THE POTENTIAL FOR USING A RENEWABLE CERTIFICATE SYSTEM TO ENCOURAGE RENEWABLE ENERGY DEVELOPMENT IN MEXICO

Prepared by:

Dr. Jan Hamrin
Meredith Wingate
Center for Resource Solutions

Laura Campbell
Climate Change Legal Foundation

Report to
THE NORTH AMERICAN FUND FOR ENVIRONMENTAL COOPERATION

The Center for Resource Solutions
Presidio Building #97, Arguello Blvd •P.O. Box 29512 •San Francisco, CA 94129
Phone: 415/561-2100 • Fax: 415/561-2105 • www.resource-solutions.org

ACKNOWLEDGMENTS

First, a special thank you to the North American Fund for Environmental Cooperation for funding this report. We also extend our great appreciation to Mexico's renewable energy developers for meeting with us and providing their candid insights into the challenges of and opportunities for the financing and construction of new renewable facilities in Mexico. Thank you also to the staff of the Mexican Ministry of Energy (SENER) for taking time to meet with us about the options for launching Mexico's renewable industry. In addition, we are grateful to Charles Feinstein of the World Bank and Ted Kennedy of Global Environmental Facility (GEF) who took time from their busy schedules to give us their ideas of how Mexico's renewable industry is likely to evolve. And finally, to Odón de Buen of the National Commission for Energy Conservation of Mexico (CONAE) who provided continuous support, information and vision concerning Mexico's renewable issues and solutions, muchas gracias.

Report to

The North American Fund for
Environmental Cooperation

THE POTENTIAL FOR USING A RENEWABLE CERTIFICATE SYSTEM TO ENCOURAGE RENEWABLE ENERGY DEVELOPMENT IN MEXICO

The Center for Resource Solutions
Presidio Building #97, Arguello Blvd. • P.O. Box 29512 •San Francisco, CA 94129
Phone: 415/561-2100 • Fax: 415/561-2105 • www.resource-solutions.org

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This paper examines the technical, legal and economic issues involved in developing a North American [1] market for tradable renewable energy[2] certificates from Mexico. The paper assesses both the feasibility of using TRCs to encourage the development of renewable energy in Mexico, and the challenges and opportunities associated with building a North American certificate-trading scheme.

The concept of tradable renewable certificates[3] is based on separating the environmental or 'green power' attributes of renewable generation from the electrical energy. This creates two saleable products for the renewable developer or marketer: (1) commodity electricity; and (2) renewable attributes (i.*e.*, TRCs, green tags, etc.).

TRCs can expand the market for renewables by creating a liquid currency [need to explain what that means] for renewable generation and improving the transferability of renewables to regional, national and global markets. There is significant potential for TRCs to be used in the following applications:

- Renewable portfolio standard (RPS) and compliance with other environmental targets or mandates
- Supply for green pricing programs
- Voluntary TRC markets *i.e.*, providing a green option to customers who are not served by a green provider (particularly relevant for large commercial/industrial customers)
- Green energy supply for specific events
- Greenhouse gas reduction goals (including CDM markets)

[1] / North America includes Canada, Mexico and the U.S. (US). However, this paper focuses primarily on Mexico/US markets.

[2] / Renewable energy resources are naturally replenishable, and virtually inexhaustible in duration (but limited in the amount of energy that is available per unit of time). For the purpose of this report, renewable energy resources include: biomass, hydro, geothermal, solar and wind.

[3] / These are also known as renewable energy certificates, certificates, renewable energy credits, green tags, tags, RECs, and T-RECS. Some of the names and acronyms are trademarked labels (e.g. RECS are the certificates sold under license with a Dutch company). Therefore, the authors chose to use the generic acronym TRCs.

A credible issuing, tracking and verification system for TRCs can serve as a platform for translating TRCs into carbon offsets while providing diverse markets for other renewable energy attributes. Therefore, the next step as new renewable energy policies are put into place and new facilities are being developed in Mexico is to ensure that a credible TRC accounting system is integrated into any renewable energy policy and development scenarios.

Mexican Renewable Energy Potential

With the exception of hydro electric and geothermal facilities, only minimal renewable energy generation has been installed to date in Mexico even though the potential quantity us quite large, the quality exceptional and the geographic location of Mexican resources diverse. Official projections estimate that renewable energy capacity will grow by 3,752 MW during the period from 2001- 2010. But except for large hydro, renewable growth is reduced to only 561 MW of the 27,357 MW of capacity needed during this time.[4] Policy and legal changes could increase the potential growth substantially.

Renewable Energy Project Barriers

There are a number of political and legal barriers to renewable energy development in Mexico. These include the need for: (1) Revisions to Mexico's electricity law to improve the conditions under which independent power producers (IPPs) can develop and sell power from renewable energy facilities to the government-owned electric utility and others; (2) development of an acceptable definition of "least cost power;" (3) an acceptable long-term (at least 10 year) power purchase and interconnection agreement to support power purchased from these facilities (including a purchase price that incorporates capacity value for intermittent resources; and (4) a stable governmental policy framework for renewable energy development. The World Bank (WB)/Global Environmental Facility (GEF) Large Renewable Energy Strategic Partnership program when implemented should significantly help to reduce or eliminate these barriers both through the program itself and by focusing the attention of the Mexican government on policy and legal reform needs in the electricity sector.

Costs and Financing Needs for Renewable Energy Development

At the time of writing, the reference price for Mexican electricity is approximately US 3.5 cents/kWh. New generation plants under construction or discussion tend to be natural gas

[4] / Estudio de la Situación Actual de la Minihidráulica Nacional y Potencial en una Región de los Estados de Veracruz Y Puebla (CONAE, 1995).

combined cycle in the 3.5 to 4.0cents/kWh range depending upon the gas price forecast used in the life-cycle calculation. As a result, wind generation is the closest renewable resource to being cost competitive with new facilities at 1.5 to 2.0 cents/kWh more expensive than projections for new natural gas plants using the present least-cost definition. The TRC and Certified Emissions Reductions (CERs) prices range from 0.5 cents/kWh to 2.5 cents/kWh, thus providing a good opportunity for additional revenue that brings wind generation within the competitive price range of new natural gas combined cycle plants. This additional revenue stream can also improve the financial viability of Mexican renewable energy projects.

On one hand, the opportunity to generate revenue from the sale of both TRCs and Green House Gas (GHG) emissions could enhance the economics of developing renewable energy in Mexico and increase interest in these projects. However, unless systems for measuring and tracking TRCs and GHG emission reduction credits are consistent and compatible, inaccurate measurement and reporting, double counting and loss of environmental integrity could result.

Trade, Legal and Policy Issues

A report by the Climate Change Legal Foundation (included in this report) looked at legal issues associated with North American trade for TRCs. What this report found is that while the TRC market is still at an early stage, there are no insurmountable legal obstacles to the development of a North American market. The report further found that defining TRCs and articulating the property rights associated with them are the most important legal issues to be addressed because the basic definition of a TRC determines how it is treated under international trade agreements. There is a reasonable basis for characterizing TRCs as commodities, services, investments or securities. The characterization of TRCs and the legal rules applicable to their international trade generally hinges on the structure of the TRC exchange and the parties to the transaction. But overall it appears that the use of TRCs provides more flexible opportunities for international trade than does the direct sale of renewable electricity itself.

For the moment, the prospect for sale of Mexican TRCs into US RPS markets is not very promising. Most US/RPS programs require that eligible renewables either be generated within the state or, if TRCs are used, that they be accompanied by energy physically delivered to the border. Because of this, the US RPS market provides the most promising opportunities for renewable projects located along the U.S.-Mexico border.

In addition, serious barriers remain to the development of renewable generating facilities within Mexico that must be addressed before the international financial community is willing

to invest and a robust renewable energy market is able to emerge. However over the next ten years it is anticipated that the Mexican government and others will be addressing these legal and regulatory barriers. If renewable energy in Mexico does develop more, then improving market conditions can take place. It will be five to ten years before significant amounts of renewable generation become part of Mexico's electricity supply mix. By starting a Mexican tracking system now, this infrastructure tool will be in place as the market evolves.

Conclusions

Both Mexico and Canada have signed the Kyoto Protocol, however, with the U.S. having withdrawn its participation, it can be difficult to initiate trilateral carbon reduction activities beneficial to the three nations. The development of a North American TRC issuing and tracking system has the unique characteristic that it will be useful to all three countries. This type of system provides a monitoring, reporting and trading platform for both renewable energy and for carbon reduction credits that can be derived from the generation of renewable energy.

The long-term vitality of a North American TRC market depends on designing in the capacity for trading the environmental attributes of renewable energy. An important issue in developing a robust international market for Mexican TRCs is the capacity to structure projects that enable Mexico to generate both TRCs and GHG emission reduction credits, thereby improving the economics of renewable energy development. In some cases, the US-Mexico TRC market may offer the best prices for renewable energy attributes. Moreover, a Mexico-Canada TRC market may also be stimulated in conjunction with implementation of the Kyoto Protocol, as could a Mexico-EU market providing optional revenue streams wherever prices are better.

INTRODUCTION

Renewable energy development in Mexico is on the verge of a breakthrough. The World Bank has announced a Mexican Strategic Partnership for Renewable Energy Development that is specifically focused on bringing 600 MW of new renewable energy (primarily wind generation) into operation over the next ten to twelve years.[5] There are also elements of this project that are compatible with a Renewable Energy Registry and Tracking System for the purpose of issuing and tracking tradable renewable energy certificates (TRCs) for use in either TRC or carbon offset markets.

The Mexican government has expressed some interest in integrating renewable energy with carbon trading markets and the Clean Development Mechanism (CDM) of the Kyoto Protocol. In addition, the advisability of pursuing natural gas generation as the answer to Mexico's power needs is being seriously questioned in light of gas price volatility and the opportunities to sell natural gas to the US or other countries for hard currency. As a result, several forces are converging that all support renewable energy development in Mexico and the issuing and use of TRCs through a related accounting system that can serve as a platform for a variety of renewable energy and carbon transactions.

Background on Project

The development of renewable generation to meet Mexico's growing electricity needs could create significant pollution savings and improve the quality of life for Mexican citizens, both in urban areas and remote locations. Numerous studies have shown that there is a strong renewable resource potential in Mexico, yet these resources go essentially untapped. TRCs are a tool that could be used to reduce some of the barriers to new renewable development in Mexico if developed in conjunction with other policy incentives and legal reforms.

The primary objective of this project is to investigate the technical, legal and economic issues around building a market for renewable certificates from Mexico and to identify recommendations for the next steps toward a certificate-trading scheme in North America.

[5] http://www.gefweb.org/Documents/Council_Documents/GEF_C21/CC_-_Mexico_-_Executive_Summary.pdf

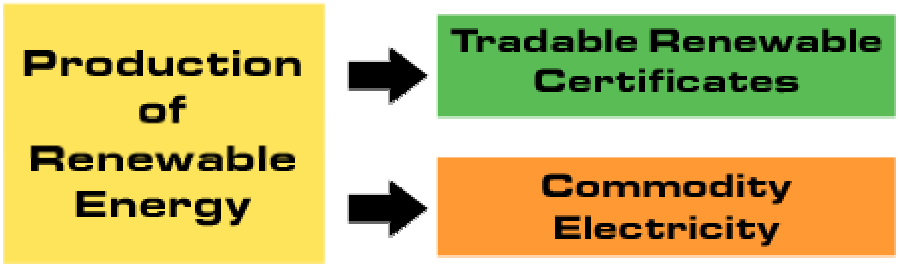
This paper examines the resource opportunities and legal issues associated with the development of a North American market for Mexican renewable energy and renewable energy certificates (TRCs). Specifically, it assesses the feasibility of using TRCs to improve the viability of new renewable development in Mexico.

In the next few sections, we describe TRCs, their uses, and their potential if Kyoto enters into force. We then summarize the current state of the TRC market and the potential for new renewable development in Mexico. We next examine the political, economic and legal barriers and opportunities concluding with some recommendations and next steps for developing a TRC market in Mexico.

TRADABLE RENEWABLE CERTIFICATES (TRC)

What are TRCs?

The concept of tradable renewable certificates[6] is based on separating the environmental or 'green power' attributes of renewable generation from the electrical energy. This creates two separate products for sale by the renewable developer or marketer: (1) commodity electricity, and (2) renewable attributes (also known as TRCs).



