norway, by Arild Angelsen, Sandra Brown, Cyril Loisel, Leo Peskett, Charlotte Streck, and Daniel Zarin. Available at: http://www.REDD-OAR.org.

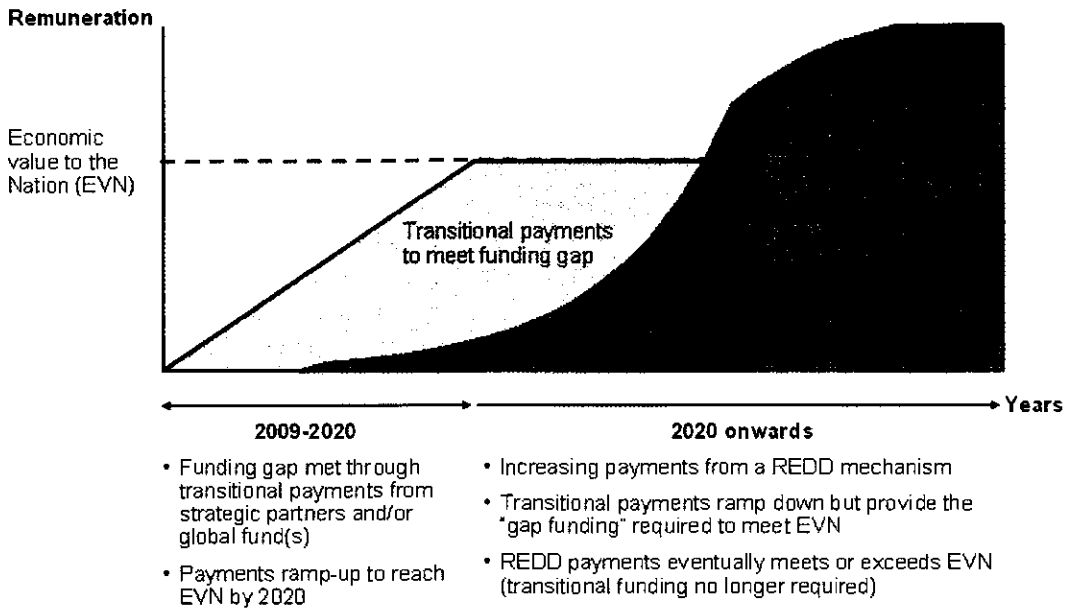
What is the best way to get started? Despite the global consensus for urgent action, rainforest nations and international partners are understandably reluctant to "move first" for the reasons already discussed. To break this impasse, the Government of Guyana believes that a series of linked confidence-building measures should take place concurrently over time. This requires a phased approach where rainforest countries demonstrate their willingness to participate by building necessary capabilities and reorienting their economies while non-rainforest members of the international community demonstrate their willingness to participate by ensuring that they pay predictable forest compensation payments that start at a discounted value but ramp up to, and eventually exceed, EVN. (This assumes adherence to agreed performance metrics by the countries providing the forest climate services.)

This transitional funding will eventually be replaced by a REDD payment mechanism linked to global carbon compliance markets. The evolution from transitional payments to payments from a REDD market mechanism is illustrated in Exhibit 2.

Exhibit 2

Potential flow of payments from transitional funding sources to an at-scale REDD mechanism

ILLUSTRATIVE



SOURCE: "Climate Change: Financing Global Forests: The Eliasch Review", Government of the United Kingdom (2008)

A Model for the World

In order to demonstrate how the parallel confidence building measures previously discussed can be implemented, Guyana is willing to participate in an international partnership to forge a new economy while combating climate change over four phases, where deepening commitments by the international community are matched by deepening commitments from Guyana as outlined below. The evolution of the payment scheme for forest services is set out in Exhibit 3, which incorporates Guyana's broad expectations of what it will take for the UNFCCC process to generate sufficient incentives for both rainforest countries and non-rainforest countries to be "willing to participate" in a global REDD mechanism.

Exhibit 3

Indicative remuneration plan for LCDS

Phase	Payments to Guyana	Description
Phase 1 (2009)		• Interim payments to launch the LCDS • Includes funding for an MRV system in Guyana
Phase 2 (2010-2012)	• Starts at: ~$60 million • Ramps up to $230-$350 million (40%-60% of EVN)	• Transitional funding that will be used for: – Capacity building – Investment required to build a low carbon economy – Human capital development
Phase 3 (2013-2020)	• Starts at: ~$230-$350 million (40%-60% of EVN) • Ramps up to $580 million (EVN)	• Continued payments to avoid deforestation • Payments will be used for further: – Investments in low carbon economy – Capacity building – Climate change adaptation
Phase 4 (2020 onwards)	• At or above EVN (>$580 million)	• "At-scale" REDD mechanism should: – Provide incentives at or above EVN – Account for increasing value of the forests (e.g., reset EVN periodically)

• From 2009 to 2020, payments will avoid ~1.5[1] Gt CO_2e at an abatement cost of $2 to $3 per ton
• Payments will be used to reorient the economy and put Guyana on a high growth, low-carbon economic development path

1 Based on Guyana's economically rational deforestation rate and biomass (above and below ground) of 418 tCO_2e from FAO-FRA2005

Phase 1, 2009: Launching the Low-Carbon Development Strategy

In this start-up phase, the intent is to:

- Demonstrate that Guyana is committed and able to carry out its Low-Carbon Development Strategy (LCDS) while protecting its standing forests;
- Gain broad support for the LCDS within Guyana through visible support from Guyana's partners, including interim forest compensation payments to start the re-orientation of the economy toward a low-carbon trajectory, in advance of the UNFCCC meeting in Copenhagen this December.

Guyana will implement an internationally-accepted forest monitoring, reporting, and verification (MRV) system, source capital for strategic investments required to start implementation of the low-carbon development strategy, and begin to execute on initial priority investments (e.g., hydropower, adaptation, development of village economies, and health care/education).

In support of this phase, Guyana has started preparatory work with the Government of Norway. At the Government of Guyana's request, Norway has commissioned an independent assessment of current forest governance and law enforcement standards; an independent assessment of present logging practices and levels of deforestation and forest degradation, including an assessment of their carbon footprints; and the provision of independent advice from an international institution for the consultative process on the LCDS (including Guyana's work within the UNFCCC's REDD process).

Phase 2, 2010-2012: Building the Foundation for the New Economy

In this multi-year phase, Guyana will receive increased payments from partners (starting with Norway, but the scale of funding to re-orient the economy onto a low carbon path will require the participation of other global partners) to:

- Execute and deliver on five to ten priority infrastructure projects needed to re-orient the economy toward low-carbon growth.
- Attract major international investors in at least three key new economic sectors such as hydropower, high-end fruits and vegetables, and aquaculture.
- Implement the most critical climate adaptation measures and signature programs to improve health care and education.
- Align all land-use policies with the LCDS – most importantly, forestry and mining policies.
- Deepen the quality and comprehensiveness of the MRV system and other capacities necessary to protect its forests.
- Work with indigenous peoples' groups who want their land included in overall transitional arrangements to incorporate them in the payment regime en route to a full-scale REDD program.
- Seek Expressions of Interest from potential investors in Guyana's expected AAUs from REDD post-2013.
- If other markets for environmental services emerge – (for example Payments for Environmental Services (PES) for bio-diversity) - their potential will also be examined during this period, and Expressions of Interest will be considered.

Phase 3, 2013-2020: Integrating the New Economy with a Global Climate Deal

During this longer phase, interim forest payments should gradually increase to approach the level of EVN. In parallel, REDD payments from carbon compliance markets should ramp up as these markets open up to an increasing flow of REDD credits and the increased supply of REDD credits make it possible to generate more forest payments from public and private sources These payments will supplement, and hopefully ultimately replace, transitional payments .

During these years, Guyana will:

- Continue to invest in the highest priority low-carbon economic infrastructure and adaptation priorities. By this time, Guyana should begin to see large-scale transformation in several target industrial sectors based on longer-term investments and the investment presence of international companies. Combined with expanded education/health programs and other investments, Guyana should also begin to reap benefits in growth in higher-value services sectors (e.g., Business Process Outsourcing).

- Build further capability, as needed, to manage and invest funds, drive economic development projects and deploy the forest MRV system and related capabilities with the intent of having fully-developed institutional capabilities in these areas as effective institutions for the nation and exemplars to the world. The Government will also promote the dispersion of these management capabilities throughout the Guyanese government and the private sector. An aspirational goal is to stop, and hopefully reverse, the "brain drain" of skilled labor, which would further help develop Guyana's economy.

- Agree on the first wave of REDD investments which will take advantage of opportunities to export forest offset credits originated by the Government or private investors into greenhouse-gas compliance trading markets (global, regional or national) that have sufficient availability of offset access rights.

Phase 4, 2020 onwards: Operating "at-scale" under a functioning international REDD regime

At the point when financial flows for REDD are at EVN or higher, Guyana should be able to fund its further low-carbon development efforts from these flows, and no longer need transitional payments. If an "at-scale" REDD mechanism that can fund Guyana's forest value at or above EVN emerges before 2020, Guyana would agree to move to Phase 4 as of this date.

3. Creating a low-carbon economy

The previous section described a new approach for valuing standing forests – where the right action by the international community could deliver value both to rainforest nations and to the wider world by making rainforests worth more alive than dead. If this occurs, Guyana can protect its forest and simultaneously seek a development path that maximizes the growth of low-carbon economic sectors and minimizes deforestation and high-carbon economic activity. This will not stop existing economic activities or threaten the employment of those already working in the forest, providing those activities are in accordance with internationally accepted practices. Instead, it would lead to action in three areas that are essential to Guyana's future:

- Investing in low-carbon economic infrastructure
- Facilitating investment and employment in low-carbon economic sectors
- Generally enhancing the nation's human capital and creating new opportunities for forest-dependent and other indigenous communities.

Investing in strategic economic infrastructure

Guyana has identified more than US$1 billion in essential capital projects that can be fully or partially funded through private investment assisted by an in-country infrastructure investment fund built from forest compensation payments. Among other initiatives, these projects will enable future economic growth to be powered predominantly by clean energy (hydropower), and to make non-forested parts of the country accessible to private investors who can generate low-carbon economic development and employment (largely high-end agriculture and aquaculture). These infrastructure projects would begin to shift the economy toward low-carbon industrial activity, and enable greater resources to be deployed towards ensuring that existing infrastructure in forested areas does not facilitate an increase in deforestation and degradation.

Initial investments focus on three types of infrastructure:

- **Hydropower (US$400 million to $600 million).** Currently, Guyana relies on imported fuel oil and diesel for its electricity generation, which is both expensive and carbon-intensive. Guyana has identified a hydro site at Amaila Falls which could deliver energy security by meeting all of the country's domestic power needs for the foreseeable future, improve Guyana's balance of payments (fuel imports in 2008 cost approximately 35% of GDP), and reduce end-user costs by about one third. Excluding emissions from construction of the plant, the carbon abatement by 2020 can be approximately 12 megatons of CO_2e. The technical design for the plant is complete, and prospective private funders of the Amaila Falls Hydro Facility will require co-investment from the Government.
- **Draining, irrigation and road development to improve access to unused, non-forested land (US$300 million to $500 million).** Guyana has substantial, unused non-forested land that can be converted to productive use, but lack of infrastructure is currently making the land inaccessible and/or substantially increasing its development cost above competitive options for developers. For example, in the

Canje Basin, approximately US$325 million in draining and irrigation investment is needed to convert land for agricultural use. In the intermediate savannahs, approximately US$100 million in roads and related infrastructure investment is needed to improve access and provide required infrastructure for future inhabitants. By developing infrastructure into the these parts of the country, economic activity and employment will be re-oriented away from areas which put pressure on the forest.

- **Fiber Optic Cables/Technology Park (US$10 million to $30 million).** According to estimates by Accenture, Guyana's outsourcing industry has the potential to more than double the number employed by 2013.[28] Industry stakeholders have identified telecommunications infrastructure as a key barrier to sustaining industry growth – for example, Guyana is competitive in all inputs to cost per seat (the key industry metric) with the exception of the cost of telecommunications bandwidth. Investment in fiber optic cables and a technology park will remove these impediments to further industry growth; they will also reduce the cost of telecommunications for individuals and companies nation-wide.

Facilitating investment in high-potential low-carbon sectors

Attracting large-scale catalytic investors to Guyana will require incentives to finance industry-specific infrastructure and overcome perceived country investment risk.

Building on the priority diversification opportunities outlined in the National Competitiveness Strategy, Guyana has identified six priority low-carbon economic sectors: fruits and vegetables, aquaculture, sustainable forestry and wood processing, business process outsourcing, eco-tourism, and possibly bio-ethanol. Guyana plans to focus initially on three sectors: fruits and vegetables, aquaculture, and sustainable forestry. In each of these sectors, long-term market demand exists and Guyana has the essential natural resources to operate at scale.

1. Fruits and Vegetables. Guyana is well-positioned to expand exports of fruits and vegetables as it has major tracts of non-forested arable land that are potentially suitable for commercial agriculture – and the country is close to major fresh fruit and vegetable import markets in the Caribbean and the United States. The enablers, costs, and benefits of this investment are summarized below:

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[28] Office of the President, Republic of Guyana. "Stimulating Growth in the Business Processing Outsourcing Sector" (unpub.)

Exhibit 4

Guyana could become a competitive global producer of tropical fruits and vegetables

Can Guyana become an internationally competitive fruits and vegetable producer?

Key requirements	Assessment
A There is land available and suitable for production	✓
B Guyana can produce these crops in a cost competitive way in the region	✓
C The necessary infrastructure and labor force can be put into place	✓
D Guyana is well positioned to supply unmet demand in Caribbean / Brazil markets	✓
E Guyana can attract partners with the right managerial and technical know-how to succeed	?
Overall assessment	✓

Impact on Guyana's economy of capturing 50% share of CARICOM fruit/vegetable imports

Impacts	Estimate
Government revenue p.a., 2013 $US millions	40-110
Potential job creation, after 2013 thousands of employees	4-10
Initial investment*, 2009 $US millions	80-100
Net exports impact per annum after 2011 $US millions	250-350
Overall impact	Medium

* including investment incentive

To capture this opportunity, Guyana needs to attract several large-scale commercial agriculture operators to help it overcome logistical and quality control issues such as lack of processing facilities, limited ability to comply with sanitary/phytosanitary standards, and weak links to key import markets. Based on interviews with leading global fruit and vegetable producers, it is clear that Guyana will need to provide significant financing incentives, offer a substantial land area to attract leading operators, and improve its investment support to new investors. Such "sector-leading investment" will be the basis of broader-based growth in this sector.

2. Aquaculture. Guyana has an opportunity to provide fresh and frozen fish to its Caribbean neighbors and other importing nations. In the United States alone, the seafood demand deficit is forecast to be approximately 1 billion pounds by 2025. Increasing demand and attractive margins for fresh-water fish make this investment particularly attractive to Guyana. The enablers, costs and benefits of this investment are summarized below:

Exhibit 5

Guyana could become a competitive global producer of aquaculture products

While aquaculture will require significant start-up costs (approximately $15,000 per hectare), the industry, once-established, would allow Guyana to tap into a large and growing markets in fresh fish, frozen and processed product. Guyana has 55,000 hectares of state-owned, uncultivated coastal lands and up to 118,000 hectares in the Intermediate Savannahs. In addition, Guyana has hinterland areas that are suited to production of fish or crustaceans, such as tilapia and shrimp. One hectare of land properly maintained can produce up to 23 tons of fresh water fish. In the medium term, Guyana will look to set up one to two major tilapia farms producing 5,000 to 10,000 tons annually.

Guyana will work to attract potential investors to help it establish its aquaculture industry, which will entail developing a system of pond excavation, drainage and irrigation pipes, and predation defense measures. These international partners will also help Guyana comply with sanitary standards, establish efficient logistics, and connect the country to import markets.

While aquaculture is an attractive market, Guyana will have to work to provide incentives to attract large-scale investors. Guyana's costs are likely to be above those of Asian producers for frozen fish and shrimp, and Guyana currently lacks a large-scale, fresh fish-exporting infrastructure. Finally, since upfront costs are high, investors will want assurances that aquaculture is feasible in Guyana.

3. Sustainable forestry and wood processing. Guyana's Forestry Act of 2009 sets out the legal framework for sustainable forestry management in Guyana, and gives effect to national policy that allows limited sustainable forest harvesting in accordance with international standards. Guyana's RPlan, produced by the REDD Secretariat at the Guyana Forestry Commission sets out further detail on how the forest's carbon stocks will continue to be

managed, to ensure that the forests are managed in a way which is as close as is reasonable to carbon neutral over time.

In order to ensure that its forestry practices are in accordance with global sustainable forest management practices, Guyana has begun to establish a framework for national-level environmental certification with the long-term goal of achieving Forest Stewardship Council certification. With the support of GTIS[29] and the World Wildlife Fund (WWF), ProForest (a U.K.-based company) has developed and field-tested a Legal Verification System. The system ensures that certified timber was produced from a legally compliant forest area and is traceable through the supply chain. In order to make this system operational, Guyana will appoint a Board of Trustees to oversee the system and retain an international auditing firm to conduct periodic quality control checks.

President Jagdeo has also asked the Government of Norway to engage independent international organizations to assess the state of forest law enforcement and governance in Guyana. This will include an assessment of current levels of deforestation and degradation in Guyana, as well as an assessment of the carbon impact of current logging practices. These assessments will be part of the basis for future improvements to forestry practices, if necessary. They will also enable Guyana to put in place measures to ensure that existing roads (and other infrastructure) in forested areas do not lead to increased deforestation or degradation, as has happened in other rainforests in the past. These measures are outlined in more detail in Guyana's RPlan.

The independent assessments will also inform the further development of policies in other forest-related sectors, in particular mining, to create an overall integrated land use policy for the country as set out in Section 2 of this document.

Providing that all logging in Guyana and all forestry concessions comply with global standards for sustainable forest management, with the right investments in technology and market linkages, companies operating in Guyana could generate substantially more value from the portion of the forest where sustainable forest harvesting is appropriate. As much as $300 million more in annual value could be realized from a shift into integrated primary and secondary processing and more efficient extraction within the existing stringent limits on logging. The enablers, costs and benefits of this investment are summarized below.

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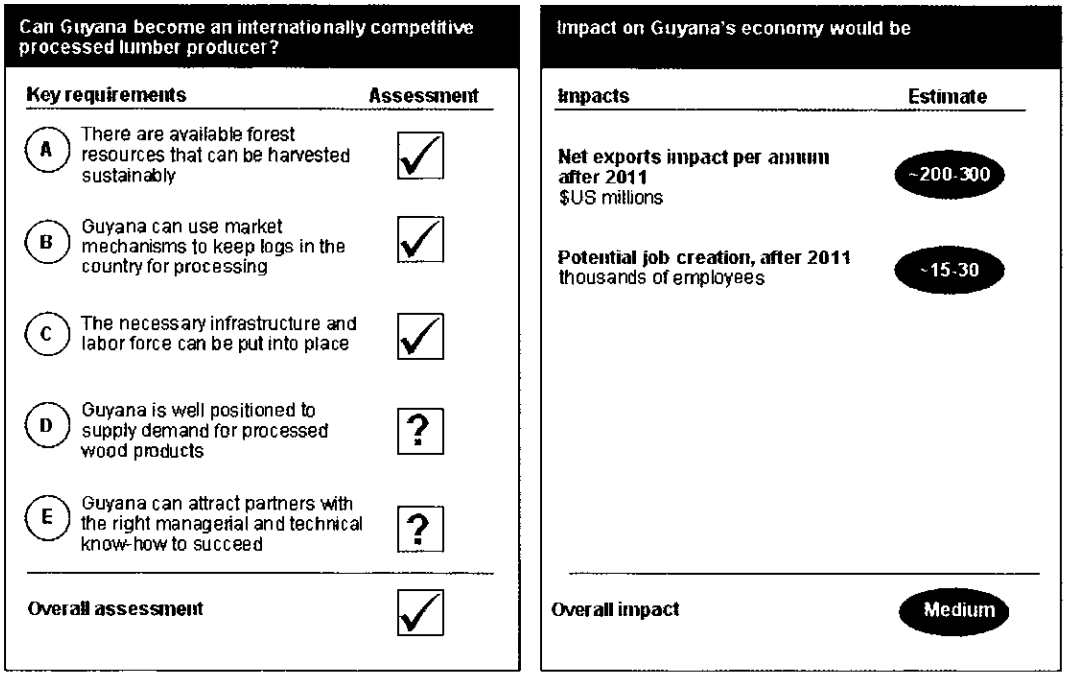
[29] Guyana Trade and Investment Support project, a joint Government of Guyana-United States Agency for International Development (USAID) effort

Exhibit 6

Guyana can sustainably extract value from its forest resources by moving up the lumber value chain



The global market for well-dimensioned processed lumber is large and growing rapidly, and prices for processed products are significantly higher than for raw logs. The global export of secondary processed tropical wood products (including molding and furniture) from forested countries exceeded US$11 billion and grew 9.2 percent in 2006. Prices for secondary processed products vary widely, from US$400 per m^3 and up, compared to approximately US$130 per m^3 for raw logs.

