EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Key Issues in Designing Mechanisms for Reducing Emissions from Deforestation and Degradation[1]

Background Paper for the EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #5

May 2009

I. Background

This paper has been prepared for a workshop to be held by the Electric Power Research Institute (EPRI) on May 13, 2009 in Washington D.C. It is the fifth in a series of workshops sponsored by EPRI in 2008 and 2009 on the subject of greenhouse gas (GHG) emissions offsets.

The purpose of this paper is to provide background for workshop discussions on topics relating to Reducing Emissions from Deforestation and Degradation (REDD), and efforts to develop policies and mechanisms to address deforestation and degradation in developing countries, including programs through which GHG emission offset credits may be generated from REDD activities at the project, sub-national or national level.

Topics addressed in this background paper include:

- Definition of REDD
- The key role of REDD in mitigating climate change, and the potential role and scale of REDD-based GHG offsets;
- Evolution of REDD discussions at international level, and potential structures for delivering REDD funding;
- Emerging policy proposals on REDD in the U.S.;
- Key technical issues
    - Developing world capacity-building needs, governance, institutions and policies;
    - Baselines;
    - National versus sub-national approaches;
    - Leakage;
    - Permanence;
    - Monitoring, measurement and verification;
    - Role of indigenous people and national government; and
- Lessons learned from existing REDD projects.

II. Definition of REDD

REDD refers to "Reducing Emissions from Deforestation and (forest) Degradation." Deforestation is the conversion of forest land to another land use, such that there is a long-term reduction of forest cover to below a 10% canopy cover threshold.[2] The main cause of human-

[1] Prepared by Robert Youngman of Natsource Advisory and Research Services with contributions by Adam Diamant of the Electric Power Research Institute.

[2] Definitions for this and other terms related to REDD are provided in the Glossary in Appendix B.

induced deforestation is the felling of trees to convert forests to alternative land uses (mainly to agriculture, cattle ranching and settlements), but it can also occur through "repeated burning, clearance of land for open-pit mining, urban sprawl or road building."[3] Forest degradation refers to:

> "…changes within the forest which negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or services… [It] takes the form of large canopy gaps, fragmentation, active fire, and burned area, [and] is often caused by selective logging operations, which do usually not reduce canopy cover to as great an extent as full land conversion."[4]

REDD falls under the broader accounting category of Land Use, Land Use Change and Forestry (LULUCF). Under the UN Framework Convention on Climate Change (UNFCCC), countries must provide inventories of net carbon stock changes and anthropogenic GHG emissions by sources and removals by sinks[5] in the LULUCF sector. Land-use categories include forest land, cropland, grassland, wetlands, settlements and other land.[6, 7, 8]

No offset crediting mechanism currently exists for REDD in *developing countries* under the Kyoto Protocol (KP). (In *developed countries*, deforestation is accounted for under the KP through the measurement of net changes in emissions from LULUCF activities.[9]) The KP's Clean Development Mechanism (CDM) currently allows for two types of LULUCF projects to implement emission reductions that may be eligible to receive offset credits. These are *afforestation* – the planting of new forests on lands that historically have not contained forests –

---

[3] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 2, Synthesis of submissions by accredited observers, Working paper No. 1 (e) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, pp. 3, 4 and 7 (definitions by CIFOR and FAO), http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_igosngos.pdf

[4] Ibid.

[5] Any process, activity or mechanism which removes a greenhouse gas from the atmosphere. http://unfccc.int/methods_and_science/lulucf/items/1084.php

[6] http://unfccc.int/methods_and_science/lulucf/items/4127.php

[7] See additional discussion on LULUCF under the Kyoto Protocol in Section IV.1.

[8] LULUCF, in turn, is similar to a slightly more comprehensive category known as Agriculture, Forestry and Other Land Use (AFOLU). The AFOLU category is incorporated in the Intergovernmental Panel on Climate Change's 2006 Guidelines for National Greenhouse Gas Inventories. It is essentially the same as LULUCF as defined in the IPCC Good Practices Guidance for LULUCF, but integrates the previously separate categories of agriculture and LULUCF (see presentation at http://www.ipcc-nggip.iges.or.jp/presentation/LULUCF-AFOLU.pdf). IPCC notes that "This integration recognizes that the processes underlying greenhouse gas emissions and removals, as well as the different forms of terrestrial carbon stocks, can occur across all types of land. It recognizes that land-use changes can involve all types of land. This approach is intended to improve consistency and completeness in the estimation and reporting of greenhouse gas emissions and removals." http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_01_Ch1_Introduction.pdf

[9] Under Article 3.3, "net changes in GHG emissions by sources and removals by sinks through direct human-induced LULUCF activities, limited to *afforestation*, *reforestation* and *deforestation* that occurred since 1990, can be used to meet Parties' emission reduction commitments. Under Article 3.4 of the Kyoto Protocol, Parties may elect additional human-induced activities related to LULUCF specifically, forest management, cropland management, grazing land management and revegetation, to be included in their accounting of anthropogenic GHG emissions and removals for the first commitment period… When LULUCF activities under Articles 3.3 and 3.4 result in a net removal of GHGs, an Annex I Party can issue removal units (RMUs) on the basis of these activities as part of meeting its commitment under Article 3.1." http://unfccc.int/methods_and_science/lulucf/items/4129.php,

and *reforestation* – the replanting of forests on lands that have previously contained forests but that have been converted to some other use. In addition, Joint Implementation (JI) allows for Annex I Parties (i.e., countries that have taken on binding emission reduction targets under the Protocol) to implement projects that increase removals by sinks in another Annex B country.

The scope of REDD is still a topic of debate in international negotiations. Variations on REDD include RED (reduction of emissions from deforestation (only)), REDD (deforestation and degradation), and REDD+ (REDD plus conservation, sustainable management of forests and enhancement of carbon stocks).[10]

Proponents of including degradation in a REDD mechanism note that this would extend participation to countries with low deforestation rates, address the conversion of primary forest to secondary forest or plantations, and help avoid any perverse incentive to allow forests to degrade to just above the deforestation threshold.[11] Other proponents point to studies showing that "the effects of selective logging may be twice as high as reported in earlier studies and have to a certain extent resulted in deforestation after a given period of time."[12] In light of repeated references to "reducing emissions from deforestation and degradation" in the Bali Action Plan – a document by Parties to the UNFCCC describing goals for international climate negotiations in December 2009 – it appears that countries will attempt to address degradation in a REDD mechanism, despite challenges in measuring emissions from degradation.[13]

Perhaps more controversial is the question of whether to include conservation in a REDD mechanism. Countries with historically low rates of deforestation and that have taken actions to maintain or increase their forest stocks (i.e., conservation actions) hope to receive recognition for their efforts. They also hope to avoid being punished for their efforts – which could occur if deforestation baselines consider only historical deforestation levels – and to avoid creating a perverse incentive for countries to abandon conservation efforts.[14] To address this problem,

---

[10] Global Canopy Programme, "The Little REDD Book," December 2008, p. 16, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.

[11] Subsidiary Body for Scientific and Technological Advice, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 14, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[12] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 2, Synthesis of submissions by accredited observers, Working paper No. 1 (e) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 4, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_igosngos.pdf

[13] Bali Action Plan, Decision CP.13, http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3. At a workshop on REDD, "some participants cautioned that estimating and verifying emissions from forest degradation is complex and presents many challenges, for example, in terms of definitions, methodologies and monitoring, and in estimating historical reference rates." Subsidiary Body for Scientific and Technological Advice, Twenty-sixth session Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, note by the secretariat, p. 14, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[14] Subsidiary Body for Scientific and Technological Advice, Twenty-sixth session Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, note by the secretariat, p. 14, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

options include adjusting baselines to take conservation efforts into account, and/or using revenues from the auctioning of developed countries Assigned Amount Units (AAUs) to support conservation activities.[15] (These issues are discussed in more detail in Section VI.B. on baselines.) Based on one assessment in December 2008, the vast majority of stakeholders and countries support limiting REDD to deforestation and degradation in view of the greater political feasibility of a more limited scope.[16]

III. The Key Role of REDD in Mitigating Climate Change, and the Potential Role and Scale of REDD-Based GHG Offsets

To date, international climate agreements primarily have focused on achieving reductions in developed country emissions from sources of greenhouse gas emissions – and particularly sources of CO_2 emissions from fossil fuel combustion. However, LULUCF accounts for such a significant share of global emissions that policy-makers recognize it needs to be put on an equal footing with such sectors as the electric power sector.

The primary source of the increased atmospheric concentration of CO_2 since the pre-industrial period results from fossil fuel use, with land-use change providing another significant but smaller contribution.[17] About 80% of anthropogenic CO_2 emissions during the 1990s resulted from fossil fuel burning, with about 20% from land use change (primarily deforestation).[18]

Average annual fossil fuel CO_2 emissions over the period 2000-2005 were 26.4$GtCO_2$,[19]of which approximately 30% can be attributed to electric power generation.[20] Average annual LULUCF emissions, estimated at 5.8 $GtCO_2$, are equivalent to nearly 20% of annual fossil fuel CO_2 emissions.[21]

Within the LULUCF category, deforestation is the primary contributor to global CO_2 emissions, although other changes in land use and management such as biomass burning, crop production and conversion of grasslands to croplands also contribute to global CO_2 emissions. Roughly one-quarter to one-third of cumulative CO_2 emissions since 1850 has been caused by

---

[15] Ibid.

[16] Global Canopy Programme, "The Little REDD Book," December 2008, pp. 68-70, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.

[17] Intergovernmental Panel on Climate Change (IPCC), Working Group 1, Summary for Policymakers, August 30, 2007, p.2., http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_SPM.pdf .

[18] Intergovernmental Panel on Climate Change (IPCC), Working Group 1 contribution to Assessment Report 4: The Physical Science Basis of Climate Change, August 30, 2007, Chapter 7, pp. 511, 513, http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch07.pdf

[19] In 2005, global total CO_2 emissions were estimated to be 29.3 $GtCO_2$, of which 1.17 GtCO2 were attributable to cement (See Marland, G. et al. (2008). Global, Regional, and National Fossil Fuel CO2 Emissions. In Trends: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., USA.).

[20] Using energy balance data from the International Energy Agency (IEA), EPRI has estimated that 9.6 GT CO_2 (33%) of total 2005 global CO_2 emission was attributable to global electric power generation.

[21] Op. cit., Working Group 1 contribution to Assessment Report 4: The Physical Science Basis of Climate Change ., p. 516. Land use change flux (emissions from land use change) accounted for an estimated 1.6 GtC in the 1990s (or 5.8 Gt CO_2). This is equivalent to 18% of annual fossil fuel and cement emissions in 2000-05 (7.2 ± 0.3 GtC) or 20% of annual fossil fuel and cement emissions in the 1990s (6.4 ± 0.4 GtC).

deforestation.[22] The UN Food and Agriculture Organization (FAO) estimates global deforestation at 13 million hectares per year in 1990-2005.[23] One of the largest contributors is deforestation in the Amazon. Brazil accounted for nearly half of global deforestation in humid tropical forests in 2000-05, while Amazonian deforestation accounted for approximately 60% of the total.[24]

When CO_2 emissions from LULUCF are taken into account, a number of developing countries join the group of the largest emitters in the world, as shown in Figure 1. In 2000, Indonesia (which accounted for 7.43% of the global total) was the third-largest-emitting country in the world, after the U.S at 15.81% and China at 11.85%.[25] Brazil was the fourth-largest, at 5.39% of the total. Following the Russian Federation in the fifth position, India was the sixth-largest, at 4.47%. Malaysia was in tenth position, at 2.10%.

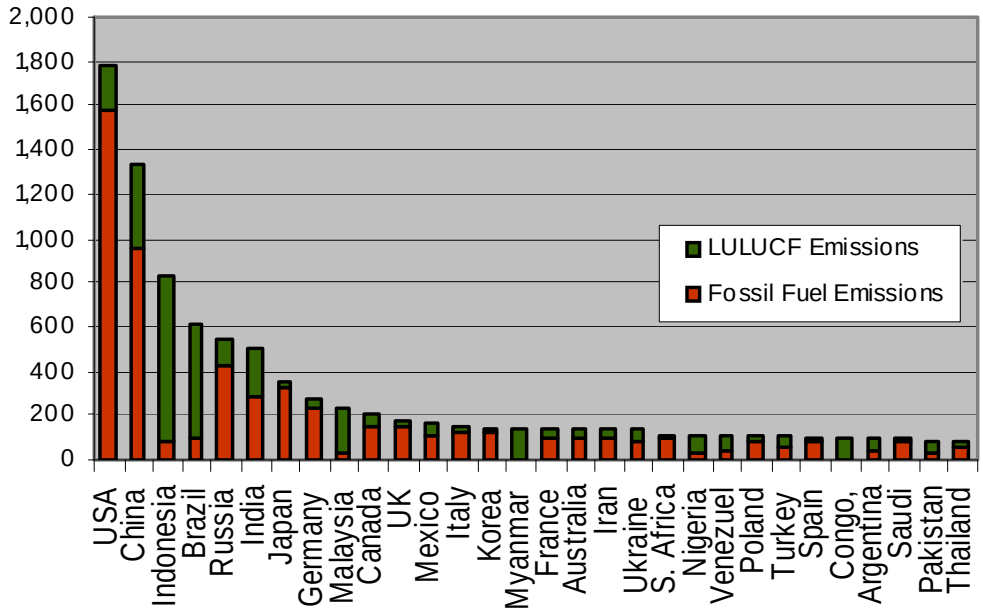

Figure 1. Carbon Emissions of Top 30 Countries in 2000 (million metric tons Carbon)
Source: Environmental Defense Fund.