TRCs are created when a renewable energy facility generates electricity. Each unique certificate represents all of the environmental attributes or benefits of a specific quantity of renewable generation, namely the benefits that everyone receives when renewable fuels are used and conventional fuels (such as coal, nuclear, oil, or gas) are displaced. At its core, a

[6] / These are also known as renewable energy certificates, certificates, renewable energy credits, green tags, tags, RECs, and T-RECS. Some of the names and acronyms are trademarked labels (e.g. RECS and "Green Tickets" are trademarked names). Therefore, the authors chose to use the generic acronym TRCs.

renewable certificate is a market-created instrument that can be bought and sold, and that conveys the value of a unit of renewable generation over that of system generation. The renewable attributes may be bought and sold together, separately or combined with system electricity at the point of sale by a developer or power marketer. Independent tracking and verification is necessary to ensure that no two certificates represent the same MWh of energy.

Uses of TRCs

The market for renewable electricity is more dynamic today than at any point in history. TRCs create a liquid currency for Mexican renewable generation that offers the potential to expand markets nationally and internationally. There is potential for Mexican TRCs to be used in the following applications. In most cases, this potential is small now, but is likely to grow significantly over the long term.

- Renewable portfolio standard (RPS) and compliance with other environmental targets or mandates in the US,
- Supply for green pricing programs in both Mexico and the US,
- Voluntary TRC markets: Providing a green option to customers who are not served by a green provider (particularly relevant for large commercial/industrial customers in the US),
- Greening energy supply for specific events in both Mexico and the US, and
- Global greenhouse gas reduction markets, including CDM markets.

Basic resource information is a fundamental part of TRC sales and marketing. Certificates are differentiated based on the type of renewable resource generation used, the geographic location of the generation facility, the vintage of the certificate (when the power was generated and thus when the TRC was 'born'), and the date the generation facility became operational (i.e. is it from a new or existing facility). The database that supports TRCs may also include such information as whether a hydro resource has been certified as 'low-impact,' and the fuels and emission profile of generators using biomass fuels with a combustion technology. Since each TRC has a unique serial number, marketers can match customer's preferences to specific TRC characteristics.

TRCs are beginning to be bought and sold separately from commodity electricity in US and Canadian markets. In the future, TRCs may be subdivided into air emission offsets such as NO_x benefits, SO_2 benefits, carbon benefits, etc. that might be sold into local or global emissions trading markets or be used to meet air quality compliance. They might also be used as a mechanism to finance clean energy development in developing countries and

rural areas of developed countries as well as renewable energy development on indigenous people's lands.

TRCs versus Carbon Offsets

The question could be asked: "Why use TRCs, why not just use carbon emission credits?" There are several responses to this question. First, TRCs represent more than just the carbon reduction value of renewable energy and may have value in other emission markets. The second reason is that at present, the U.S. has withdrawn its participation in the Kyoto Protocol and therefore there is not a government carbon reduction target in the US. However, there is a rapidly expanding market for TRCs in the US related to voluntary carbon reduction activities as well as renewable energy policies. A credible issuing, tracking and verification system for TRCs from Mexico can serve as a platform for translating those TRCs into carbon reductions that can be sold internationally while providing diverse markets for other renewable energy attributes.

Finally, though the Kyoto Protocol needs only one more large country, possibly Russia, to enter into force of law, agreements will still need to be forged regarding the methodology for converting a MWh of power from renewable resources into pounds of carbon reduced. Though some conversions and trading are taking place today, many more opportunities are being lost due to uncertainty about the final rules and methodology. Establishing a credible TRC issuing, tracking and certification system will allow the attributes from renewable energy to be banked in a secure system until such time as these issues have been resolved and the TRCs can be converted to their appropriate carbon equivalents. Since such a system will include data on the type of generation/fuel, generator location, date of generation, etc., any certificates that are not eligible under the final rules and methodology can be readily identified and exempted from use for this purpose. While those that meet the eligibility criteria will not have been lost due to the absence of an official conversion methodology at the time they were produced.

TRC North American/European Market Background

The TRC market in the US and Europe is extremely dynamic and is becoming more and more interconnected with global emissions markets. In Mexico, geothermal, wind and small hydro resources have the greatest potential for new renewable development that could produce TRCs for international sale. All of these resources hold some potential for additional revenue through a North American or international TRC market. Wind and solar TRCs are the most sought after in green power markets, that is, the direct sale of TRCs to retail

customers. Geothermal, biomass and small hydro TRCs hold more promise for conversion into emissions offsets for global markets with the majority of demand at present coming from Europe. Though Canada (also a Kyoto signatory) could become an attractive market for Mexican certified emissions reductions (CERs) through the CDM mechanism.

As the renewable energy market continues to grow and innovate, renewable certificates have emerged as an economic and flexible way to support new development. The use of TRCs is widespread in both the wholesale and retail American green power markets and continues to grow rapidly. TRCs are used to track compliance with 7 of the 13 active Renewable Portfolio Standards (RPS) in the country.

The states that employ a certificate-based compliance mechanism for their RPS requirements include: Arizona, Connecticut, Maine, Massachusetts, Nevada, Texas, and Wisconsin. New Mexico's RPS will use TRCs, once that RPS takes effect. Minnesota, New Jersey, Pennsylvania, and Iowa are the only states with active RPS policies or goals that do not use TRCs, and the New Jersey and Pennsylvania requirements are likely to use TRCs once Pennsylvania, New Jersey and Maryland (PJM) have developed such a system, which is expected. The CRS Team estimates that wholesale and retail TRC transactions in 2002 in the U.S. exceeded 1,242,300 MWh.

MEXICAN POTENTIAL FOR NEW RENEWABLE ENERGY DEVELOPMENT

Mexican Renewable Energy Potential

Though numerous studies have indicated a large and diverse potential renewable resource base in Mexico, for the present, little has been developed. Fossil fueled generation still accounted for 76 percent of electricity generated in 2000 (according to the Energy Information Agency - EIA), hydropower 17 percent and other resources only 3 percent. Though hydro accounts for 26.2 percent of generation capacity (9,619 MW) it only accounts for 14 to 17 percent of the energy due to insufficient water supplies for year-round generation.[7] Geothermal is the second most used renewable resource with 855 MW

[7] / Estudio de la Situación Actual de la Minihidráulica Nacional y Potencial en una Región de los Estados de Veracruz Y Puebla (CONAE, 1995).

followed by wind with 2MW from 'La Ventosa' and 'Gerrero Negro,' and Solar PV (non-grid connected) that accounts for 14MW.

Table 1 – Renewable Resources for Energy Generation in Mexico

Source	Potential Location	Potential Capacity	Installed Capacity
Solar	¾ of the national territory	5.5 kWh/m^2	13.2 MW (Source: CONAE)
Wind	Isthmus of Tehuantepec, coast of Quintara Roo, Vera Cruz, Tamaulipas and Baja California, central region of Zacatecas, San Luis Potosi and Hidalgo (source: SENER) Oaxaca, Zacatecas, Hidalgo	5,000 MW (Source: SENER) 2,900 MW (Source: CFE)	2 MW (Source: CONAE)
Geothermal	Cerro Prieto (North Baja California); Azufres (Michoacan), Humeros (Puebla), Tres Virgenes (South Baja California), Primavera (Jalisco)	35,782 MW	855 MW (Source: SENER)
Small Hydro (< 5MW)	Chiapas, Veracruz, Puebla, Tabasco	3,200 MW (Source: CONAE)	76 MW (Source: Study of Current National Situation of Small Hydro, CONAE 1997)

Interestingly, not only are there large potential renewable resources available for development in Mexico but the resources are well distributed throughout the country as shown in Table 1. Three-quarters of Mexico has a good solar resource ($\geq$5.5 kWh/m2); there is an estimated 5,000 MW of commercially developable wind (distributed over 8 states), 35,782 MW of geothermal (located in 5 states), and 3,200 MW of small hydro (5MW size) located primarily in 4 states.

Current Use of Renewables in Mexico

Despite the great potential for solar power, in general this resource has primarily been used for off-grid applications in rural areas of Mexico. And despite the fact that this is a broadly distributed high quality solar resource, there are no grid-connected photovoltaic systems installed in the country. There has been discussion about development of a large solar thermal generating station in Baja California but that project has not gone forward.[8]

[8] / The GEF earmarked $50 million for Mexico to use for a Solar thermal project in Baja but instead the RFP focused on natural gas facilities and awarded a contract for that rather than for a solar facility according to conversations with solar thermal developers.

The situation for wind power development began to change in 1994 when La Venta Wind Power Station (1.5 MW grid-connected system) began functioning in the State of Oaxaca. In 1998, the wind power station Guerro Negro started operation with a capacity of 600kW in Baja California Sur. However, unlike La Venta, this system is not connected to the grid, instead the electricity generated has been used for local agricultural purposes.[9]

In September of 2001, the CRE (Energy Regulatory Commission of Mexico) published special rules for interconnection contracts between CFE (Federal Electricity Commission – the government owned electric utility) and suppliers of renewable energy that benefit self-suppliers whose consumption points are not adjacent to the production site. As a result, a 51 MW wind farm in Oaxaca (that could be expanded to 99 MW) is under development and private sponsors are planning three additional wind farms of 30, 60 and 300 MW.[10] Each of the projects contemplates wheeling and third party sales agreements to nearby industries and municipalities who currently pay high electricity tariffs. Though all of these projects are important for developing momentum for renewable energy development (especially wind) in Mexico, there are many uncertainties, the costs for these projects are high, and the business model that is being used (self-supply to a consortium of users) is probably not politically sustainable over the long-term as a mechanism for encouraging the broad use of renewables.

A recent study of the "Current Situation of Mini-hydro and Determination of Available Potential in Puebla and Veracruz States," [11] indicates that Mexico has more than 100 years of mini-hydro experience. To date, CFE has 13 mini-hydro plants, LFC has 9 plants and there are 61 plants operated by independent producers. At the same time, 36 previously generating CFE plants have ceased operation primarily due to high operation costs and obsolete equipment.

Geothermal generation (855 MW installed to date) continues to be a favorite of the utility with a proposal to develop at least another 123 MW over the next ten years.

Future Projections for Renewable Energy Growth in Mexico

CRE estimates that Mexico will need to increase its electrical capacity by 27,357 MW between 2001 and 2010. Plans also include retiring 1,661 MW of older oil-fired generation

[9] / APEC 21st Century Renewable Energy Development Initiative: Survey of APEC Member Economies' Renewable Energy-based Priority Needs and Issues Relating to Sustainable Development, 2001.

[10] / Carlos Gottfried, from presentation at Commission for Environmental Cooperation meeting "Overcoming Renewable Energy Production and Sourcing Constraints in Mexico: Lesson Learned from NAFTA Partners." Mexico City, February 7, 2003.

[11] / Estudio de la Situación Actual de la Minihidráulica Nacional y Potencial en una Región de los Estados de Veracruz Y Puebla (CONAE, 1995).

during this period, for an 83% net increase in generation capacity. Because of their relative efficiency and fuel price projections, most of the capacity to be built or contracted by the public sector over that ten-year period is expected to use natural gas combined cycle turbines. This trend will result in gas-based generation increasing its share from 9.2 to 52.1 percent while oil-based thermal generation will reduce its contribution to approximately 13.8 percent. Though 10,854 MW are already committed or under construction, CFE does not have the capital required to construct all of the new generation necessary to meet this projected demand. With CFE building conventional facilities as rapidly as possible, there will continue to be an unserved need that could be filled by renewable generating facilities. Official projections (see below) appear to reduce renewable energy contributions (including large hydro) from 20 percent down to 12 percent (though the absolute MW amounts will grow).

Ministry of Energy projections summarized in Table 2 show that renewable energy capacity will grow by 3,752 MW during the period from 2001-2010 (from 10,735 MW to 14,487MW). But except for large hydro and geothermal projects, renewable growth is reduced dramatically to only 438 MW of the 27,357 MW of capacity needed during this time. Table 2 indicates the anticipated breakdown of renewable energy development during that period.

Table 2 - Baseline Renewable Energy Capacity Additions 2001-2010 (MW)

	Cane Bagasse	Mini Hydro	Wind	Solar	Biogas	Geo	Hydro	TOTAL
2001	210	20.3	5.7	14	11	855	9,619	10,735
2010	246	225.0	187.0	24	17	978	12,810	14,487
Installed 2001-2010	36	204.7	181.3	10	6	123	3,191	3,752

Source: Prospectiva del Sector Eléctrico 2001-2010, Secretaría de Energía; CRE

The policy objectives included in the Ministry of Energy's *Programa Sectorial* (See Appendix A for a description of those policy proposals) propose to augment the targets in Table 2 with an additional 1000 MW of renewable capacity.