In recent years, Guyana has made significant progress in shifting to higher-value wood products. Increased tariffs and quota restrictions on export of raw logs have shifted the sector's focus to the production of value-added products (e.g., sawn timber). From 2006 to 2007, there was a 22 percent increase in the volume of value-added exports and an 18 percent decrease in volume of log exports. New investment in processing activities in Guyana would facilitate even greater production of higher-value wood products that meet international standards for export and could bring new capabilities in waste minimization and recovery, as well as market linkages to enhance export value of processed products. In addition, Guyana will support local and international firms in increasing end-user demand for products from Guyanese species.

4. Other potential investment opportunities: business process outsourcing (BPO), ecotourism, and possibly bio-ethanol. Over the longer term, Guyana has an opportunity to build its services sector. By investing in its infrastructure, its workforce, business environment, and marketing, Guyana can expand its nascent business process outsourcing (BPO) industry, providing a variety of services and employment opportunities. As noted above, the low cost of labor and the English-speaking population make Guyana an attractive outsourcing location.

Guyana's tourism industry also has potential, particularly in the eco-tourism segment; the global eco-tourism market is approximately $50 billion (or 6 percent of the $860 billion general tourism market) but is growing rapidly (20-30 percent per year). Guyana has the potential to develop its eco-tourism industry - however, tourism development requires a gradual build-up of capabilities, infrastructure and brand over time.

Finally, Guyana could enter the clean energy market by becoming a bio-ethanol producer. The 142,000 hectares tentatively set aside for bio-fuel production at the Canje Basin would allow it to produce bio-ethanol at commercial scale. Guyana's bio-ethanol industry would benefit from existing trade agreements with the United States, which would serve as a large export market. While Guyana is not the world's lowest cost sugar producer, it has the potential to be competitive in bioethanol production if it can use latest technology in a fully utilized at-scale facility. The lack of ethanol-producing production and transport infrastructure necessitates the participation of large investors to create this new industry. These investors would likely require large land tracts in order to earn a scale-based return. As noted earlier, the potential sites would require significant infrastructure investment.

Investing in Communities and Human Capital

Transforming Guyana's economy will require striking a balance between attracting large, long-term private investors who will have a catalytic impact on the national economy, and making significant investments in human capital and social services to equip the population for participation in the new economy. It will also require a balance between using forest payments to enhance the opportunities for those who live in the forest and recognizing the rights of other Guyanese citizens, including the urban poor.

Indigenous peoples

The Amerindian Act of 2006 gives Amerindian villages legal powers to manage and conserve their lands and increasingly they are instituting formal mechanisms to protect their forest. However, they are not obliged by law to protect forested areas. As such, Amerindian lands have been omitted from the calculation of EVN described earlier – that calculation has been limited to the State Forest Estate. Inclusion of Amerindian land in forest payments, including REDD, will be determined through the consultative process with individual forest communities.

Amerindians total approximately 9.1 percent of Guyana's population and currently own approximately 13.9 percent of the land. Ninety-six village communities have title over their lands, and another ten villages do not yet have formal legal title. Amerindian lands are owned collectively by the whole village and administered through an elected Village Council that has the power to make legally-binding rules for everyone within village lands.

The Ministry of Amerindian Affairs is continuing to work to expand land under Amerindian ownership, and extra resources provided through REDD and other forest payments will be used to accelerate this process.

Over the next few years, Amerindian villages will have a choice of whether to put their forests into the international protection program (side-by-side with the State Estate) and, assuming continuing adherence to the agreement, receive their appropriate share of forest

Transforming Guyana's economy while combating climate change

Contents

Foreword

The world is running out of time – average global temperatures are rising too fast and our planet is on a trajectory towards human catastrophe of a scale never seen before. The greenhouse gas emissions causing these temperature rises must peak by 2020 and be cut by 80 percent by 2050. It will be impossible to do this without a dramatic reduction in emissions from deforestation – which comprise about a fifth of the global total. Future generations will not forgive us if we fail to act despite knowing these facts.

The people of Guyana are willing to act – as a country where almost 80% of our territory is rainforest, we stand ready to work with others who share our view that the world needs to break the false debate which suggests that a nation must choose between national development and combating climate change. Instead we should be asking how can we forge prosperous low carbon economies where national development and combating climate change are complementary, not competing, objectives.

The international mechanism for delivering a solution is the United Nations Framework Convention on Climate Change (UNFCCC). Parties to the Convention will meet in Copenhagen in December 2009 to agree on a new climate agreement to replace the Kyoto Protocol. When they meet, it is essential that the world's historic polluters make meaningful commitments to reduce emissions; if the current global economic crisis is used as an excuse to pull back from these commitments, it will send a disastrous signal to the developing world that action on climate change can only take place during times of prosperity. However, if the countries of the developed world accept their responsibilities, I believe that the developing world in general and rainforest countries in particular are willing to play their part.

Even though per capita, countries like Guyana already emit far less than the average required to stabilize global temperatures, as we become more prosperous, it is in everyone's interests that we avoid the high pollution path that today's richer countries followed. To achieve this, the international community and developing countries must create a platform for partnership where developing countries are not seen merely as passive recipients of aid, but as equal partners in the search for climate solutions. This is particularly vital in devising solutions for addressing deforestation – which happens almost entirely within today's developing world.

This draft strategy document sets out Guyana's view on how such a platform for partnership can be created, and affirms our commitment to play our part. The strategy is based on three fundamental realities:

First, much deforestation across the world happens because individuals, communities and countries pursue legitimate economic activities – such as selling timber or earning money and creating jobs in agriculture. The world economy values these activities and does not value most of the services that forests provide when trees are kept alive, including the storage of

greenhouse gases. Correcting this market failure is the only long-term solution to deforestation.

Second, the UNFCCC and its Reduced Emissions from Deforestation and Degradation (REDD) program have made valuable progress on agreeing to include payments for forestry climate services within the global carbon markets. However this will not generate the breakthrough required on avoiding deforestation unless there is also first-order political direction and support from Heads of Government around the world. I very much welcomed the opportunity for Guyana to participate in the recent G20 side meeting on deforestation, where national leaders from the world's leading economies and rainforest countries committed to take urgent action on deforestation. It is vital that this leadership is sustained.

Finally, getting started is difficult. Rainforest countries are hesitant to commit to the long-term reorientation of their economies that solving this problem requires – because they are unsure of the predictability of forest payments. The rest of the international community is hesitant to support REDD at the scale required - because they are unsure about the technical and institutional mechanisms to be used to monitor and verify that global deforestation is being reduced. Many international organizations – including non-governmental organizations - are also keen to ensure that the inclusion of REDD in an international carbon market does not become an "escape route" for historic polluters by allowing them to avoid making the necessary cuts in their domestic emissions.

This could be a recipe for a stalemate the world cannot afford. We need to find a way forward, and this draft strategy represents our views on how we can do this. In its current form, it is a starting point to gather the input of all sectors of Guyanese society. The involvement of our indigenous peoples is particularly vital. Our Amerindians have protected our forests for generations; a sizeable component of forest land is under their jurisdiction and their insights will be valuable not only for their own communities, but for the rest of Guyana and the wider world. Similarly, elected representatives from all political parties are critical to long-term success. Despite our other differences, successive Guyanese governments of different parties have long provided strong leadership to the world on the need to protect our forests. Members of Parliament and all other sectors of our society can make extremely valuable contributions to the national consultation of which this draft strategy is part.

I am deeply conscious of the enormous scale of ambition that Guyana's low-carbon vision represents. But the world needs ambition that is commensurate with the challenge we face. I am confident that our consultation will show the world that the people of Guyana stand ready to play our part – I hope that the international community is ready to do the same.

Bharrat Jagdeo

President of the Republic of Guyana

Executive summary

Guyana is reaching a new stage in its national development. Over the past two decades, the country has re-established a market-led economy within a multi-party democratic system. The economy has been restructured to support progressively increasing levels of social sector and infrastructural investment alongside private sector-driven economic growth. As this first generation of reforms and infrastructural development nears completion, the Government is embarking on a new wave of reforms, coupled with further expansion of the country's strategic economic infrastructure. These aim to build on previous reforms to further stimulate investment, economic growth and job creation as well as to improve security and social services, protect vulnerable sections of society, and deal with increased climate change-induced flooding. Harnessing the nation's assets to continue to develop the economy and fund these and other social and economic needs must be the Government's top priority.

Guyana's pristine forests are its most valuable asset – the majority of the 15 million hectare rainforest is suitable for timber extraction and post-harvest agriculture, and significant mineral deposits exist below its surface. The value of this forest - known as Economic Value to the Nation or EVN - is estimated to be the equivalent of an annual annuity payment of US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world. The deforestation that would accompany this development path would reduce the critical environmental services that Guyana's forests provide to the world – such as bio-diversity, water regulation and carbon sequestration. Conservative valuations of the Economic Value to the World (EVW) provided by Guyana's forests suggest that, left standing, they can contribute US$40 billion to the global economy each year.

However, no trading markets exist for these environmental services – and as a consequence, individuals and companies in rainforest countries face powerful incentives to deforest. In turn, national and local governments face political pressure to use the forest for economic and employment benefit. Reconciling this tension between protecting rainforests and pursuing economically rational development is the core challenge that must be addressed to make forests worth more alive than dead.

There is increasing global recognition of the fact that protecting forests is essential to the fight against climate change – forestry causes about 17% of global greenhouse gas emissions. Yet movement from *recognizing* the need for action to *actual action* continues to be too slow. Guyana's Low-Carbon Development Strategy seeks to provide insights on how to stimulate the creation of a low-deforestation, low-carbon, climate-resilient economy, whereby:

- With the right low-deforestation economic incentives, Guyana will avoid emissions of 1.5 gigatons of CO_2e (carbon dioxide equivalent which includes other greenhouse gases) by 2020 that would have been produced by an otherwise economically rational development path. These incentives will be generated through interim forestry payments from Guyana's partnership with the Norwegian Government and other sources, and the REDD program.

- These payments can enable Guyana's economy to be realigned onto a low-carbon development trajectory. Guyana can generate economic growth at or in excess of projected Latin American growth rates over the coming decade, while simultaneously eliminating approximately 30 percent of non-forestry emissions through the use of clean energy. To achieve this, Guyana must:
    - Invest in strategic low carbon economic infrastructure, such as: a hydro plant at Amelia Falls; improved access to unused, non-forested land; and improved fiber optic bandwidth to facilitate the development of low-carbon business activities.
    - Nurture investment in high-potential low-carbon sectors, such as fruits and vegetables, aquaculture, and sustainable forestry and wood processing.
    - Invest in other low-carbon business development opportunities such as business process outsourcing and ecotourism.
    - Expand access to services and new economic opportunity for indigenous peoples through improved social services (including health and education), low-carbon energy sources, clean water and employment which does not threaten the forest.
    - Improve services to the broader Guyana citizenry, including improving and expanding job prospects, promoting private sector entrepreneurship, and improving social services with a particular focus on health and education.
- Guyana's people and productive land can be protected from changing weather patterns. Investments in priority climate adaptation infrastructure can reduce the 10 percent of current GDP which is estimated to be lost each year as a result of flooding.

To support this strategy, Guyana will institute a number of new organizational units and systems, to include an Office of Climate Change (to coordinate all climate-related activities for the nation), a Low Carbon Strategy Project Management Office (to drive major low-carbon program priorities), and a Guyana Low-Carbon Finance Authority (to manage forest payments and related investment flows into the country and promote investment efficiency to the benefit of Guyana's economy). In addition, safeguards and systems will be developed to ensure the continuing protection of Guyana's tropical rainforests through globally-verified forest and other land use governance standards and transparent, accountable deployment of forest payments.

The strategy in its current form is a draft for discussion by national stakeholders to seek support for the proposals to protect Guyana's State Forest Estate (which does not include forests under Amerindian jurisdiction). It will also kick-start the next phase of consultation among forest communities, following earlier sensitization meetings. Over the coming years, forest-based Amerindians – who total approximately 9.1 percent of Guyana's population and own approximately 14 percent of the land – will have a choice of whether to put their forests into a forest compensation program (side-by-side with the State Forest Estate). No deadline is being set for when communities must "opt in" – it is envisaged that the process will move at different speeds in different communities, as consultations proceed in line with the Amerindian Act and international norms that seek to gather prior and informed consent from impacted communities.

1. A Low-Carbon economic development strategy for Guyana

Guyana's economic development opportunities and challenges

Guyana is reaching a new stage in its national development. As the country's first generation of reforms and infrastructural development nears completion, the Government is embarking on a new wave of reforms, coupled with further expansion of the country's strategic economic infrastructure.

Over the past two decades, Guyana has transitioned to a multi-party democracy and market-based economy. Since 2001, far-reaching constitutional reform has included the establishment of six constitutional commissions and four parliamentary standing committees to promote greater inclusivity in national politics; the introduction of presidential term limits which prevent a President from being elected to more than two consecutive terms; and the restoration of parliamentary oversight to the National Budget process. An independent Office of the Auditor General reporting to the National Assembly is charged with ensuring transparency of Government expenditures, and parliamentary participation in the police, teaching, public service and judicial appointment commissions has been enabled in law.

The country's macro-economic foundations have been transformed and remain strong[1]. Guyana has experienced positive growth in almost every year over the past two decades – growth rates in 2006, 2007 and 2008 were 5.1%, 5.4% and 3.1% respectively[2] (growth in 2008 was 5.9% if the sugar industry is excluded[3]). Inflation has been kept under control, and monetary policy is implemented by an independent Central Bank. Recent years have seen the Government's stock of debt reduced significantly – with external debt now less than half what it was in the early 1990s[4]. This has enabled considerable expansion in social sectors, most notably in education, where investments are now about a third of all Government revenue[5].

The framework for private investment has been progressively modernized, and all major political parties within the National Assembly support market-based approaches to economic growth. The corporate tax regime allows the full repatriation of profits, and the 2004 Investment Act was introduced to modernize the regulatory and legislative framework to protect private investment. There is no discrimination between foreign and domestic investors.

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[1] The 2008 Executive Board of the International Monetary Fund (IMF) Public Information Notice states "Directors...welcomed the authorities' commitment to sound macroeconomic and structural policies, as evidenced by the perseverance with adjustment and reform and the cautious use of external financing." Available at: http://www.imf.org/external/np/sec/pn/2008/pn0845.htm

[2] Ministry of Finance, Budget Speech to the National Assembly, 2009

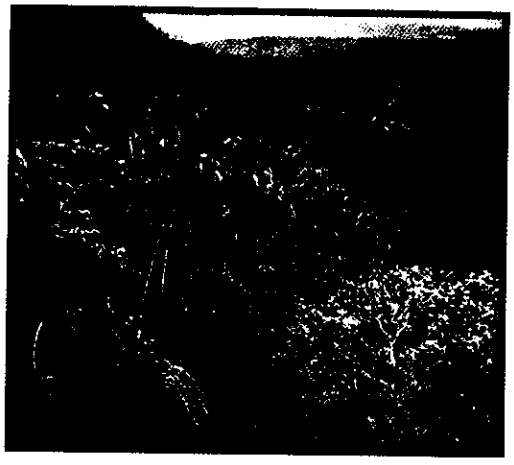
[3] The sugar industry accounts for about 15% of Guyana's GDP. In 2008, it experienced major disruptions in production modalities, in part because of the transition to a new factory which experienced start-up problems.

[4] Ministry of Finance, National Budgets

[5] Ministry of Finance, National Budgets

Strategic economic infrastructure has been upgraded – including almost all of the national road network, the main international airport and hinterland air-strips. The Berbice Bridge now links some of the country's most productive land to Georgetown, and the bridge across the Takutu provides Guyana with its first-ever land border with any of its neighbors – in this case, linking Guyana to Brazil and through Brazil to the rest of South America.

Coupled with the country's as yet-untapped further potential for economic development – [illegible] potential, valuable natural resources and a young, educated and [illegible] stimulate the next wave of



Transforming Guyana's economy while combating climate change

Contents

Foreword

The world is running out of time – average global temperatures are rising too fast and our planet is on a trajectory towards human catastrophe of a scale never seen before. The greenhouse gas emissions causing these temperature rises must peak by 2020 and be cut by 80 percent by 2050. It will be impossible to do this without a dramatic reduction in emissions from deforestation – which comprise about a fifth of the global total. Future generations will not forgive us if we fail to act despite knowing these facts.

The people of Guyana are willing to act – as a country where almost 80% of our territory is rainforest, we stand ready to work with others who share our view that the world needs to break the false debate which suggests that a nation must choose between national development and combating climate change. Instead we should be asking how can we forge prosperous low carbon economies where national development and combating climate change are complementary, not competing, objectives.

The international mechanism for delivering a solution is the United Nations Framework Convention on Climate Change (UNFCCC). Parties to the Convention will meet in Copenhagen in December 2009 to agree on a new climate agreement to replace the Kyoto Protocol. When they meet, it is essential that the world's historic polluters make meaningful commitments to reduce emissions; if the current global economic crisis is used as an excuse to pull back from these commitments, it will send a disastrous signal to the developing world that action on climate change can only take place during times of prosperity. However, if the countries of the developed world accept their responsibilities, I believe that the developing world in general and rainforest countries in particular are willing to play their part.

Even though per capita, countries like Guyana already emit far less than the average required to stabilize global temperatures, as we become more prosperous, it is in everyone's interests that we avoid the high pollution path that today's richer countries followed. To achieve this, the international community and developing countries must create a platform for partnership where developing countries are not seen merely as passive recipients of aid, but as equal partners in the search for climate solutions. This is particularly vital in devising solutions for addressing deforestation – which happens almost entirely within today's developing world.

This draft strategy document sets out Guyana's view on how such a platform for partnership can be created, and affirms our commitment to play our part. The strategy is based on three fundamental realities:

First, much deforestation across the world happens because individuals, communities and countries pursue legitimate economic activities – such as selling timber or earning money and creating jobs in agriculture. The world economy values these activities and does not value most of the services that forests provide when trees are kept alive, including the storage of

greenhouse gases. Correcting this market failure is the only long-term solution to deforestation.

Second, the UNFCCC and its Reduced Emissions from Deforestation and Degradation (REDD) program have made valuable progress on agreeing to include payments for forestry climate services within the global carbon markets. However this will not generate the breakthrough required on avoiding deforestation unless there is also first-order political direction and support from Heads of Government around the world. I very much welcomed the opportunity for Guyana to participate in the recent G20 side meeting on deforestation, where national leaders from the world's leading economies and rainforest countries committed to take urgent action on deforestation. It is vital that this leadership is sustained.

Finally, getting started is difficult. Rainforest countries are hesitant to commit to the long-term reorientation of their economies that solving this problem requires – because they are unsure of the predictability of forest payments. The rest of the international community is hesitant to support REDD at the scale required - because they are unsure about the technical and institutional mechanisms to be used to monitor and verify that global deforestation is being reduced. Many international organizations – including non-governmental organizations - are also keen to ensure that the inclusion of REDD in an international carbon market does not become an "escape route" for historic polluters by allowing them to avoid making the necessary cuts in their domestic emissions.