[22] Houghton, R.A. (2008). "Carbon Flux to the Atmosphere from Land-Use Changes: 1850-2005." In TRENDS: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A, http://cdiac.ornl.gov/trends/landuse/houghton/houghton.html.
[23] FAO, Global Forests Resource Assessment 2005, p. xii, http://www.fao.org/forestry/41555/en/
[24] Hansen et al., 2008, "Humid tropical forest clearing from 2000 to 2005 quantified by using multitemporal and multiresolution remotely sensed data," Proceedings of the National Academy of Sciences, 105, pp. 9439 – 9444, http://www.pnas.org/content/early/2008/06/27/0804042105.full.pdf+html
[25] Data sourced by the Environmental Defense Fund from the World Resource Institute's Climate Analysis Indicators Tool (CAIT), http://cait.wri.org. If the EU-25 were treated as a single country, it would be the third largest emitter after the U.S. and China, with 11.40% of the total.

A. Potential Role and Scale of REDD-based GHG Offsets

REDD is viewed by many experts as being critically important not only for meeting long-term climate objectives, but for obtaining significant volumes of cost-effective emission reductions in the short term. One study estimates that reducing deforestation by 50% would cost approximately $15 billion per year and would yield 2 Gigatons (Gt) CO_2 per year, or 11% of base year emissions for Annex B Parties.[26] In comparison, estimates of the *cumulative* volume of Certified Emissions Reductions (CERs) to be issued by the CDM Executive Board from 2005 (when the first CER was issued) through 2012 are currently in the area of 1.5 Gt.

The European Commission provides a similar annual cost estimate to reduce deforestation by 50% in 2020 – €18 billion (2005 prices) – but only if leakage can be limited to a regional scale. However, if leakage is global, thereby requiring compensation "…for continued conservation of all standing carbon stocks globally," the Commission's estimate balloons to €184 billion per year.[27] At the country level, McKinsey and Company recently estimated Guyana's "economic value to the nation [EVN] generated by pursuing deforestation and profitable after-harvest activities (farming, ranching, mining)" at $5.8 billion in present value terms, or $518 million per year at a discount rate of 10%. This is considered to be the minimum amount that a REDD mechanism could provide in order to compensate for opportunity costs in Guyana.[28]

IV. Evolution of REDD Discussions at International Level, and Potential Structures for Delivering REDD Funding

REDD was first introduced into KP policy discussions at the 11th Conference of Parties in December 2005.[29] Since then, several UNFCCC workshops, expert meetings and discussions at meetings of the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA) have been held on a wide range of REDD issues. An important milestone for REDD was reached at the 13th Conference of Parties (COP) to the UNFCCC at Bali in December 2007. In the Bali Action Plan, the Parties decided to work toward an agreement at COP-15 in Copenhagen in December 2009 which would consider

> "[p]olicy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and

[26] Kinderman, Obersteiner, Sohngen, Sathaye, Andrasko, Rametsteiner, et al. (2008). Global cost estimates of reducing carbon emissions through avoided deforestation. Cited in "Linkage between forest-based mitigation and GHG markets," Cyril Loisel, Institut du Developpement Durable et des Relations Internationales (Iddri), N° 19/2008. Loisel views Kindermann et al.'s estimate as the consensus estimate among experts on opportunity costs of avoiding deforestation.

[27] Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Towards a comprehensive climate change agreement in Copenhagen, *Extensive background information and analysis, PART 1*, Brussels, 28.1.2009, SEC(2009) 101, p. 82.

[28] "Saving the World's Forests Today: Creating Incentives for Avoiding Deforestation," Office of the President, Republic of Guyana, December 2008, pp. 3, 16, http://www.redd-monitor.org/wordpress/wp-content/uploads/2009/02/guyana_mckinsey_report.pdf

[29] UNFCCC Background on REDD, http://unfccc.int/methods_and_science/lulucf/items/4123.php

the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries."[30]

Since Bali, discussions and negotiations on REDD issues have focused on methodological issues relating to baselines, monitoring, verification and reporting (MV&R), and the scope of activities to be addressed; needs for institutional and technical capacity building in the development of national and sub-national monitoring and reporting systems, and in methodologies for forest inventories; and various other issues.[31] Section VI of this paper addresses a number of these critical issues and related policy debates in the international context.

The emergence of REDD as an issue for international negotiations has grown out of previous policy approaches within the UNFCCC to measure emissions from land use change and to create incentives to increase LULUCF sinks. Current debates on REDD also are informed by the European Union's (EU) positions of the use of CERs from afforestation and reforestation projects in the EU Emissions Trading Scheme (EU ETS), and its position on future REDD financing approaches. In particular, the EU's support for a non-market-based approach for funding REDD prior to 2020 can serve as an introduction to the broader debate on market- versus non-market-based approaches for REDD, as discussed below.

A. Predecessor to REDD in Developing Countries: Afforestation and Reforestation in the CDM

Developed countries already take their LULUCF emissions and sinks (including from deforestation) into account in national inventories and targets. However, the European Commission has expressed the view that accounting rules for LULUCF activities in developing countries – including deforestation and forest management – need to be revised to provide greater consistency and comprehensiveness of coverage.[32] In contrast, deforestation and REDD in developing countries are relatively new topics in international climate policy discussions and negotiations.

While discussions on potential approaches to, and inclusion of, REDD in an international agreement are fairly new, there is a precedent for crediting forest-related activities in developing

[30] Bali Action Plan, Decision 1/CP.13, FCCC/CP/2007/6/Add.1, 14 March 2008, p. 3, http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3.

[31] Details on these international meetings and discussions on REDD are provided at these UNFCCC websites: http://unfccc.int/methods_and_science/lulucf/items/4123.php, and http://unfccc.int/methods_science/redd/items/4615.php

[32] For example, the European Commission points out that reporting emissions from sources and removals from sinks for afforestation, reforestation and deforestation is mandatory, while there is an opt-in policy for forest management, revegetation, cropland management and grazing land management. Emissions and sinks for different activities are measured and reported based on different approaches. A "gross-net" accounting approach is used for forest-related activities (i.e., only the total carbon flux – emissions and removals – for the first Kyoto commitment period is reported) and a "net-net" approach is used for cropland and grazing land management (i.e., the carbon flux for the period is subtracted from the carbon flux for the base year). In addition, a limit on crediting for net removals from forest management activities in developed countries was imposed during the first commitment period, thereby limiting incentives to undertake such activities. (Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Towards a comprehensive climate change agreement in Copenhagen, *Extensive background information and analysis, PART 1, B*russels, 28.1.2009, SEC(2009) 101, pp. 28-29.)

countries. As noted above, afforestation and reforestation (A/R) projects are eligible to generate offset credits under the CDM. They may be used for compliance with KP targets up to a cumulative limit (in 2008-12) of 5% of developed countries' 1990 emissions. However, interest in these projects has been limited to date. Only 0.4% of emission reductions (through 2012) from all projects in the CDM pipeline are estimated to come from A/R projects.[33] In addition, only 3 afforestation or reforestation projects have been registered with the CDM Executive Board to date, out of a total of 1,591 registered projects.[34]

The relative lack of interest in CDM A/R offsets for KP compliance buyers (which is also manifested in discounted prices) can be attributed to the EU's decision not to allow the use of A/R offsets for compliance (see next section) and the temporary crediting approach adopted for these projects.[35] Under this approach, project participants may choose to be issued tCERs (temporary Certified Emissions Reductions) or lCERs (long-term CERs). Temporary CERs expire at the end of the commitment period in which they were issued, and lCERs expire at the end of the crediting period for the project. When retired tCERs and lCERs expire, they must be replaced by other KP compliance units.

Temporary credits can be used to meet compliance requirements cost-effectively, but only if future offset prices are expected to increase slower than the discount rate.[36] In practice, buyers may simply prefer to avoid having to replace a temporary credit, or may not wish to take the risk that the cost of replacing a credit will be higher than expected, in light of price volatility and significant uncertainties regarding future offset prices.

B. EU Positions on A/R Projects and REDD

The EU ETS has been the largest source of demand for CERs during the first commitment period (2008-2012) of the KP. Importantly, however, the EU decided not to allow the use of tCERs or lCERs from LULUCF projects (i.e., A/R projects) during Phase 1 (2005-07) or Phase 2 (2008-12) of the EU ETS. In its "Linking Directive," the EU alluded to concerns with A/R projects regarding "non-permanence, additionality, leakage, uncertainties and socioeconomic and environmental impacts, including impacts on biodiversity and natural ecosystems."[37]

For Phase 3 (2013-20), the EU has decided that if no international climate agreement is reached, it will continue to disallow the use of CERs from A/R projects in the EU ETS.[38] While EU ETS

[33] Based on UNEP's Risoe CDM/JI Pipeline Analysis and Database, updated March 1, 2009, http://cdmpipeline.org/
[34] http://cdm.unfccc.int/Statistics/index.html, http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html
[35] Information in this paragraph derived from "CDM Rulebook" entries for tCERs and lCERs, Baker & McKenzie, http://cdmrulebook.org/PageId/332
[36] See discussion in Section IV.A.2 (p. 12) of Key Design Issues Relating to Greenhouse Gas Abatement and Sequestration Projects in Agriculture and Forestry, Background Paper for the EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #4, February 2009
[37] Official Journal of the European Union, Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, November 13, 2004, p.2, p. 4, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:338:0018:0023:EN:PDF
[38] Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, March 26, 2009, pp. 54-55 (Article 11a),

installations will not be able to use CERs from A/R projects in the 2013-20 period, EU governments will be permitted to use tCERs or lCERs, provided that Member States commit to replacing these temporary credits before their expiry with permanent reductions.[39]

On the specific topic of REDD in a post-2012 agreement, the Commission has stated that the EU should not allow for recognition of forestry credits (i.e.,, credits for avoided deforestation in developing countries) until after 2020, and only if several concerns are addressed. These include the potential for REDD credits to flood the EU ETS market; monitoring, verification and reporting issues; and liability for ensuring the environmental integrity of REDD credits purchased by a company if the company goes out of business.[40]

Despite the Commission's opposition to a market-based approach for supporting REDD, it nevertheless supports a goal of reducing global deforestation by at least 50% compared to current levels, and halting global forest cover loss by 2030.[41] To contribute to meeting this goal, the Commission proposes that the EU create a Global Climate Financing Mechanism (GCFM). The GCFM would raise a target amount of €1 billion per year over 2010-14 by issuing bonds, and would be intended to provide funding in the immediate term for priority climate-related actions including reducing emissions from deforestation.[42] The GCFM would provide funding for capacity-building, and would also serve as a pilot program for REDD in countries that ratify the post-2012 international climate agreement and commit to reduce emissions from deforestation. Financial support for actions to reduce deforestation would be based on performance against agreed deforestation baselines, and results would be verified.[43] The Commission states that in order for funding to be effective, financial and technical assistance would first need to be provided for capacity-building and strengthening institutions, and technical issues such as monitoring and verification would need to be resolved.[44]

The Commission also notes that in the future, the EU could provide financial support for avoided deforestation by using a portion of EU allowance (EUA) auctioning proceeds. If 5% of auction revenue were used for this purpose, the Commission estimates a resulting funding level of €1.5-€2.5 billion for avoided deforestation in 2020. This funding would reward developing countries based on performance.

---

http://register.consilium.europa.eu/pdf/en/08/st03/st03737.en08.pdf

[39] Decision of the European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, p. 22, http://register.consilium.europa.eu/pdf/en/08/st03/st03738.en08.pdf

[40] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss, p. 10, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0645:FIN:EN:PDF

[41] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Towards a comprehensive climate change agreement in Copenhagen, http://ec.europa.eu/environment/climat/pdf/future_action/communication.pdf, p. 6.