The national electricity research institute (IIE) has proposed a more aggressive growth scenario (see Table 3) if the appropriate policies and regulations were put into force over the 2001-2010 time period. Their proposal is as follows:

Table 3 An Aggressive Expansion Scenario for Renewable Energy Additions 2001-2010

Resource:	MW:
Wind	2000
Small Hydro	300 – 500
Biomass	150
Photovoltaic (solar)	10 – 20

Source: IIE

The World Bank/GEF Large Scale Renewable Energy Development Project for Mexico is proposing to stimulate renewable energy investments through technical assistance, detailed system-based analysis and tariff incentive support at the national level that will support up to 600 MW of new wind generation by 2010.

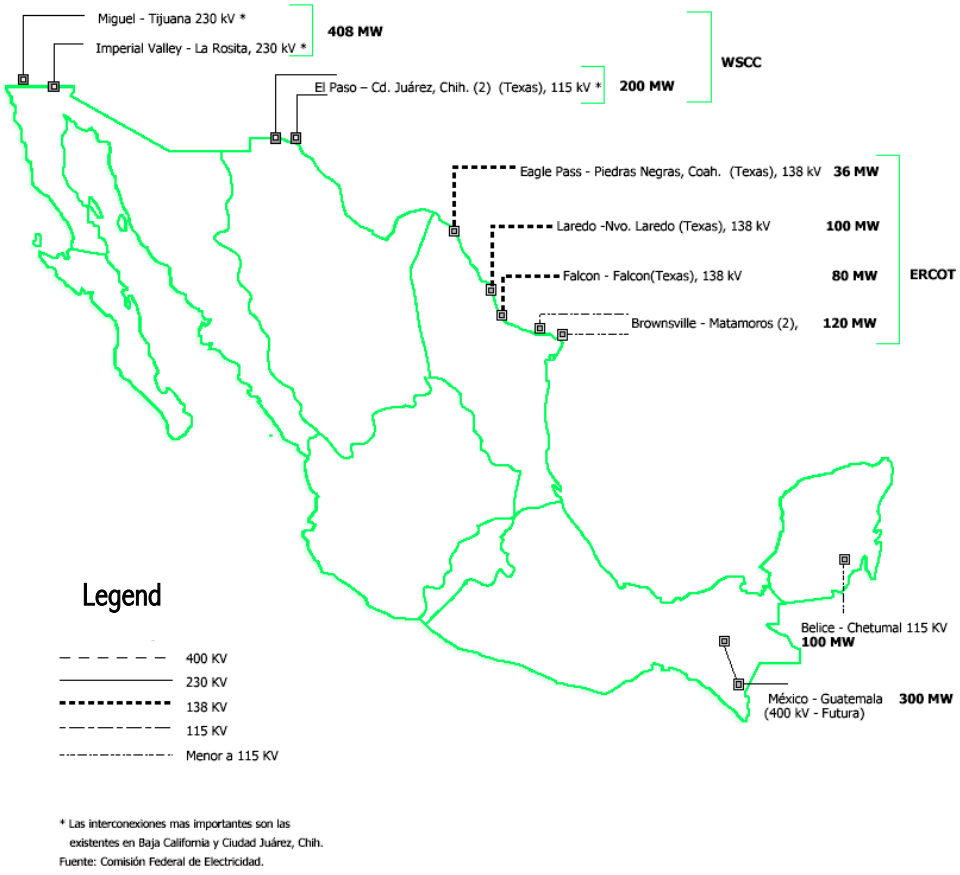
INTERCONNECTION CAPABILITY WITH THE U.S. FOR MEXICAN RENEWABLE ENERGY FACILITIES

Interconnection capabilities with the U.S. along the border region are limited at the present time though they could be expanded if there were sufficient interest. At present there are nine points of interconnection with the US. There are discussions taking place now about adding additional transmission capacity between California and Mexico due to the construction of one or more new generating facilities in northern Mexico that would partially serve the California market. There have been few US/Mexico electricity interconnections because electricity demand in northern Mexico has historically been very light and few generating facilities were built in Mexico to serve US load. If generation facilities are constructed (or proposed to be constructed) in northern Mexico to serve U.S. markets, and/or electricity demand in northern Mexico increases significantly, then transmission/interconnections will likely be expanded.

Though strengthening the US/Mexico interconnection capability would certainly be useful, it is not critical to the development and trade of renewable energy attributes. One of the attractive aspects of TRCs is the ability to sell renewable energy attributes without the need for direct electrical interconnection facilities. Moreover, since Mexico itself has a constantly increasing demand for electricity, the country is not expected to have surplus electricity that

it needs to sell[12]. Rather the issue is one of identifying basic financing and alternative sources of revenue to support new renewable energy development.

Figure 1. Existing Mexican Electricity Interconnections



Source: Secretaría de Energía

[12] / Unless generation is cited in the U.S. /Mexico border area where there is insufficient Mexican demand but where there might be significant U.S. demand.

RENEWABLE ENERGY POLITICAL BARRIERS FOR MEXICAN DEVELOPMENT

There are a number of political barriers to renewable energy development in Mexico. These include the need for: (1) revisions to Mexico's Electricity Law[13] to improve the conditions under which independent power producers (IPPs) can develop and sell power from renewable energy facilities to the government-owned electric utility and others; (2) development of an acceptable definition of "least cost power;" (3) an acceptable long-term (at least 10 year) power purchase and interconnection agreement to support power purchased from these facilities (including a purchase price that incorporates capacity value for intermittent resources; and (4) a stable governmental policy framework for renewable energy development in Mexico.

The single greatest barrier is the Mexican Constitutional provision that restricts foreign activity in the Mexican electricity market and prohibits private party investment in the energy sector. Though the regulatory modifications established in September 2001 that permit indirect contracts between renewable energy producers and consumers and allow new generation/sales relationships to develop are extremely helpful, they do not go far enough in providing real flexibility and confidence in the system required to support significant investments by the financial community. The Mexican government is aware of this problem but, as yet, has not found a politically acceptable solution.[14]

Moreover, Artlicles 27 and 28 of the Mexican Constitution require CFE to acquire energy at 'least cost.' To date, this has been interpreted by CFE to mean the lowest priced power without taking into consideration other cost factors such as:

- The as-available capacity value of seasonal or intermittent renewable resources;
- Portfolio diversification benefits (including hedging gas price fluctuations); or
- Internalization of environmental costs and benefits (local, regional and global).

The WB/GEF Renewable Energy Strategic Partnership intends to address the development of an acceptable long-term contract, when that program is implemented. This partnership may also improve the perception of policy stability necessary to reassure potential renewable

[13] / Much of which is contained as part of the Mexican Constitution

[14] / From discussions with Mexican government officials February 2003.

energy financing institutions. Through the competitive solicitation, the Strategic Partnership may also help to redefine 'least cost' (see discussion in the section below). If these barriers can be overcome, then we can look at the financial needs of these projects.

Finally, as stated in the Asia-Pacific Economic Cooperation (APEC) Survey,[15] the key competition to the use of renewable technologies are the current subsidy policies to fossil fuels and the lack of adequate regulatory framework to encourage the development of electricity generation projects with renewable resources. This reinforces the barriers identified by the Ministry of Energy's *Programa Sectorial,* the national electricity research institute (IIE) and others who are calling for policy and regulatory reforms along with legal changes and financial incentives as the measures needed to address current barriers.

REVIEW OF SUPPORT SCHEMES FOR RENEWABLE ENERGY DEVELOPMENT IN MEXICO

World Bank Prototype Carbon Fund (PCF)[16]

The World Bank Prototype Carbon Fund (PCF) was initiated in 1999 with the operational objective of mitigating climate change, promoting the Bank's tenet of sustainable development, demonstrating the possibilities of public-private partnerships, and offering a "learning-by-doing" opportunity to its stakeholders. The PCF invests in projects that they anticipate will produce high quality greenhouse gas emission reductions that could be registered with the United Nations Framework Convention on Climate Change (UNFCCC) for the purposes of the Kyoto Protocol. Independent experts follow validation, verification and certification procedures that respond to UNFCCC rules as they develop, to increase the likelihood that the Parties to the UNFCCC will recognize the reductions.

The PCF invests contributions made by companies and governments in projects designed to produce carbon emission reductions (CERs) fully consistent with the Kyoto Protocol and the emerging framework for Joint Implementation and the CDM. Contributors, or "Participants" in the PCF, then receive a pro rata share of the emission reductions, verified

[15] / Supra Note 6 (APEC pp. 7 & 8).

[16] http://prototypecarbonfund.org/router.cfm?Page=About

and certified in accordance with agreements reached with the respective countries "hosting" the projects.

Development of a North American TRC issuing and tracking system would be compatible with and complementary to the Prototype Carbon Fund. The two programs would need to develop good communications so that TRCs purchased by the Prototype Carbon Fund are removed from the TRC accounts to avoid double counting of these attributes.

World Bank/GEF Large Scale Renewable Energy Development Project[17]

The World Bank/GEF Large Scale Renewable Energy Development Project is proposing to stimulate renewable energy investments through regulatory changes and policy commitments at the national level. The program seeks to develop a continuous stream of investments with a declining level of concessional support overtime, and integrate these investments with policy and market recognition of the energy capacity, environmental and diversification value of renewable energy sources at the tariff level.[18]

The financial mechanism will support approximately 600 MW of primarily new wind generation over a ten to twelve year period. The financial mechanism being proposed includes a tendering-type policy to select the most cost effective wind projects and the use of GEF funds to pay the incremental costs of those participating renewables. This special fund would, in effect, be purchasing the TRCs generated by the renewable energy facilities once they are operational. This project has just been approved by the GEF Council and will become operational March 2004. Development of a renewable energy tracking system would definitely facilitate this effort and people at the World Bank, GEF and the Mexican Ministry of Energy and CONAE have expressed interest in the concept.

We believe it is possible to leverage the momentum and interest of the Mexican Government generated by the GEF Large Renewables Project to stimulate additional renewable energy projects and the implementation of other Mexican policy and support activities.

[17] http://www.gefweb.org/Documents/Council_Documents/GEF_C21/CC_-_Mexico_-_Executive_Summary.pdf

[18] / Mexico Renewable Energy Strategic Partnership, GEF PDF Block B Grant Proposal, Draft 1/31/03

MEXICAN COSTS AND FINANCING NEEDS FOR RENEWABLE ENERGY DEVELOPMENT

Presently the reference price for Mexican electricity is approximately US 3.5 cents/kWh. The average imbedded price of generation already in operation (much of which exceeds 30 or 40 years of age and does not meet current pollution standards) is US 2.7 cents/kWh. New generation plants under construction or discussion tend to be natural gas combined cycle in the 3.5 to 4.0-cents/kWh range depending upon the gas price forecast used in the life-cycle calculation. As a result, wind generation is the closest renewable resource to being cost competitive with these new facilities at 1.5 to 2.0 cents/kWh more expensive than projections for new natural gas plants using the present least-cost definition.[19]

One of the benefits of renewable generation facilities is that 75 to 90 percent of their costs are fixed from the time they become operational so that, unlike gas or oil facilities, they do not have volatile fuel price swings. They can therefore provide a cost-stabilizing element to the utility's supply portfolio. This is a major benefit in Mexico where gas price fluctuations have been significant over the last several years. The volatility of such price impacts will be further magnified by the high concentration of combined cycle gas turbines planned or under construction over the next ten years. Widespread adoption of renewable resources would not displace major quantities of natural gas, but would complement gas while diminishing the risk. In addition, accessing the value of renewable energy attributes such as carbon and other pollution credits could add an alternative revenue stream for renewable energy developers and facilitate financing of renewable generation contributing positively to local industrial development.

Development of favorable financing conditions for new renewable energy facilities requires, at the minimum the following preconditions:

- A stable and positive political/policy environment for renewable electricity purchases
- A financiable long-term power purchase agreement (PPA)
- A Revenue stream(s) for the output from the project (including the TRCs or CERs) so that a combination of these with the power purchase price will cover the full project costs (including the cost of capital) plus a reasonable return on investment.

[19] / Mexico Renewable Energy Strategic Partnership, GEF PDF Block B Grant Proposal Draft 1/31/03.