This could be a recipe for a stalemate the world cannot afford. We need to find a way forward, and this draft strategy represents our views on how we can do this. In its current form, it is a starting point to gather the input of all sectors of Guyanese society. The involvement of our indigenous peoples is particularly vital. Our Amerindians have protected our forests for generations; a sizeable component of forest land is under their jurisdiction and their insights will be valuable not only for their own communities, but for the rest of Guyana and the wider world. Similarly, elected representatives from all political parties are critical to long-term success. Despite our other differences, successive Guyanese governments of different parties have long provided strong leadership to the world on the need to protect our forests. Members of Parliament and all other sectors of our society can make extremely valuable contributions to the national consultation of which this draft strategy is part.

I am deeply conscious of the enormous scale of ambition that Guyana's low-carbon vision represents. But the world needs ambition that is commensurate with the challenge we face. I am confident that our consultation will show the world that the people of Guyana stand ready to play our part – I hope that the international community is ready to do the same.

Bharrat Jagdeo

President of the Republic of Guyana

Executive summary

Guyana is reaching a new stage in its national development. Over the past two decades, the country has re-established a market-led economy within a multi-party democratic system. The economy has been restructured to support progressively increasing levels of social sector and infrastructural investment alongside private sector-driven economic growth. As this first generation of reforms and infrastructural development nears completion, the Government is embarking on a new wave of reforms, coupled with further expansion of the country's strategic economic infrastructure. These aim to build on previous reforms to further stimulate investment, economic growth and job creation as well as to improve security and social services, protect vulnerable sections of society, and deal with increased climate change-induced flooding. Harnessing the nation's assets to continue to develop the economy and fund these and other social and economic needs must be the Government's top priority.

Guyana's pristine forests are its most valuable asset – the majority of the 15 million hectare rainforest is suitable for timber extraction and post-harvest agriculture, and significant mineral deposits exist below its surface. The value of this forest - known as Economic Value to the Nation or EVN - is estimated to be the equivalent of an annual annuity payment of US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world. The deforestation that would accompany this development path would reduce the critical environmental services that Guyana's forests provide to the world – such as bio-diversity, water regulation and carbon sequestration. Conservative valuations of the Economic Value to the World (EVW) provided by Guyana's forests suggest that, left standing, they can contribute US$40 billion to the global economy each year.

However, no trading markets exist for these environmental services – and as a consequence, individuals and companies in rainforest countries face powerful incentives to deforest. In turn, national and local governments face political pressure to use the forest for economic and employment benefit. Reconciling this tension between protecting rainforests and pursuing economically rational development is the core challenge that must be addressed to make forests worth more alive than dead.

There is increasing global recognition of the fact that protecting forests is essential to the fight against climate change – forestry causes about 17% of global greenhouse gas emissions. Yet movement from *recognizing* the need for action to *actual action* continues to be too slow. Guyana's Low-Carbon Development Strategy seeks to provide insights on how to stimulate the creation of a low-deforestation, low-carbon, climate-resilient economy, whereby:

- With the right low-deforestation economic incentives, Guyana will avoid emissions of 1.5 gigatons of CO_2e (carbon dioxide equivalent which includes other greenhouse gases) by 2020 that would have been produced by an otherwise economically rational development path. These incentives will be generated through interim forestry payments from Guyana's partnership with the Norwegian Government and other sources, and the REDD program.

- These payments can enable Guyana's economy to be realigned onto a low-carbon development trajectory. Guyana can generate economic growth at or in excess of projected Latin American growth rates over the coming decade, while simultaneously eliminating approximately 30 percent of non-forestry emissions through the use of clean energy. To achieve this, Guyana must:

    - Invest in strategic low carbon economic infrastructure, such as: a hydro plant at Amelia Falls; improved access to unused, non-forested land; and improved fiber optic bandwidth to facilitate the development of low-carbon business activities.

    - Nurture investment in high-potential low-carbon sectors, such as fruits and vegetables, aquaculture, and sustainable forestry and wood processing.

    - Invest in other low-carbon business development opportunities such as business process outsourcing and ecotourism.

    - Expand access to services and new economic opportunity for indigenous peoples through improved social services (including health and education), low-carbon energy sources, clean water and employment which does not threaten the forest.

    - Improve services to the broader Guyana citizenry, including improving and expanding job prospects, promoting private sector entrepreneurship, and improving social services with a particular focus on health and education.

- Guyana's people and productive land can be protected from changing weather patterns. Investments in priority climate adaptation infrastructure can reduce the 10 percent of current GOP which is estimated to be lost each year as a result of flooding.

To support this strategy, Guyana will institute a number of new organizational units and systems, to include an Office of Climate Change (to coordinate all climate-related activities for the nation), a Low Carbon Strategy Project Management Office (to drive major low-carbon program priorities), and a Guyana Low-Carbon Finance Authority (to manage forest payments and related investment flows into the country and promote investment efficiency to the benefit of Guyana's economy). In addition, safeguards and systems will be developed to ensure the continuing protection of Guyana's tropical rainforests through globally-verified forest and other land use governance standards and transparent, accountable deployment of forest payments.

The strategy in its current form is a draft for discussion by national stakeholders to seek support for the proposals to protect Guyana's State Forest Estate (which does not include forests under Amerindian jurisdiction). It will also kick-start the next phase of consultation among forest communities, following earlier sensitization meetings. Over the coming years, forest-based Amerindians – who total approximately 9.1 percent of Guyana's population and own approximately 14 percent of the land – will have a choice of whether to put their forests into a forest compensation program (side-by-side with the State Forest Estate). No deadline is being set for when communities must "opt in" – it is envisaged that the process will move at different speeds in different communities, as consultations proceed in line with the Amerindian Act and international norms that seek to gather prior and informed consent from impacted communities.

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Strategic economic infrastructure has been upgraded – including almost all of the national road network, the main international airport and hinterland air-strips. The Berbice Bridge now links some of the country's most productive land to Georgetown, and the bridge across the Takutu provides Guyana with its first-ever land border with any of its neighbors – in this case, linking Guyana to Brazil and through Brazil to the rest of South America.

Coupled with the country's as yet-untapped further potential for economic development – including agricultural potential, valuable natural resources and a young, educated and English-speaking workforce - the foundations are now in place to stimulate the next wave of economic growth. This will require Guyana to seize the opportunities present in today's changing global economic environment. This means continuing the modernization of the traditional economic sectors which have generated Guyana's historical growth and employment, while simultaneously diversifying the economy into new sectors where Guyana possesses comparative advantage[6]. Guyana's National Competitiveness Strategy prioritizes the modernization of four traditional sectors: sugar, rice, forestry, and mining. It also identifies five additional sectors with the greatest opportunities for new growth and diversification: non-traditional agriculture, aquaculture, manufacturing, business process outsourcing/information technology, and tourism.

Considerable progress has been made in building domestic capability in several of these new sectors. Yet to fully realize the potential of each, the country also needs to invest in a second generation of reform and infrastructural development to attract this higher-value investment. These reforms and investments need to address a set of challenges which include:

- Much of Guyana's several hundred thousand hectares of non-forested land available for higher-value agricultural development requires either costly drainage and irrigation (e.g., the Canje Basin) or significant road and utility investments to provide access (e.g., the Intermediate Savannahs). This makes Guyana's non-forested land less attractive than available land in other countries such as Brazil.

- Guyana's oil-dependent electricity supply is more expensive to end users than in neighboring countries (e.g., Suriname), and both cost and reliability concerns have led many major users to operate off the grid. This makes Guyana less attractive to industrial investors.

- Limited fiber optic capacity and sub-standard telecommunications infrastructure make the cost of bandwidth and other telecommunications services among the most expensive in the world, impairing Guyana's ability to develop its business process outsourcing enterprises.

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6 The policy framework to achieve these twin objectives is summarized in Guyana's National Competitiveness Strategy (NCS) – which was published in 2006. The NCS updates key aspects of the economic strategy first outlined in the National Development Strategy (NDS). Both the NDS and NCS were prepared after extensive consultations between the Government, private sector and other civil society stakeholders.

- Much of the population and economic activity in Guyana exist at or below sea-level, and in-land flooding represents a significant and growing risk to investors. Major floods in 2005 caused damage equivalent to 60 percent of GDP[7].

- Guyana is not well known to major investors outside of its traditional industries. To be a catalyst for Guyana, leading international players require a business rationale to invest. Given the lack of awareness that exists, the corresponding higher perceived country-risk and the new investment required in industry-specific infrastructure, substantial incentives will be required to attract investors in these industries.

Guyana also needs to invest in further improvements in its social sectors – for example, to increase access to quality healthcare and education; to help businesses and citizens improve their access to safe and affordable water and electricity; to enhance the security of all Guyana's citizens; to protect vulnerable sectors of society; and to alleviate poverty. Furthermore, Guyana must develop the workforce which is required for a modern economy, and attract and retain skilled people – including skilled immigrants from other countries and members of Guyana's "Diaspora".

Meeting these challenges will require significant resources to transform the economy. In doing so, Guyana's policymakers have a prime responsibility to harness the value of the country's assets to promote economic and social development.

Economic value of Guyana's forests

Guyana's pristine forests are its most valuable asset. Almost 80%[8] of Guyana's territory consists of tropical rainforest that is still largely untouched. The great majority of the forest is suitable for timber extraction and post-harvest agriculture, and significant mineral deposits exist below its surface. The Office of the President, based on an independent assessment by McKinsey & Company, estimates the value of Guyana's rainforest[9], if harvested and the land put to the highest value subsequent use, to be between US$4.3 billion and $23.4 billion[10]. The wide range of estimates is driven by fluctuating prices for commodities such as logs, rice and palm oil – but the most likely estimate is US$5.8 billion. This forest value known as Economic Value to the Nation (EVN) is the equivalent of an annual annuity payment of between US$430 million and $2.3 billion, with the most likely annuity payment being US$580 million.

However, generating this EVN, while economically rational for Guyana, would have significant negative consequences for the world. The deforestation that would accompany this development path would reduce the critical environmental value which Guyana's forests provide. Conservative valuations of the Economic Value to the World (EVW) provided by

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7 See www.eclac.org

8 Guyana's rainforest covers an area in excess of 15 million hectares.

9 This estimate includes the State Forest Estate, and excludes lands under the jurisdiction of indigenous peoples, who will be able to "opt in" to the forest protection program through the national consultation process.

10 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

Guyana's forests suggest that, left standing, they contribute US$40 billion to the global economy each year.[11]

However, no trading markets exist for these environmental services today – they represent a market "externality" where the public good provided by the forests in rainforest nations is not paid for. Consequently, because forested land can generate greater economic value when put to other uses, individuals and companies in rainforest countries face powerful incentives to exploit these opportunities. In turn, national and local governments face understandable political pressure to permit and even encourage economic activity which leads to deforestation. Many of today's richest countries actively pursued deforestation and land conversion to agriculture in early phases of development for precisely these reasons. Reconciling the tension between protecting its rainforest and pursuing economically rational development is the core challenge that Guyana is seeking to address through its Low-Carbon Development Strategy.

Protecting Guyana's rainforests while furthering economic development

Since 2006, the Government of Guyana has been calling for bold action by rainforest nations and international partners to address deforestation. President Jagdeo has stated that if the right economic incentives are created, Guyana would be willing to consider placing almost its entire rainforest under internationally verifiable protection, provided national sovereignty and the rights of all Guyanese are not undermined.

As set out in the Office of the President's "Creating Incentives to Avoid Deforestation" memorandum, Guyana has recognized that although standing forests provide enormous EVW through environmental services such as bio-diversity and water regulation, in practical terms there is currently only one potential market of real importance for an environmental commodity - the carbon market.[12],[13]

However, the existing carbon market (or markets, there are a number of different mechanisms permitted within the Kyoto Protocol) does not include any meaningful mechanisms to combat deforestation at the scale required[14]. This is despite the fact that forestry contributes around 17 percent of global greenhouse gas emissions – about the same as the United States, and more than the entire global transport sector.[15] Moreover, a report for the British Government has estimated that the global economic cost of climate change caused by deforestation could

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11 Based on 2030 marginal abatement cost from McKinsey & Company. "A Cost Curve for Greenhouse Gas Reduction", *McKinsey Quarterly*, 2007 Number 1

12 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

13 A ton of carbon emissions avoided from reducing or preventing deforestation provides essentially the same ecosystem services as a ton of carbon emissions abated by other means so the world's willingness to pay for this service should be the same.

14 The Kyoto protocol included the Clean Development Mechanism which had limited possibilities to create incentives for afforestation and reforestation projects, but none for countries which had avoided deforestation in the past, such as Guyana

15 Eliasch, J. "Climate Change: Financing Global Forests" (Eliasch Review), Office of Climate Change, Govemment of the United Kingdom (2008)

be as high as $1 trillion by 2100[16]. Yet extensive deforestation continues – every day, at least 32,000 hectares of rainforest disappear in countries across the world. No realistic solution to climate change is possible without incentives that quickly lead to a dramatic decrease in global deforestation.

The Government of Guyana believes that the replacement to the Kyoto Protocol which will be negotiated in Copenhagen in December 2009 must address the exclusion of forestry from the carbon markets. The Government supports international proposals that Kyoto's replacement should include incentives to cut tropical deforestation in half by 2020, and make the global forestry sector carbon neutral by 2030 – where greenhouse gas emissions from deforestation are balanced by new forest growth. Over the past 18 months, significant progress has been made in building the international partnership needed to make this a reality:

- The UNFCCC has included reduced emissions from deforestation and degradation (REDD) as part of the emerging overall climate change framework. Importantly, REDD[17] recognizes the importance of protecting standing forests in countries with low historic rates of deforestation. As such, there is agreement in principle to generate international payments for forest protection.
- An emerging consensus is developing for immediate, interim funding to begin to protect the world's rainforests. While REDD mechanisms are the key to a long-term solution, transitioning to REDD will take years – and so will not generate sufficient funding quickly enough. In April 2009, Guyana joined leaders of key G20 countries at a meeting hosted by the Prince's Rainforest Project, where the leaders agreed to examine options to look at interim / emergency measures to help save tropical forests. While there are a number of proposals for how this might be structured, some form of transitional funding is needed to immediately slow and avoid deforestation, while supporting the longer-term emergence of an at-scale REDD mechanism.[18]
- The Governments of Norway and Guyana have agreed to work together to provide the world with a model of how to quickly implement policies to avoid deforestation by progressing Guyana's Low-Carbon Development Strategy. In February 2009, the Prime Minister of Norway, Jens Stoltenberg, and President Jagdeo announced a partnership to support "the creation of low-carbon employment and investment opportunities in Guyana, sustained efforts to avoid deforestation and forest degradation, strengthening transparent forest governance, and establishing an international monitoring, reporting, and verification system for Guyana's forests. A financial mechanism run by a reputable international organization will be established through which performance-based

16 Eliasch, J. "Climate Change: Financing Global Forests" (Eliasch Review), Office of Climate Change, Government of the United Kingdom (2008)

17 Some refer to the inclusion of Avoided Deforestation within REDD as REDD-plus. For the purpose of this document, the phrase REDD refers to incentives to reduce emissions from deforestation, degradation and avoided deforestation.

18 See http://www.princesrainforestsproject.org/what-the-projects-doing/news#meeting-0104

compensation can be channeled to support the implementation of Guyana's low-carbon development strategy."[19]

Toward a low-deforestation, low-carbon, climate resilient economy

This draft strategy sets out how Guyana can work within the emerging international partnership to provide the world with a model for how immediate action can stimulate the creation of a low-deforestation, low-carbon, climate-resilient economy:

- Section 2 outlines how Guyana's forest helps the world, and how transitional payments from Guyana's climate change partnership with Norway and others, followed in the longer term by payments under the REDD mechanism, can create the platform for an effective strategy to avoid deforestation. This can enable Guyana to avoid emissions of 1.5 gigatons of CO_2e (carbon dioxide equivalent which includes other greenhouse gases) by 2020 that would have otherwise stemmed from an economically rational development path).[20]
- Section 3 outlines how transitional payments and REDD can enable Guyana's economy to be realigned onto a low-carbon development trajectory. Guyana can generate economic growth at or in excess of projected Latin American growth rates over the coming decade, while simultaneously eliminating approximately 30 percent of its non-forestry emissions through the use of clean energy - approximately 12 megatons of CO_2e by 2020.[21]
- Section 4 outlines how investments in priority climate adaptation infrastructure can reduce the 10% of Guyana's current GDP which is estimated to be lost each year as a result of flooding.[22]
- Section 5 outlines how the Low-Carbon Development Strategy can be implemented, and sets out the institutional framework through which transitional payments and REDD would be administered.
- Section 6 outlines how long-term support for the LCDS and REDD can be built in Guyana through a transparent, inclusive, multi-stakeholder consultative process. It specifically addresses how forest communities can choose whether to participate in the international partnership to access transitional and REDD payments.

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19 Joint statement issued after a meeting between the President of Guyana, Bharrat Jagdeo, and the Prime Minister of Norway, Jens Stoltenberg, in Oslo on February 3, 2009. See http://www.regjeringen.no/en/dep/smk/Whats-new/News/2009/norway-and-guyana-cooperate-to-reduce-gr.html?id=544712

20 Assumption is loss of above and below ground biomass, at 418 tCO_2e per hectare, from FAO Forest Resources Assessment 2005 (cited in OSIRIS v2.2)

21 Guyana's National GHG Inventory (1998 UNFCCC Reporting); McKinsey & Company, "Global GHG Abatement Cost Curve v2" (2009)

22 Office of the President, Republic of Guyana, "Economic Impact of Adaptation" (unpub.)

This draft document is part of the process to seek support for Guyana's low-carbon development strategy and REDD from the people of Guyana, including those who live in and depend on its forests. It is supported by the "RPlan" – a document produced by the Guyana Forestry Commision which sets out more details about Guyana's participation in the REDD process. In their current form, this document and the RPlan are supporting the initial phase of the national consultation, which is taking place in June, July and August 2009.

2. Deploying Guyana's forests in the battle against climate change

Building an International Partnership

The higher priority now given to the role of forestry in climate change represents significant progress in global efforts to combat climate change. However, to build on this, both non-rainforest members of the international community and rainforest nations need to understand what it will take for others to be willing to participate in bold action to combat deforestation. Non-rainforest members of the international community need to recognize that rainforest countries cannot be expected to fundamentally re-orient their economies unless they can rely on a predictable flow of compensation for the services their forests provide to the world. Rainforest countries need to recognize that the rest of the international community cannot be expected to facilitate this compensation unless they can rely on a permanent and predictable slow-down in global deforestation. To generate a willingness to participate from all parties, four crucial questions need to be answered:

- Will funds be available to provide incentives for avoided deforestation?
- How will these funds be distributed?
- What technical capabilities must be built in rainforest countries?
- What is the best way to get started quickly?

The Government of Guyana believes that each of these questions can be answered.