[42] Ibid., p. 11 and Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss, p. 11, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0645:FIN:EN:PDF

[43] Ibid., p. 11.

[44] Ibid., p. 9.

In addition to this fund-based approach, the Commission proposes "testing the inclusion of deforestation in carbon markets" in the post-2012 period by first testing the use of deforestation credits for government compliance. If an international agreement is adopted that leads to mandatory reductions of 20% below 1990 levels, the European Commission will consider "afforestation, reforestation, avoided deforestation and forest degradation in third countries in the event of the establishment of any internationally recognised system in this context."[45] In order for EU governments to be able to use of deforestation credits, there must be sufficiently stringent targets in an international agreement to ensure an appropriate supply-demand balance, and issues relating to permanence, liability, and leakage must be resolved.[46]

C. Current International Discussions on Structure of a Post-2012 REDD Mechanism

The structure of a potential REDD mechanism for the post-2012 period has been a key topic of debate in preparation for the Copenhagen climate negotiations in December 2009. Two broad options that have been discussed are financial resources to help reduce emissions from deforestation and degradation (i.e., non-market-based approaches), and market-based approaches.

At a UNFCCC meeting on REDD, the following non-market-based approaches were identified:

1. "Overseas development assistance;
2. Voluntary contributions from governments and NGOs;
3. Private sector sponsorship/donations;
4. Potential new and additional financial resources under the UN Framework Convention;
5. Funds created under the Convention and its Kyoto Protocol (e.g., the Special Climate Change Fund, the Adaptation Fund) and the Trust Fund of the Global Environment Facility (GEF);
6. Taxes on carbon-intensive commodities and services."[47]

Under these non-market-based approaches, financing REDD-related activities would not result in credits that could be used for compliance with emission reduction requirements under a post-Kyoto climate framework.

The market-based approaches identified at the meeting included the following:

1. "Trading of carbon credits;
2. Project-based, programmatic and/or sectoral CDM;

[45] Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, March 26, 2009, pp. 71-72, (Article 28, paragraphs 1 and 1f), http://register.consilium.europa.eu/pdf/en/08/st03/st03737.en08.pdf

[46] Op. cit., "Communication of the Commission, Addressing the challenges of deforestation…", p. 11.

[47] UNFCCC, Subsidiary Body for Scientific and Technological Advice, FCCC/SBSTA/2009/3, 17 April 2007, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 15, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

3. Barter transaction (similar to existing market approaches but credits could be paid by using currency other than money, e.g., debt cancellation, trading opportunities, employment, etc.);
4. Payment for ecosystem services; [and]
5. Levies on emission reductions units issued or assigned amounts units first traded on the carbon market."

Another summary of REDD financing options further distinguishes between "market-based" approaches and "hybrid/market-linked approaches."[48] In a market-based approach, REDD credits would be fungible with CERs and/or such instruments as sector-based credits, and usable for compliance. Options 1 and 2 from the list above likely would fall into this definition of market-based approach. Option 4 also would qualify as a market-based approach, although a payment for ecosystem services approach necessarily would entail changes to the carbon market and perhaps new policy drivers to accommodate and incentivize the creation of differentiated commodities that include non-carbon ecosystem benefits. The "compensated reductions" approach, which was proposed by the Environmental Defense Fund (EDF) and the Amazon Institute for Environmental Research (IPAM), was one of the earlier market-based proposals. Under this approach, tropical countries that voluntarily participate in a national program to reduce deforestation emissions would adopt targets derived from average annual historical deforestation rates (based on satellite imagery) over an agreed period. They also would agree to stabilize, or to further reduce, deforestation in subsequent commitment periods. After demonstrating that emission reductions below the target have been achieved during a commitment period, countries would be authorized to issue tradable carbon credits. The baseline would be revised downward over time. Lastly, the validity of banked credits in subsequent periods could be subject to limits under this approach.[49]

Under a "hybrid/market-linked approach," the funding mechanism is linked to the carbon market, but does not involve the creation of credits that are fungible with CERs and sector-based credits. One example of such an approach is Norway's proposal for imposing a 2% levy on Assigned Amount Units (which are national emissions "rights" under the Kyoto Protocol comparable to allowances in a national cap-and-trade program) in a post-2012 international climate regime) to fund REDD activities. Another example is a proposal by the NGO network Climate Action Network to auction all or part of developed country AAUs to fund REDD activities.[50]

The Center for Clean Air Policy's (CCAP) "dual market approach" also qualifies as a hybrid approach. Industrialized countries would commit a portion of their target to come from REDD activities in developing countries (e.g., the EU would meet 5% of its 20% below 1990 target through investments in REDD activities).[51] CCAP notes that this approach would avoid the disruption of the Kyoto market that could result from the introduction of very large volumes of

[48] Global Canopy Programme, "The Little REDD Book," December 2008, p. 21, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.
[49] "Creating GHG Emission Offsets from Avoided Deforestation in the Amazon's Xingu River Basin," webcast, presentation by A. Diamant, EPRI and Dr. S. Schwartzman, EDF, August 15, 2008.
[50] Ibid., p. 52.
[51] N. Helme et al, "A New Framework for Reducing Deforestation in Developing Countries: The Dual Markets Approach," Center for Clean Air Policy, presentation at Bali, December 2007.

lower-cost REDD credits, give the market and policy time to develop, and establish a minimum amount of demand for REDD. Following an initial period, the linking of markets could be considered.

Yet another proposal calls for AAUs to be issued to countries based on the carbon stock stored in forests in the baseline year, and creating a cap and trade program. Similar approaches were previously proposed by supported by Bolivia, Costa Rica, Nicaragua and Papua New Guinea, and by the Center for International Sustainable Development Law (CISDL).[52]

1. Examples of current non-market funding sources for REDD

The EU's proposal for a Global Climate Financing Mechanism, and the European Commission's separate proposal to use EUA auction revenues to fund avoided deforestation, qualify as non-market-based approaches. A number of other initiatives also fall within this category, and include but are not limited to the funds and programs briefly summarized below.

- **Prince's Rainforest Project**: This project is a charity established by the Prince of Wales to work with governments, business, NGOs and individuals to increase global recognition of the contribution of tropical deforestation to climate change,"[53] and to call for and help support "a properly funded and effectively coordinated emergency package that prevents the further degradation and disappearance of the tropical rainforests."[54] Funding – which is targeted to be billions of pounds – could be raised through "rainforest bonds" offered by an international agency with competitive rates to pension funds and other investors.[55] World leaders at the G-20 meeting in April 2009 agreed to "try to set up the means of raising the emergency funding."

- **Amazon Protection Fund**: Brazil's President Luiz Inacio Lula da Silva and Brazil's state-run development bank established an international donation fund to help protect the Amazon's rainforests in August 2008. Norway – the first country to make a pledge – will donate a total of $1 billion to the fund, starting with $130 million in 2009. The fund seeks to raise $21 billion. In order to receive funds, Brazil must demonstrate a reduction in deforestation levels each year. As required by Brazil, donations to the fund will not generate offset credits.[56] In connection with its requests for funding, Brazil announced

[52] Global Canopy Programme, "The Little REDD Book," December 2008, p. 21, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf ; UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 1, Synthesis of submissions by Parties on issues relating to reducing emissions from deforestation in developing countries, Working paper No. 1 (d) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy , p. 26, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_submissions_complete_cj_250806_10.30.pdf

[53] http://www.princesrainforestsproject.org/what-the-projects-doing

[54] http://www.princesrainforestsproject.org/what-the-projects-doing/declaration

[55] Telegraph, "G-20 summit: Leaders agree to look at Prince Charles's multi-billion plan to save rainforests," April 2, 2009, http://www.telegraph.co.uk/earth/earthnews/5090782/G20-summit-leaders-agree-to-look-at-Prince-Charless-multi-billion-plan-to-save-rainforests.html

[56] Reuters, "Norway pledges $1 billion to Brazil Amazon Fund," September 16, 2008, http://www.reuters.com/article/environmentNews/idUSN1649421720080916; Reuters, "Brazil to set up Amazon protection fund," May 28, 2008, http://www.reuters.com/article/environmentNews/idUSN2843680720080528,

that it would reduce deforestation rates by 70% over the next ten years.[57]

- **UN-REDD Programme Fund**: The UN Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme) is a collaboration between the Food and Agriculture Organization, the UN Development Programme and the UN Environment Programme. The program was established in July 2008 to develop a functioning international REDD finance mechanism. Areas of support include capacity support for national reporting on forest GHG emissions, for developing REDD monitoring strategies, and for forest resource assessments; development of a national REDD strategy; and other capacity-building measures to prepare countries to participate in REDD. Norway has contributed $52 million to the fund.[58]

- **World Bank Forest Carbon Partnership Facility (FCPF) and Forest Investment Program**: The FCPF was launched in December 2007 and has two components – the Readiness Fund and the Carbon Fund. The Readiness Fund, which has a target size of $100 million, provides "grants to help countries set up systems and processes to monitor and credibly govern their forests." Some of the countries receiving funds will be able to sell emission reductions to a Carbon Fund targeted at $200 million as well as the private sector and organizations. The Facility expects to have a high degree of consultation with civil society and indigenous peoples' organizations to ensure they are involved in the design of national REDD strategies.[59] As of March 13, 2009, 39 developing countries had been selected for participation, and 11 donor countries had contributed $107 million for the Readiness Fund and $51 million for the Carbon Fund.[60] The Bank has also proposed a Forest Investment Program (FIP), which may still be in the design phase, and which aims to complement existing efforts, such as the Bank's FCPF and the UN-REDD Programme, which are targeted mainly at building capacity for REDD.[61] The FIP may seek to address a gap in existing funding flows for REDD – providing adequate "upfront investment to achieve carbon emission reduction outcomes which would form the basis for carbon payments."[62]

In addition to these sources of funding, REDD activities are currently being supported by voluntary carbon markets. Avoided deforestation projects accounted for an estimated 28% of voluntary market transactions in the biological sequestration category in 2007, and accounted for approximately 5% (2 million tonnes) of voluntary credits transacted in the over-the-counter

---

Bloomberg, "Brazil creates $21 billion fund to slow Amazon deforestation," August 1, 2008, http://www.bloomberg.com/apps/news?pid=20601086&sid=ahDbiZfuCxZI&refer=latin_america

[57] BBC News, "70% deforestation cuts for Brazil," December 2, 2008, http://news.bbc.co.uk/2/hi/science/nature/7759192.stm

[58] http://www.undp.org/mdtf/UN-REDD/overview.shtml, http://www.undp.org/mdtf/UN-REDD/assistance_strategy.shtml, http://www.undp.org/mdtf/UN-REDD/pledges_commitments_deposits.shtml

[59] http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21581819~pagePK:64257043~piPK:437376~theSitePK:4607,00.html

[60] http://unfccc.int/methods_science/redd/demonstration_activities/items/4536.php

[61] http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCC/0,,contentMDK:22106056~menuPK:5924904~pagePK:210058~piPK:210062~theSitePK:407864,00.html#FIP_Design_Meetings, http://siteresources.worldbank.org/INTCC/Resources/AWFIPComplementaritywithFCPFInf3.pdf

[62] http://siteresources.worldbank.org/INTCC/Resources/AWFIPComplementaritywithFCPFInf3.pdf

market (non-Chicago Climate Exchange transactions).[63] In addition, Merrill Lynch announced a plan in 2008 to invest $9 million in a REDD project in Aceh, Indonesia.[64] Volumes of REDD reductions purchased in voluntary markets could expand significantly as other funding sources provide the capacity building needed to prepare countries to deliver REDD reductions.