The World Bank/GEF Renewable Energy Strategic Partnership, mentioned previously, is aimed at improving these preconditions in Mexico. The mechanism being suggested by the World Bank uses GEF funds to pay the incremental costs of renewable energy facilities that win the competitive solicitation (compensation for every kWh of power generated to offset the incremental cost of renewables compared to other types of new generation in Mexico). In essence, they are buying the TRCs from the new renewable energy generators at their bid price (the lowest price subsidy needed to build the facilities).

Though this type of program could be implemented without a generation certificate tracking system, the development of a credible TRC issuing, tracking and certification system for Mexico renewable energy projects would allow other potential projects to be developed beyond what is planned under the current World Bank scheme. The TRC/CERs market could contribute the additional revenue stream that is supplied by the GEF funds in the World Bank project and similarly improve the economic picture for renewable generation facility financing.

CURRENT GLOBAL MARKET AND PRICING FOR TRCS AND CERS

The international market for TRCs is very regionalized, primarily because the market is being driven by mandatory programs, such as US states' RPS and national country targets like UK Renewable Obligation. In many cases, renewable energy or TRCs from a particular state or country (in the case of the UK) meets the regulatory requirement. In some US states, out-of-state TRCs have to be accompanied by an energy delivery to the state border. Therefore, the mandatory markets for TRCs are generally not very liquid and large price differences are seen between regions and countries as shown in Table 4 below.

There is also a voluntary market for TRCs. This market is international in scope, but is immature at the present time. Most voluntary purchases of TRCs are from large local businesses, industries and multinational corporations who are using their purchase to offset their energy usage from traditional resources. In the US, voluntary non-residential demand accounts for the vast majority of TRC purchases.[20] The top five reasons cited by US non-

[20] / Personal Communication, Gabe Petlin, Green-e Program Manager, Center for Resource Solutions, May 22, 2003.

residential customers for purchasing renewable energy include: (1) organizational values (the purchase helps companies meet a corporate environmental mission statement), (2) civic responsibility, (3) employee morale, (4) public image, (5) ability to translate their purchase into green marketing around their product, and (6) reduced regulatory risk against future regulation.[21] In many cases the geographic location of the renewable generator matters, but in other cases where the environmental motive is driven by carbon reduction, it does not. Many companies prefer purchasing TRCs because it is a much easier transaction than purchasing delivered renewable electricity. In addition, companies have many more choices of TRC providers than they do renewable electricity providers. Currently in the US and Canada, there are over twenty TRC providers, whereas most electricity markets have only one or two renewable electricity providers if any at all.[22]

Table 4. May 2003 Market Prices for New TRCs

US: New England (mandatory driver)	$24-25/MWh
US: Texas (mandatory driver)	$12 /MWh
US: PJM (mandatory driver)	$3-5/MWh
US: WECC (voluntary)	$1-5/MWh
UK ROCs: (mandatory)	$69-79/MWh
Dutch Green certificates (voluntary)	$6-7/MWh
Swedish Electricity Certificates	$25/MWh
CDM Carbon Emissions Reductions	$3.50-$4.50/tonne CO2 eq[23] / $1.70 – $2.30/MWh (estimated)

Source: Natsource "Airtrends," May 2003 unless otherwise noted

There is also a very strong future opportunity for Mexican renewable developers to convert their TRCs, denominated in MWhs, to Certified Emissions Reductions (CERs), denominated in tons of CO2 equivalent, through the Kyoto CDM. The CDM will become active when the Kyoto Protocol enters into force after the last country, possibly Russia, ratifies the agreement. In preparation for this, the CDM has worked through their process for validating CERs from renewable projects, and has created a "fast-track" approval process for small scale renewable projects under 15 MW.

CDM project rules, as defined by the Kyoto Protocol and the Marrakesh Accords, state that projects must meet certain requirements in order to qualify as CDM. These requirements

[21] / Ed Holt et al, Understanding Non-residential Demand for Green Power, p. 39.

[22] / http://green-e.org/your_e_choices/trcs.html

[23] / Personal Communication with Natalie Roth, Associate Evolutions Markets, May 22, 2003.

include compliance with the project and development criteria, the validation and project registration process, the monitoring requirements, the verification and certification requirements, and the rules governing the issuance of CERs. Briefly, to obtain tradable CERs for a renewable project located in Mexico, the developer needs to estimate the greenhouse gas (GHG) emissions that are being displaced by the project. CDM projects must meet an 'additionality' requirement. CERs can only be issued for projects where the calculated reductions in emissions are additional to any that would have occurred in the absence of the project activity. The developer has to register their project, submit the justification for the quantity of emissions reduced to the CDM Board, and prove that the MWhs were generated. The CDM Board validates the CERs, which are then available for international trading under the Kyoto protocol.

As of the writing of this document, there is very little market demand for Mexican TRCs that could potentially be converted to CERs or that could be used in future cap and trade or other emissions trading markets. Regulatory uncertainty around voluntary early action has chilled many would-be buyers into waiting until there is more certainty that buying TRCs now will be credited toward future GHG or other emission reduction obligations.[24] However, emissions brokers are very sanguine about the potential market for CERs from Mexican renewable projects under the CDM. This may provide a financing opportunity for new renewable projects in Mexico, although the price paid will ultimately be subject to market fluctuations and worldwide supply and demand, and it is hard to predict what the prevailing price will be. The development of a renewable generation accounting system would aid in the validation of the CERs under this financing mechanism. The early creation of a TRC banking system would also provide the proof needed to convert TRCs generated now into CERs in the future, should this be allowed under the CDM.

Mexican renewable developers can also enter into forward contracts for expected CERs. Currently, forward contracts for CERs pay in the range of $3.50-$4.50 per metric tonne of CO_2 equivalent. The average CO_2 emissions rate from a natural gas-fired generation plant in the US is 1135 lbs/MWh.[25] Using this as a very conservative estimate of displacement, and not including NOx emissions, which can also be converted to CO_2 eq, a MWh from a Mexican renewable facility would displace approximately 0.51 tons of CO_2 per MWh. Although the current price for a forward contract for CERs is not very high, when Kyoto enters into force, the price should significantly increase as the regulatory uncertainty is dispelled.[26]

[24] Personal Communication, Aldyen Donnely, President, GemCo May 7, 2003.

[25] / U.S. EPA, eGRID 2000. http://www.epa.gov/cleanenergy/natgas.htm

[26] / Personal Communication, Ben Feldman, Natsource LLC, May 22, 2003.

LEGAL ENVIRONMENT UNDER WHICH A NORTH AMERICAN TRC MARKET COULD DEVELOP[27]

In an increasingly integrated North American energy market, the exchange of TRCs can serve an important role in promoting private investment in renewable energy development in Mexico. International sale of TRCs, however, raises a number of legal issues that must be addressed in order to ensure that the potential benefits of TRC trade between the U.S., Canada and Mexico can be achieved. Minimizing legal barriers to cross border exchange of TRCs will be a critical element in the development of a robust North American market.

As discussed earlier in this paper, restrictions on foreign investment in the Mexican electricity sector pose the most serious legal and economic barriers to the development of a U.S.-Mexico TRC market. Determining what other barriers might exist will depend on the legal definition of a TRC which in turn can vary based on the structure of the exchange transaction. This section discusses the potential applicability of trade, investment and securities laws to TRC sales, noting that different legal requirements could apply to the kinds of transactions envisioned for TRC exchange.

WHAT IS A TRADABLE RENEWABLE CERTIFICATE?

Some possible legal definitions:

- *Commodity*
- *Service*
- *Investment*
- *Security*

Resolving the TRC definitional issue poses difficulties for both practical and political reasons. From a practical perspective, a universal legal definition of a TRC regardless of how the exchange transaction is structured would simplify the identification of applicable laws however. The variety of transactions currently used to effectuate TRC exchange makes this difficult in the current market. While a common view has been that TRCs are commodities, this paper takes the position that they are more appropriately characterized as securities. As the TRC market continues to evolve in a way that results in TRCs being sold independently---rather than in combination with electricity---they are very likely to be classified as securities.

[27] / *An Integrated North American Market for Tradable Renewable Energy Certificates: Legal Issues in U.S.-Mexico Trade,* by the Climate Change Legal Foundation is available in full in Appendix B of this document.

It is envisioned that, to the extent allowed under Mexican investment law, an increasing segment of the U.S.-Mexico market will involve transfer to a foreign investor of TRCs generated in the context of a project. Even if these TRCs are appropriately characterized as investments, this does not negate the validity of a general classification of TRCs as securities, particularly because they may be converted to securities if resold on an exchange.

How TRCs are defined will also affect the property rights associated their ownership. For example, one of the most controversial issues surrounding these definitional issues is whether TRCs are property that is subject to rules on governmental expropriation and compensation. As long as the definition of a TRC remains ambiguous, the nature of the property rights associated with a TRC will also be unclear reducing the need to address the expropriation issue.

Important for Legal Issues to be Resolved Early

The development of the TRC market is still at an early stage and many issues about the legal nature of TRCs have not yet been resolved. Because the TRC market is still just beginning to evolve, there is a window of opportunity to resolve these issues in a manner that facilitates trade and investment by minimizing legal barriers. Minimizing legal barriers will encourage the development of a robust regional market by reducing transactional costs that could negatively impact TRC trade.

Another important factor in determining the legal requirements that apply to TRC exchanges is who the parties to the transactions are. Governments, private commercial entities and consumers may all participate in the TRC market. The laws governing TRC sales and settlement of disputes can vary depending on the nature of the parties to the transaction.

In the long term, it is also important that TRC documentation, measurement and trading infrastructure be designed in a manner that will facilitate trade in other environmental attributes of energy production in the future. In this regard, the Kyoto Protocol on Climate Change and the rules on trading green house gas emissions need to be considered.

Are TRCs Goods or Services?

Under both NAFTA and WTO agreements, whether a TRC is characterized as a "good" or "service" is a threshold question for determining whether these agreements apply to cross border TRC trade. As noted above, depending on the structure of the transaction, TRCs could be classified as either goods or services. Prior to market liberalization, much of the energy sector was vertically integrated and was comprised of government owned enterprises engaged in the production, transportation and distribution of energy. Because of its integrated structure, the energy industry historically did not distinguish between energy goods and services. Due to the restructuring and privatization of the energy sector, energy activities have been disaggregated and energy goods have been identified as distinct from energy services. In a restructured energy market, generation, transportation and distribution of electricity have been separated and are increasingly carried out by independent entities.

While electricity has the characteristics of a service--it is not a product that can be stored for future use and it must be supplied over transmission lines--it has also been classified as a commodity. At this time, there is still no universally accepted definition of electricity as a good or a service due to the differences among countries. However, the World Customs Organization, which assigns customs codes under the Harmonized System to products traded internationally to enable customs officials to track exports and imports, has created a code for electricity, implying that it is viewed as a commodity. While application of the customs code for electricity by members of the World Customs Organization is not mandatory, its inclusion reflects the inclination of most countries to treat electricity as a product when it is traded internationally.

Both NAFTA and WTO agreements apply to energy related activities, with some differences in their classifications of these activities as goods or services. Mexico, Canada and the U.S. are parties to both WTO and NAFTA.

A full discussion of NAFTA and WTO definitions and their applicability to TRC trade is contained in the full legal report attached as Appendix B of this document. The following is a summary of the findings as they relate to legal barriers to trade of TRCs in North America.

Are TRCs Securities?

TRCs are most likely to be characterized as securities when sold: 1) independent of their underlying electricity, 2) over an exchange, 3) to unsophisticated consumers. If investors

are solicited from the general public e.g. through mailings to energy customers, TRCs are very likely to be deemed securities.

The basic purpose of the U.S. securities laws is to protect investors from manipulative and deceptive practices in the solicitation of sales. The U.S. has a dual track regulatory system consisting of both federal and state securities laws that are duplicative in many respects and different in others. The key focus of federal securities laws is on information disclosure. The federal securities laws protect investors from deception or manipulation by requiring financial disclosure and transparency while leaving them free to make their own, possibly bad, investment decisions.

If TRCs were classified as securities, Article 8 of the U.C.C. would apply to TRC sales within the U.S.. For the sale of a security, evidence of ownership and registration are some of the key issues covered by U.C.C. Article 8, issues of particular importance for the developing TRC markets. The U.C.C. applies whether or not a certificate has been issued as evidence of ownership of the security. Federal securities law may govern many aspects of the certificate.