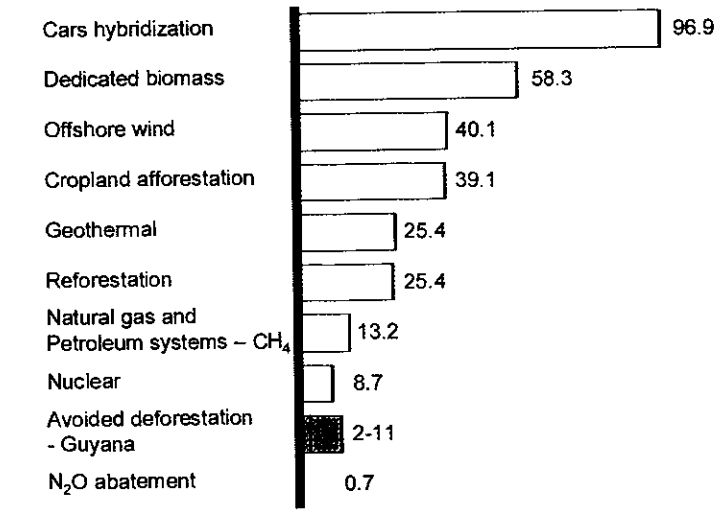
Will funds be available? The rationale to provide sufficient funding quickly is clear - global estimates to halve deforestation range from US$15 billion per year to US$60 billion per year – even at the higher end of this range, it is one of the lowest cost abatement options. Compensation for Guyana at EVN would represent a price per ton of avoided emissions in the range of US$2-11 per ton by 2020, which is far lower than most abatement options as illustrated in Exhibit 1.[23] However, to actually generate these funds over the long term, the forestry sector must be included within the global carbon trading system (or a series of linked regional trading systems). The Eliasch Review estimates that including REDD and action on sustainable forestry management (SFM) in a properly-designed carbon market could generate incentives to reduce deforestation by up to 75% by 2030. With the addition of afforestation, reforestation and restoration (ARR), this could make the forestry sector carbon neutral – in line with the over-arching goal for the forestry sector which the Government of Guyana supports.

23 Office of the President, Republic of Guyana. "Creating Incentives to Avoid Deforestation" (2008)

Exhibit 1

Cost of carbon abatement

USD per tonne of CO_2



Source: Vattenfall; McKinsey

However, the global carbon markets are still at a very early stage of development, so including the entire forestry sector in these markets in the near future is unlikely. At the same time, excluding forestry from carbon markets would erode the willingness of rainforest nations to participate. To balance these conflicting positions, the Government of Guyana believes that a dual approach is necessary.

First, forestry should be introduced to the carbon markets progressively over time. Starting in 2013, a portion of each country's rainforest should be assigned forestry emissions quotas or carbon credits (known as AAUs)[24] as offsets to trade within the carbon markets. Over years, the portion of rainforest for which AAUs are assigned should be progressively increased in line with a trajectory which prevents "flooding" the markets.[25] The Eliasch Review suggests that the carbon markets should be able to meet 22 percent of forestry abatement costs by 2020 and as much as 75 percent by 2030. This implies that the protection of approximately 2 million hectares of Guyana's forest could be funded by a REDD mechanism within the global carbon markets by 2020.

Second, to ensure national scale action and prevent leakage, a transitional funding mechanism will be needed to address the significant short-fall between what can be generated via the market and compensation levels that out-compete EVN as outlined in

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[24] Assigned Amount Units: cited in the Eliasch Review as "tradable sovereign allowances to emit CO_2e"

[25] Market flooding involves an excessively large supply of credits (AAUs) into the market and may result in reduction in carbon price and/or deterrence of investment in low-carbon technologies and other abatement options

Section One. This shortfall will have to be resolved via a transitional funding mechanism – which can cover the portion of a country's forest not included within REDD.[26]

How should these funds be allocated? In the near term, allocation of funds will be done through bilateral partners and other transitional mechanisms. Over the longer term, funds will be allocated through REDD. In both cases, compensation should be performance-based – where rainforest countries are compensated for services they provide against negotiated indicators in accordance with globally accepted standards. The exact performance metrics will need to show that deforestation and degradation are being reduced or avoided – in the long term, this will require sophisticated carbon measurement, but in the short-term, proxy indicators (such as area of forest preserved) should be utilized to encourage early action.

Any long-term REDD payment mechanism must be designed to maximize and sustain the participation of a critical mass of forest nations. The REDD Options Assessment Report prepared for the Government of Norway highlights the importance of participation: "if only a subset of forest nations participate in an international REDD mechanism, there is a risk that deforesting activities will shift to non-participating countries."[27] The REDD mechanism developed must therefore create incentives that recognize that countries have different historical deforestation rates, amounts of forest cover, and development trajectories. Since EVN reflects the actual economic pressures on the forest, an emissions baseline that provides forest payments at or above the level of EVN is more likely to out-compete other potential uses of the forest.

What in-country technical capabilities are needed? If rainforest countries are not confident that forest payments will be accessible and predictable in the near-term, they are unlikely to want to develop capacity to sell a service that is not going to be paid for – this is why proposals that REDD should start with a "capacity building phase" are unlikely to generate sufficient willingness to participate quickly enough. By contrast, if capacity building is supported *in parallel with* performance-based payments for early action, rainforest nations will recognize that they need to build the capacity to monitor deforestation activity, report performance against deforestation baselines, and verify that international commitments are being followed (known as Monitoring, Reporting and Verification or MRV). In this situation, rainforest countries will need to put in place strong governance institutions for the effective deployment of forest compensation payments and seek to ensure the equitable use of these payments. Leakage – where slowing deforestation in one area of a country leads to deforestation in another – needs to be avoided, and commitments need to permanent, so that rainforest countries cannot take payments for a period of time only to later reverse their policies on forest protection.

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[26] If the carbon markets are used to support small-scale, sub-national pilots, they will not generate the national incentives that are critical to prevent "leakage" – where stopping deforestation in one area leads to its displacement to another.

[27] Meridian Institute. 2009. "Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report." Prepared for the Government of Norway, by Arild Angelsen, Sandra Brown, Cyril Loisel, Leo Peskett, Charlotte Streck, and Daniel Zarin. Available at: http://www.REDD-OAR.org.

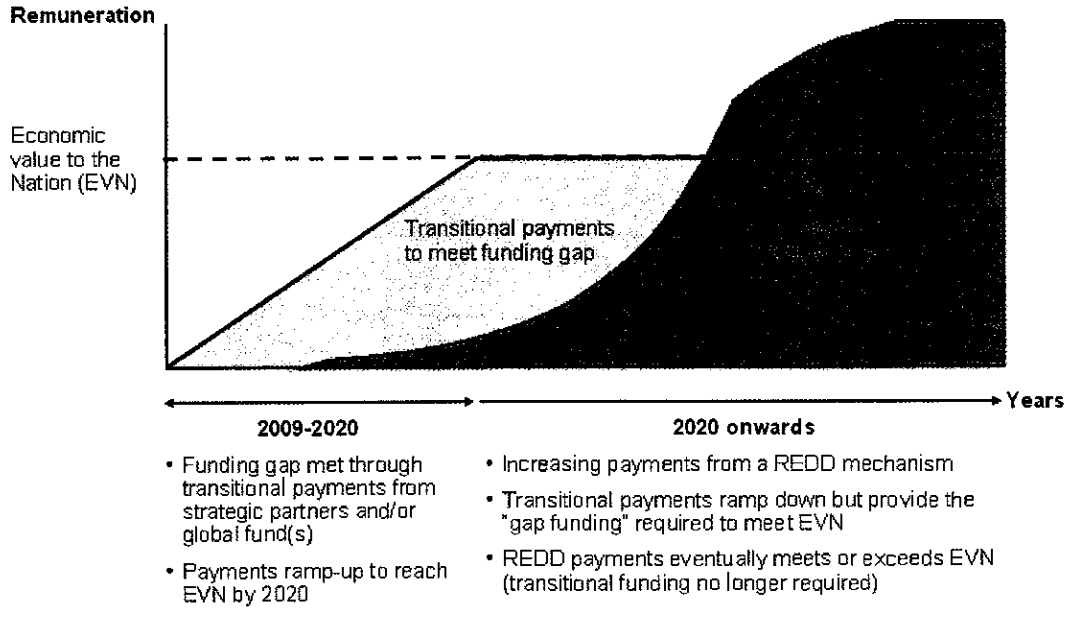
What is the best way to get started? Despite the global consensus for urgent action, rainforest nations and international partners are understandably reluctant to "move first" for the reasons already discussed. To break this impasse, the Government of Guyana believes that a series of linked confidence-building measures should take place concurrently over time. This requires a phased approach where rainforest countries demonstrate their willingness to participate by building necessary capabilities and reorienting their economies while non-rainforest members of the international community demonstrate their willingness to participate by ensuring that they pay predictable forest compensation payments that start at a discounted value but ramp up to, and eventually exceed, EVN. (This assumes adherence to agreed performance metrics by the countries providing the forest climate services.)

This transitional funding will eventually be replaced by a REDD payment mechanism linked to global carbon compliance markets. The evolution from transitional payments to payments from a REDD market mechanism is illustrated in Exhibit 2.

Exhibit 2

Potential flow of payments from transitional funding sources to an at-scale REDD mechanism

ILLUSTRATIVE



SOURCE: "Climate Change: Financing Global Forests: The Eliasch Review", Government of the United Kingdom (2008)

A Model for the World

In order to demonstrate how the parallel confidence building measures previously discussed can be implemented, Guyana is willing to participate in an international partnership to forge a new economy while combating climate change over four phases, where deepening commitments by the international community are matched by deepening commitments from Guyana as outlined below. The evolution of the payment scheme for forest services is set out in Exhibit 3, which incorporates Guyana's broad expectations of what it will take for the UNFCCC process to generate sufficient incentives for both rainforest countries and non-rainforest countries to be "willing to participate" in a global REDD mechanism.

Exhibit 3

Indicative remuneration plan for LCDS

Phase	Payments to Guyana	Description
Phase 1 (2009)		• Interim payments to launch the LCDS • Includes funding for an MRV system in Guyana
Phase 2 (2010-2012)	• Starts at: ~$60 million • Ramps up to $230-$350 million (40%-60% of EVN)	• Transitional funding that will be used for: – Capacity building – Investment required to build a low carbon economy – Human capital development
Phase 3 (2013-2020)	• Starts at: ~$230-$350 million (40%-60% of EVN) • Ramps up to $580 million (EVN)	• Continued payments to avoid deforestation • Payments will be used for further: – Investments in low carbon economy – Capacity building – Climate change adaptation
Phase 4 (2020 onwards)	• At or above EVN (>$580 million)	• "At-scale" REDD mechanism should: – Provide incentives at or above EVN – Account for increasing value of the forests (e.g., reset EVN periodically)

• From 2009 to 2020, payments will avoid ~1.5[1] Gt CO_2e at an abatement cost of $2 to $3 per ton
• Payments will be used to reorient the economy and put Guyana on a high growth, low-carbon economic development path

1 Based on Guyana's economically rational deforestation rate and biomass (above and below ground) of 418 tCO_2e from FAO-FRA 2005

Phase 1, 2009: Launching the Low-Carbon Development Strategy

In this start-up phase, the intent is to:

- Demonstrate that Guyana is committed and able to carry out its Low-Carbon Development Strategy (LCDS) while protecting its standing forests;
- Gain broad support for the LCDS within Guyana through visible support from Guyana's partners, including interim forest compensation payments to start the re-orientation of the economy toward a low-carbon trajectory, in advance of the UNFCCC meeting in Copenhagen this December.

Guyana will implement an internationally-accepted forest monitoring, reporting, and verification (MRV) system, source capital for strategic investments required to start implementation of the low-carbon development strategy, and begin to execute on initial priority investments (e.g., hydropower, adaptation, development of village economies, and health care/education).

In support of this phase, Guyana has started preparatory work with the Government of Norway. At the Government of Guyana's request, Norway has commissioned an independent assessment of current forest governance and law enforcement standards; an independent assessment of present logging practices and levels of deforestation and forest degradation, including an assessment of their carbon footprints; and the provision of independent advice from an international institution for the consultative process on the LCDS (including Guyana's work within the UNFCCC's REDD process).

Phase 2, 2010-2012: Building the Foundation for the New Economy

In this multi-year phase, Guyana will receive increased payments from partners (starting with Norway, but the scale of funding to re-orient the economy onto a low carbon path will require the participation of other global partners) to:

- Execute and deliver on five to ten priority infrastructure projects needed to re-orient the economy toward low-carbon growth.
- Attract major international investors in at least three key new economic sectors such as hydropower, high-end fruits and vegetables, and aquaculture.
- Implement the most critical climate adaptation measures and signature programs to improve health care and education.
- Align all land-use policies with the LCDS – most importantly, forestry and mining policies.
- Deepen the quality and comprehensiveness of the MRV system and other capacities necessary to protect its forests.
- Work with indigenous peoples' groups who want their land included in overall transitional arrangements to incorporate them in the payment regime en route to a full-scale REDD program.
- Seek Expressions of Interest from potential investors in Guyana's expected AAUs from REDD post-2013.
- If other markets for environmental services emerge – (for example Payments for Environmental Services (PES) for bio-diversity) - their potential will also be examined during this period, and Expressions of Interest will be considered.

Phase 3, 2013-2020: Integrating the New Economy with a Global Climate Deal

During this longer phase, interim forest payments should gradually increase to approach the level of EVN. In parallel, REDD payments from carbon compliance markets should ramp up as these markets open up to an increasing flow of REDD credits and the increased supply of REDD credits make it possible to generate more forest payments from public and private sources These payments will supplement, and hopefully ultimately replace, transitional payments .

During these years, Guyana will:

- Continue to invest in the highest priority low-carbon economic infrastructure and adaptation priorities. By this time, Guyana should begin to see large-scale transformation in several target industrial sectors based on longer-term investments and the investment presence of international companies. Combined with expanded education/health programs and other investments, Guyana should also begin to reap benefits in growth in higher-value services sectors (e.g., Business Process Outsourcing).

- Build further capability, as needed, to manage and invest funds, drive economic development projects and deploy the forest MRV system and related capabilities with the intent of having fully-developed institutional capabilities in these areas as effective institutions for the nation and exemplars to the world. The Government will also promote the dispersion of these management capabilities throughout the Guyanese government and the private sector. An aspirational goal is to stop, and hopefully reverse, the "brain drain" of skilled labor, which would further help develop Guyana's economy.

- Agree on the first wave of REDD investments which will take advantage of opportunities to export forest offset credits originated by the Government or private investors into greenhouse-gas compliance trading markets (global, regional or national) that have sufficient availability of offset access rights.

Phase 4, 2020 onwards: Operating "at-scale" under a functioning international REDD regime

At the point when financial flows for REDD are at EVN or higher, Guyana should be able to fund its further low-carbon development efforts from these flows, and no longer need transitional payments. If an "at-scale" REDD mechanism that can fund Guyana's forest value at or above EVN emerges before 2020, Guyana would agree to move to Phase 4 as of this date.

3. Creating a low-carbon economy

The previous section described a new approach for valuing standing forests – where the right action by the international community could deliver value both to rainforest nations and to the wider world by making rainforests worth more alive than dead. If this occurs, Guyana can protect its forest and simultaneously seek a development path that maximizes the growth of low-carbon economic sectors and minimizes deforestation and high-carbon economic activity. This will not stop existing economic activities or threaten the employment of those already working in the forest, providing those activities are in accordance with internationally accepted practices. Instead, it would lead to action in three areas that are essential to Guyana's future:

- Investing in low-carbon economic infrastructure
- Facilitating investment and employment in low-carbon economic sectors
- Generally enhancing the nation's human capital and creating new opportunities for forest-dependent and other indigenous communities.

Investing in strategic economic infrastructure

Guyana has identified more than US$1 billion in essential capital projects that can be fully or partially funded through private investment assisted by an in-country infrastructure investment fund built from forest compensation payments. Among other initiatives, these projects will enable future economic growth to be powered predominantly by clean energy (hydropower), and to make non-forested parts of the country accessible to private investors who can generate low-carbon economic development and employment (largely high-end agriculture and aquaculture). These infrastructure projects would begin to shift the economy toward low-carbon industrial activity, and enable greater resources to be deployed towards ensuring that existing infrastructure in forested areas does not facilitate an increase in deforestation and degradation.

Initial investments focus on three types of infrastructure:

- **Hydropower (US$400 million to $600 million).** Currently, Guyana relies on imported fuel oil and diesel for its electricity generation, which is both expensive and carbon-intensive. Guyana has identified a hydro site at Amaila Falls which could deliver energy security by meeting all of the country's domestic power needs for the foreseeable future, improve Guyana's balance of payments (fuel imports in 2008 cost approximately 35% of GDP), and reduce end-user costs by about one third. Excluding emissions from construction of the plant, the carbon abatement by 2020 can be approximately 12 megatons of CO_2e. The technical design for the plant is complete, and prospective private funders of the Amaila Falls Hydro Facility will require co-investment from the Government.
- **Draining, irrigation and road development to improve access to unused, non-forested land (US$300 million to $500 million).** Guyana has substantial, unused non-forested land that can be converted to productive use, but lack of infrastructure is currently making the land inaccessible and/or substantially increasing its development cost above competitive options for developers. For example, in the

Canje Basin, approximately US$325 million in draining and irrigation investment is needed to convert land for agricultural use. In the intermediate savannahs, approximately US$100 million in roads and related infrastructure investment is needed to improve access and provide required infrastructure for future inhabitants. By developing infrastructure into the these parts of the country, economic activity and employment will be re-oriented away from areas which put pressure on the forest.

- **Fiber Optic Cables/Technology Park (US$10 million to $30 million).** According to estimates by Accenture, Guyana's outsourcing industry has the potential to more than double the number employed by 2013.[28] Industry stakeholders have identified telecommunications infrastructure as a key barrier to sustaining industry growth – for example, Guyana is competitive in all inputs to cost per seat (the key industry metric) with the exception of the cost of telecommunications bandwidth. Investment in fiber optic cables and a technology park will remove these impediments to further industry growth; they will also reduce the cost of telecommunications for individuals and companies nation-wide.

Facilitating investment in high-potential low-carbon sectors

Attracting large-scale catalytic investors to Guyana will require incentives to finance industry-specific infrastructure and overcome perceived country investment risk.

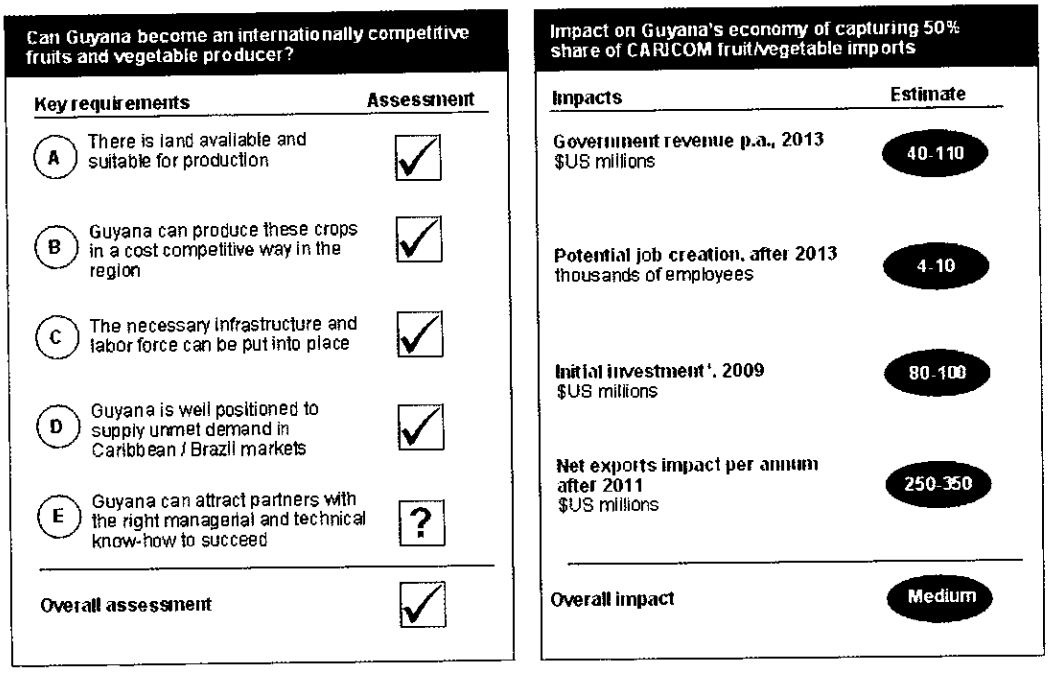
Building on the priority diversification opportunities outlined in the National Competitiveness Strategy, Guyana has identified six priority low-carbon economic sectors: fruits and vegetables, aquaculture, sustainable forestry and wood processing, business process outsourcing, eco-tourism, and possibly bio-ethanol. Guyana plans to focus initially on three sectors: fruits and vegetables, aquaculture, and sustainable forestry. In each of these sectors, long-term market demand exists and Guyana has the essential natural resources to operate at scale.