2. Positions on market versus non-market-based approaches for REDD

A number of arguments have been made in favor of and against market-based approaches to REDD. Supporters of a market-based approach believe that it would provide the scale of financing needed to address deforestation, and would be more sustainable than voluntary sources of funding because it would not compete with other government funding priorities. It also provides the benefit of engaging the private sector and spurring the creation of robust carbon accounting systems.[65]

In the project-based approach to international offset projects that has been used to date (e.g., CDM projects), private-sector funding goes directly to project implementation, and the project review process is designed to allow eligible projects to generate emission reductions that meet applicable criteria for environmental integrity and can be used for compliance. (Similarly, voluntary REDD projects are currently acting as pilot projects to demonstrate that REDD can yield compliance-quality reductions.) This approach therefore produces a tangible result in the form of real, verifiable emission reductions. Some have raised the concern that if only non-market-based approaches are adopted, there will not be sufficient funding at the project level, and emission reductions will be delayed and achieved at a higher price than under a market-driven approach. Others point out the potential for a non-market-based approach to crowd out private participation and investment, which "is likely to raise greater amounts of capital, do it more quickly and ensure its utilisation more efficiently."[66]

Opponents of a market-based approach express concerns that making REDD credits fungible with CERs and/or sector-based credits would result in an oversupplied market that devalues the price of CERs, diverts resources from reductions in energy and transport, and reduces pressure on industrialized countries to reduce their own emissions.[67] One study estimated that allowing access to REDD credits would reduce global carbon prices by 61% if no supplementarity restrictions were applied, and based on publicly stated targets for industrialized countries as of

[63] Ecosystem Marketplace and New Carbon Finance, "Forging a Frontier: State of the Voluntary Carbon Market 2008," May 2008, p. 7, p. 38, http://ecosystemmarketplace.com/documents/cms_documents/2008_StateofVoluntaryCarbonMarket2.pdf
[64] Ibid., p. 38.
[65] UNFCCC, Subsidiary Body for Scientific and Technological Advice, FCCC/SBSTA/2009/3, 17 April 2007, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 16, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf
[66] Clifford Chance, "Forestry Carbon Finance and REDD: A Perspective on Design Options," Client Briefing, February 2009, p. 6, http://www.cliffordchance.com/showimage/showimage.aspx?LangID=UK&binaryname=/forestry_primer%20february%2009.pdf
[67] Ibid..

December 2008.[68] If supplementarity restrictions were applied, however, there would be price differentiation between REDD credits and CERs, and CER price declines would be smaller (51% in a 50% supplementarity scenario, and 21% in a 20% supplementarity scenario).[69] Another analysis, the Eliasch Review – a report on financing global forests commissioned by the UK government – reached a different conclusion:

> "[I]f supplementarity limits are set at 50 per cent or lower in Phase III of the EU ETS, then admitting forest credits into the international credit market would have little or no impact on the EU carbon market price. This is because, when restrictions on the use of non-Annex I country credits are this tight, more costly EU abatement would still be necessary and would continue to set the price for all units of abatement in the carbon market.[70]

One solution to the potential risk of oversupply proposed by a broad group of developing countries, as well as the European Commission and Canada, is to "balance supply and demand." Under this approach, industrialized countries would agree to take on more stringent emission targets in exchange for access to REDD credits.[71] However, Brazil opposes this approach because it views national efforts by developing countries on REDD as voluntary, and strongly resists linking such efforts to targets.[72] Presumably this position is based on the view that a crediting program for REDD, and associated REDD targets, would open the door to the imposition of national emissions targets for Brazil and other developing countries.

According to a December 2008 overview of international REDD discussions, there is an emerging consensus "that a combination of these approaches will be needed to match the different stages of development and differing needs of tropical rainforest nations.[73] More specifically, there appears to be a widespread acknowledgement of the need to provide upfront funding for capacity-building in a number of areas to prepare countries to eventually participate in a REDD crediting program. Non-market-based financing sources will be necessary to provide

---

[68] KEA 3, "REDD and the effort to limit global warming to 2°C: Implications for including REDD credits in the international carbon market," prepared for Greenpeace International, March 30, 2009, pp. 10, 13, http://www.greenpeace.org/raw/content/usa/press-center/reports4/redd-and-the-effort-to-limit-g.pdf

[69] Ibid., p. 13.

[70] Eliasch Review – Global Climate Change: Financing Global Forests, Crown copyright 2008, p. 166, http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review(1).pdf

[71] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Twenty-eighth session, Bonn, 4–13 June 2008, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries, Submissions from Parties, Addendum, FCCC/SBSTA/2008/MISC.4/Add.1, May 21, 2008, p. 4, http://unfccc.int/resource/docs/2008/sbsta/eng/misc04a01.pdf

[72] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 1, Synthesis of submissions by Parties on issues relating to reducing emissions from deforestation in developing countries, Working paper No. 1 (d) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 26, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_submissions_complete_cj_250806_10.30.pdf

[73] Global Canopy Programme, "The Little REDD Book," December 2008, p. 86, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.

this capacity building. However, market-based approaches provide significant advantages in terms of the potential scope and consistency of funding. They also may be needed to speed the delivery of verifiable emission reductions from REDD activities. For this reason, options that allow for a phase-in of a market-based approach may provide the best basis for developing a consensus.[74]

V. Emerging Policy Proposals on REDD in the U.S.

In the U.S., interest has been developing in the last few years on incorporating provisions in U.S. climate legislation that would support international REDD activities. The "Waxman-Markey" draft legislative proposal recently released in the House of Representatives provides a further spotlight on international forestry issues. Provisions addressing these issues in recent federal U.S. climate legislation are discussed below, as well as voluntary offset programs in the U.S. that have developed methodologies for REDD activities.

A. Waxman-Markey Discussion Draft

On March 31, 2009, Representative Henry Waxman (D-CA), the Chairman of the House Energy and Commerce Committee, and Representative Edward Markey (D-MA), the Chairman of the Energy and Environment Subcommittee, released a "discussion draft" of clean energy and climate legislation entitled "The American Clean Energy and Security Act of 2009." This draft legislation contains a number of provisions relating to international forest activities. It states that "reducing emissions from deforestation is highly cost-effective, compared to many other sources of emissions reductions," and that "as part of a global effort to mitigate climate change, it is in the national interest of the United States to assist developing countries to reduce and ultimately halt emissions from deforestation."

1. Supplemental Emissions Reductions from Reduced Deforestation

The draft bill provides three channels through which the U.S. can provide funding for international forestry activities. First, it creates an annual allowance "set-aside" for the "**Supplemental Emissions Reduction from Reduced Deforestation**" program. The set-aside is equal to 5% of the cap in 2012-25, 3% in 2026-30, and 2% in 2031-50. These allowances will be transferred to countries that have entered into a bilateral agreement with the U.S. or a multilateral agreement, and will be used to provide incentives to reduce deforestation. The allowances may be used to fund a wide range of activities including, but not limited to, national and sub-national deforestation reduction activities (provided that the latter convert to national activities over time), including pilot activities; capacity building for monitoring, measurement and verification (MMV) of reductions from avoided deforestation; and development of governance structures to reduce illegal logging and deforestation. The objective of this "Supplemental Emissions Reduction from Reduced Deforestation" program set aside is to achieve emission reductions of at least 720 million tons CO_2 in 2020, which is equal to 10% of U.S. emissions in 2005, and 6 billion tons cumulatively by the end of 2025.

[74] One analysis speculates that a REDD approach that combines a fund with a market-based approach in a post-2012 international agreement may be used "as a trade-off to ensure the inclusion of Carbon Capture and Storage within the CDM." Clifford Chance, "Forestry Carbon Finance and REDD: A Perspective on Design Options," Client Briefing, February 2009, p. 6, http://www.cliffordchance.com/showimage/showimage.aspx?LangID=UK&binaryname=/forestry_primer%20february%2009.pdf

2. International Offset Credits

Second, the draft bill allows for the creation of "**international offset credits for reduced deforestation activities**." (The other categories of international offset credits are "credits issued by an international body" and "sector-based credits.")[75] Credits for reduced deforestation activities must meet general criteria established for international offset credits (i.e., the host country for the offset project must be a developing country, and the U.S. must be party to a bilateral or multilateral agreement that includes the host country) and specific criteria for reduced deforestation activities.

Importantly, only reductions from reduced deforestation that are measured against a *national* deforestation baseline established in a bilateral or multilateral agreement are eligible to receive international offset credits. The baseline must take into consideration at least 5 years of historical deforestation rates, and establish a trajectory that would result in zero gross deforestation within 20 years of the establishment of the baseline. The EPA Administrator may decide to allow reduced emissions from forest degradation or reduced soil carbon losses associated with forested wetlands or peatlands to be eligible to receive credits. Eligible countries must show technical capacity to monitor and measure carbon fluxes, and institutional capacity (strong forest governance). Reductions must have occurred prior to issuance of credits, and have been demonstrated using ground-based inventories, remote sensing technology, and other methods. To account for country-specific circumstances, the EPA Administrator must make adjustments (such as discounting for uncertainty). The activity must be managed "in accordance with widely accepted, environmentally sustainable forestry practices" and "to promote native species and conservation or restoration of native forests, if practicable, and to avoid the introduction of invasive nonnative species." Provisions are included to ensure that the rights and interests of local communities, indigenous peoples and vulnerable social groups are protected; that they are consulted during throughout the project design, implementation and evaluation process; and that the sharing of profits from incentives for emission reductions or leakage prevention is encouraged. Finally, no credits will be issued for reductions from activities funded through the "Supplemental Emissions Reduction from Reduced Deforestation" program.

3. Strategic Reserve Auction

Third, the bill provides that proceeds from the **Strategic Reserve Auction** (an auction of allowances that are set aside in a reserve to help mitigate unexpected price increases) will be used to purchase international offset credits from reduced deforestation. 80% of international deforestation credits purchased with auction revenue will be converted to allowances to deposit in the Strategic Reserve, and the remainder will be retired.

A number of policy positions and approaches are reflected in the bill's international forestry provisions. The most prominent of these is a non-market-based approach for REDD activities and reductions in countries with sub-national baselines, and a market-based approach for

[75] An entity may use offset credits (domestic and international) to meet a percentage of its compliance obligation. The percentage is a function of the program's emissions cap, and starts at approximately 30%. (However, the intent of the draft may have been to allow for the use of 2 billion offsets per year, and this provision may be changed when the bill is formally introduced.) Up to one-half of the percentage may be met with domestic offset credits, and up to one-half may be met with international offset credits.

countries with national baselines. Issues relating to national versus sub-national approaches are discussed in greater detail in Section VI.C.

B. Dingell-Boucher Draft Climate Legislation

Draft legislation introduced on October 7, 2008 by former Chairman of the House Energy and Commerce Committee, Rep. John Dingell (D-MI), and former Chairman of the Subcommittee on Energy and Air Quality, Rep. Rick Boucher (D-VA), also included provisions relating to international forestry. Many elements of the Dingell-Boucher draft legislation are reflected in the Waxman-Markey discussion draft legislation. The most salient differences include the Dingell-Boucher draft's provisions: 1) allowing the EPA Administrator to decide to issue international offset credits for *project-scale reductions* from avoided deforestation in countries with *sub-national* rather than national baselines; 2) requiring that a national deforestation baseline reach zero net deforestation by not later than 2050, as opposed to 20 years after establishment of the baseline, as in Waxman-Markey; 3) including afforestation, reforestation, restoration of degraded land or forest, and improved forest management as eligible activities for international offset credits; and 4) creating a "Supplemental GHG Reduction Program" that uses a set-aside of allowances to fund emission reductions from a wide range of activities that includes but is not limited to REDD activities (including preparing countries for participation in a national REDD program), and that therefore could provide significantly less funding for REDD activities than the Waxman-Markey discussion draft.

C. Lieberman-Warner Climate Legislation

The version of the Lieberman-Warner climate bill that was considered by the Senate in June 2008 (S. 3036) provided a starting point for a number of international forestry provisions that subsequently were included in the Dingell-Boucher and Waxman-Markey draft bills.

The most salient differences between the Lieberman-Warner bill and the Waxman-Markey draft include the following. The Lieberman-Warner bill establishes a significantly smaller (in terms of percentage) annual allowance set-aside (1% of the cap). The set-aside in the Lieberman-Warner bill can be used to fund international forestry activities (defined as sequestration of carbon through restoration of forests and degraded land, afforestation, and improved forest management), while the Waxman-Markey draft allows for avoided deforestation and other related activities (e.g. capacity building), but not other international forestry activities. For international offsets, the Lieberman-Warner bill allows both international forestry and avoided deforestation activities to create offsets, while the Waxman-Markey allows only avoided deforestation. Like the Dingell-Boucher draft, the Lieberman-Warner bill also called for national baselines that assume zero net deforestation not later than 2050, a less stringent baseline than that incorporated in the Waxman-Markey draft.

D. U.S. Voluntary Offset Programs with Avoided Deforestation Project Methodologies

To date, two voluntary offset programs in the U.S. have established project methodologies relating to REDD activities. The California Climate Action Registry (CCAR)[76] has developed a

[76] In 2008, the CCAR changed its name to the Climate Action Reserve (CAR).

methodology for "avoided conversion" projects (projects "consisting of specific conservation actions to prevent the site-specific clearing and conversion of native forests to a non-forest use, such as agriculture or other commercial development").[77] Currently, this protocol only is applicable to domestic offsets projects implemented in the U.S., and does not apply to avoided deforestation projects implement in tropical countries. The Voluntary Carbon Standard (VCS) has established a methodology for Reduced Emissions from Deforestation and Degradation.[78] In addition, the Western Climate Initiative (WCI) will consider including avoided deforestation as an eligible offset category.