If TRC are classified as securities and sold in the U.S., they would be regulated under US federal and state securities laws, even if they were created in Mexico. Securities that are not sold on a national stock exchange are said to take place "over the counter" or "OTC" and are not subject to federal registration requirements.

.

As TRC trading is expected to take place OTC, as is the case with pollution emission credit trading, it is likely that they would be exempt from federal and state registration requirements. However, the anti-fraud provisions of the US federal and state securities laws would still apply to TRCs sold in the U.S.

TRCs could also be exempt from both securities registration and disclosure if they meet certain criteria concerning the value of the securities issued, solicitation of buyers, restrictions on resale and the qualifications of the investor.

Main Conclusions on TRC Trade Barriers and Issues

Depending on how TRCs are characterized, different legal requirements will be applicable to their exchange. TRCs could be classified as commodities, services, securities or investments.

TRCs as Commodities

TRCs are most likely to be classified as commodities when they are sold in combination with electricity.
If TRCs are classified as commodities, international trade agreements would apply to cross-border exchanges--

The General Agreement on Tariffs and Trade, administered by the World Trade Organization
NAFTA Part Two on Cross-Border Trade in Goods

TRCs as Services

If TRCs are created and exchanged in the context of foreign participation in construction, operation, maintenance of a project, they could be classified as services
If TRCs are characterized as services, the following international agreements could apply to their exchange—

General Agreement on Trade in Services, administered by the WTO
NAFTA-Chapter on Trade in Services

TRCs as Securities

If TRCs are sold independently of the underlying electricity generated when they were created over an exchange, they could be classified as securities.
If TRCs are classified as securities, the key laws that could apply to cross-border sales to U.S. parties---

U.S. Federal Securities Law—Anti-Fraud Provisions
Uniform Commercial Code— documentation of TRCs and their sales
State "Blue Sky" Securities Laws—Anti-Fraud Provisions

As the TRC market evolves and more TRCs are sold over exchanges to unrelated third parties, they are more likely to be defined as securities.

TRCs as Investments

TRCs exchanged in the context of a foreign investment in a renewable energy project could be classified as an investment
If TRCs are considered to be investments, the key laws applicable to their exchange would be--

Mexican national law on foreign investment and private investment in the energy sector
NAFTA-Chapter 11 on Investment and Chapter 6 on Energy and Petrochemicals
WTO Agreement on Trade Related Investment Measures

POTENTIAL FOR PUBLIC POLICY TO DRIVE A MEXICAN TRC MARKET

A stable regulatory environment is one of the most important conditions for the development of North American TRC market. The regulatory environment can drive demand for Mexican TRCs or CERs and create a politically stable market under which potential buyers feel comfortable investing. These factors reduce the investment risk to potential TRC or CER buyers, and therefore make it easier for renewable developers to secure long-term purchase contracts, which is usually a condition of financing. Even a small bit of regulatory uncertainty can greatly influence the price of the contract, which in turn influences the lending rate. Since renewable projects generally operate on very thin margins, and often are pressured to supply power at a price near the market price for system power, very small changes in the lending rate can determine whether a project goes forward or is cancelled. Therefore, a stable and positive regulatory environment is an extremely important factor in the development of a TRC market.

Right now, the regulatory environment for TRCs and CERs is poor, although there is much speculation that things will improve. Until they do improve, however, the market for Mexican TRCs or forward CERs contracts will remain immature. The two main areas of uncertainty relate to the use of Mexican TRCs to meet US RPS obligations and potential future Kyoto obligations. With the latter, once Kyoto enters into force of law, this will be a huge driver for CERs, and there is a good potential for long term contracts for Mexican CERs from renewable projects if buyers are confident that the CERs are legitimate and have not been double sold.

The potential for Mexican TRCs to be used to meet US RPS obligations is much less certain. As stated earlier, thirteen US states have RPS obligations. All of these states, except California, require either a delivery of energy into the state or require the energy to be generated in state in order to meet the RPS obligation. The RPS regulations for California

are still under development, but at the time of writing, it looks as though California will also require an in-state delivery of electricity for out-of-state generation to be used to meet the RPS obligation.[28] This greatly reduces the potential for Mexican TRCs sourced from any part of Mexico except the border region. That said, there is great renewable potential in the border region, and all four Border States have an RPS.

Of the four Border States that have an RPS, three, California, New Mexico and Texas are sizable enough to drive a potential market for Mexican TRCs. In order for TRCs from Mexico to qualify for the Texas RPS, the first point of interconnection must be in Texas and the energy and TRCs must be first metered within the ERCOT system. A similar restriction is likely to be a part of the final rules in California as well. The rules for the New Mexico RPS currently restrict out-of-state generators from being eligible for the New Mexico RPS. According to Radar et al., such laws would likely violate the Commerce Clause [interfering with inter-state commerce], as well as NAFTA. It is possible that if these laws were ever challenged, New Mexico would be forced to modify its rules to allow out-of-generation to participate in some fashion.

TECHNICAL ISSUES RELATED TO TRACKING TRCS FROM MEXICO IN U.S. SYSTEMS

There are several TRC tracking systems operating or under development in North America. At this time, these systems are technologically isolated and do not have any interface function or ability to network. However, there are efforts underway to bring these systems together into a North American network that would facilitate national and international TRC trade. A TRC tracking system developed in Mexico should be a part of this North American network to allow Mexican renewable generators to participate in this growing market. To do so, any Mexican TRC tracking system needs to meet the minimum standards being developed by the American Association of Issuing Bodies.

[28] / As noted in the report on Legal Issues in US Mexican Trade, Appendix C of this document, US state RPS regulations that require in-state generation may be contrary to NAFTA and the Commerce Clause of the US Constitution.

Review of Tracking Methodologies in US

Texas, New England, Wisconsin and Nevada currently operate the only TRC tracking systems in the U.S. to issue and track renewable certificates and more broadly, generation attribute certificates. In addition, there are thee or four other certificate tracking systems that are being contemplated in the US and Canada.

Texas RECs Program

In July 2001, Texas developed the first comprehensive certificate-based tracking system in the U.S. Though designed principally to meet RPS compliance needs, Texas' renewable certificate tracking system has also found other uses. In particular, it is used by green power marketers to procure renewable energy in Texas. Texas renewable certificates have also been purchased by out-of-state entities for the purposes of green power marketing and green claims. The system consists of a web-based platform that provides for the issuance, registration, trade, and retirement of renewable certificates that are eligible for the state's RPS. The platform facilitates RPS compliance, but does not provide the "market making" function of a certificate exchange. This function is left to the private marketplace. The system is operated by the Electric reliability Council of Texas (ERCOT), though the Public Utility Commission of Texas has significant generator verification responsibilities.

New England GIS

In addition to the system in Texas, the only other fully automated system for tradable certificates in North America is in New England, serving the six New England states. This system is conceptually very similar to the Texas system, except that the NEPOOL Generation Information System (NEPOOL GIS) tracks all electricity generation in the system. The NEPOOL GIS was established to account for various attributes of energy transactions in the NEPOOL transmission region for the purposes of verifying compliance with state RPS mandates, emission and power content disclosure statements, and to establish a trading platform to facilitate compliance with these mandates. No financial information is recorded in the GIS database.

Both the NEPOOL GIS and the ERCOT RECs Program use financial settlement information as the basis for issuing certificates. Such information is corrected for transmission line losses throughout the system and is considered to be the most accurate basis for issuing certificates.

Wisconsin Renewable Resource Credit (RRC) Program

Wisconsin developed a system to track renewables purchased by the local utilities in excess of their renewable mandate. The certificates issued are referred to as Renewable Resource

Credits (RRC) because they are used almost exclusively in the regulatory context of the state's RPS. RRCs are issued to the utilities for any renewable generation that was purchased in excess of the state's renewable mandate, and was served to utility customers. The RRCs can then be traded between the utilities or held for future compliance. The tracking system has a web-based interface where generators can enter information that is verified by the state regulatory authority or the system administrator. The tracking system was launched in February 2003.

Comparatively, the system is less automated and less sophisticated than the NEPOOL GIS and the ERCOT RECs system, however, it serves the needs of the state and was much less expensive to build.

Nevada

Nevada also operates a certificate-based renewable tracking system, though it relies on a manual review of contracts to verify self-reported generation information. This is known as "contract-path" verification, and is distinguished from the electronic systems described above that receive generation information directly from the transmission system operator. Operated by the Nevada Public Utilities Commission (PUCN), the "system" is really a simple spreadsheet managed by staff at the PUCN who has the authority to issue and retire certificates. Certificates are only issued for electricity generation that is delivered to a Nevada consumer. Therefore, the system is very similar to Wisconsin's in that the only renewable certificates traded in the Nevada system are those renewables purchased by the utilities in excess of the state's RPS. The Nevada system is not equipped to handle a well-developed TRC trading market where the TRCs change hands several times or are traded for voluntary purposes. Because of this, the NV system is considered to be an interim system while an electronic tracking system is being developed for the western US.

The key design features of the four tracking systems operating today are found in Table 1.

Other States

There are several other efforts underway to develop a certificate tracking systems in the US. In the **Mid-Atlantic**, a committee of interested stakeholders has been meeting to design a conceptual model of a generation attribute tracking system for the PJM interconnection electricity region, which includes the Mid-Atlantic and significant portions of the Midwest and Southeastern US. The system as currently envisioned would create certificates for all energy attributes. Although there is no calendar for when the system will be built, there is a high probability that a certificate-based electronic tracking system will be developed because of the regulatory-driven verification needs in the region.

The **Western Governors Association** passed a resolution in June 2002 supporting the development of a tracking system for 11 states in the Western US. A Working Group has been formed to begin discussions on functional and design features of the system, costs, and contributions. If implemented, this system would most likely meet the RPS verification needs of western states that have an RPS, including California, New Mexico, Nevada and Arizona. It would also most likely track renewable certificate generated in the WECC power pool, which includes portions of Baja Norte and British Colombia in Mexico and Canada, respectively.

New York passed an RPS in 2003, and is currently holding proceedings to discuss implementation of the rule. They are considering two options for verifying compliance with their RPS; one is to expand the NEPOOL GIS to meet their tracking needs. The other is to create a New York-only tracking system. If the latter option is chosen, the NYPOOL operator will probably operate it.

The **Ontario** Independent Electricity Market Operator issued a Request for Proposals in May 2003 for a contractor to help them design and develop a tracking and labeling system for environmentally preferable electricity products sold in Ontario. In June 2002, the Ministry of Energy responsibilities and authorities were extended to allow the administrator to collect information for certificate tracking and to collect fees to pay for such a tracking system. They have indicated a strong desire to be compatible with similar systems developed in New York and New England.

If these efforts move forward, the majority of the US and parts of Canada will be covered by a state or ISO operated/sanctioned Issuing Body. In addition, CRS is working with a potential default Issuing Body for generators located in states where there is no government sanctioned Issuing Body. This will effectively allow all renewable generators to voluntarily participate in the national TRC tracking network.