1. Fruits and Vegetables. Guyana is well-positioned to expand exports of fruits and vegetables as it has major tracts of non-forested arable land that are potentially suitable for commercial agriculture – and the country is close to major fresh fruit and vegetable import markets in the Caribbean and the United States. The enablers, costs, and benefits of this investment are summarized below:

[28] Office of the President, Republic of Guyana. "Stimulating Growth in the Business Processing Outsourcing Sector" (unpub.)

Exhibit 4

Guyana could become a competitive global producer of tropical fruits and vegetables



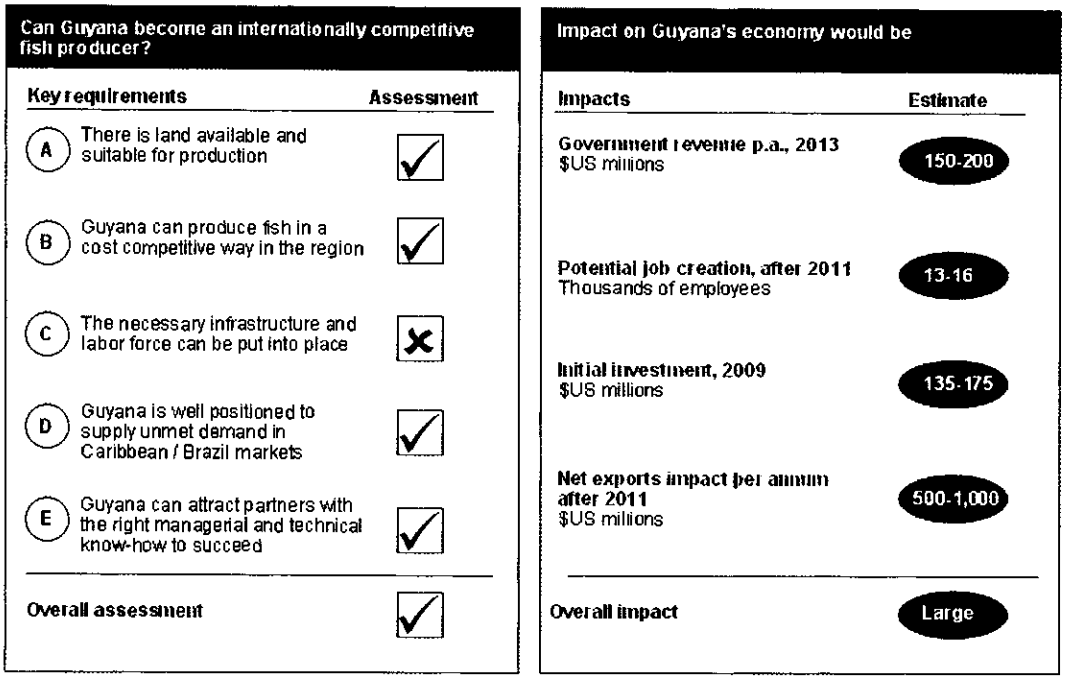
* Including investment incentive

To capture this opportunity, Guyana needs to attract several large-scale commercial agriculture operators to help it overcome logistical and quality control issues such as lack of processing facilities, limited ability to comply with sanitary/phytosanitary standards, and weak links to key import markets. Based on interviews with leading global fruit and vegetable producers, it is clear that Guyana will need to provide significant financing incentives, offer a substantial land area to attract leading operators, and improve its investment support to new investors. Such "sector-leading investment" will be the basis of broader-based growth in this sector.

2. Aquaculture. Guyana has an opportunity to provide fresh and frozen fish to its Caribbean neighbors and other importing nations. In the United States alone, the seafood demand deficit is forecast to be approximately 1 billion pounds by 2025. Increasing demand and attractive margins for fresh-water fish make this investment particularly attractive to Guyana. The enablers, costs and benefits of this investment are summarized below:

Exhibit 5

Guyana could become a competitive global producer of aquaculture products



While aquaculture will require significant start-up costs (approximately $15,000 per hectare), the industry, once-established, would allow Guyana to tap into a large and growing markets in fresh fish, frozen and processed product. Guyana has 55,000 hectares of state-owned, uncultivated coastal lands and up to 118,000 hectares in the Intermediate Savannahs. In addition, Guyana has hinterland areas that are suited to production of fish or crustaceans, such as tilapia and shrimp. One hectare of land properly maintained can produce up to 23 tons of fresh water fish. In the medium term, Guyana will look to set up one to two major tilapia farms producing 5,000 to 10,000 tons annually.

Guyana will work to attract potential investors to help it establish its aquaculture industry, which will entail developing a system of pond excavation, drainage and irrigation pipes, and predation defense measures. These international partners will also help Guyana comply with sanitary standards, establish efficient logistics, and connect the country to import markets.

While aquaculture is an attractive market, Guyana will have to work to provide incentives to attract large-scale investors. Guyana's costs are likely to be above those of Asian producers for frozen fish and shrimp, and Guyana currently lacks a large-scale, fresh fish-exporting infrastructure. Finally, since upfront costs are high, investors will want assurances that aquaculture is feasible in Guyana.

3. Sustainable forestry and wood processing. Guyana's Forestry Act of 2009 sets out the legal framework for sustainable forestry management in Guyana, and gives effect to national policy that allows limited sustainable forest harvesting in accordance with international standards. Guyana's RPlan, produced by the REDD Secretariat at the Guyana Forestry Commission sets out further detail on how the forest's carbon stocks will continue to be

managed, to ensure that the forests are managed in a way which is as close as is reasonable to carbon neutral over time.

In order to ensure that its forestry practices are in accordance with global sustainable forest management practices, Guyana has begun to establish a framework for national-level environmental certification with the long-term goal of achieving Forest Stewardship Council certification. With the support of GTIS[29] and the World Wildlife Fund (WWF), ProForest (a U.K.-based company) has developed and field-tested a Legal Verification System. The system ensures that certified timber was produced from a legally compliant forest area and is traceable through the supply chain. In order to make this system operational, Guyana will appoint a Board of Trustees to oversee the system and retain an international auditing firm to conduct periodic quality control checks.

President Jagdeo has also asked the Government of Norway to engage independent international organizations to assess the state of forest law enforcement and governance in Guyana. This will include an assessment of current levels of deforestation and degradation in Guyana, as well as an assessment of the carbon impact of current logging practices. These assessments will be part of the basis for future improvements to forestry practices, if necessary. They will also enable Guyana to put in place measures to ensure that existing roads (and other infrastructure) in forested areas do not lead to increased deforestation or degradation, as has happened in other rainforests in the past. These measures are outlined in more detail in Guyana's RPlan.

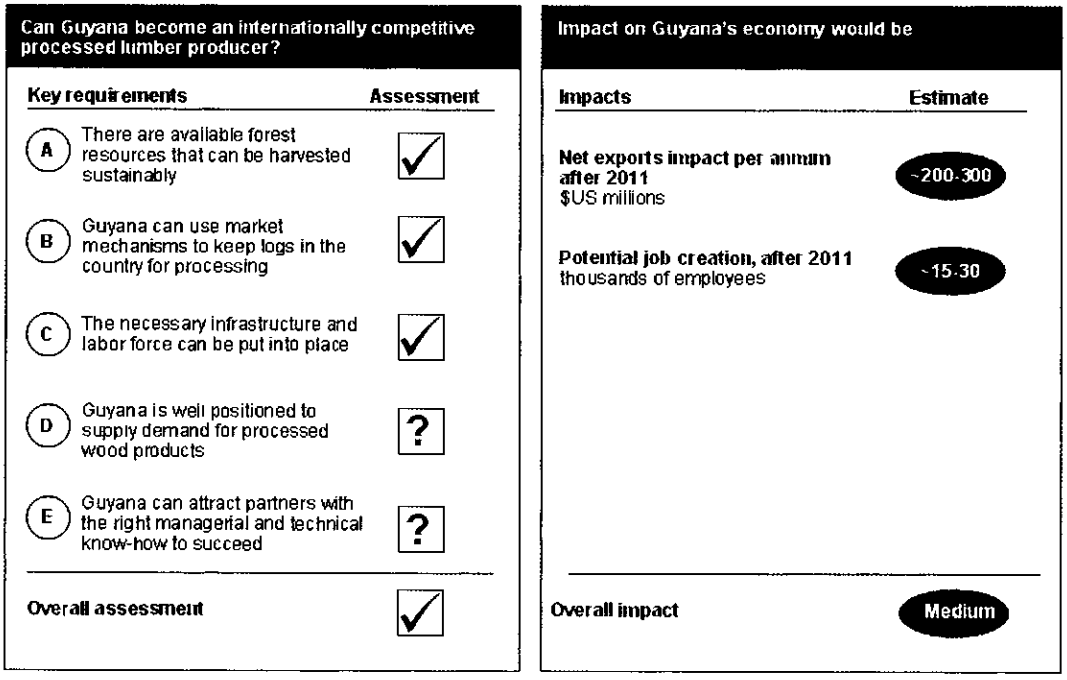
The independent assessments will also inform the further development of policies in other forest-related sectors, in particular mining, to create an overall integrated land use policy for the country as set out in Section 2 of this document.

Providing that all logging in Guyana and all forestry concessions comply with global standards for sustainable forest management, with the right investments in technology and market linkages, companies operating in Guyana could generate substantially more value from the portion of the forest where sustainable forest harvesting is appropriate. As much as $300 million more in annual value could be realized from a shift into integrated primary and secondary processing and more efficient extraction within the existing stringent limits on logging. The enablers, costs and benefits of this investment are summarized below.

[29] Guyana Trade and Investment Support project, a joint Government of Guyana-United States Agency for International Development (USAID) effort

Exhibit 6

Guyana can sustainably extract value from its forest resources by moving up the lumber value chain



The global market for well-dimensioned processed lumber is large and growing rapidly, and prices for processed products are significantly higher than for raw logs. The global export of secondary processed tropical wood products (including molding and furniture) from forested countries exceeded US$11 billion and grew 9.2 percent in 2006. Prices for secondary processed products vary widely, from US$400 per m^3 and up, compared to approximately US$130 per m^3 for raw logs.

In recent years, Guyana has made significant progress in shifting to higher-value wood products. Increased tariffs and quota restrictions on export of raw logs have shifted the sector's focus to the production of value-added products (e.g., sawn timber). From 2006 to 2007, there was a 22 percent increase in the volume of value-added exports and an 18 percent decrease in volume of log exports. New investment in processing activities in Guyana would facilitate even greater production of higher-value wood products that meet international standards for export and could bring new capabilities in waste minimization and recovery, as well as market linkages to enhance export value of processed products. In addition, Guyana will support local and international firms in increasing end-user demand for products from Guyanese species.

4. Other potential investment opportunities: business process outsourcing (BPO), ecotourism, and possibly bio-ethanol. Over the longer term, Guyana has an opportunity to build its services sector. By investing in its infrastructure, its workforce, business environment, and marketing, Guyana can expand its nascent business process outsourcing (BPO) industry, providing a variety of services and employment opportunities. As noted above, the low cost of labor and the English-speaking population make Guyana an attractive outsourcing location.

Guyana's tourism industry also has potential, particularly in the eco-tourism segment; the global eco-tourism market is approximately $50 billion (or 6 percent of the $860 billion general tourism market) but is growing rapidly (20-30 percent per year). Guyana has the potential to develop its eco-tourism industry - however, tourism development requires a gradual build-up of capabilities, infrastructure and brand over time.

Finally, Guyana could enter the clean energy market by becoming a bio-ethanol producer. The 142,000 hectares tentatively set aside for bio-fuel production at the Canje Basin would allow it to produce bio-ethanol at commercial scale. Guyana's bio-ethanol industry would benefit from existing trade agreements with the United States, which would serve as a large export market. While Guyana is not the world's lowest cost sugar producer, it has the potential to be competitive in bioethanol production if it can use latest technology in a fully utilized at-scale facility. The lack of ethanol-producing production and transport infrastructure necessitates the participation of large investors to create this new industry. These investors would likely require large land tracts in order to earn a scale-based return. As noted earlier, the potential sites would require significant infrastructure investment.

Investing in Communities and Human Capital

Transforming Guyana's economy will require striking a balance between attracting large, long-term private investors who will have a catalytic impact on the national economy, and making significant investments in human capital and social services to equip the population for participation in the new economy. It will also require a balance between using forest payments to enhance the opportunities for those who live in the forest and recognizing the rights of other Guyanese citizens, including the urban poor.

Indigenous peoples

The Amerindian Act of 2006 gives Amerindian villages legal powers to manage and conserve their lands and increasingly they are instituting formal mechanisms to protect their forest. However, they are not obliged by law to protect forested areas. As such, Amerindian lands have been omitted from the calculation of EVN described earlier – that calculation has been limited to the State Forest Estate. Inclusion of Amerindian land in forest payments, including REDD, will be determined through the consultative process with individual forest communities.

Amerindians total approximately 9.1 percent of Guyana's population and currently own approximately 13.9 percent of the land. Ninety-six village communities have title over their lands, and another ten villages do not yet have formal legal title. Amerindian lands are owned collectively by the whole village and administered through an elected Village Council that has the power to make legally-binding rules for everyone within village lands.

The Ministry of Amerindian Affairs is continuing to work to expand land under Amerindian ownership, and extra resources provided through REDD and other forest payments will be used to accelerate this process.

Over the next few years, Amerindian villages will have a choice of whether to put their forests into the international protection program (side-by-side with the State Estate) and, assuming continuing adherence to the agreement, receive their appropriate share of forest

compensation payments. The decision to participate will likely be based on whether participation will lead to improved access to opportunities and services for forest-dependent communities. Communities will be asked to propose priority improvement opportunities, such as expansion of social services including health and education, provision of low-carbon energy sources (most villages are not on the national grid so need alternate power sources), and provision of clean water. In addition, previous consultations with forest communities in Guyana have highlighted the importance of providing attractive income-generating opportunities – for example, support to grow and market non-subsistence agriculture products without stimulating deforestation (for example, non-perishable spices) and help to develop community-based ecotourism offerings.

Based on proposals from some representatives of Amerindian communities during the preparation of this document, it is planned to set up an indigenous development fund with forest payments that are for Amerindian lands. Some payments would flow directly to individual villages, and the balance would fund a broader Amerindian Development Fund. The Amerindian Development Fund would be a grant-based program where indigenous groups (not just those who live in the forest) could apply for funds for development programs (similar to the Brazilian Amazon Fund).

The broader Guyana citizenry

To meet the needs of both forest dwellers and the population at large, Guyana will invest a significant share of the forest protection funds it receives in initiatives aimed at developing jobs and diversifying the jobs base, and improving the general standards of living of all of its citizens. Key areas of investment will include:

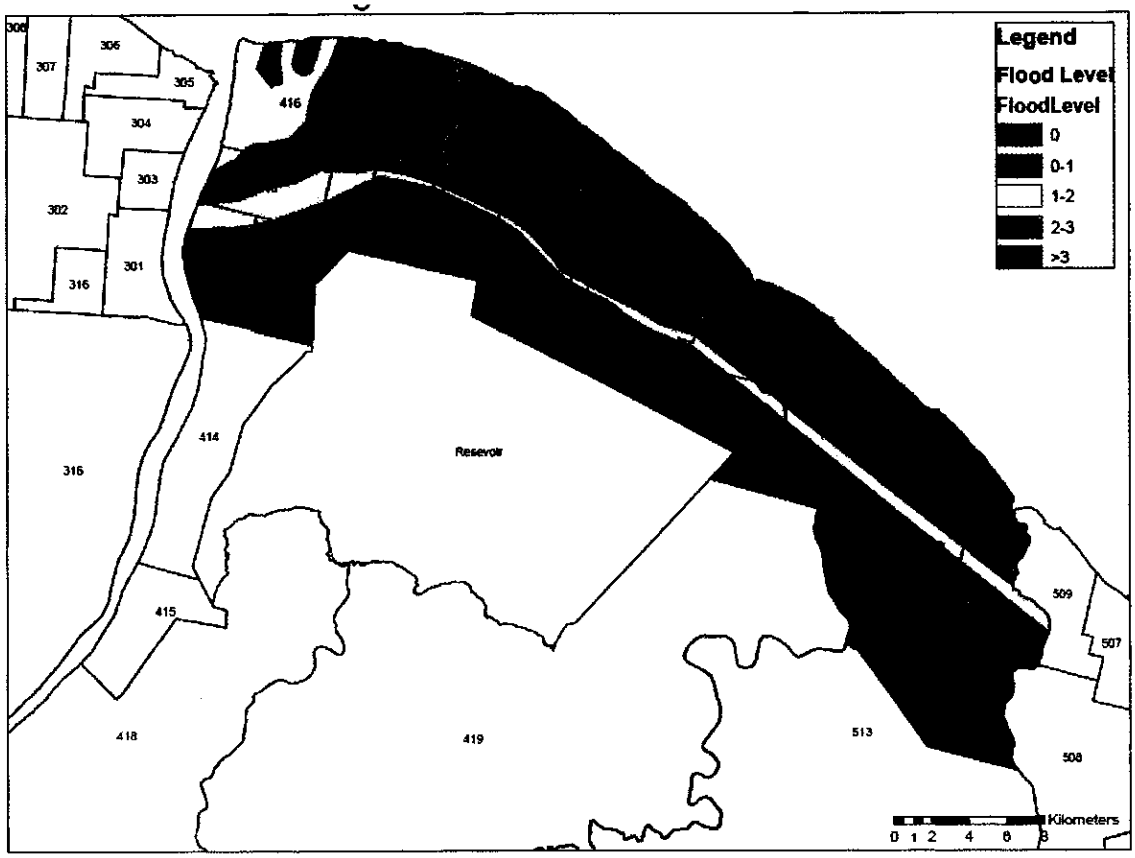
- **Improving job prospects and private sector entrepreneurship.** Guyana will invest in targeted education initiatives to fuel economic growth, potentially including specialized vocational training (e.g., for business process outsourcing), creation of a management school, and possibly establishing a center of biodiversity excellence. Additional ideas will be gathered during the ongoing National Consultation (described below).
- **Supporting social services** such as basic infrastructure (road maintenance, reliable supplies of potable water) and health and education services through discrete projects funded by forestry payments.

4. Protecting Guyana's people and productive land

Guyana's coastal regions, including Georgetown, lie below sea level, and a large part of Guyana's population (39 percent of its population and 43 percent of its GDP) live in regions exposed to significant flooding risk. As such, flooding is a major adaptation challenge for Guyana.

By 2030, the annual loss due to flooding in Guyana is projected to be US$150 million (or close to 10 percent of current GDP). This at-risk value has been estimated by using flood maps that combine an assessment of flood risk, population density, and economic activity. Additionally, an extreme event similar to the serious flooding in 2005, which resulted in losses equivalent to 60 percent of GDP, could result in some US$0.8 billion in losses and harm to more than 320,000 people. Given these potential losses, investing in the most beneficial adaptation measures would significantly increase estimated national income in Guyana, and would likely be essential to attracting investors.

Exhibit 7: Flood map of Georgetown



Total adaptation costs for Guyana are projected to exceed US$1 billion at the national level. While all of these adaptation needs must eventually be met, the Office of the President has identified a portfolio of urgent, near-term investments in the highest priority areas where the population and economic activity are concentrated. These investments include:

- **Upgrading infrastructure and assets to protect against flooding through urgent, near-term measures** (US$225 million): This includes maintaining (US$20 million) and upgrading (US$39 million) drainage systems; maintaining and reinforcing the ocean seawall which protects most of the low-lying coastal areas from the Atlantic (US$30 million); and repairing the Conservancy (which protects Georgetown and most of the East Coast from overflow water) (US$123 million). In addition, these initiatives include implementation initiatives to improve sanitation and water (US$12 million) and flood- proofing health clinics (US$1 million).

- **Addressing systematic and behavioral concerns** (US$33 million): These initiatives include strengthening building codes and expanding the early warning system (US$19 million) and building an emergency response system (US$15 million).