VI. Key Technical Issues in REDD

REDD projects pose a number of challenging issues at the policymaking and program/project implementation level. These include but are not limited to: 1) capacity building – i.e., significant needs to build various capacities in developing countries required for a REDD program and REDD investments to succeed; 2) approaches for determining national deforestation baselines that may be used for crediting and that take into account differing national circumstances; 3) national versus sub-national approaches for REDD; 4) leakage; 5) permanence; 6) monitoring, measurement and verification (MMV); and 7) the role of indigenous peoples and governments. These issues are discussed below.

A. Developing World Capacity-Building Needs, Governance, Institutions and Policies

An overarching challenge for REDD programs is the gap that exists between current capacity in developing countries that could host such programs and the level of capacity needed to ensure that the programs yield real, verifiable emission reductions that meet stringent international requirements. The concept of capacity extends to "organizational or institutional capacity, human resource capacity, targeted technical knowledge capacity, planning capacity, financial capacity, logistical capacity, management and operational system capacity, and organizational performance."[79]

Capacity building for REDD is required at several levels:[80]

1. The regional level, to ensure there is an adequate pool of knowledge in specialized technical skills to avoid dependence on international experts;

2. The national (government and civil society) level, to ensure that institutions manage REDD activities and handle REDD funds efficiently and responsibly; that financial institutions are involved in project financing; and that the appropriate accounting

[77] Ibid.
[78] Additional background on how CCAR and VCS address such issues as permanence in the context of forestry projects is provided in the background paper for the fourth EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop, entitled "Key Design Issues Relating to Greenhouse Gas Abatement and Sequestration Projects in Agriculture and Forestry," February 2009.
[79] "REDD Readiness: Capacity Building," presented by John J. Mason, Forum on Readiness for REDD Accra, Ghana, 19-20 August 2008, http://whrc.org/Policy/REDD/Reports/REDD_Capacity%20building_john_mason.ppt
[80] Ibid.

framework, measurement tools, techniques and systems are established and implemented;

3. The local level (indigenous peoples and communities), to ensure that there is local understanding of REDD; that local organizations can organize land owners and communities and have the credibility and trust necessary to enter into contracts and obtain financing; that other organizations "can represent indigenous people and communities to handle benefit sharing decision making among members;" and that local mechanisms can handle REDD funds transparently and democratically.

There may be relatively few developing countries at present other than perhaps Brazil that have sufficient institutional and technical capacity for REDD, although significant efforts are underway to build capacity in other countries.

Other prerequisites for an effective national REDD program include, but are not limited to, effective national or sub-national institutions, legal and technology infrastructure, a legal environment in which property rights are protected and contracts can be enforced, and the necessary technical capacity to undertake forest inventories and MMV. In many developing countries experiencing deforestation and/or degradation, there is illegal logging and trade of illegal timber, illegal conversion of forest land for other uses. Illegal logging in public lands in developing countries leads to losses in assets and revenue of more than $10 billion annually.[81] As noted in a World Bank report,

> "Within developing countries, 1 billion extremely poor people depend upon forests for part of their livelihoods, and as many as 350 million people living in and around forests are heavily dependent on forests for their livelihoods and security. These vulnerable groups are at risk from illegal logging and removal of timber and nontimber products from the forests."[82]

Forest governance and law enforcement often needs to be significantly improved; in practice, prosecution is rare, particularly for large operators.[83] A country's economic power base is often manifested in weak, underfunded forest institutions and corruption such as the issuance of permits to large operators to clear land for political or economic reasons.[84]

---

[81] "Strengthening Forest Law Enforcement and Governance: Addressing a Systemic Constraint to Sustainable Development," 2006, World Bank Report No. 36638-GLB, p. xi, http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/09/05/000160016_20060905125450/Rendered/PDF/366380REVISED010Forest0Law01PUBLIC1.pdf

[82] Ibid.

[83] Ibid.

[84] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Part II: Policies approaches and positive incentives, Working paper No. 1 (d) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 6, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/partii_policy_approaches_and_positive_incentives.pdf

For REDD programs to work, land tenure and property rights regimes also must not incentivize conversion of land (e.g., if land must be converted to assert property rights).[85] Similarly, various public policies must not create economic incentives for land conversion (e.g., repeated currency devaluation, which encourages agricultural expansion; economic policies that curtail the urban economy and drive people to the agricultural frontier; land colonization programs; and trade policies that protect the agricultural and timber sectors).[86] In Brazil, policies and incentives that have promoted agricultural development and led to deforestation include "low land prices, tax credits, low interest rates for agriculture loans, guaranteed minimum prices for agricultural products, flexible rules for land title rights, low property taxes, and fiscal incentives for investment in development projects."[87]

B. Baselines

One of the fundamental questions in REDD policy is how to establish baseline deforestation rates and associated baseline emissions for countries participating in a REDD crediting mechanism. The choice of a baseline determines whether credits rewarded are truly additional, and can drastically change the volume of credits issued for the same level of performance in terms of reducing the rate of deforestation and degradation. Countries with high historical rates of deforestation (such as Brazil) tend to favor a baseline based on those rates; the assumption of continued high levels of deforestation in the "business as usual" (BAU) scenario provides a generous baseline for crediting. Countries with low historical levels of deforestation – including countries that have taken significant policy actions to conserve forests and avoid deforestation – favor a baseline that takes their previous efforts into account, as opposed to a historical baseline that results in limited opportunities to earn REDD credits and effectively punishes them for conserving their forests. Historical baselines do have the advantage of being based on actual performance, but they don't take into account the effect of current or future efforts to avoid deforestation that would occur even in the absence of a REDD crediting mechanism.[88] Using historical baselines also may create perverse incentives for countries to increase logging to get a better baseline, although presumably this would be addressed by selecting baseline periods that preceded international discussions on baselines.

One alternative to a historical baseline is a baseline based on projections (including model-based projections), which takes into account the drivers of deforestation and present and future responses under BAU. However, such baselines are hypothetical and potentially subject to being inflated.[89] Other options include a combination of historical rates and projections, or the use of

[85] Ibid.
[86] Ibid..
[87] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 1, Synthesis of relevant information contained in national communications, Working paper No. 1 (c) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 9, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/addendum_i_ncs.pdf
[88] UNFCCC, Subsidiary Body for Scientific and Technological Advice, FCCC/SBSTA/2009/3, 17 April 2007, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 12, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf
[89] Ibid.

the global deforestation baseline for the developing world, as suggested by Panama.[90] Perhaps the most common solution offered is that proposed by approximately 30 African, Southeast Asian and Latin American countries – a "development adjustment factor" which accounts for national circumstances, particularly early actions in such areas as forest conservation.[91] This approach would be subjective and require negotiation in the absence of any acceptable common formula for an adjustment factor.

Other topics related to baselines include how the baseline period is chosen, and uncertainties with respect to data. With respect to the latter, Norway points to a shortage of knowledge about past trends; problems in estimating carbon losses associated with different types of disturbance; large uncertainty ranges for recent deforestation estimates at all levels; ongoing academic debates over historical baselines; differing carbon amounts in different types of forests and in different locations; and uncertainties regarding the distribution of forest types across regions. All of these factors complicate the task of developing a historical baseline.[92]

C. National versus Sub-National Approaches

Another fundamental question at the heart of international discussions on REDD is whether a REDD crediting mechanism should be limited to countries that have the necessary data, capacity, and other elements to participate in national approach, in which REDD accounting is performed at the national level using a national deforestation baseline, or whether it should allow for sub-national approaches to REDD, in which a region could participate in and account for REDD activities based on a sub-national baseline. Under a national approach, countries would implement policies to reduce deforestation and degradation, and would receive tradable credits or financial transfers.[93]

Supporters of a national approach believe it would ensure that coverage is comprehensive while reducing the potential for leakage of deforestation activities and associated emissions from covered to uncovered regions within the participating country. There is also the concern that allowing for REDD crediting for a broader group of countries (i.e., the group that could qualify for participation under a sub-national approach but not a national approach) could jeopardize the program's environmental integrity given current uncertainties and data gaps in many countries.

---

[90] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 1, Synthesis of submissions by Parties on issues relating to reducing emissions from deforestation in developing countries, Working paper No. 1 (d) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 15,
http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_submissions_complete_cj_250806_10.30.pdf

[91] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Twenty-eighth session, Bonn, 4–13 June 2008, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries, Submissions from Parties, Addendum, FCCC/SBSTA/2008/MISC.4/Add.1, May 21, 2008, p. 5,
http://unfccc.int/resource/docs/2008/sbsta/eng/misc04a01.pdf

[92] Ibid., p. 15.

[93] Center for International Forestry Research (CIFOR), "Moving Ahead with REDD: Issues, Options and Implications," edited by A. Angelson, p. 34,
http://www.cifor.cgiar.org/publications/pdf_files/Books/BAngelsen0801.pdf

Finally, a national approach would allow governments to implement broad-based policy reforms, and would "encourage better integration with national development policies and result in stronger country ownership."[94]

Supporters of a sub-national approach note that limiting REDD crediting to the national level would exclude many countries, and add that there is far greater potential for REDD reductions to be achieved in the near-term if a sub-national approach is accepted. A sub-national approach may also be more compatible with project-level activities. Some believe that under a national approach there is no clear means for REDD-based offset projects to be implemented, for the private sector to participate (since credits or funds would be awarded to the national government), or for financial resources to reach the project implementation level efficiently.

It is also not clear how baselines at the project level would relate to and interact with a national baseline. Lastly, investors may be reluctant to provide upfront payments for reductions at the national level "because they have limited or no control over host country risks."[95] If these concerns are justified, providing U.S. covered sectors with access to international REDD offsets from countries with national programs, as envisioned under the Waxman-Markey discussion draft, may not lead to significant REDD investments.

To address these problems, some have proposed opting for a project- or community-based approach.[96] Supporters posit that this approach would be more likely to yield compliance-grade, verifiable emission reductions, and would allow for the participation of countries that otherwise would not qualify for participation due to weak governance structures or an inability to meet national GHG inventory requirements. They also note that this approach would increase private sector engagement because it would be consistent with project-level experience to date. However, leakage under this more fragmented approach would need to be addressed.

Others make the case that a national approach could be made compatible with a project-based approach through a "nested approach," in which project-level activities are implemented while being accounted for at the national level (i.e.,, by subtracting emission reductions achieved and credited at the project level from national-level accounting estimates). Under one "nested approach" proposal, projects would not receive credits unless and until national level emissions were below the baseline.[97] Experience with projects would help build national capacity and help countries transition from a sub-national to a national approach, taking their particular circumstances into account.[98] From an implementation standpoint, however, there may be cause

[94] Center for International Forestry Research (CIFOR), "Moving Ahead with REDD: Issues, Options and Implications," edited by A. Angelson, p. ix, http://www.cifor.cgiar.org/publications/pdf_files/Books/BAngelsen0801.pdf

[95] Ibid., p. 37.

[96] Except where otherwise noted, information in this paragraph was derived from UNFCCC, Subsidiary Body for Scientific and Technological Advice, FCCC/SBSTA/2009/3, 17 April 2007, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 13, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[97] Global Canopy Programme, "The Little REDD Book," December 2008, p. 53, http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.

[98] Clifford Chance, "Forestry Carbon Finance and REDD: A Perspective on Design Options," Client Briefing, February 2009, p. 7,

for concern that a national approach will not interact seamlessly with a project-based approach, and so could make it very difficult for covered entities in the U.S. to use these kinds of offsets to achieve compliance with a U.S.-based cap-and-trade program.

A potential model for a sub-national approach may be developed in California, where Governor Schwarzenegger has entered into a Memorandum of Understanding (MOU) with 6 governors of Brazil and Indonesia, as well as the governors of Wisconsin and Illinois, to reduce forestry-related emissions. The Brazilian and Indonesian governors manage more than 60% of the world's tropical forests. Under the MOU, the partners will "[j]ointly develop rules to ensure that forest-sector emission reductions and sequestration could pass the strict criteria outlined in California's AB 32 Scoping Plan and potentially play a role in the Western Climate Initiative effort; and [d]evelop a Joint Action Plan by early 2009 to clearly outline progress."[99]

D. Leakage

Concerns about leakage – i.e., displacement of deforestation and degradation emissions to locations not covered by a REDD program – are due to the expectation that a future international REDD program will have incomplete coverage. Leakage can occur from one country to another if some developing countries do not participate in a REDD program at the national level. As described by FAO, leakage to another country – in which "demand or people might move to another country where land is more readily available for clearing" – can occur "if the current deforestation/degradation pattern is dominated by commercial extraction or conversion of forest to large scale agriculture that will provide international markets with timber or agricultural products."[100] Leakage can also occur within a country, from a covered jurisdiction to an uncovered jurisdiction, under a sub-national approach or project-based approach.[101]

Another type of leakage could occur as a result of incomplete coverage of activities that reduce forest carbon stocks. For example, if degradation is not included in a REDD regime, countries can reduce carbon stocks through selective logging without exceeding the definitional threshold for deforestation. As FAO notes, such countries potentially could earn credits for reducing deforestation while simultaneously undertaking degradation activities that are not accounted for in the REDD mechanism.[102] Similarly, leakage can occur when not all LULUCF sinks and emissions sources are completely accounted for, or when only certain types of activities can earn credits.