Table 5. Comparison of Existing Renewable Certificates Tracking Programs in the U.S. [29]

	Texas Renewable Energy Credit (TRC) Program	NEPOOL Generation Information System (GIS)	WI Renewable Resource Credit (RRC)	Nevada
Type of Tracking Methodology	Certificate tracking with automated verification	Certificate tracking with automated verification	Certificate tracking with automated verification	Certificate tracking with contract path verification
Type of Generation Tracked	Existing and new renewable generation	All generation in or delivered to NEPOOL dispatch and control area	Renewable generation delivered in excess of state RPS requirement	Existing and new RPS eligible renewable generation
System Overview	- TRCs are issued based on settlement data & deposited in generator accts. -TRCs are bought/sold/traded per privately arranged contracts -TRCs transfers occur electronically, initiated by participants -RPS compliance is verified via TRC ownership at end of compliance period - TRCs are retired after they are used to meet RPS compliance	- Certificates are issued based on settlement data & deposited in generator accts. -Certificates are bought/sold/traded per privately arranged contracts -Certificate transfers occur electronically, initiated by participants -RPS and GPS compliance is verified via certificate ownership at end of compliance period - At end of compliance period, all unsold certificates are assigned the "residual mix" and are retired; all certificates in LSE accts used to calculate disclosure label or verify compliance w/ RPS or GPS	-RRCs are issued for any amount of RE generation delivered in excess of an LSEs RPS obligation -RRCs are bought/sold/traded per private contracts - RRC transfers occur electronically, initiated by participants -At end of compliance period, all RRCs used to meet RPS are retired.	-Generators register with PUCN -Generators/utilities submit quarterly forms indicating amount of RE generated and purchased -PUCN verifies information submitted through utility contracts and billing statements -Credits are issued for eligible RE delivered, multipliers applied if applicable -Credits may be traded -At end of compliance period, all credits used to satisfy RPS are retired
Location/ Domain	Texas/ERCOT Control Area	NEPOOL Control Area- 6 New England States	Wisconsin	Nevada
Primary Function of System	Verify utility and ESP compliance with State RPS. Secondary function to verify green power claims)	Develop and issue environmental disclosure labels; Verify RPS and GPS compliance where applicable	Track and verify utility compliance with State RPS; facilitate trading of RRCs among electric providers	Verify compliance with State RPS.
System Administrator	ERCOT with some shared responsibilities with PUCT	APX with some shared responsibilities by NE regulators	Clean Power Markets	PUCN
Source of Data	Electronic transfer of settlement quality meter data	Financial settlements data from ISO's Market Settlement System	Combination of electronic transfer of settlement quality meter data; manual entry of meter data; and self-reported	Self-reported by generators and utilities with verification through contracts and spot checks

[29] / This Table was developed for the California Energy Commission for inclusion in the Renewable Portfolio Standards Proceedings, Phase 2 Implementation May 13, 2003 Workshop, Background Materials, p. 12-13.

	Texas Renewable Energy Credit (TRC) Program	NEPOOL Generation Information System (GIS)	WI Renewable Resource Credit (RRC)	Nevada
Participation in System	Mandatory for companies that must meet RPS; voluntary for other market participants	Mandatory for all generators and LSEs; voluntary for other market participants	RPS compliance mandatory for all WI electric providers; RRC trading participation voluntary	Voluntary
Imports/ Exports	Generally not applicable	Unit-specific imports or exports must be physically delivered to/from NEPOOL system. System mix imports/exports assigned system or "residual" average.	Imports of renewable energy allowed from renewable generators that have a wholesale contract with a WI electric provider	Generators must be interconnected with T&D system of utility. At present time, standards for "proof of interconnection" have not been developed
Verification of Generator Attribute Information	Generators register and become "certified" by the PUCT	Generator information verified by state regulators	Generators register and become "certified" by Wisconsin PSC, including out-of-state generators referenced above	Verified by PUCN through contracts and PUC filings
Small-scale Systems Capability	Yes	Yes	Yes	Yes
Maximum Lifespan of Certificates	Approx 3 years	1 quarter	Current rules have no expiration date for RRCs	Approximately 5 years
Other Features	Banking and borrowing capability for RPS	GIS organized in quarterly trading periods. System automates line losses, pumped storage, green tag transactions, etc.	"Bulletin board" provided to facilitate trading of RRCs	Credits are first issued according to financial settlement statements, however, starting in 2004, there will be a reconciliation where additional credits will be issued for the difference between gross generation and energy delivered that occurred in 2003.

Development of a North American Association of Issuing Bodies

European market participants have formed an *Association of Issuing Bodies* that coordinates and networks different certificate tracking systems in the European Union. In June 2002, the Center for Resource Solutions held a US stakeholder meeting to investigate the potential for a similar organization to collaboratively develop a set of standard protocols for newly developing certificate-tracking systems. As a result of the positive response from the meeting, the Center for Resource Solutions is working to establish a North American Association of Issuing Bodies or AAIB. As envisioned, the AAIB will be formed to develop inter-regional standards for issuing, registering and tracking TRCs and to provide an institutional base for the development of an interconnected network of state and national renewable certificate tracking systems in North America.

The AAIB will lead the effort to develop North American standards for renewable certificate accounting.[30] The basic premise is that with uniform standards, all regional renewable tracking systems can be linked together into a North American network so that certificates can be traded and transferred between tracking systems in a credible way that prevents opportunities for double counting, double selling or inappropriate double uses. The potential complexity of interregional trade in TRCs underscores the importance of having an institutional driver, the AAIB, to work through these coordination issues with stakeholders before parties are invested in tracking systems that may not be compatible with one another.

The AAIB will work with stakeholders and potential TRC Issuing Bodies to develop minimum standards relating to issuing, registering, and tracking TRCs within a country or region and protocols for transferring TRCs between regional and national tracking systems. The purpose of defining such standards and creating protocols is to (1) ensure compatibility between tracking systems, (2) ensure that TRCs are credible and verifiable, (3) develop a legal framework that will establish property rights of TRC owners, and to (4) ensure that minimum levels of information are attached to TRCs so they may be easily converted into CERs or emissions credits as markets mature.[31] The network will have sufficient flexibility to allow for individual regional and national differences while not compromising the integrity of the overall program.

[30] / The incremental cost of establishing a framework that serves the needs of the hemisphere is very low as opposed to one country. Both Canada and Mexico have already indicated their interest in participating sometime in the near future.

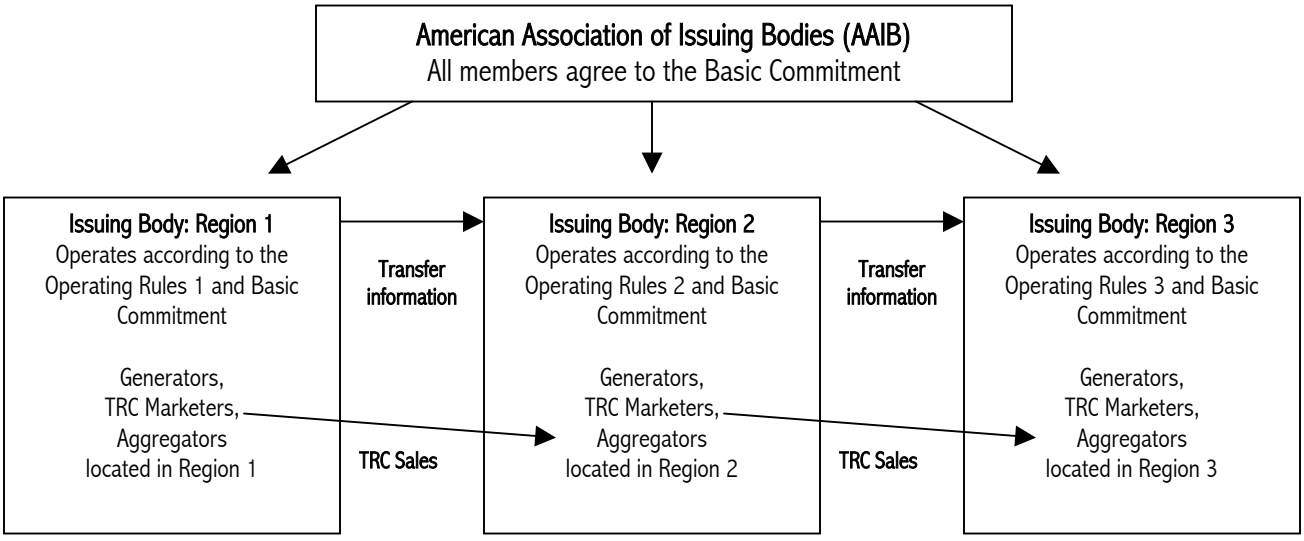
[31] / Currently in the US, certificate-tracking systems are being created for regulatory purposes that do not contemplate a TRC market outside of the regulatory arena. Therefore, systems are being developed that may not be compatible and do not necessarily track enough information to allow renewable generators in those regions to participate in newly emerging markets.

Responsibilities of an Issuing Body

Issuing Bodies will be established for different regional domains in North America. A domain will be defined by geographical boundaries (e.g. state/province, power pool, country, or region) or other similar delineations so that a renewable generating facility is assigned to one and only one domain. The participating "Issuing Bodies "are envisioned to be independent transmission system operators -- ISOs (such as ERCOT and NEPOOL) that have already developed or are developing TRC accounting systems. In areas without a planned ISO-type system, a default accounting system will be implemented by an independent entity in the AAIB network.

The chief responsibility of an Issuing Body is to ensure the accurate issuing, tracking, and retiring of TRCs for any generator registered with that Issuing Body. The mechanism for issuing, tracking and retiring TRCs will be developed by each Issuing Body, however, they will need to meet the minimum standards described above to ensure compatibility with the larger AAIB network.[32] The most recent draft of the AAIB minimum operating procedures, known as the "Basic Commitment", can be found at www.resource-solutions.org.

Figure 2: Organization Structure of a North American TRC Tracking and Verification Network



[32] / However, each Issuing Body (TRC tracking system) can and probably will go beyond the minimum standards to include options and services tailored to the needs of the regulators and participants in their region.

A second responsibility of the Issuing Body is to ensure that information is transferred and shared between Issuing Bodies when necessary and appropriate. For example, when TRCs are sold into a neighboring region or country, the importing and exporting Issuing Bodies will follow the protocol for transferring TRCs between regions.[33] This integrated accounting approach will diminish the opportunity for double counting certificates that are bought or sold in other regions. The goal is to make sure there is seamless coordination between Issuing Bodies so that a North American network of Issuing Bodies is established.

A third responsibility of the Issuing Bodies is to register generators and periodically verify the information provided by generators such as type of technology/fuel and operational status.

Technical Issues Associated with Tracking TRCs in Mexico

The most important technical issues associated with tracking TRCs in Mexico relate to the functionality of the tracking mechanism, verification of information, the ability to ensure unique ownership (no-double counting) and enforce property rights, the credibility of the tracking system, and system access and security. All of these functions are most easily served through the creation of a comprehensive electronic renewable certificate tracking system for Mexico that is compatible with the US, Canadian and EU systems. Anything less, could jeopardize the credibility of the system.

Functionality

A TRC tracking system for Mexico should be able to provide several core services in addition to the ones listed in the sections below. These include:

- Creating an accounting platform, in which TRC generators, and other market participants have unique accounts,
- Issuing certificates for generators,[34]
- Recording the minimum characteristics of the generator on each certificate as established by international agreements,
- Transferring certificates between market participants in Mexico or internationally,
- Retiring certificates, whether through mandatory program or voluntary initiative,
- Maintaining data and records for up to ten years (recommended by AAIB), and
- Providing a mechanism to resolve disputes, and make modifications to data if mistakes are found.

[33] / A protocol for transferring TRCs between Issuing Bodies has not yet been developed. The development will be a part of the collaborative work between US, Mexico and Canadian Issuing Bodies.

[34] / The AAIB Basic Commitment recommends not less than one per quarter.

Verification of Information

One of the most critical roles of a renewable certificate tracking system is to verify information that is in the TRC tracking database. There are several components to this including the, (1) verification of the characteristics of the generation unit, e.g. what kind of facility is it, what kind of fuel is used, (2) verification that the metering equipment functions properly, and (3) verification that the generation output that was reported actually occurred. Ideally all of these functions are performed by one party, although it is possible that one or more of the verification functions could be performed by an independent party, such as a government regulatory agency that has a cooperative agreement with the TRC tracking administrator or the utility. In the US and Europe, issuing certificates is based on financial payments for electricity delivered and therefore financial settlements data are used as the basis for substantiating that the generation occurred.

Ability to Establish and Protect Property Rights

Another technical issue with TRC tracking in Mexico is the ability of the tracking system to establish and enforce property rights. Because the TRC tracking system is essentially issuing renewable "currency" that has a monetary value, there is a strong need to ensure that only one TRC is issued per unit of generation, and that each TRC can be easily tracked when bought, sold or retired. This means that there must be some method of identifying a particular certificate or certificates, either individually with unique serial numbers, or grouped in lots with unique identifiers. Along with this, the TRC tracking system must ensure that generators are registered with one and only tracking system. To reduce potential conflicts and to maintain order, it is recommended that only one TRC tracking system be established for all of Mexico.

Credibility of Tracking System

Although the credibility of the tracking system is not a technical issue per say, it is included in this discussion because it is a function of the choice of a tracking system operator. For competitive reasons, it is critical that the tracking system operator be an independent, impartial party that has no financial interest in the TRC market, carbon market, or any other financial activity that could create conflicts of interest. In the US, the government or an agent of the government, usually the transmission system operator is considered the most credible party to operate a TRC tracking system.

System Access and Security

System access and security are two critical technical issues that are interrelated. The TRC tracking system should allow reasonable participant access so TRC owners can use the system to verify their TRC transactions and transfers of ownership. However, the system must also have adequate security to prevent manipulations of the system, hacking, or other activities that could jeopardize the accuracy of the information.