- **Developing financial and risk/insurance measures to boost resiliency post-flooding** (US$10 million): These are contingent funds (cash reserve and contingent capital) to provide immediate financial ability to respond following the flooding.

- **Switching to flood resistant crops** (US$10 million).

- **Establishing the climate change adaptation needs of Guyana's hinterland regions, including forest communities** At the time of writing, work on analyzing the adaptation of Guyana's hinterland and riverain areas has not yet started, but initial scoping work has identified the need to empolder communities, build new river defenses, and introduce new seed varieties for crops. The analysis of the hinterland and riverain areas' adaptation needs will be completed in the coming months, and will be integrated with the initial estimates of coastal region adaptation requirements.

In addition to these urgent near-term measures, an additional US$500 million to $600 million of long-term adaptation measures have been identified including: upgrading the Conservancy to recognized engineered standards (US$410 million); expanding beyond the priority regions in upgrading the seawall (US$15 million to $60 million); and expanding the drainage and irrigation program (US$30 million to $119 million).

5. Implementing Guyana's development plan

Developing Required Capabilities

To ensure successful execution of the Low-Carbon Development Strategy, Guyana will develop three institutional capabilities:

1. An Office of Climate Change (OCC) will consolidate and streamline existing Government efforts to encompass, among other things, the forest monitoring, reporting and verification (MRV) system and related capabilities, and co-ordination of engagement with multilateral processes and negotiations including the UNFCCC and REDD.

2. A Low Carbon Strategy Project Management Office (PMO) to drive key projects as part of the Low-Carbon Development Strategy.

3. A Guyana Low-Carbon Finance Authority (GLCFA) to manage forest payments and to reduce the cost of capital on other essential investments.

1. Office of Climate Change

The Office of Climate Change will be established within the Office of the President to work across Government to support work on climate adaptation, mitigation and forest conservation. It will serve to bring together and align efforts that are already underway and to co-ordinate efforts by multilateral and non-governmental organizations assisting Guyana's climate change agenda.

The OCC will be the entity with overall coordinating responsibility for ongoing national consultations on Guyana's Low-Carbon Development Strategy and related stakeholder engagement processes, working closely with the REDD Secretariat in the Guyana Forestry Commission.

The OCC will also support Guyana's National Climate Committee, the Guyana Geology and Mines Commission, the Environmental Protection Agency, and the Guyana Lands and Surveys Commission. It will ensure coordination of Government engagements with international forestry programs such as the World Bank's Forest Carbon Partnership Fund (FCPF), the Forestry Investment Program (FIP), and the United Nations' UN-REDD fund. It will also work closely with Guyana-based and international non-governmental organizations such as Conservation International, World Wildlife Fund for Nature, and Iwokrama.

2. Low Carbon Strategy Project Management Office

Reporting directly to the President and launched by Q3-2009, the PMO will serve to attract high-caliber, experienced managers into project management positions to drive the most critical elements of the Low-Carbon Development Strategy. Its focus will be on executing a limited number of critical projects, including implementation of hydropower and priority adaptation measures, and working alongside the Guyana Office for Investment (GO-Invest), to attract sector-leading investments in low-carbon economic sectors.

To build local management capacity, the PMO will recruit locally and be assigned project officers from related agencies to work with program managers in support of each program; over time, the PMO will transfer certain programs to these government agencies.

When executing on specific projects targeting sector investments, the PMO will provide significant support for GO-Invest to strengthen Guyana's current investment capabilities. While investor interest exists, Guyana's investment promotion system does not have the resources needed to reach the number of new additional investors envisaged. It needs further strengthening to convert leads and streamline inter-agency approval processes. Specifically, the PMO will work with GO-Invest to streamline operational procedures, in particular those that are customer facing. This will enable GO-Invest to convert a larger number of investment inquiries into actual investments, thereby increasing domestic and foreign investment, jobs and economic growth.

3. Guyana Low-Carbon Finance Authority

Guyana will establish the Guyana Low-Carbon Finance Authority to fulfill two functions: to collect, manage and monitor forestry payments; and, to work with GO-Invest addressing the challenge in attracting investors to Guyana who are willing to underwrite their investments in low-carbon sectors.

Managing and Monitoring Forestry Payments. In time, GLCFA might interface with a new international tropical forest funding agency. In the near term (starting in 2009), the Government of Guyana proposes that a multilateral financial institution be established to enable bilateral partners, starting with Norway, to provide performance-based forest payments. The mechanism will act to ensure the appropriate fiduciary oversight of funds – where contributors can have confidence that appropriate transparency and fiduciary oversight is in place, and where Guyana can have confidence that payments will be predictable and performance-driven. Disbursement to the GLCFA will be in accordance with strict performance agreements, using information from the internationally verifiable MRV system. Once it receives forestry payments, the GLCFA will continue to enable full transparency on the disbursement and use of funds within Guyana, and be subject to strict control and external audit.

Attracting Low-Carbon Investment to Guyana. Aside from the relatively small size of the local market, potential investors are concerned about the lack of investment infrastructure in Guyana, the relatively few investors that have already invested at scale, and other perceived risks. As a consequence, interested foreign investors tend to demand excessively high investment returns. The GLCFA will seek to address these barriers and help improve investment returns. Due to lack of world-class investment promotion capability in Guyana, this will likely require a reputable international services provider in the near term. At a later point, the GLCFA will build its own staff capability, starting with three to five professionals and ramping up staffing as needed.

6. Ensuring support from stakeholders through a National Consultation process

The long-term success of Guyana's Low-Carbon Development Strategy is ultimately dependent not only on the international partnership outlined in Section 2 but also on broad-based, inclusive domestic support within Guyana. Implementing the LCDS represents a transformation of Guyana's economy and, therefore, receiving support for the LCDS from the people of Guyana and their representatives has to be done at a pace which enables the commitment of Guyana's international partners to be made visible to the people of Guyana and, in turn, to allow Guyana to demonstrate its commitment to international partners.

This document is the basis for the consultation. It draws on Guyana's proposal on avoided deforestation which was outlined by President Jagdeo in Georgetown in December 2008. At that time, the overall principles of the LCDS were articulated, and the need for broad-based national constultation emphasized. This current draft of the strategy was published by the Office of the President in May 2009, and draws on input from previous consultations on climate change, indigenous peoples' rights and national development.[30]

The draft is now being circulated and, while the consultative process will be open to all, specific invitations to participate are being issued to the following:

- All Members of the National Assembly
- All Toshaos and members of village councils
- Forestry Business Community
- Mining Business Community
- Major Private Sector Organizations
- Organized Labor
- Guyanese Non-Governmental Organizations (NGOs)
- International NGOs

Initial consultations will take place in June, July and August 2009 along with awareness and outreach activities utilizing the local media and internet. At the request of President Jagdeo, the Government of Norway engaged the International Institute for Environment and Development (IIED) to provide independent advice to assist the consultation process.

This strategy will be tabled in the National Assembly for debate, and local, regional and national consultations will also take place. Outreach programmes in schools and for business organizations will be supported. Where necessary, supporting materials will be produced to complement this document and the RPlan.

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[30] National Competitiveness Strategy, Amerindian Act, National Development Strategy, add in the others from our reference notes

The consultations are being co-ordinated by the Office of Climate Change at the Office of the President, with the support of IIED. At the time of writing, consultations are planned for Georgetown, as well as in forest communities in Regions 1, 7, 8 and 9 and in coastal communities in Berbice and communities in Essequibo. However, the consultation is an evolving process and may change as more information is gathered from communities and local and national representatives.

"Opt In" for Indigenous Communities

Guyana's Amerindians have jurisdiction over the forests in all their own titled lands. In its current form, the calculation of Guyana's EVN and corresponding structuring of incentives is based on the forest services provided by Guyana's State Forest Estate, and excludes forest lands under Amerindian jurisdiction. This is in accordance with the Government's commitment to only include lands under Amerindian jurisdiction after communities have engaged in appropriate consultation to decide whether they wish their lands to be included.

In accordance with the Amerindian Act and international norms, a series of consultations will take place to enable the participation of communities. Then, if communities choose to engage in the LCDS, their lands will be included in the overall strategy, and in the Government's negotiations with international partners, including those that take place as part of the REDD process. As mentioned, the proposed nature of these consultations will be determined with the involvement of forest communities and their representatives. Although initial consultations with all communities are expected to be completed before the end of August 2009, there is no deadline for communities to "opt in" to the international payments regime – further opportunities will be available in the future.

Consultative Process

At the launch of the LCDS, details of the planned consultation process will be communicated, and a proposed timeline for further development of the strategy during the consultative period will be outlined. Information about progress against this timeline will be communicated regularly utilizing the national media and the internet, and the process will be guided by a multi-stakeholder steering committee. Based on the feedback received throughout the process, an updated version of the LCDS will be published before the end of September 2009.

* * *

Along with its strategic partners, Guyana stands ready to demonstrate the effectiveness of providing economic incentives to reduce tropical deforestation. These incentives will serve to reduce carbon emissions and provide a sustainable path for economic development and improved standards of living in Guyana and, by demonstration, elsewhere, while at the same time advancing the process of protecting the world's forests.

In the absence of a full-scale international framework to deliver incentives for forest conservation, national scale pilots between cooperating governments, grounded in the logic of providing incentives large enough to motivate long-term forest conservation, can start saving the world's forests as carbon sinks today while generating show-the-way experience for the future.

Appendix I: The EVN-EVW methodology applied to Guyana

EVN and EVW: The solution space for avoiding deforestation

There are powerful, rational incentives for forested countries to deforest even though this causes massive negative consequences for the world. Two concepts explain this misalignment of current incentives: deforestation's economic value to the nation (EVN) and forests' economic value to the world (EVW).

Deforestation's economic value to the nation (EVN)

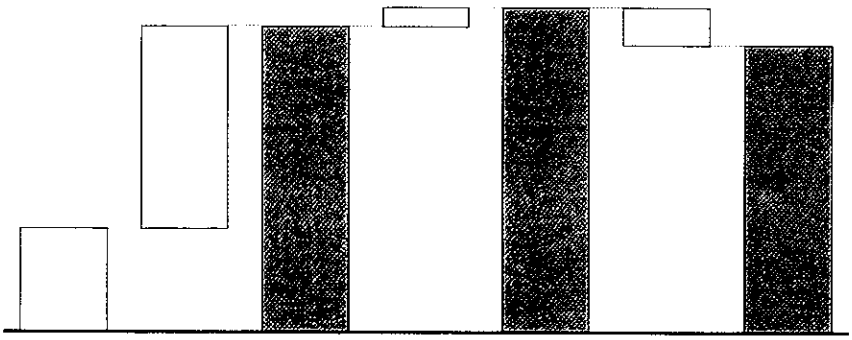
National and local policymakers have a responsibility to their home constituencies to promote social and economic development. Because forested land can generate greater economic value when put to other uses, individuals and companies in developing countries face powerful incentives to exploit these opportunities. In turn, national and local governments will face political pressure to permit or even encourage deforestation. Today's richest countries, such as the United States, actively pursued deforestation and land conversion to agriculture in early phases of development for exactly these reasons.

Land conversion can create significant 'economic value to the nation' (EVN) – which is intuitively obvious judging by the high rates of deforestation typically associated with economic development. The EVN from deforestation has four principal components: standing timber value, post-harvest land use profits, savings on forest protection costs, and loss of local ecosystem services.[31]

[31] For technical assumptions on EVN as applied in Guyana see Appendix II.

Exhibit 8

FOUR COMPONENTS OF EVN



1. Standing timber value. Forests contain valuable wood that can be harvested and sold for multiple uses, such as sawnwood, pulp, and fuelwood. While some of this value can be tapped through sustainable management practices, unsustainable extraction is typically more economically attractive, as it generates higher timber volumes and earlier cash flow. Early cash flow is particularly important in developing countries, which have huge developmental objectives which require funding to lay the foundation for future economic growth.

2. Post-harvest land use value. Post-harvest uses such as commercial agriculture, plantation forestry, ranching, and mining can generate attractive ongoing cash flow after trees are cleared from the land. The value from post-harvest land use is typically even greater than the value of the standing timber and will drive deforestation even where forest resources are not themselves commercially valuable.

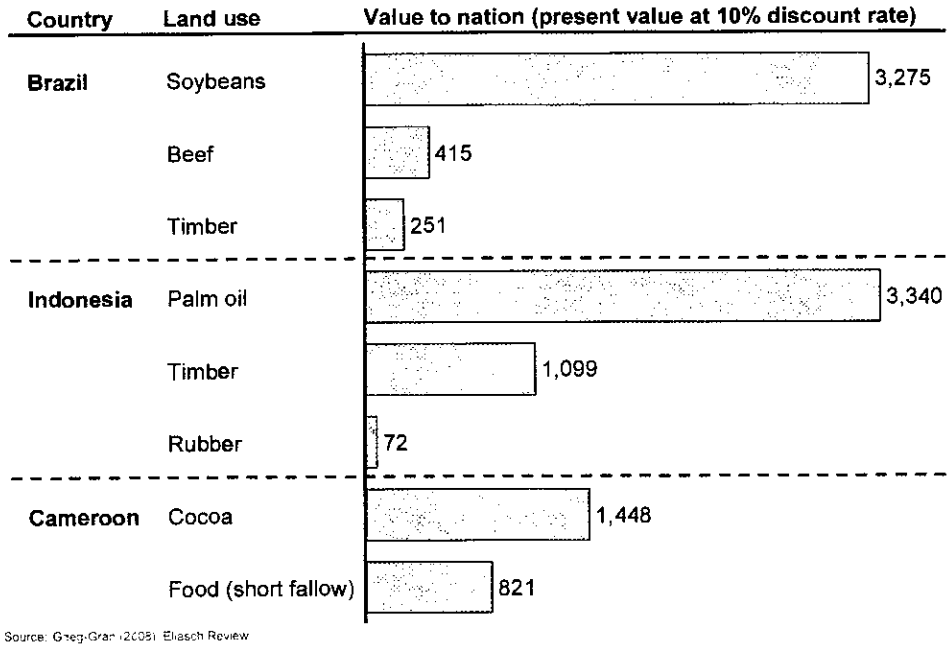
3. Avoided protection costs. Tropical governments spend significant amounts on forestry personnel and equipment to monitor and protect their forests. These costs could be avoided if countries choose to relax levels of forest protection, thereby leading to increased deforestation.

4. Loss of local ecosystem services. Standing forests generate significant local ecosystem services – those services whose economic benefits accrue primarily to local stakeholders – that are lost when forests are cleared. These services include, among others, flood control, the provision of non-timber forest products, and eco-tourism.[32]

32 Local ecosystem services exclude the local element of 'global' ecosystem services that will be lost or impaired as a consequence of global climate change, as it is not possible to attribute these impacts to land use emissions relative to other existing and historical sources of greenhouse gas emissions.

Exhibit 9

'ECONOMICALLY RATIONAL' USE OF LAND GENERATES PROFITS... AND DEFORESTATION



Source: Greg-Grau (2008); Eliasch Review

Defining forests' economic value to the world (EVW)

Standing forests provide tremendous global economic value in the form of ecosystem services, including carbon storage, climate regulation, and biodiversity conservation. However, there are no commodity prices or traded markets for most of these services, making it difficult to estimate their value and impossible for forested countries to generate income from them. Deforestation destroys these services and imposes significant costs on the world; the recent Eliasch Review reports that the world loses $1.8-$4.2 trillion (€1.35-€3.1 trillion) in ecosystem services each year due to deforestation. The size of this number reflects the very significant values that standing forests provide, which some researchers estimate to be as high as $25,000 per hectare in net present value terms.[33]

The services provided by forests produce 'economic value to the world' (EVW), a concept that captures the true economic value of the ecosystem services that forests provide. However, in practical terms, there is only one market of real importance for an environmental commodity: the carbon market. Since abatement of carbon emissions is the only ecosystem service that the world is currently willing to pay for at meaningful scale, the carbon price is a reasonable proxy for the world's willingness to pay for ecosystem services despite carbon market

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33 Government of the United Kingdom. Climate Change: Financing Global Forests: The Eliasch Review, page 30. United Kingdom: 2008. (Citing Braat and Ten Brink (2008).)

fragmentation across geographies and incomplete scope (they largely exclude abatement opportunities in the forestry sector today).

The value of avoided carbon emissions from deforestation therefore serves as a proxy for the economic value to the world that forests provide (hereafter denoted as EVW_C). Since a ton of carbon emissions avoided from reducing deforestation provides essentially the same ecosystem services as a ton of carbon emissions abated by other means, its economic value to the world is the same, and the world's theoretical willingness to pay should be the same. Just as Certified Emissions Reductions (CERs) receive the same prices regardless of their source, tons of carbon abatement from avoided deforestation should be roughly equivalent in value to tons from other abatement levers, potentially discounted as appropriate to account for permanence risk and other methodological challenges.

Valued at today's CER price of approximately $20/ton and assuming crediting for carbon stored only in above-ground biomass, EVW_C from avoided deforestation would range from $6,500 to $7,000 per hectare in Guyana.[34] Valued at projected global marginal abatement costs of $60 to $80 per ton in 2030, EVW_C could eventually exceed $20,000 per hectare of forest protected from deforestation.[35] These values vastly exceed most alternative land uses and suggest that the world has a very strong interest in preventing deforestation. Other ecosystem services are valuable, but currently irrelevant to decision-makers given the absence of institutional mechanisms for compensation.

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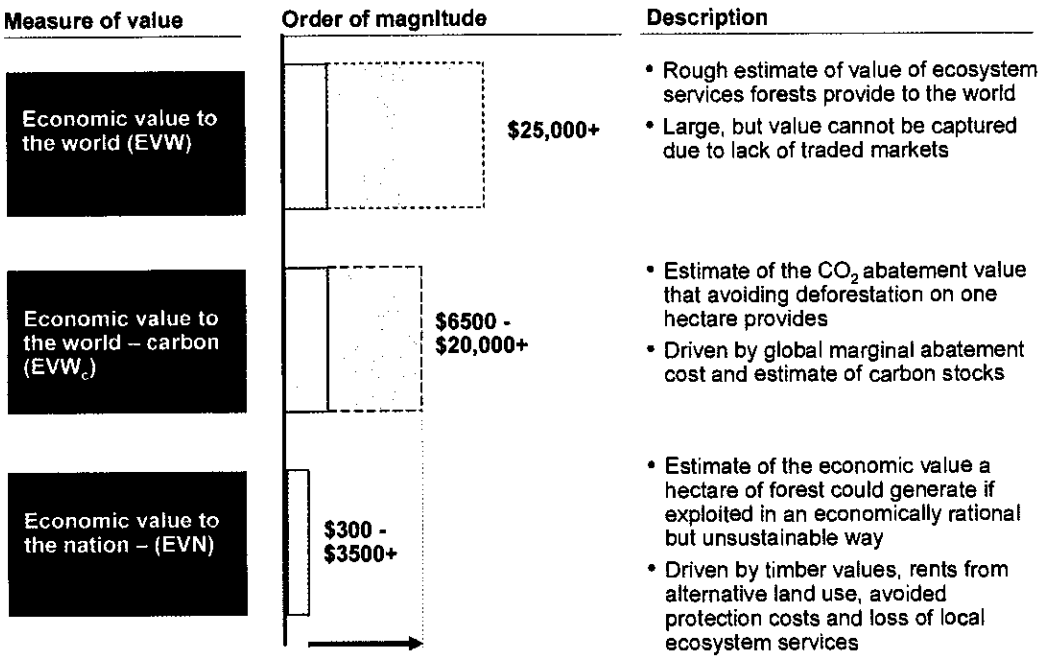
34 Assumption is loss of above-ground biomass only, at 342.78 tCO_2e per hectare, from FAO Forest Resources Assessment 2005

35 Based on 2030 marginal abatement cost from McKinsey & Company. "A Cost Curve for Greenhouse Gas Reduction," *McKinsey Quarterly*, 2007 Number 1

Exhibit 10

EVW, EVW_C, AND EVN PROVIDE BOUNDARY CONDITIONS FOR A DEAL

$US, present value per hectare of forest



Boundary conditions for aligning incentives

Halting deforestation requires aligning the interests of forest countries and the broader community of nations. In turn, alignment would require remuneration for forest ecosystem services that lies between EVN and EVW_C, with EVN the 'floor' and $EVW_{C\ the}$ ceiling in this range of values. Incentives that lie between EVN and EVW_C will align national and global interests; values below EVN or above EVW_C will not. If support falls below EVN, deforestation will continue as stakeholders in forested nations act in their own rational economic interest, making forest protection progressively more difficult. If the cost of forest protection exceeds EVW_C, the world will forgo conservation from avoided deforestation and seek carbon abatement elsewhere.