---

http://www.cliffordchance.com/showimage/showimage.aspx?LangID=UK&binaryname=/forestry_primer%20february%2009.pdf

[99] California Office of the Governor, press release, "Gov. Schwarzenegger Partners with Other States to Reduce Greenhouse Gas Emissions from Deforestation," November 18, 2008, http://gov.ca.gov/press-release/11101/

[100] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 2, Synthesis of submissions by accredited observers, Working paper No. 1 (e) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy , p. 10, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_igosngos.pdf

[101] For more information about leakage, please refer to "Key Design Issues Relating to Greenhouse Gas Abatement and Sequestration Projects in Agriculture and Forestry, Background Paper for the EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #4, February 2009, Electric Power Research Institute (EPRI), February 2009. Accessible online at: http://globalclimate.epri.com/Greenhouse_Gas_Emissions_Offsets.html .

[102] Ibid..

Supporters of a national approach to REDD often cite leakage to other countries as a reason for adopting such an approach. Some believe that "leakage may be minimized through approaches that focus on the national level (as compared with project-based approaches), and through wide coverage of forest areas, the broad participation of Parties and a broader definition of deforestation."[103] On the other hand, a group of African, Southeast Asian and Latin American countries believes that in light of the UNFCCC's and KP's ineffectiveness in addressing emissions leakage to date, it is inequitable to "unilaterally apply this concept to developing countries or the forest sector specifically."[104]

Also, recent modeling by EPRI and others has demonstrated that climate policies that credit only afforestation projects (domestic and international) to generate GHG emissions offsets, rather than afforestation, forest management, and avoided deforestation, are likely to lead to increased deforestation in developing nations. In short, afforestation activities have the potential to displace existing agriculture and shift agricultural production into unmanaged forest areas across the world. However, commitments to future comprehensive forest carbon policies can ameliorate much of this leakage.[105]

To assess leakage for a REDD project, Colombia offers the following methodological approach:

> [D]isplacement of emissions could be determined using an approved methodology and the amount of displacement of emissions detected should be deducted from the project credits, thus creating a disincentive to displace deforestation elsewhere. The methodology would require a "leakage belt", or area around the project that will be monitored for deforestation using satellite imagery or ground techniques. The width of this monitoring area would be correlated to the main deforestation driver(s) in the area including a socioeconomic study of the driver(s) and communities involved.[106]

To address leakage, the Center for International Forestry Research (CIFOR) offers the following alternatives:

1. "Monitoring what is happening outside the project boundaries;

---

[103] Subsidiary Body for Scientific and Technological Advice, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries. Note by the secretariat, p. 15, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[104] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Twenty-eighth session, Bonn, 4–13 June 2008, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries, Submissions from Parties, Addendum, FCCC/SBSTA/2008/MISC.4/Add.1, May 21, 2008, p. 6, http://unfccc.int/resource/docs/2008/sbsta/eng/misc04a01.pdf

[105] S. Rose and B. Sohngen, "Climate Policy Design and Forest Carbon Sequestration," working paper, April, 2009.

[106] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Twenty-eighth session, Bonn, 4–13 June 2008, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries, Submissions from Parties, FCCC/SBSTA/2008/MISC.4/Add.1, May 21, 2008, p. 10, http://unfccc.int/resource/docs/2008/sbsta/eng/misc04.pdf

2. Moving to a higher scale of accounting and crediting, which is indeed one of the main arguments for a national approach *vis-à-vis* a sub-national approach;
3. Discounting credits based on estimates of the extent of the leakage;
4. Redesigning interventions to minimise leakage; and
5. Neutralising leakage with complementary activities…"[107]

E. Permanence

The issue of "permanence" relates to the risk that emission reductions from REDD projects will not be permanent, and actions to address this risk. The emission reduction benefits of a reduction in the rate of deforestation and degradation can be quickly reversed by natural factors (storms, droughts, pests or fire), climate change, increases in demand for agricultural crops, non-performance of project partners, or a change of government.[108] Whether a reversal is intentional or unintentional, the reversal must somehow be compensated to safeguard the environmental integrity of the offset crediting system. Compensation for reversals could be done in a variety of ways as described below.[109]

A number of approaches are available to address impermanence risk for REDD projects. These include, but are not limited to, the following approaches identified by CIFOR:[110]

1. **Temporary crediting**: The CDM has adopted a temporary crediting approach for afforestation and reforestation projects.[111] Project participants may choose to be issued tCERs (temporary Certified Emissions Reductions) or lCERs (long-term CERs). Temporary CERs expire at the end of the commitment period in which they were issued, and lCERs expire at the end of the crediting period for the project (up to 60 years). When retired tCERs and lCERs expire, they must be replaced by other Kyoto Protocol compliance units. Based on limited interest in these projects in the CDM market – perhaps due to the need to replace temporary credits with permanent credits at future prices that are unknown and unpredictable – it appears that other approaches will need to be considered for REDD. (A more detailed discussion on temporary crediting is provided in Section IV.B. of the background paper for the fourth EPRI Offsets Dialogue workshop held in February 2009.)

2. **The ton-year approach**: Under this approach, an equivalence period is determined after which forestry mitigation could be considered permanent. Estimates of this period range from 42 to 100 years or more.

3. **Project credit buffers and risk pooling**: Under a project credit buffer approach, "[o]nly a certain share (e.g., 50%) of the credits generated are sold, while the remainder

[107] Center for International Forestry Research (CIFOR), "Moving Ahead with REDD: Issues, Options and Implications," edited by A. Angelson, p. 6, http://www.cifor.cgiar.org/publications/pdf_files/Books/BAngelsen0801.pdf
[108] Ibid., p. 79.
[109] For more information about permanence, please refer to EPRI 2009, accessible online at: http://globalclimate.epri.com/Greenhouse_Gas_Emissions_Offsets.html.
[110] Ibid., p. 79-82.
[111] Information in this paragraph derived from "CDM Rulebook" entries for tCERs and lCERs, Baker & McKenzie, http://cdmrulebook.org/PageId/332

is held in an escrow account for a predetermined period (e.g., 50 years). A proportion of these credits are liberated as the guarantee period ends if no losses have occurred."[112] Under a risk pooling approach, projects pool their credit buffers together, and the system-wide pool can be drawn upon in cases of reversal. This concept can be applied to a national REDD program in which the risks of different activities in different regions can be pooled to manage risk at the national level. Both CCAR and the Voluntary Carbon Standard (VCS) have adopted a risk pooling approach for sequestration projects.

4. **Insurance**: A third-party insurer guarantees to replace credits in the case of reversals, and holds a portfolio of diversified projects for this purpose. The insured entity pays the risk premium either in cash or in emission reduction units.

5. **Shared liability or forest compliance partnership (FCP**): Under this approach, developed countries take on a negotiated share of liability for the permanence of REDD credits from developing countries in the partnership, and may get preferential access to those credits. This approach may also call for restrictions on the use of REDD credits for compliance.

F. Monitoring, Measurement and Verification (MMV)

Significant concern has been expressed by Parties to the UNFCCC and other groups regarding monitoring, measurement and verification (MMV) issues, the quality of data, and the ability and capacity of developing countries to provide accurate forest inventories and other data that can meet rigorous quality standards for a REDD program. For example, Norway has indicated that

> "[m]any developing countries do not presently have the equipment or technology to produce reliable estimates of land-use changes on their own land. Given the need for local expertise (i.e., to analyze ground data) relatively large resources and substantial capacity building would be necessary to establish satisfactory monitoring in a baselines and crediting scenario and achieve sufficiently precise estimates of deforestation. Improved monitoring and managing capacity is crucial to any strategy to reduce deforestation in developing countries and related emissions."[113]

[112] Center for International Forestry Research (CIFOR), "Moving Ahead with REDD: Issues, Options and Implications," edited by A. Angelson, p. 81, http://www.cifor.cgiar.org/publications/pdf_files/Books/BAngelsen0801.pdf

[113] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 1, Synthesis of submissions by Parties on issues relating to reducing emissions from deforestation in developing countries, Working paper No. 1 (d) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 14, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_submissions_complete_cj_250806_10.30.pdf

Other MMV issues that have been raised include but are not limited to the following:

- Colombia has expressed concern that heavy reliance on remote sensing technologies limits participation due to its cost, related capacity needs, and cloud cover over forested areas, which may preclude effective remote sensing. It also notes that significant effort is needed for countries to "develop ecosystem-specific equations and/or models rather than using default values" in order to allow them to inventory requirements under Tier 2 or 3 of the IPCC guidelines for GHG national inventories.[114]

- Estimating historical reference rates, and monitoring and verifying emissions for forest degradation, presents many challenges in terms of definitions and methodologies.[115] CIFOR also noted that methods and standards for measuring degradation needed further development.[116]

- The FAO indicated that while field-based forest inventory and remote sensing practices were well-established, there is a lack of resources and institutional capacity in many developing countries, and a need for technical support to implement national forest inventories.[117]

- Because developing countries depend on default emission factors and have limited data on forest cover, LUCF inventory estimates report significant uncertainties (e.g., 20- 30% for Botswana and 39% for Brazil, compared to 5% and 7% uncertainty estimates for energy and industrial processes in those countries, respectively).[118]

Despite these challenges, significant progress in MMV also has been reported. Remote sensing of changes in land cover and land use at a variety of scales and coverage is close to being operational on a routine basis.[119] In preparation for Copenhagen, the UNFCCC Secretariat and

---

[114] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Twenty-eighth session, Bonn, 4–13 June 2008, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries, Submissions from Parties, FCCC/SBSTA/2008/MISC.4/Add.1, May 21, 2008, p. 8, http://unfccc.int/resource/docs/2008/sbsta/eng/misc04.pdf

[115] UNFCCC, Subsidiary Body for Scientific and Technological Advice, FCCC/SBSTA/2009/3, 17 April 2007, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 14, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[116] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 2 - Part 2, Synthesis of submissions by accredited observers, Working paper No. 1 (e) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 8, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_igosngos.pdf .

[117] Ibid., p. 9.

[118] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Addendum 1, Synthesis of relevant information contained in national communications, Working paper No. 1 (c) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 10, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/addendum_i_ncs.pdf

[119] UNFCCC Secretariat, Background paper for the workshop on reducing emissions from deforestation in developing countries, Part I, Scientific, socio-economic, technical and methodological issues related to deforestation

participating countries continue to make progress on: 1) methodological issues on reference emission and deforestation levels and on the cost of implementing methodologies and monitoring systems; and 2) needs assessments for capacity-building relating to implementation of methodologies, national and sub-national monitoring and reporting systems, and methodologies for forest inventories, ground-based and remote-sensing approaches.[120]

In addition, remote sensing has been demonstrated to be effective in measuring not only deforestation, but degradation. Deforestation in the Amazon has been measured by remote sensing for three decades.[121] Until as recently as 2005, analytical methods for measuring selective logging (i.e., degradation) in the Amazon missed approximately 50% of the canopy damage caused by timber operations. This shortcoming has been addressed through the use of large-scale, high-resolution, automated remote sensing (Landsat) analysis. Remote sensing has provided critical insights into the scale and impact of degradation.

For example, selective logging was found to add 60 to 123% more forest area damage than was reported for deforestation alone in the same study period.[122] Using this analysis, new estimates of the total amount of Amazon forest degraded by human activities have doubled from previous estimates. Results of the analysis have been confirmed by extensive field studies. These results suggest that if access to and training in remote sensing technology can be provided to a broad range of countries, the accuracy of monitoring can be improved significantly.

G. Role of Indigenous People and National Government

Indigenous peoples are critical stakeholders in REDD efforts from the project to the national level. If REDD schemes are to be effective and sustainable, the needs of indigenous peoples who depend on, live in and (depending on the country) own forests must be addressed and their perspectives and incentives understood. This view was formally recognized in a decision of the Parties at Bali.[123] In addition, local data measurement and monitoring improve the quality of data, and help identify causes of deforestation and degradation.[124] Such data improvements could allow countries to progress from one "tier" of reporting requirements under IPCC reporting guidelines to a more stringent tier, which could mean the difference between eligibility and

---

in developing countries, Working paper No. 1 (a) (2006), 23 August 2006, for the Workshop on reducing emissions from deforestation in developing countries, 30 August – 1 September 2006, Rome, Italy, p. 3, http://unfccc.int/files/methods_and_science/lulucf/application/pdf/part_i_scientific_issues.pdf

[120] http://unfccc.int/methods_and_science/lulucf/items/4123.php

[121] Information in the remainder of the paragraph was derived from Asner, G. et al., "Selective logging in the Brazilian Amazon," *Science* 310, October 21, pp. 480-482.