CONCLUSIONS AND NEXT STEPS

The results of this report indicate that the development of a North American TRC issuing and tracking system has the unique characteristic that it will be useful to all three countries. This type of system provides a monitoring, reporting and trading platform for renewable energy as well as for carbon reductions that can be derived from the generation of renewable energy.

On the international level, harmonizing measurement standards, registration requirements and tracking procedures with other programs in other countries will facilitate the development of robust regional and global markets. This is particularly pressing in the case of the development of a North American market because use of TRCs is moving so rapidly on a variety of fronts including voluntary renewable and carbon reduction markets. In addition, Mexico and Canada are parties to the Kyoto Protocol on Climate Change and as a result projects that generate TRCs can also create green house gas emission credits under country targets and the CDM once Kyoto comes into force.

Even though the U.S. has withdrawn its participation in the Kyoto Protocol, a variety of voluntary carbon reduction activities have recently emerged in the US involving large non-residential consumers. Ensuring the development of robust and long-term regional and global TRC markets requires that trading mechanisms and procedures "build in" the capacity to include GHG emissions. In order to do this, it is critical to create a system for measuring and tracking TRCs that can accommodate the inclusion of documentation required for creation and transfer of CERs under the Kyoto Protocol. Further, designing a system that is generally consistent with that being developed in the European Union for similar purposes is much easier and more efficient than trying to harmonize divergent schemes later on.

Presently the reference price for Mexican electricity is approximately US 3.5 cents/kWh. New generation plants under construction or discussion tend to be natural gas combined cycle in the 3.5 to 4.0 cents/kWh range depending upon the gas price forecast used in the life-cycle calculation. As a result, wind generation is the closest renewable resource to being cost competitive with these new facilities at 1.5 to 2.0 cents/kWh more expensive than projections for new natural gas plants using the present least-cost definition. The TRC and CER prices range from 0.5 cents/kWh to 2.5 cents/kWh providing a good opportunity for

additional revenue that brings wind generation within the competitive price range of new natural gas combined cycle plants improving the financial viability of Mexican renewable energy projects.

An important issue in developing a robust U.S.-Mexico TRC market is the capacity to structure projects to enable Mexico to generate both TRCs and GHG emission reduction credits thereby improving the economics of renewable energy development. In some cases, the U.S.-Mexico TRC market may offer the best prices for renewable energy attributes. Moreover, a Mexico-Canada TRC market may also be stimulated in conjunction with implementation of the Kyoto Protocol, as could a Mexico-EU market thus providing an optional revenue stream wherever prices are better.

While the TRC market is still at an early stage, there are no insurmountable legal obstacles to the development of a North American market. Defining TRCs and articulating the property rights associated with them are the most important legal issues to be addressed. There is a reasonable basis for characterizing TRCs as commodities, services, investments or securities. The characterization of TRCs and the legal rules applicable to their international trade generally hinges on the structure of the TRC exchange and the parties to the transaction. But overall it appears that the use of TRCs provides more flexible opportunities for international trade than does the direct sale of renewable electricity.

For the moment, the prospect for sale of Mexican TRCs into US/RPS markets is not very promising. Most U.S./RPS programs require that eligible renewables either be generated within the state or, if TRCs are used, that they be accompanied by energy physically delivered to the border. The US RPS market provides the most promising opportunities for renewable projects located along the US-Mexico border.

In addition, serious barriers remain to the development of renewable generating facilities in Mexico itself that must be addressed before the international financial community is willing to invest and a robust renewable energy market is able to emerge. However over the next ten years it is anticipated that the Mexican government and others will be addressing these legal and regulatory barriers. Assuming Mexican renewable energy development gets moving we can turn our attention to improving the market conditions for Mexican renewables. It will be five to ten years before significant amounts of renewable generation become part of Mexico's electricity supply mix. By starting a Mexican tracking system now, this infrastructure tool will be in place as the market evolves.

Because the North American TRC market is still in its infancy and the legal character of a TRC has not been fully established, there is a window of opportunity to resolve legal issues

in a manner that limits transactional costs. In this way, legal barriers can be minimized to facilitate international trade and foreign investment.

The opportunity to generate revenue from the sale of both TRCs and CERs could enhance the economics of developing renewable energy in Mexico and increase interest in and financing opportunities for these projects. However, unless systems for measuring and tracking TRCs and GHG emission reduction credits are consistent and compatible, inaccurate measurement and reporting, double counting and loss of environmental integrity could become serious problems.

Therefore, the next step as new renewable energy policies are put into place and new facilities are being developed in Mexico, is to ensure a credible TRC accounting system is integrated into any renewable energy policy and development scenarios.

Recommendations/Next Steps

1. Encourage the WB/GEF to integrate the development of a TRC tracking system into their Mexico Renewable Energy Partnership Program.
    a. Work with CFE to investigate technical issues that may be associated with transferring utility electronic metered data from renewable energy generators to an automated TRC system.
    b. Identify if there are any Mexico specific legal issues associated with the development of the system and resolve them.
    c. Develop a Mexican working group to help design the system specifications.
    d. Coordinate with the GEF Prototype Carbon Fund and others working on Kyoto Protocol to ensure a seamless interface between the TRC system and carbon offset trading systems.
    e. Develop a draft model system for public comment.
    f. Develop a plan for the institutional and governance structure of the Mexican TRC tracking system.
    g. Identify Mexico specific issues and provide examples of how these issues have been resolved for other systems.
    h. Modify the model system as recommended by the working group. Develop software specifications from the model.

i. Develop an RFP for the software design. Award the contract, develop and test the system.

j. Publicize the system among renewable facility owners and others who may use the system.

2. Alternatively, support the establishment of an international body to issue, and certify Mexican TRCs. This body would act as a default tracking system for Mexico until such time as Mexico is in a position to develop their own system.

    a. Establish a 'Default TRC Tracking System' working group. Identify the needs to be met by such a system.

    b. Identify technical issues and how they can be resolved.

    c. Identify legal issues that might result if a US tracking system acted as a default system for Mexico.

    d. Assess how the US system would need to be modified to meet Mexico's RE/TRC needs.

    e. Assess the incremental costs of performing these tasks and how the costs would be covered.

    f. Develop a plan for moving forward including a tentative approach for how to transition the default system into a permanent Mexico Tracking System when that time comes.

    g. Implement the plan and publicize the system's availability.

ACRONYMS

APEC – Asia-Pacific Economic Cooperation, an organization of Asian-pacific nations

CDM – Clean Development Mechanism, a part of the Kyoto Protocol that allows trading of carbon offsets by developing countries to developed countries.

CERs – Certified Emissions Reductions (part of the Kyoto Protocol)

CRE – Energy Regulatory Commission of Mexico

CONAE – The National Commission for Energy Conservation of Mexico (that is involved in renewable energy development as well)

CFE – The Federal Electricity Commission (the name of the government owned electric utility in Mexico)

ERCOT- Electric Reliability Council of Texas (the transmission system operator in Texas)

GEF – The Global Environmental Facility (a part of the World Bank that makes funds available for programs and projects

that have environmental and social benefits and reduce the emission of greenhouse gases.

GATS – General Agreement on Trade in Services (part of WTO).

GATT – General Agreement on Tariffs and Trade (part of WTO).

IIE – The Mexican Institute of Electric Research (similar to EPRI in the U.S.)

JI – Joint Implementation portion of the Kyoto Protocol.

KWh – Kilowatt-hour (a measure of the amount of energy produced by one kilowatt of capacity per hour)

LFC – Luz y Fuerza del Centro (Central Light and Power – a publicly owned Mexican utility)

MW – Megawatt, 1000 kilowatts – kW (a measure of electricity capacity).

MWh – Megawatt-hour (a measure of the amount of energy produced by one megawatt of capacity per hour)

NAFTA – The North American Free Trade Agreement

NEPOOL GIS–The New England Power Pool Generation Information System

OTC – Over the counter -- Securities that are not sold on a stock exchange are said to take place "over the counter" or "OTC." Securities sold OTC are not subject to federal registration and disclosure requirements but must comply with the anti-fraud provisions of the U.S. federal securities laws.

PV – Photovoltaics or solar electric cells (a type of solar technology for the direct conversion of sunlight into electricity)

RPS – Renewable Portfolio Standard (a set-aside for renewables often established on the state level

SENER – The Mexican Ministry of Energy

TRC – Tradable Renewable Certificates (also called renewable energy certificates or credits – RECs, green certificates, and green tags).

TRIMS – Trade Related Investment Measures

UCC – Uniform Commercial Code

WTO – World Trade Organization

BIBLIOGRAPHY

APEC 21st Century Renewable Energy Development Initiative: Survey of APEC Member Economies' Renewable Energy-based Priority Needs and Issues Relating to Sustainable Development, 2001. Available at: http://www.apecnetwork.org/forum/survey/fulltext/mexico.htm

Breceda-Lapeyre, Miguel G., Private Investment in Mexico's Electricity Sector, Montreal: Commission on Environmental Cooperation, Nov. 2002

California Energy Commission for inclusion in the Renewable Portfolio Standards Proceedings, Phase 2 Implementation May 13, 2003 Workshop, Background Materials, p. 12-13.

Center for Resource Solutions, Green-e Program, www.green-e.org.

Climate Change Legal Foundation, An Integrated North American Market for Tradable Renewable Energy Certificates: Legal Issues in U.S.-Mexico Trade

Climate Change Mitigation in Developing Countries, Chapter on Mexico, Pew Center on Climate Change, 2002

Commission for Environmental Cooperation, Mexico and Emerging Carbon Markets. Montreal: Commission for Environmental Cooperation, 2001.

CONAE. Estudio de la Situación Actual de la Minihidráulica Nacional y Potencial en una Región de los Estados de Veracruz Y Puebla, 1995. Available at: http://www.conae.gob.mx/wb/distribuidor.jsp?seccion=1686

Evolution Markets. Monthly Market Update: RECs Markets March 2003. Albany: Evolution Markets, March 2003.

Folsom, Ralph H., Michael Wallace Gordon, John A. Spanogle, Jr., International Business Transactions, Fifth Edition, West Group, 2002.

Gaines, Sanford, NAFTA Chapter 11 as a Challenge to Environmental Law Making—One View from the United States, paper presented at EnviReform Conference on Civil Participation in NAFTA; Toronto, November 16-18, 2000.

GEF PDF Block B Grant Proposal - Mexico Renewable Energy Strategic Partnership, Draft 1/31/03.

Gottfried, Carlos. Presentation at Commission for Environmental Cooperation meeting "Overcoming Renewable Energy Production and Sourcing Constraints in Mexico: Lesson Learned from NAFTA Partners." Mexico City, February 7, 2003.

Holt, Ed, Ryan Wiser, Meredith Fowlie, Rudd Mayer, Susan Innes. Understanding Non-Residential Demand for Green Power. Washington: American Wind Energy Association and National Wind Coordinating Committee, December 2002.

Huacuz, J.M. and A.M. Martinez, Renewable Energy Rural Electrification: Sustainability Aspects of the Mexican Programme in Practice, Natural Resources Forum, 1995.

King, Donald B., Calvin Kuenzel, Bradford Stone, W.H. Knight, Jr., Commercial Transactions Under the
Uniform Commercial Code, Matthew Bender, 1997.

Natsource Emissions Brokerage Desk, LLC. *Airtrends.* New York: Natsource, LLC, May 2003.
North American Free Trade Agreement
Prabhudesai, Anand, "Trading Greenhouse Gas Emissions," Chicago Business-GSB Business, Oct. 28, 2002.

Radar, Nancy and Scott Hempling. The Renewable Portfolio Standard: A Practical Guide. Washington: National Association of Regulatory Utility Commissioners, February 2001.

Scott, Hal S. and Philip A. Wellons, International Finance, Foundation Press, 2000.

Secretaría de Energía. Dirección General de Formulación de Política Energética Prospectiva del Sector Eléctrico 2001-2010. Mexico City: Secretaría de Energía, 2001.

Spanogle, John A. and Peter Winship, International Sales Law, West Group, 2000.

Steinberg, Marc I. Securities Regulation, Lexis Publishing, 1998.

Stone, Bradford, Uniform Commercial Code in a Nutshell, West Publishing Company.