In this range of values, forested countries will find economic value from forest conservation that exceeds the economic value to the nation from deforestation, and the world will continue to receive valuable ecosystem services at a cost less than or equal to their full value to the world. All parties will be better off as the world enables forested countries to diversify their economies away from activities that drive deforestation while continuing to grow.

The following section outlines a methodology for estimating EVN and applies it to the Republic of Guyana in an illustrative case study.

How to measure EVN: The case of Guyana

Measuring EVN involves three steps: assessing the value of each component of EVN for each unit of land in a country; charting an economically rational deforestation path; and developing reasonable probabilistic estimates of the EVN. This section explains this approach in greater detail by application to the Republic of Guyana, a developing country with a large tropical rainforest.

Estimating EVN in Guyana

Guyana faces many of the challenges and opportunities faced by all forested countries seeking to reduce deforestation. The country has a strong track record of sustainable forestry practices, with FAO statistics demonstrating no net loss of forest cover between 1990 and 2005.[36] However, economic pressures to increase value from forest resources in Guyana are growing. The great majority of Guyana's forests are suitable for timber extraction, there are large sub-surface mineral deposits within the forest, and rising agricultural commodity prices increase the potential returns to alternative forms of land use, all increasing the opportunity cost of leaving the forest alone. These challenges will intensify as infrastructure links between Northern Brazil and Guyana advance, increasing development opportunities in the interior of Guyana.

Guyana also faces potentially massive climate change adaptation costs given the need to protect low-lying areas from the risk of flooding (~90 percent of Guyana's population and all of its economic base lives on a narrow strip of coastal land that lies below sea level, rendering it vulnerable to sea-level rise and inland flooding). Moreover, its citizens expect continuously better social and economic services as the country develops. If long-term economic incentives to protect the forest are weak, future Governments may find it necessary to meet these needs using revenues from unsustainable resource extraction. These pressures bring into sharp focus the need to create meaningful incentives for forest conservation, and make Guyana an important case study in the economics of deforestation.

The Office of the President has estimated EVN in Guyana using a baseline scenario in which Guyana aggressively pursues economically rational land use opportunities. A high-level probabilistic analysis indicates a value that is likely to lie between $4.3 billion and $23.4 billion depending on movement of commodity prices, with a most likely estimate of $5.8 billion.[37] These estimates are equivalent to an annuity of between $430 million and $2.3 billion at a 10 percent discount rate, suggesting that Guyana forgoes an amount roughly equal to its current GDP of $1,100 per capita in preventing extraction from its forests.[38] Conservative carbon stock estimates and the 'economically rational' baseline deforestation rate suggest a marginal abatement cost of $2 to $11 /t$CO_2$e.

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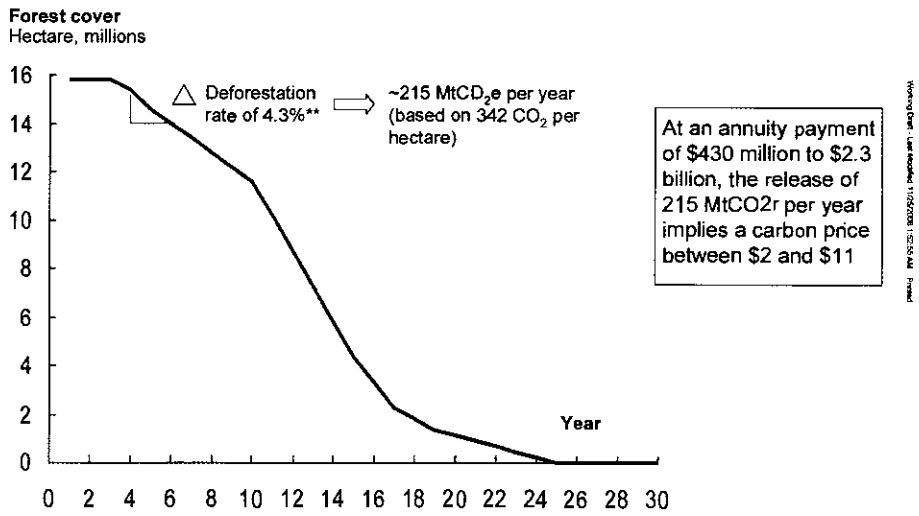
36 Food and Agriculture Organization of the United Nations. Forest Resources Assessment 2005. Rome: 2005

37 80 percent confidence interval

38 10 percent discount rate is standard in forest valuation literature. See Appendix III for reference to other forest valuation studies using a 10 percent discount rate.

Exhibit 11

Calculation of marginal carbon abatement cost for avoided deforestation in Guyana



Source: FAO 2005 Forestry Assessment; team analysis

The Office of the President assessed EVN through a bottom-up analysis of its land use opportunities and the 'economically rational' rate of deforestation. In the following section, the steps used to generate this estimate are described in greater detail, both in general terms and with specific reference to the case of Guyana.

EVN Step 1: Assessing value of each component of EVN. This step involved gathering data for forested lands to estimate each of the four elements of EVN.

- **Standing timber value.** Valuation of timber stands is routine for timber investors and involves assessing likely yields of marketable species, extraction costs, and projected prices. Despite historical price volatility, mean price growth and variance assumptions can be extrapolated from past data and future market trends. However, many tropical countries lack robust timber inventories and their forests contain large numbers of lesser-known species for which the timber market lacks reliable price data.

  To date, very strict sustainable forestry rules in Guyana have limited extraction to less than 20 m^3 of timber per hectare over cycles as long as 60 years (implying an allowable cut of 0.33 m^3 per hectare per year), but current forest inventories suggest that substantially greater quantities (60-70 m^3 of valuable hardwood species such as greenheart, locust and mora could profitably be extracted.[39]) This analysis assumes that loggers could extract 40m^3 of commercially marketable species from each hectare of forest under a more permissive regulatory regime, and that the resulting timber could be exported at prices roughly comparable to those facing Guyana

39 Guyana Forestry Commission; company data

today.[40] By applying existing structures for government revenue, including export levies, acreage fees and taxes on an unconstrained harvest, Guyana could generate substantially greater value from its timber resources than it does today, albeit at a major cost to the world in terms of lost carbon storage, habitat destruction and biodiversity loss. To make the standing timber value truly incremental, the projected value of continuing extraction under a sustainable harvesting regime is subtracted from this estimate.

- **Post-harvest land use value.** Data on soil quality, topography, and sub-soil mineral resources were used to identify plausible alternative land uses for forested land. Based on an informed assessment of alternative land uses and assumptions about future yields and prices, returns from alternative land uses were estimated for each region or geographical sub-unit in the country.

  The soil beneath tropical forests tends to be thin and poor, and Guyana is no exception. However, Guyana's forests cover a variety of soil types, including some areas with rich soils and mineral deposits that could be exploited within two years of forest extraction. Agronomists suggest that by targeting the limited range of areas with 'Class 1' and 'Class 2' soils for agriculture, Guyana can prepare 2.9 million hectares of land for rice, fruit production, and other agricultural efforts as soon as two years after deforestation.[41] On other land areas, palm oil, softwood pulp or hardwood tree plantations – which are ecologically poorer and store less carbon than natural forests – could be planted to generate post-harvest economic value. Similarly, through investments in gold mining equipment, local experts suggest that Guyana could extract at least 9.2 million ounces of identified gold deposits within 30 years.[42] These alternative land uses are, by construction, hypothetical, but they are plausible. Such alternative uses are common in comparable countries, and the Government of Guyana has received – and declined – numerous approaches from investors seeking to develop agricultural, ranching and mining projects in forested areas.

- **Avoided protection costs**. By allowing unconstrained forest extraction, Guyana would avoid a cost of US$2/ha for forest monitoring and protection.[43] This is lower than cross-national estimates of US$4-9/ha from the Stern and Eliasch Reviews but represent the best available cost estimates for forest protection in Guyana.

- **Loss of local ecosystem services**. This is the most uncertain of the four elements of EVN for two reasons: the absence of a traded market for most ecosystem services, and limitations in scientific understanding of these services. A range of approaches were used to estimate potential locally realized losses from deforestation. Deforestation would eliminate a range of ecosystem services from

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40 This is a partial equilibrium assumption that excludes from consideration the price impacts of other countries' decisions. Timber prices from International Tropical Timber Organization (ITTO)

41 Guyana Lands and Surveys Commission

42 Metals Economics Group database

43 Estimate based on the cost of forest protection in Iwokrama, an international program area in Guyana focusing on sustainable rainforest use and conservation

forests, including natural watershed protection and revenue from non-timber forest products.[44] This analysis considers three of the most economically important ecosystem services forests provide in Guyana: flood management, non-timber forest products, and eco-tourism.

- **Flood management.** Management of floods is one of the most important services forests provide in Guyana because the country's low-lying coastal regions are highly vulnerable to inland flooding. A simple estimate of the impact of deforestation on flood risk involves multiplying an estimate of the incremental flood risk associated with deforestation and the economic impact of flooding in Guyana. Recent research estimates that a 1 percent loss in forest cover will result in a 0.4 percent to 2.8 percent increase in frequency of a catastrophic flood.[45] An external assessment by the United Nations ECLAC of a catastrophic flood in 2005 (that cost Guyana 59 percent of its 2005 GDP) estimates approximately US$450 million in GDP loss from such a flood. These estimates generate a ranged stream of expected incremental losses from flooding as forest cover declines.

- **Non-timber forest products.** Many Guyanese citizens obtain value from non-timber forest products (NTFPs), such as wattles and manicoles (hearts of palm). Guyana currently exports US$0.23/ha. of non-timber forest products harvested from standing natural forests.[46] Deforestation will deprive the country of the value of these products.

- **Eco-tourism.** Eco-tourism is not a major driver of value today. Though this could change in the future, we assume that protecting 10 percent of the country's most attractive forest assets (e.g., Kaieteur Falls) to comply with protected area obligations under the Convention on Biological Diversity will sustain an ongoing opportunity to develop Guyana's eco-tourism sector.

These categories are not exhaustive; deforestation obviously impairs other valuable services that standing forests provide, such as prevention of soil erosion and maintenance of water quality. In some specific areas (and regions of the world), the loss of local ecosystem services will be greater than estimated here. However, mitigating measures can be taken (e.g., prohibitions on deforestation near streambeds) to reduce these risks, and many alternative land uses involving plantation of new trees (e.g., palm oil or tree plantations) will partially mitigate loss of these services even where their negative impact on global ecosystem benefits such as biodiversity conservation or carbon storage is immense.

Using price and yield data from international sources and local topographic and geological information from Guyana's Lands and Surveys Commission, estimates were developed for

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44 Ecotourism is not included in lost ecosystem services because all of Guyana's current planned ecotourism activity takes place in the ~1.5 million hectares of forest it has or plans to place under protection as national parks or wildlife preserves.

45 Bradshaw, Corey et.al. 2007. "Global evidence that deforestation amplifies flood risk and severity in the developing world." Global Change Biology. Estimates probability of catastrophic flood in Guyana is twice in 10 years based on 1990 to 2000 data.

46 Guyana Forestry Commission

each component of EVN for each hectare by region. The next step is to chart an economically rational deforestation path over time to project cash flows to the nation. (See Appendix I for data sources.)

EVN Step 2: Charting an 'economically rational' deforestation path. The present value of each component of EVN depends on the speed and sequence of deforestation, so estimating EVN requires charting a path that describes the trajectory of deforestation across geography and across time. While deforestation might not in practice follow a predictable path, it is possible to project a profit-maximizing path equivalent to the strategy a central planner might pursue in seeking to optimize returns to the country from deforestation and post-harvest land use. Because it is a value-maximizing strategy, this economically rational path yields the maximum return from forest exploitation, and therefore suggests an 'economically rational' rate of deforestation that can be used to estimate EVN.

Charting the economically rational path begins with drawing on the assessment of alternative land use developed in Step One. The planner generates a profit-maximizing harvesting path, where countries begin harvesting trees in regions with existing infrastructure and road access, thus creating a stream of income to be used in developing infrastructure in areas that are less accessible today.

In the economically rational deforestation path, harvest occurs at the maximum rate consistent with the constraints of technical feasibility, market dynamics, and legal commitments. Technical feasibility constrains the rate of harvest because significant infrastructure development, labor movement and land preparation would be needed to execute the strategy. Additionally, anticipated production of commodities must not violate reasonable assumptions of market demand for increased timber, agriculture, and mineral commodities in any given year to avoid the risk of market flooding and price collapses. Lastly, international laws on forest protection (e.g., the Convention on Biological Diversity) and national agreements with indigenous communities are assumed to be honored.

In Guyana, we chart an 'economically rational' deforestation path that involves reducing forest cover by approximately 4.3 percent (~630,000 ha) per annum over the course of 25 years, leaving intact as protected areas the 10 percent of Guyana's forests with the highest conservation value. This rate of deforestation is comparable to deforestation in the nearby Brazilian states of Pará and Mato Grosso, which experienced even faster declines in forest cover between 2000 and 2005.[47] This deforestation trajectory is pursued on lands currently under the jurisdiction of the national government, excluding ~1.7 million hectares of forest under the jurisdiction of Amerindian communities.[48] The timing and sequence of deforestation across regions are influenced by distance to required infrastructure and major population centers.

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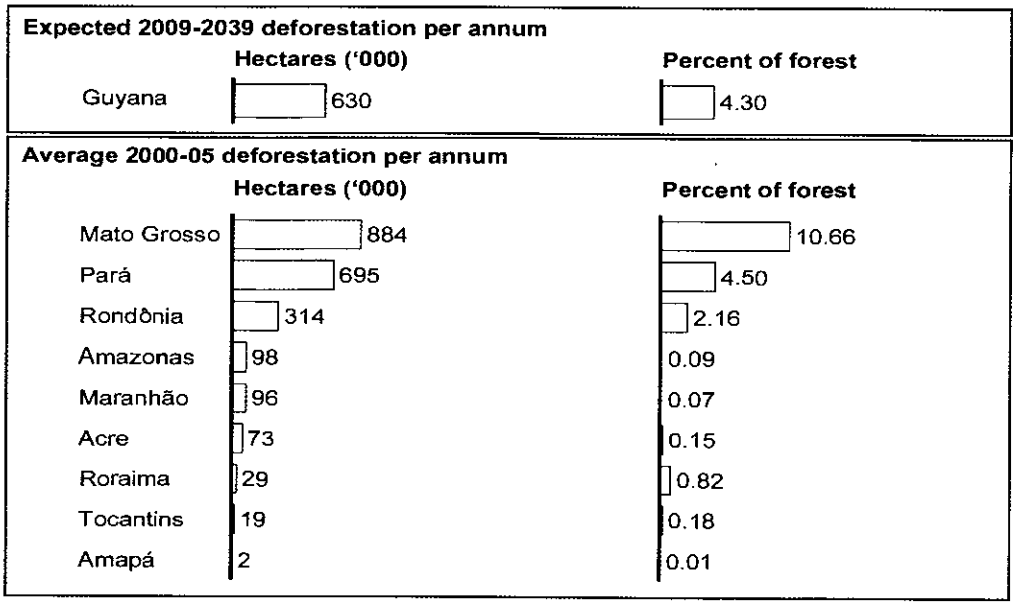
47 Brazil National Institute for Space Research (INPE) Project PRODES

48 This analysis excludes land, which is under the jurisdiction of Amerindian communities, plus land, which is planned to be placed under Amerindian jurisdiction. However, it is likely that Amerindian communities would elect to participate in REDD mechanisms - in these circumstances overall EVN, EVW and EVWc from within Guyana would increase.

Exhibit 12

GUYANA'S PROJECTED DEFORESTATION VS. BRAZILIAN STATES

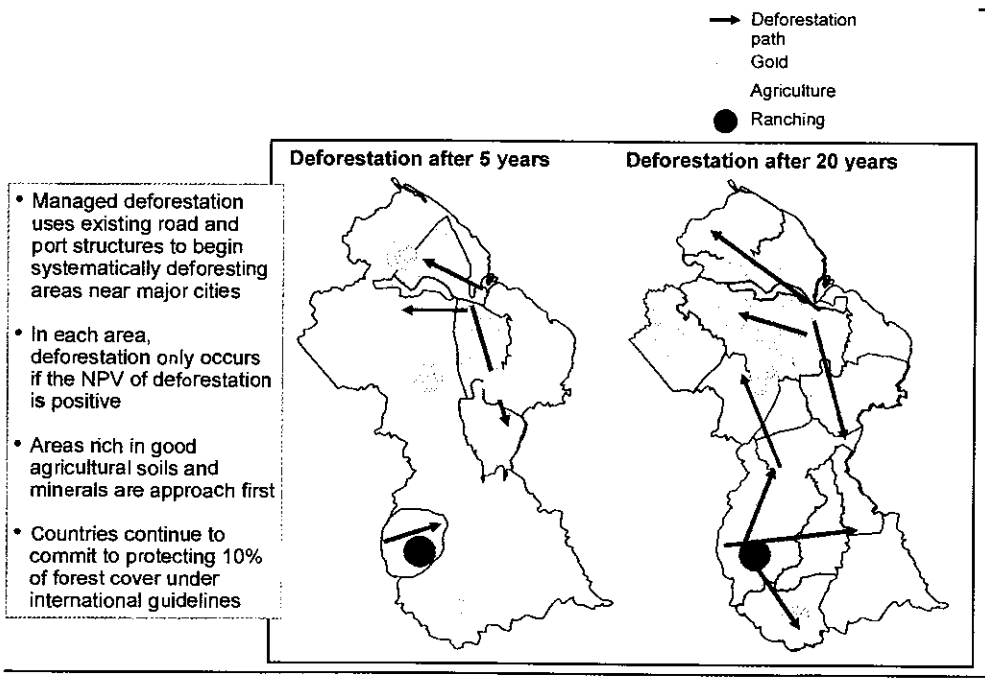


Technical, economic and legal factors place an upper limit on how quickly and extensively to pursue a deforestation strategy. However, the path described is technically feasible, creates economic value, and is consistent with Guyana's international and national legal obligations.

Exhibit 13

ECONOMICALLY RATIONAL DEFORESTATION PATH

CONCEPTUAL

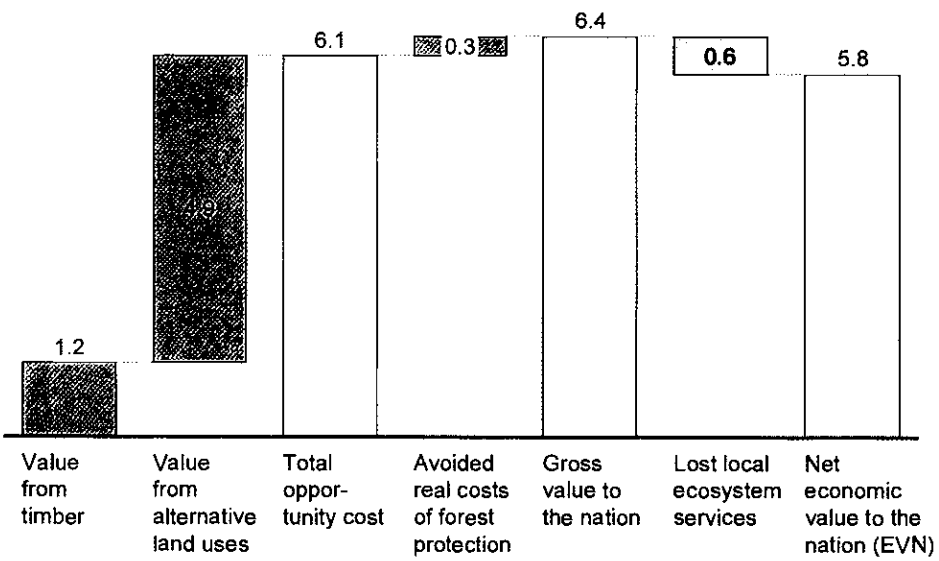


EVN Step 3: Developing probabilistic estimates of the EVN. Since future prices and yields driving cash flows are uncertain, Guyana's EVN is better represented as a probability distribution than as a point estimate. Statistical analysis suggests that Guyana's EVN is highly likely to fall between $4.3 billion and $23.4 billion (with a most likely estimate of $5.8 billion, equivalent to a $580 million annuity payment at a 10 percent real discount rate).[49] In other words, by protecting its forests, Guyana forgoes economically rational opportunities that could net it the equivalent of $430 million to $2.3 billion in additional value per year.