[122] Ibid.

[123] UNFCCC, Conference of the Parties, Report of the Conference of the Parties on its thirteenth session, held in Bali from 3 to 15 December 2007, Addendum, Part Two: Action taken by the Conference of the Parties at its thirteenth session, Decision 2/CP.13, Reducing emissions from deforestation in developing countries: approaches to stimulate action, March 14, 2008, FCCC/CP/2007/6/Add.1, p. 8, http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8

[124] UNFCCC, Subsidiary Body for Scientific and Technological Advice, Thirtieth session Bonn, 1.10 June 2009, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries: approaches to stimulate action, Issues relating to indigenous people and local communities for the development and application of methodologies, Submissions from Parties, 10 March 2009, p. 3, http://unfccc.int/resource/docs/2009/sbsta/eng/misc01.pdf

ineligibility to participate in REDD programs. .[125, 126] Voluntary REDD projects are providing experience and models for working with tribes at the community level to get input, ensure understanding, and improve the potential for success.

REDD presents both opportunities and risks for indigenous peoples. There is the potential that REDD programs could create incentives to displace indigenous peoples in countries where their land rights are not protected, or restrict their access to land or resources. However, if designed appropriately, REDD can improve living standards, provide sustainable income for tribes, and improve forest governance.[127] REDD programs must take into account financial pressures on indigenous peoples to provide loggers, land developers and others with access to their lands, and ensure that economic incentives for indigenous peoples to protect lands are real and well-understood. To do so, REDD programs must overcome language and cultural barriers, increase local knowledge of REDD issues and carbon markets, and build relationships to promote trust and long-term cooperation.

Proposals to ensure effective participation of indigenous peoples and local communities include recommendations to systematically include these groups in REDD program design and implementation, require their consent, and provide sufficient resources to participate and establish accountability systems. They also include recommendations to involve local governments and support such national policies as land tenure reform.[128]

Host country governments play a key role in REDD programs, and have the ability to create conditions for success through establishing and protecting property rights, improving forest governance, strengthening law enforcement, expanding networks of protected areas, and implementing policies that reinforce incentives to protect forests.

VII. Lessons Learned from Existing Projects

Voluntary REDD projects provide important examples of what can be achieved and of how obstacles can proliferate and impede success. A number of U.S. electric companies, including American Electric Power (AEP), DTE Energy, Duke Energy, PacifiCorp, WE Energies and other project partners, have been actively engaged in some of the more well-known examples of voluntary REDD-based projects, including the Noel Kempff Mercado Climate Action Project in Bolivia (avoided deforestation), the Guaraquecaba Climate Action Project in Brazil (avoided deforestation and reforestation), and the Rio Bravo Conservation and Management Area in Belize (avoided deforestation and sustainable forest management).[129]

---

[125] Ibid.

[126] Subsidiary Body for Scientific and Technological Advice, Twenty-sixth session, Bonn, 7–18 May 2007, Item 5 of the provisional agenda, Reducing emissions from deforestation in developing countries, Report on the second workshop on reducing emissions from deforestation in developing countries, Note by the secretariat, p. 11, http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

[127] "Reducing Emissions from Deforestation and Degradation: An Assessment Report," prepared for the Government of Norway by the Meridian Institute, March 2009, p. ix, http://unfccc.int/files/methods_science/redd/country_specific_information/application/pdf/redd_oar_english.pdf

[128] Ibid., p. x.

[129] This paragraph and the subsequent two paragraphs were derived and paraphrased or quoted directly from "AEP's International Forestry Project Experiences, Or 'No Good Deed Goes Unpunished,'" presentation by Diane

The Noel Kempff project added 1.5 million acres to a 2 million acre national park, and provided a number of biodiversity and community benefits. However, it encountered a number of very difficult challenges. Initial carbon offset estimates were reduced by 75% or more, due to incorrect assumptions on deforestation and emission rates and other factors. Offset costs were far higher than originally estimated ($7.60 per ton versus $0.25) due to in-country businesses that went bankrupt, leading to a loss of the entire initial investment, penalties and legal fees. The devaluation of the dollar also had a negative impact on the economics of the project. The government of Bolivia lacked institutional capacity to support the project, and is attempting to impose a tax on the offset credits. To make matters even worse, political instability has made it unsafe to travel to Bolivia, and indigenous groups have blocked progress in an effort to increase their share of credits, leaving the project in limbo. As a result, offsets generated since 2005 so far have remained unclaimable. Other projects have encountered one or more of these same obstacles.

This experience has yielded a number of lessons that many parties believe should be incorporated in future REDD efforts. On the positive side, such projects can yield real environmental and community benefits. However, projects need to anticipate and plan for many potential roadblocks. For example, project risks need to be identified and managed, as is required under the Voluntary Carbon Standards' sequestration project methodologies; investors cannot take on all risks; projects must be managed as investments, not contributions; host government stability is critical; indigenous people must be involved in project design and implementation; tax liabilities must be clearly identified; endowments and budgets must support long-term operations; and turn-key projects are needed because managing project issues is not a core competency of many potential investors.

There are many risks involved in developing offset projects, which include but are not limited to country, regulatory, project performance, counterparty and other risks. These are not unique to REDD projects; they are a central element of offset projects developed under the CDM, other evolving carbon management regimes, and pilot-phase activities. Despite these risks, CDM projects are being undertaken (although many good projects have failed due to a lack of regulatory clarity, and many risks could be mitigated by reforming the CDM). However, the complexity of REDD projects and programs, the level of involvement of multiple stakeholder groups including indigenous groups, and the various project design and operational elements that remain to be resolved and tested all suggest that realizing the potential of REDD, particularly in terms of REDD-based offset credits may require several years of further development.

Recently the President of the Republic of Guyana, Bharrah Jagdeo, summarized the central challenge posed by global deforestation and the need to reduce deforestation and forest degradation to achieve stabilization of the global climate system:[130]

Fitzgerald, Managing Director of Environmental Affairs, American Electric Power, March 18, 2009, presented at the EPRI Spring 2009 Global Climate Program Advisors Meeting.

[130] Op. cit., "Saving the World's Forests Today…, p. 1.

“The world urgently needs to intensify its efforts to stabilise global temperatures at levels which will avoid catastrophic climate change. Greenhouse gas emissions need to peak within the next seven years and to be cut by 80 percent by 2050. It is difficult to envision how this can happen without effective action to dramatically reduce the approximately 20 percent of global emissions caused by deforestation…..”

“But in common with other rainforest countries, we face imminent development challenges. We need better schools and hospitals, teachers and doctors, economic opportunities and jobs for our citizens. Developing our economy to provide resources to fund these and many other social and economic needs has to be a responsible Government’s top priority. If we are to reconcile this with the world’s needs for forests to be kept intact, we must find a way to make national development and avoiding deforestation complimentary, not competing, objectives.”

Appendix A – References

Asner, G. et al. "Selective logging in the Brazilian Amazon." *Science* 310. October 2005.
http://www.sciencemag.org/cgi/content/abstract/310/5747/480?ck=nck

Bali Action Plan. Decision 1/CP.13, FCCC/CP/2007/6/Add.1. March 14, 2008.
http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3.

BBC News. "70% deforestation cuts for Brazil." December 2, 2008.
http://news.bbc.co.uk/2/hi/science/nature/7759192.stm

Bloomberg. "Brazil creates $21 billion fund to slow Amazon deforestation." August 1, 2008.
http://www.bloomberg.com/apps/news?pid=20601086&sid=ahDbiZfuCxZI&refer=latin_america

California Office of the Governor. "Gov. Schwarzenegger Partners with Other States to Reduce Greenhouse Gas Emissions from Deforestation." Press Release. November 18, 2008.
http://gov.ca.gov/press-release/11101/

Center for International Forestry Research (CIFOR). "Moving Ahead with REDD: Issues, Options and Implications." Edited by A. Angelson. 2008.
http://www.cifor.cgiar.org/publications/pdf_files/Books/BAngelsen0801.pdf

Clifford Chance. "Forestry Carbon Finance and REDD: A Perspective on Design Options." Client Briefing. February 2009.
http://www.cliffordchance.com/showimage/showimage.aspx?LangID=UK&binaryname=/forestry_primer%20february%2009.pdf

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. "Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss." October 17, 2008.
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0645:FIN:EN:PDF

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. "Towards a comprehensive climate change agreement in Copenhagen." January 1, 2009.
http://ec.europa.eu/environment/climat/pdf/future_action/communication.pdf

Commission Staff Working Document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. "Towards a comprehensive climate change agreement in Copenhagen." *Extensive background information and analysis, PART I.* SEC(2009) 101. January 28, 2009.

A. Diamant (EPRI) and Dr. S. Schwartzman (EDF), "Creating GHG Emission Offsets from Avoided Deforestation in the Amazon's Xingu River Basin." Webcast. August 15, 2008.

Ecosystem Marketplace and New Carbon Finance. "Forging a Frontier: State of the Voluntary Carbon Market 2008." May 2008.
http://ecosystemmarketplace.com/documents/cms_documents/2008_StateofVoluntaryCarbonMarket2.pdf

Eliasch Review. "Global Climate Change: Financing Global Forests" Crown copyright 2008.
http://www.occ.gov.uk/activities/eliasch/Full_report_eliasch_review(1).pdf

Environmental Defense. "Compensated Reduction: A Positive Incentive for Tackling the Largest Source of Greenhouse Gas Emissions in the Developing World." Brochure. December 18, 2006.
http://www.edf.org/documents/4875_CompensatedReduction_Overview.pdf

EPRI Greenhouse Gas Emissions Offset Policy Dialogue Workshop #4. "Key Design Issues Relating to Greenhouse Gas Abatement and Sequestration Projects in Agriculture and Forestry." Section IV.A.2 (p. 12) February 2009.
http://globalclimate.epri.com/Greenhouse_Gas_Emissions_Offsets.html

European Parliament and of the Council. Decision PE-CONS 3737/08. March 26, 2009.
http://register.consilium.europa.eu/pdf/en/08/st03/st03737.en08.pdf

European Parliament and of the Council. Decision PE-CONS 3738/08. March 26,2009.
http://register.consilium.europa.eu/pdf/en/08/st03/st03738.en08.pdf

Fitzgerald, Diane "AEP's International Forestry Project Experiences, Or 'No Good Deed Goes Unpunished.'" American Electric Power (AEP). Presentation at EPRI Spring 2009 Global Climate program Advisors Meeting. March 18, 2009.

Global Canopy Programme. "The Little REDD Book." December 2008.
http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf.

Hansen et al. "Humid tropical forest clearing from 2000 to 2005 quantified by using multitemporal and multiresolution remotely sensed data." Proceedings of the National Academy of Sciences, 105. pp. 9439 – 9444. 2007.
http://www.pnas.org/content/early/2008/06/27/0804042105.full.pdf+html

Helme, Ned et al. "A New Framework for Reducing Deforestation in Developing Countries: The Dual Markets Approach." Center for Clean Air Policy. Presentation at Bali. December 2007.

Houghton, R.A. "Carbon Flux to the Atmosphere from Land-Use Changes: 1850-2005." TRENDS: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Department of Energy Oak Ridge National Laboratory, U.S. 2008.
http://cdiac.ornl.gov/trends/landuse/houghton/houghton.html

Intergovernmental Panel on Climate Change (IPCC). "Assessment Report 4: The Physical Science Basis of Climate Change." Working Group I. Chapter 7. August 30, 2007.
http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch07.pdf

KEA 3. "REDD and the effort to limit global warming to 2°C: Implications for including REDD credits in the international carbon market." Prepared for Greenpeace International. March 30, 2009.
http://www.greenpeace.org/raw/content/usa/press-center/reports4/redd-and-the-effort-to-limit-g.pdf

Kinderman, Obersteiner, Sohngen, Sathaye, Andrasko, Rametsteiner, et al. "Global cost estimates of reducing carbon emissions through avoided deforestation." Cited in "Linkage between forest-based mitigation and GHG markets." Cyril Loisel, Institut du Developpement Durable et des Relations Internationales (Iddri), N° 19/2008.