Most of this value comes from forgone opportunities to use land in more intensive ways, though a significant amount comes from the value of Guyana's standing timber. To give a sense of magnitude, the most likely estimate of EVN ($5.8 billion in present value terms) is driven primarily by value from timber extraction ($1.2 billion) and from post-harvest land use ($4.9 billion), with a contribution from avoided costs of protection ($0.3 billion) and a downward adjustment for the loss of local ecosystem services ($0.6 billion).[50]

Exhibit 14

GUYANA'S EVN IS DRIVEN LARGELY BY POST-HARVEST LAND USE



EVN's range of between $4.3 billion and $20.4 billion reflects variability driven by fluctuating prices for commodities such as logs, palm oil, and rice. Under favorable circumstances (such

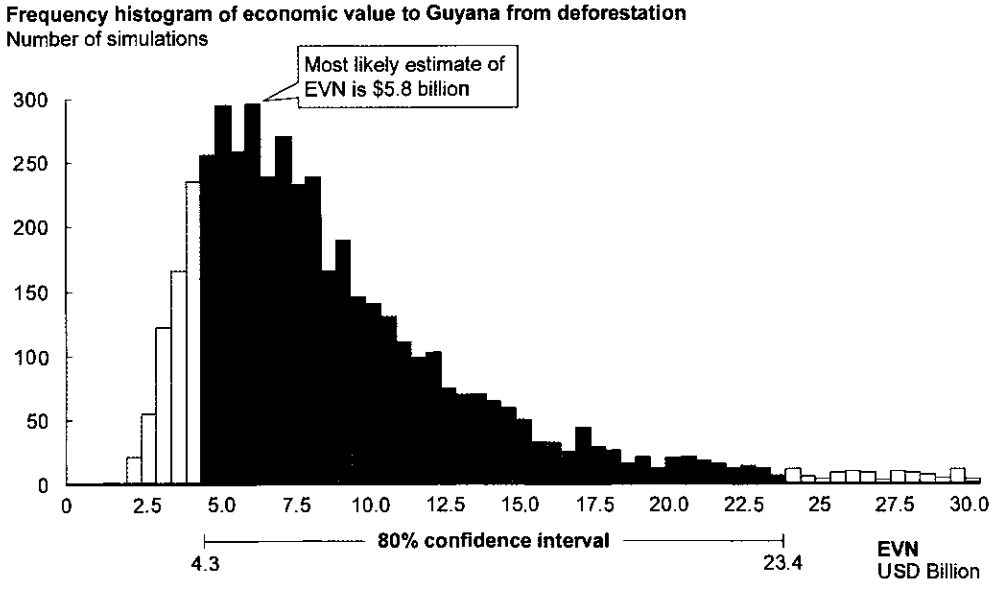
49 Median 80 percent of simulated values

50 These values assume that Guyana's conversion of land to alternative uses does not impact global commodity prices, as Guyana will remain a "price-taker" in these markets (See appendix III on timber values). Whilst an argument exists that if all forested nations pursued a deforestation strategy, prices would fall (reducing EVN), the current economic pressures on the forest combined with the likely growing demand driven by population increases, may act to offset these.

as a commodity price boom) the EVN could be even higher in the future, increasing pressure to deforest.

Exhibit 15

EVN IS LIKELY TO FALL BETWEEN $4.3 AND $23.4 BILLION



Appendix II: Economic Value to the Nation (EVN) Methodology

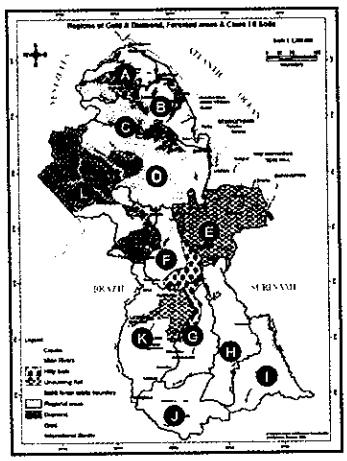
This appendix outlines the calculations and key assumptions for the Economic Value to the Nation (EVN) calculation, including macro assumptions, standing timber value, post-harvest land-use profits, savings on protection costs, and loss of local ecosystem services.

Macro assumptions

- Inflation will continue at the historical average of 4.58 percent per annum seen from 2000-2007 despite high levels of fluctuations in some years.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Inflation	6.15	2.63	5.34	5.98	4.67	6.24	5.86	3.85	4.22

- The assumed real discount rate is 10.0 percent based on a review of existing forest valuation literature (see Appendix III).
- We assume Guyana's forest contain 342.78 tCO2e per hectare based on the total carbon sequestration estimate from the 2005 FAO Forestry Assessment.
- Guyana's forest was divided into 12 regions (marked A-L on map below) based on wood types, access, value of post-harvesting after-uses (e.g., based on soil quality and mineral deposits), and ownership.



Standing timber value

To determine the standing value of timber we base the assumptions on data secured from both within and outside of Guyana for forest regions, wood types, production costs, and government fees.

Forest regions

- 20 percent of Guyana's forest is non-productive, according to current estimates by the Guyana Forestry Commission, due to inaccessible mountain areas, streams, and other natural obstructions.
- Guyana can extract 40m^3 per hectare from productive forest areas based on inventories from leading concessionaires indicating marketable species may be as high as 69-79m^3 per hectare.
- Deforestation will not begin until Year 4 when regions D and E would be deforested and subsequent regions added based on infrastructure accessibility and value. Regions are deforested at a rate of 150,000 to 200,000 hectares per annum.

Region	Start year	End year
A	2020	2025
B	2014	2022
C	2014	2014
D	2013	2027
E	2013	2023
F	2020	2023
G	2020	2025
H	2026	2033
I	2024	2024
J	2020	2025
K	Amerindian	Amerindian
L	Amerindian	Amerindian

Wood types

- Guyana's current ratio of wood types will remain constant throughout its managed deforestation plan.

Wood type	Share of timber input
Logs	67%
Sawnwood	15
Roundwood	4
Splitwood	1
Fuelwood	5
Plywood	8

- Recovery rates for each wood type would remain the same as current rates.

Wood type	Recovery rate
Logs	100%
Sawnwood	40
Roundwood	100
Splitwood	33
Fuelwood	100
Plywood	50

- Domestic consumption of each product would remain at current absolute levels (~270,000 m^3), growing with population at 0.24 percent per annum, resulting in negligible domestic consumption compared to exports.
- Current average domestic and export prices as of June 2008 from the ITTO Guyana submissions are assumed as base prices.
- Export and domestic prices grow at the same rate based on the maximum likelihood estimate of the best fit statistical model for real price growth from 1961 to 2005, adjusting using the United States CPI.

Wood type	Real price growth	Statistical fit model
Logs	0.79%	Log Logistic (λ=-0.37, α=0.36,β=5.46)
Sawnwood	0.88	Wald (μ=0.44, λ=11.91) Shift=-0.44
Roundwood	-0.22	Log Logistic (λ=-0.37, α=0.36,β=5.46)
Splitwood	0.88	Log Normal (μ=0.49, σ=0.11) Shift=-0.50
Fuelwood	1.62	Gumbel (location=-0.047, scale=0.11)
Plywood	-1.74	Gamma (α=47.73,β=0.013) Shift=-0.64

- Guyana would lose sustainable forestry value for each type of wood if it were to continue its current practices into perpetuity, growing at the above real prices.

Wood type	2007 sustainable forestry
Logs	$20,847,246
Sawnwood	$21,862,299
Roundwood	$2,899,341
Splitwood	$1,725,224
Fuelwood	~$0
Plywood	$8,877,001

Production costs

- Capital investments are incurred one year in advance of timber harvesting to begin construction.
- Costs are broken down by function based on current operators in Guyana:

Cost description	Cost (USD/m^3)	Cost type
Fixed management cost (overhead)	$21.41	In-year
Road construction – primary	$0.83	CapEx
Road construction – secondary	$1.65	CapEx
Road maintenance – primary	$0.10	In-year
Road maintenance – secondary	$0.21	In-year
Harvesting cost to roadside	$34.46	In-year
Log transport to mill	$15.26	In-year
Sawmilling cost (inc. loader)	$32.07	In-year
Sawmill licensing Fee	$0.00	In-year
Sawmill Operating Fee	$0.00	In-year
Kiln drying cost (inc. fork-lift)	$25.70	In-year
Planer/moulder	$14.60	In-year
Depreciation on mill equip.	$1.14	CapEx
Transport to Georgetown	$40.12	In-year
Storage and handling - Georgetown	$5.80	In-year
Finance costs on capital	$35.58	CapEx

- Road and transport costs are multiplied by a factor to account for more expensive infrastructure requirements deeper in the forest:

Region	Transport cost factor
A	3x
B	2x
C	2x
D	3x
E	2x
F	2x
G	3x
H	4x
I	4x
J	4x
K	2x
L	4x

Government fees

- Government of Guyana will continue to receive royalties on timber production and export commissions on timber sales at 2009 schedules:

Wood type	Royalties (USD/m^3)	Export commission
Logs	1.65	10%
Sawnwood	7.29	2
Roundwood	0.33	2
Splitwood	0	2
Fuelwood	0.15	2
Plywood	0	2

- Government revenue on foreign companies will continue to come from acreage fees (US$0.37/ha.), licensing fees (US$0.04/ha.), and corporate tax (35 percent).
- 70 percent of companies are expected to be foreign-owned, maintaining the current ratio of foreign to domestic companies.
- Government of Guyana will need to continue to spend US$4,490 per employee for monitoring and collecting fees at a rate of 0.13 employees per 10,000 hectares.

Post-harvest land-use profits

Assumptions made for agriculture, ranching, and mining are based on the factors of available land or deposits, costs and productivity, and forecasted prices.

Agriculture

- Available land
  - Existing soil assessment maps indicate significant amounts of 'rich' arable soils in most regions of Guyana's forest.

Region	**Class 1 undulating soil** (ha.)	**Class 1/2 hilly soil** (ha.)
A	-	191,574
B	183,224	-
C	92,023	-
D	-	104,809
E	1,911,516	-
F	-	198,042
G	-	251,287
H	-	14,795
I	-	-
J	-	-
K	Amerindian	Amerindian
L	Amerindian	Amerindian

- Rice is the most productive and likely product to be grown on Class 1 undulating soils given Guyana's history of rice production and growing demand for rice products in the world.
- Class 1/2 hilly soils are equally divided between palm oil plantations and small-scale farming for high-end vegetables as the most likely positive NPV crops for Guyana to grow on these soils. Coffee and cocoa were tested but resulted in a negative NPV.

■ Costs and productivity

- Yields for all products are based on historical averages reported by the FAO. For palm oil, average yields in other palm oil producing countries is used given there has been no palm oil production in Guyana to date.
- Capital expenditure and land preparation costs are based on historical estimates for rice in Guyana according to current rice producers and the Guyana Rice Development Board. For all other products, 2007 Brazilian capital expenditure costs are drawn from the Agrianual survey.
- Capital investments would need to take place on average 2 years prior to crop cultivation.
- Operating profit margins are similarly based on historical margins for current rice producers and Brazilian producers for all other products according to the Agrianual survey.

Product	Yield (Mt/ha.)	Capex (USD)	Operating profit margin
Sugar	76.92	$2,000	N/A
Rice	4.14	$600	19.64%
Palm oil	4.00	$498	18.75
Cocoa	0.26	$3,978	39.59
Coffee	0.43	$7,561	21.22
Vegetables	6.19	$330	37.00

■ Forecasted prices

- Prices for 2009 to 2018 are based on FAPRI 10-year market price projections by product.
- Real price growth after 2018 is based on average real price growth from 1960 to 2007 according FAO market prices, adjusted for inflation with the United States CPI.

Product	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sugar	$262	$276	$269	$270	$273	$277	$280	$281	$283	$285
Rice	$463	$479	$486	$499	$510	$515	$517	$520	$521	$531
Palm oil	$1,004	$1,026	$1,057	$1,081	$1,110	$1,146	$1,185	$1,229	$1,275	$1,319
Cocoa	$1,551	$1,632	$1,716	$1,805	$1,899	$1,998	$2,102	$2,211	$2,326	$2,447
Coffee	$2,032	$2,018	$2,004	$1,991	$1,977	$1,964	$1,950	$1,937	$1,924	$1,911
Vegetables	$163	$166	$168	$171	$174	$177	$179	$182	$185	$188

Product	Real price growth	Statistical fit model
Sugar	2.66%	Logistic (α=0.027,β=0.11)
Rice	0.22	Log Logistic (λ=-0.47, α=0.45,β=5.44)
Palm oil	2.29	Gumbel (location=-0.098, scale=0.21)
Cocoa	5.19	Beta (α1=2.40, α2=10.08, min=-0.36, max=1.80)
Coffee	-0.68	Beta (α1=0.33, α2=0.34, min=-0.32, max=0.32)
Vegetables	1.61	Gumbel (location=-0.078

Ranching

- Available land
  - There are no lands available on state forest for ranching.

- Cost and productivity
  - Beef cattle yields are based on historical averages reported by the FAO.
  - Capital expenditure and land preparation costs are unavailable.
  - Capital investments would need to take place on average two years prior to cattle ranching.
  - Operating profit margins are based on historical margins for Brazilian ranchers.

Product	Yield (Mt/ha.)	Capex (USD)	Operating profit margin
Cattle beef	0.001423	N/A	30.0%

- Forecasted prices
  - Prices for 2009 to 2018 are based on FAPRI 10-year market price projections for beef.
  - Real price growth after 2018 is based on average real price growth of beef from 1960 to 2007 according FAO market prices, adjusted for inflation with the United States CPI.

Product	2009	2010	2011	2012	2013
Beef	$2,075	$2,027	$2,000	$1,979	$1,971
	2014	**2015**	**2016**	**2017**	**2018**
	$1,987	$2,017	$2,053	$2,096	$2,138

Product	Real price growth	Statistical fit model
Beef	0.18%	Normal (μ=0.0018, σ=0.095)

Mining

- Available minerals
  - Mineral Economics Group (MEG) data indicates that 9.2 million ounces of gold have been identified for extraction in the forested lands.

Region	Land with gold (Ha.)	Identified gold (Ounces)
A	463,480	513,000
B	526,229	470,000
C	-	
D	1,338,909	4,500,000
E	34,948	592,000
F	303,378	1,297,000
G	5,747	1,748,000
H	-	-
I	-	-
J	30,903	48,000
K	-	-
L	-	-

  - Deposits of other minerals are not known with any certainty and are thus excluded.
- Costs and productivity
  - Capital expenditure costs are assumed at $74.77 per ounce based on investments made for other small-scale mining operations in Guyana.
  - The MEG database indicates that operating costs in Guyana are $260.00 per ounce.
  - We assume two years are required to put capital investments in place prior to mining.
- Forecasted prices
  - Gold prices have fluctuated significantly throughout history with a dramatic rise recently. We take 2009, 2010, and long-term consensus on gold price for 14 analysts. We assume the long-term price will be achieved by 2015 and will remain constant in real terms thereafter.

Product	2009	2010	2011	2012	2013
Gold	$750	$883	$838	$796	$756
	2014	**2015**	**2016**	**2017**	**2018**
	$717	$681	$681	$681	$681

Product	Long-term price	Statistical fit model
Gold	$681	Normal (μ=681, σ=55.80)

Savings from protection costs

- Interviews with Iwokrama, an international rainforest conservancy, indicate that under optimal circumstances, they would require US$2 per hectare for protection of their wildlife preserve. Iwokrama is an internationally recognized conservation research concession offered to the world by Guyana as an area to study sustainable forest management and ecosystem services.
- The US$2 is conservative compared to the cost of administration of payment for ecosystem services schemes in other countries, ranging from US$4 to $9 according to Grieg-Gran for the Eliasch Review (2008).

Loss of local ecosystem services

- Flood risk is estimated based on analysis conducted by Bradshaw, et. al. (2007) based on a review of catastrophic floods around the world. They find that a 10 percent decrease in forest cover results in a 3.5 to 28 percent increase in flood frequency when controlling for steepness and precipitation.
- For Guyana, Bradshaw indicates that two major floods occurred between 1990 and 2000, implying a 20 percent baseline probability of flooding in any given year.
- We assume an average relationship of 15.8 percent increase in flood frequency for every 10 percent decline in forest cover.
- A study by the United Nations Economic Commission for Latin America and the Caribbean indicated in 2005 that a catastrophic flood destroyed much of the coastal area near Georgetown, resulting in a loss of US$452 million, or 60 percent of Guyana's GDP.
- We assume this economic damage keeps pace with inflation as the potential damage from a catastrophic flood.

Data sources used in modeling assumptions

Soil quality and crop feasibility:

- Soil quality data and crop feasibility assumptions from Guyana Lands and Surveys Commission using FAO classifications.

Timber value:

- Historical export prices for raw logs, sawnwood, roundwood piles, and plywood from FAOSTAT World Export Prices
- Domestic prices for raw logs, sawnwood, roundwood piles, and plywood from Guyana Forestry Commission submission to ITTO

Post-harvest alternative land use:

- Historical export prices for rice, coffee, fruits and vegetables, cocoa, palm oil from FAOSTAT World Export Prices
- Historical yield levels for Guyanese products from FAOSTAT Production database and non-Guyanese products from Brazil Agrianual 2007.

Appendix III: Forest valuation studies using 10 percent discount rate

Bann, C. 1997. An Economic Analysis of Tropical Forest Land Use Options: Ratanakiri Province, Cambodia. Singapore: Economy and Environment Program for Southeast Asia.

Grieg-Gran, M. 2008. The Cost of Avoiding Deforestation. London: International Institute for Environment and Development *(work basis of 10 percent discount rate cited in Stern Report and Eliasch Review)*

Godoy, R. and Lubowski, R. 1992. Guidelines For The Economic Valuation Of Non-Timber Tropical-Forest Products, Current Anthropology, 33(4), August-October, 423-433.

Howard, A.F, and Valerio, J. 1996. Financial Returns From Sustainable Forest Management And Selected Agricultural Land-Use Options In Costa Rica, Forest Ecology and Management, 81, 35-49

Kremen, C., Niles, J., Dalton, M., Gaily, G., Ehrlich, P., Fay, J., Grewal, D and Guillery, R. 2000. Economic Incentives for Rain Forest Conservation Across Scales, Science, 288, 1828-1832

Pearce, D.W. 1994. Assessing the Social Rate of Return from Investment in Temperate Zone Forestry, in R.Layard and S.Glaister (eds), Cost-Benefit Analysis, Second edition, Cambridge: Cambridge University Press, 464-490

Simpson, D., Sedjo, R. and Reid, J. 1996. Valuing Biodiversity for Use in Pharmaceutical Research. Journal of Political Economy 104 (1), pp. 163-185

Wunder, S. 2000. The Economics of Deforestation: the Examples of Ecuador, London: Macmillan

Yaron, G. 2001. Forest, Plantation Crops or Small-Scale Agriculture? An Economic Analysis of Alternative Land Use Options in the Mount Cameroun Area, Journal of Environmental Planning and Management, 44 (1), 85-108