Mason, John J. "REDD Readiness: Capacity Building," Presented at Forum on Readiness for REDD Accra, Ghana, August 19-20, 2008.
http://whrc.org/Policy/REDD/Reports/REDD_Capacity%20building_john_mason.ppt

Meridian Institute. "Reducing Emissions from Deforestation and Degradation: An Assessment Report." Prepared for the Government of Norway. March 2009.
http://unfccc.int/files/methods_science/redd/country_specific_information/application/pdf/redd_oar_english.pdf

Official Journal of the European Union. Directive 2004/101/EC of the European Parliament and of the Council of 27 amending Directive 2003/87/EC. November 2004.
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:338:0018:0023:EN:PDF

Republic of Guyana. "Saving the World's Forests Today: Creating Incentives for Avoiding Deforestation," Office of the President, Republic of Guyana. December 2008.
http://www.redd-monitor.org/wordpress/wp-content/uploads/2009/02/guyana_mckinsey_report.pdf

Reuters. "Brazil to set up Amazon protection fund." May 28, 2008.
http://www.reuters.com/article/environmentNews/idUSN2843680720080528

Reuters. "Norway pledges $1 billion to Brazil Amazon Fund." September 16, 2008.
http://www.reuters.com/article/environmentNews/idUSN1649421720080916

Rose, S. "Modeling Land Use for Climate and Energy Analyses." Presentation at EPRI Advisory Meeting, San Diego, CA. March 17, 2009.

Telegraph. "G-20 summit: Leaders agree to look at Prince Charles's multi-billion plan to save rainforests." April 2, 2009.
http://www.telegraph.co.uk/earth/earthnews/5090782/G20-summit-leaders-agree-to-look-at-Prince-Charless-multi-billion-plan-to-save-rainforests.html

United Nations Food and Agriculture Organization (FAO). "Global Forests Resource Assessment" 2005.
http://www.fao.org/forestry/41555/en/

United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties. "Report of the Conference of the Parties on its thirteenth session." December 3-15, 2007 in Bali. Addendum, Part Two: Action taken by the Conference of the Parties at its thirteenth session. FCCC/CP/2007/6/Add.1. Decision 2/CP.13: Reducing emissions from deforestation in developing countries: approaches to stimulate action. March 14, 2008.
http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=8

UNFCCC Secretariat. "Background paper for the workshop on reducing emissions from deforestation in developing countries." August 30-September 1, 2006 in Rome. Addendum 1: Synthesis of relevant information contained in national communications. Working paper No. 1 (c) (2006). August 23, 2006.
http://unfccc.int/files/methods_and_science/lulucf/application/pdf/addendum_i_ncs.pdf

UNFCCC Secretariat. "Background paper for the workshop on reducing emissions from deforestation in developing countries." August 30-September 1, 2006 in Rome. Addendum 2 - Part 1: Synthesis of submissions by Parties on issues relating to reducing emissions from deforestation in developing countries. Working paper No. 1 (d) (2006). August 23, 2006.
http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_submissions_complete_cj_250806_10.30.pdf

UNFCCC Secretariat. "Background paper for the workshop on reducing emissions from deforestation in developing countries." August 30-September, 2006 1 in Rome. Addendum 2 - Part 2: Synthesis of submissions by accredited observers. Working paper No. 1 (e) (2006). August 23, 2006.
http://unfccc.int/files/methods_and_science/lulucf/application/pdf/synthesis_igosngos.pdf

UNFCCC Secretariat. "Background paper for the workshop on reducing emissions from deforestation in developing countries." August 30-September 1, 2006 in Rome. Part I: Scientific, socio-economic, technical and methodological issues related to deforestation in developing countries. Working paper No. 1 (a) (2006). August 23, 2006. http://unfccc.int/files/methods_and_science/lulucf/application/pdf/part_i_scientific_issues.pdf

UNFCCC Secretariat. "Background paper for the workshop on reducing emissions from deforestation in developing countries." August 30-September 1, 2006 in Rome. Part II: Policies approaches and positive incentives. Working paper No. 1 (b) (2006). August 23, 2006. http://unfccc.int/files/methods_and_science/lulucf/application/pdf/partii_policy_approaches_and_positive_incentives.pdf

UNFCCC Subsidiary Body for Scientific and Technological Advice. "Report on the second workshop on reducing emissions from deforestation in developing countries." FCCC/SBSTA/2007/3. Twenty-sixth session in Bonn (May 7-18, 2007). Item 5: Reducing emissions from deforestation in developing countries. April 17, 2007. http://unfccc.int/resource/docs/2007/sbsta/eng/03.pdf

UNFCCC Subsidiary Body for Scientific and Technological Advice. "Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries." FCCC/SBSTA/2008/MISC.4/Add.1. Twenty-eighth session in Bonn (June 4–13, 2008). Item 5: Reducing emissions from deforestation in developing countries: approaches to stimulate action. May 21, 2008. http://unfccc.int/resource/docs/2008/sbsta/eng/misc04a01.pdf

UNFCCC Subsidiary Body for Scientific and Technological Advice. "Views on outstanding methodological issues related to policy approaches and positive incentives to reduce emissions from deforestation and forest degradation in developing countries." FCCC/SBSTA/2008/MISC.4/Add.3. Twenty-eighth session in Bonn (June 4–13, 2008). Item 5: Reducing emissions from deforestation in developing countries: approaches to stimulate action. June 11, 2008. http://unfccc.int/resource/docs/2008/sbsta/eng/misc04a03.pdf

UNFCCC Subsidiary Body for Scientific and Technological Advice. "Issues relating to indigenous people and local communities for the development and application of methodologies." FCCC/SBSTA/2009/MISC.1. Thirtieth session in Bonn (June 1-10, 2009). Item 5: Reducing emissions from deforestation in developing countries: approaches to stimulate action. March 10, 2009. http://unfccc.int/resource/docs/2009/sbsta/eng/misc01.pdf

World Bank. "Strengthening Forest Law Enforcement and Governance: Addressing a Systemic Constraint to Sustainable Development." World Bank Report No. 36638-GLB, p. xi. 2006. http://wwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/09/05/000160016_20060905125450/Rendered/PDF/366380REVISED010Forest0Law01PUBLIC1.pdf

Websites

http://unfccc.int/methods_and_science/lulucf/items/1084.php

http://unfccc.int/methods_and_science/lulucf/items/4127.php

http://globalclimate.epri.com/Greenhouse_Gas_Emissions_Offsets.html .

"CDM Rulebook" entries for tCERs and lCERs, Baker & McKenzie, http://cdmrulebook.org/PageId/332

http://unfccc.int/methods_and_science/lulucf/items/4123.php

http://unfccc.int/methods_and_science/lulucf/items/4123.php, and

http://unfccc.int/methods_science/redd/items/4615.php

UNEP's Risoe CDM/JI Pipeline Analysis and Database, updated March 1, 2009, http://cdmpipeline.org/

http://cdm.unfccc.int/Statistics/index.html,

http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html

http://www.princesrainforestsproject.org/what-the-projects-doing

http://www.princesrainforestsproject.org/what-the-projects-doing/declaration

http://www.undp.org/mdtf/UN-REDD/overview.shtml

http://www.undp.org/mdtf/UN-REDD/assistance_strategy.shtml

http://www.undp.org/mdtf/UN-REDD/pledges_commitments_deposits.shtml

http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21581819~pagePK:64257043~piPK:437376~theSitePK:4607,00.html

http://unfccc.int/methods_science/redd/demonstration_activities/items/4536.php

http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCC/0,,contentMDK:22106056~menuPK:5924904~pagePK:210058~piPK:210062~theSitePK:407864,00.html#FIP_Design_Meetings,

http://siteresources.worldbank.org/INTCC/Resources/AWFIPComplementaritywithFCPFInf3.pdf

http://unfccc.int/methods_and_science/lulucf/items/4123.php

Marland at http://cdiac.ornl.gov/trends/emis/overview.html

Appendix B – Glossary

Additionality	The degree to which GHG benefits achieved by an emission mitigation project would not have occurred in the absence of the added incentive of creating GHG emission mitigation.
Afforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, establishing new forests on land that has not ever, or in recent times, been forested.
Annex I countries, non-Annex I countries	Countries listed, or not listed, in Annex I of the UNFCCC; Annex I is a list of industrialized countries, non-Annex I countries are developing countries.
Annex B countries	Annex B of the Kyoto Protocol is a list of industrialized countries; they must also then ratify the Kyoto Protocol.
A,R & D	Afforestation, Reforestation and Deforestation.
Assigned amount	The number of emission units that an Annex B country holds; the initial amount for the first compliance period of 2008-2102 equals the emissions target for the country times five.
Assigned Amount Unit (AAU)	An emissions unit under the Kyoto Protocol; AAUs are issued by Annex B countries equal to their "initial assigned amount."
A&R Activities	Afforestation and Reforestation activities.
Baseline	The schedule of GHG emissions related to a project that would be expected to occur in the absence of a project.
BAU	Business As Usual.
Clean Development Mechanism (CDM)	A provision described in Article 12 of the Kyoto Protocol that allows tradable credits, called CERs, to be generated through projects in developing countries that can be used by industrialized countries for compliance with their Kyoto commitments.
CDM Executive Board (EB)	The executive body that is charged by the UNFCCC COP to oversee the operation of the CDM.
Certified Emission Reduction (CER)	An emissions unit under the Kyoto Protocol that is issued under the procedures of the CDM.
Conference of the Parties (COP)	The main operational body of the UNFCCC, representing all countries that have ratified the Convention. It meets annually.
Cropland management	An activity included under Article 3.4 of the Kyoto Protocol; more generally, the management of croplands to reduce emissions of carbon and/or increase the sequestration of carbon.
Deforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, the conversion of forested land to some other land use following forest clearance (e.g.,, by harvesting or forest fire).

Emission Reduction Unit (ERU)	An emissions unit under the Kyoto Protocol from projects under the Joint Implementation (Article 6) mechanism.
EUA	EU (emissions) allowance under the EU ETS.
EU ETS	EU Emissions Trading Scheme.
FAO	United Nations Food and Agriculture Organization.
Forest management	An activity included under Article 3.4 of the Kyoto Protocol; more generally, the management of forests to reduce emissions of carbon and/or increase the sequestration of carbon.
GHG	Greenhouse gas. This term usually is used to refer to the collection of all six types of GHGs regulated by the Kyoto Protocol (CO_2, CH_4, N_2O, SF_6, PFCs and HFCs)
Gigatonne	1,000 million tonnes (1 billion tonnes) (e.g.., $GtCO_2$)
Grazing land management	An activity included under Article 3.4 of the Kyoto Protocol; more generally, the management of grazing lands to reduce emissions of carbon and/or increase the sequestration of carbon.
Joint Implementation (JI)	A provision described in Article 6 of the Kyoto Protocol that allows tradable credits called ERUs to be generated through projects in Annex B (industrialized) countries that can be used by Annex B countries for compliance with their Kyoto commitments.
Kyoto Protocol (KP)	A protocol under the UNFCCC where, *inter-alia*, industrialized countries took on binding commitments to reduce their greenhouse gas emissions in a first commitment period (cp1), 2008-2012.
lCER	Long-term CER; a particular form of CER issued under the CDM for LULUCF A&R projects.
Leakage	A GHG effect occurring outside the boundary of what is being reported or accounted for a project or activity that, however, is caused by the project or activity and reduces its environmental benefit.
LUCF	Land use change and forestry, a sector for emissions reporting purposes under the UNFCCC.
LULUCF	Land use, land use change and forestry, a sector covered under Articles 3.3 and 3.4 of the Kyoto Protocol; becoming used more generally than just related to the Kyoto Protocol.
MMV	Monitoring, measurement and verification of emissions or sequestration.
Permanence, non-permanence, reversal	Generally, the issue that removals of carbon from the atmosphere by biological processes, such as the growing of forests, are not permanent and can be reversed (i.e., sinks can become sources) as a consequence of fire, disease, die-off, timber harvesting, and other activities.
Reforestation	An activity included under Article 3.3 of the Kyoto Protocol; more generally, establishing forests on land that has in recent past times been forested but in more recent times has been under some other land use.
Removals	The sequestration of carbon from the atmosphere (the opposite of

	emissions); a process that does this is a “sink.”
Removal Unit (RMU)	An emissions unit under the Kyoto Protocol that is issued by Annex B countries for LULUCF activities under Articles 3.3 and 3.4.
Sequestration	The absorption of carbon from the atmosphere by some process; normally of CO_2 but can be for other greenhouse gases (e.g., methane).
Sink	A process that removes carbon from the atmosphere (e.g.., a growing forest).
Storage	Keeping sequestered carbon out of the atmosphere.
tCERs	Temporary CER; a particular form of CER issued under the CDM for LULUCF A&R projects.
UNFCCC	United Nations Framework Convention on Climate Change, the multilateral environmental agreement to address the risk of global climate change.