Texas Public Utility Commission. Chapter 25: Substantive Rules Applicable to Electricity Service Providers §25.173. Goal for Renewable Energy May 15, 2000. Available at: http://www.puc.state.tx.us/rules/subrules/electric/25.173/25.173.pdf

U.S. EPA, eGRID 2000. http://www.epa.gov/cleanenergy/natgas.htm

U.S. Uniform Commercial Code.

World Bank Prototype Carbon Fund (PCF). Available at: http://prototypecarbonfund.org/router.cfm?Page=About

WTO Council for Trade in Services, Energy Services, Background Note by the Secretariat, S/C/W/52, September 9, 1998.

WTO Council for Trade in Services, Guidelines for the Scheduling of Specific Commitments under the General Agreement on Trade in Services, S/L/92, 28 March 2001; Adopted by the Council for Trade in Services on 23 March 2001.

WTO General Agreement on Tariffs and Trade

WTO General Agreement on Trade in Services

APPENDIX A

Summary of Renewable Energy Policy Recommendations by Mexican Government

(Source: Mexico Renewable Energy Strategic Partnership GEF PDF Block B Grant Proposal)

Regulatory changes form part of imperatives described in the Programa Sectorial de Energía 2001-2006, in which the government recognizes the lag in the development of renewable energy and lays out a comprehensive strategy aimed at correcting this situation. Some of the key objectives include:

- Energy tariffs and prices that reflect the costs associated with environmental impacts, on top of those from generation, transmission, storage and distribution;
- Medium and long-term programs (national and regional) for energy conservation and the use of renewable energy, according to the structural changes of the energy sector;
- A set of norms and mechanisms for the promotion of co-generation and renewable energy;
- A national system for the evaluation, registration and diffusion of RE resources;
- Financial support mechanisms for energy conservation and renewable energy projects;
- Financial resources for research activities on energy conservation and renewable energy;
- An active and permanent bilateral and multilateral link of Mexican institutions with similar international organisms in other countries.

The promotion of renewable energy forms an important part of Mexico's energy policy for the future, for a variety of reasons:

- Diversification (long term). Currently the Mexican power sector is heavily dependent on oil, natural gas, and coal. Fossil fuel based generation accounts for 68% of installed capacity and an even larger share of production. Under the current growth and regulatory scenario, the share of conventional thermal generation will fall from 47% to 13% of total generation over the 2000-2010 period, while the share of natural gas will increase from 9% to 52%. During this same period, hydroelectric generation is forecast to fall from 17 to 11% (due to slow growth relative to CC gas, limited availability of new sites and low water availability). CFE is required by law to procure power on a least cost basis, defined in Mexico as the marginal cost of system expansion. As marginal costs are benchmarked to natural gas combined cycle, it is difficult for other technologies or fuels to compete for IPP contracts. Thus, while Mexico will diversify out of traditional, oil-fired thermal plants, it will do so by heightening its dependency on natural gas, increasing exposure risks of supply disruptions and stranded investments.

- Diversification (short term). Past evidence shows that natural gas is the most volatile energy commodity in terms of price. Promotion of renewable energy sources would allow Mexico to take advantage of the stable and low (or non-existent) fuel prices of renewables and reduce its exposure to volatility in fossil fuel markets.

- Self-Sufficiency. Current projections estimate that Mexico will need to import about 20-25% of its from required gas supply from the U.S.; a significant portion of this requirement could be met over the long term from indigenous sources.

- Environmental. While many of Mexico's emissions issues are related to the transport sector, and its relatively high quotient of natural gas in the power sector reduces overall emission intensity, there are significant local and global benefits associated with reducing GHG intensity in the power sector.

Additional, policy structures benefiting renewable energy could assist important niches within Mexico:

- Private sector participation and financing flows can be significantly augmented and reduce public sector commitments for new capacity construction. Promotion of renewable energy projects in Mexico will also stimulate the development of domestic suppliers, contributing indirectly to the diversification of the sector (currently most gas turbines are imported). As CFE continues to move toward IPP procurement, there will be additional opportunities to build private sector experience across a wider range of renewable energy technologies.
- Agricultural and Rural Development. This sector urgently requires economic reform, but programs to boost its economy will demand more energy. Local generation from forest residues, manure, bagasse and other organic materials, or energy plantations can be developed and relieve deforestation pressures, create jobs, and reduce emissions. Other energy source options like mini-hydro and photovoltaic maybe implemented in non-grid connected locations
- Water Sector. Water is a critical human and agricultural commodity requiring consistent supply. The water sector in Mexico maintains a large number of diesel gensets as back up power for pumping, requiring large capital investments along with sizable budgets for operation and maintenance, as well as generating significant emissions. Renewables can provide cost effective generation sources through biogas recovery from wastewater treatment plants and through mini-hydro turbines in aqueducts.
- Municipal Sector. Large amounts of electricity are used for municipal services; coupled with the particularly high tariffs in the sector, create heavy financial burdens. Renewables can provide additional, low cost generation through landfill methane recovery and sludge from water treatment processes while reducing solid waste disposal costs.

APPENDIX B

An Integrated North American Market For Tradable Renewable Energy Certificates: Legal Issues in U.S.-Mexico Trade

Climate Change Legal Foundation

EXECUTIVE SUMMARY

In an increasingly integrated North American energy market, the exchange of tradable renewable certificates (TRCs) could serve an important role in promoting private investment in renewable energy development in Mexico by U.S. companies. International sale of TRCs, however, raises a number of legal issues that must be addressed in order to ensure that the potential benefits of TRC trade between the U.S. and Mexico can be achieved. Minimizing legal barriers to cross border exchange of TRCs will be a critical element in the development of a robust North American market. This report analyzes the applicability of global, regional and national law to TRC trade in light of the legal characteristics of TRCs and the mechanisms envisioned for their international exchange.

The single most important issue to be resolved in determining which laws and regulations govern regional trade is the legal definition of a TRC. Achieving consensus on a definition of a TRC is difficult for both practical and political reasons. From a practical perspective, the legal characteristics of TRCs can vary based on the context in which they are created and how they are transferred. Defining the legal character of TRCs also raises questions about the nature of the property rights attached to ownership. As long as the definition of a TRC remains ambiguous, it is impossible to clearly articulate the property rights attached to them. Lack of clear property rights limits the likelihood of bringing a successful claim for compensation due to expropriation under NAFTA or national law.

Laws governing trade, investment, the environment, sales and contracts could apply to TRC trade, depending on how TRCs are defined, international transactions are structured and

TRC trades are executed. This report examines key regional and global treaties and analyzes their potential applications to TRC transactions, including: 1) the World Trade Organization (WTO) Agreements, 2) the North American Free Trade Agreement (NAFTA) and 3) the Kyoto Protocol on Climate Change. The report also looks at the potential effects of private international and national law on TRC trade.

WHY LEGAL ISSUES ARE IMPORTANT

The development of the TRC market is still at an early stage and many issues about the legal nature of TRCs have not yet been resolved. Depending on how TRCs are characterized, different legal requirements will be applicable to their trade. For example, TRCs have characteristics of commodities, securities and services. When TRCs are sold in the context of foreign investment in renewable energy projects in Mexico, foreign investment laws need to be considered. Because the TRC market and, indeed, the structure and definition of TRCs are still in an evolutionary stage, there is a window of opportunity to resolve these issues in a manner that facilitates trade and investment by minimizing legal barriers. Minimizing legal barriers will encourage the development of a robust regional market by reducing transactional costs that could negatively impact TRC trade.

WHAT IS A TRADABLE RENEWABLE CERTIFICATE?

Some possible legal definitions--

- *Commodity*
- *Service*
- *Investment*
- *Security*

Thinking of the longer term, it is also important that the TRC market and infrastructure designed to manage trading be designed in a manner that would facilitate trading other environmental attributes of energy production in the future. In this regard, the Kyoto Protocol on Climate Change and the rules on trading green house gas emissions need to be considered.

According to the Center for Resource Solutions, Tradable Renewable Certificates are likely to be sold in the following forms:

- TRCs tied to the underlying generation of electricity that created them.
- TRCs tied to electricity generated independently of the TRCs.
- TRCs sold as separate commodities not tied to electricity.
- TRCs sold as part of contract governing an investment.
- TRCs not tied to electricity that are bundled with TRCs created at other generation facilities.

In each of the above cases, the TRCs could be sold through a contract between the generator of electricity and the buyer of TRCs or to unrelated third parties through

exchanges that may also bundle them with TRCs from other renewable energy sources. As the U.S. market matures, the sale of TRCs to parties with no relationship to generators, including retail consumers, of the underlying electricity by brokers over computer exchanges will probably become the primary method of exchange. In the U.S.-Mexican market, however, the sale of TRCs in the context of an investment could also be an important segment of the market.

Depending on the structure of a TRC transaction, TRCs could be characterized as commodities, services, investments or securities. TRCs sold as separate commodities not tied to the sale of electricity as well as TRCs sold in combination with the sale of electricity could fall within the definitions of "goods" contained in both NAFTA and WTO agreements. TRCs tied to the generation of electricity could also be classified as "services" under NAFTA and WTO agreements. Under both NAFTA and WTO, different rules apply to cross border trade in goods and services. TRC could also be classified as an "investment" under NAFTA, as it could fall within the definition of investment in Chapter 11. While Mexican law prohibits both private and foreign investment in the energy sector, even an activity such as pledging financing toward purchase of TRCs, could be an "investment" under NAFTA and create rights for compensation in the case of expropriation.

WHICH LAWS APPLY TO EXCHANGE OF TRADEABLE RENEWABLE CERTIFICATES

National

- Energy Law
- Contract Law
- Investment Law
- Banking and Financial Law
- Securities

Regional

- North American Free Trade Agreement
  - Goods and Services
  - Investment

Global

- Trade and Investment Treaties
- International Sales and Financing
- International Environmental Agreements

TRCs could also be classified as securities because their value is tied to an underlying transaction, the generation of electricity. When TRCs are "stripped" from the underlying generation of renewable energy and sold over an exchange to customers without a connection to the process that created them, they begin to look very many like securities. When the TRC market matures and bundling of TRCs from different facilities for sale to

unrelated third party customers over computer exchanges becomes more common, the case for characterizing TRCs as securities will strengthen. While bundling TRCs can facilitate trade and reduce risk, it further removes creation of the TRC from its sale, invoking the need for information disclosure to avoid fraud. TRC derivatives, such as futures and options, are also likely to be issued. Even if TRCs are defined as securities, they will probably not be subject to federal or state registration requirements because they are generally traded "over the counter"—not on a national securities or commodities exchange.

Another important factor in determining the legal requirements that apply to TRC exchanges is who the parties to the transactions are. Governments, private commercial entities and consumers may all participate in the TRC market. The laws governing TRC sales and settlement of disputes can vary depending on the nature of the parties to the transaction.

EFFECT OF INTERNATIONAL TRADE AGREEMENTS ON A NORTH AMERICAN TRC MARKET

Are TRCs Goods or Services?

Under both NAFTA and WTO agreements, whether a TRC is characterized as a "good" or "service" is a threshold question for determining whether these agreements apply to cross border TRC trade. As noted above, depending on the structure of the transaction, TRCs could be classified as either goods or services.

Prior to market liberalization, much of the energy sector was vertically integrated and was comprised of government owned enterprises engaged in the production, transportation and distribution of energy. Because of its integrated structure, the energy industry historically did not distinguish between energy goods and services. Due to the restructuring and privatization of the energy sector, energy activities have been disaggregated and energy goods have been identified as distinct from energy services. In a restructured energy market, generation, transportation and distribution of electricity have been separated and are increasingly carried out by independent entities.

While electricity has characteristics of a service--it is not a product that can be stored for future use and it must be supplied over transmission lines--it has also been classified as a commodity. At this time, there is still no universally accepted definition of electricity as a good or a service due to the differences among countries. However, the World Customs Organization, which assigns customs codes under the Harmonized System to products traded internationally to enable customs officials to track exports and imports, has created a code for electricity, implying that it is viewed as a commodity. While application of the

customs code for electricity by members of the World Customs Organization is not mandatory, its inclusion reflects the inclination of most countries to treat electricity as a product when it is traded internationally.

Both NAFTA and WTO agreements apply to energy related activities, with some differences in their classifications of these activities as goods or services. Mexico and the U.S. are parties to both WTO and NAFTA.

TRCS AND INTERNATIONAL TRADE AGREEMENTS

WTO General Agreement on Tariffs and Trade

The WTO General Agreement on Tariffs and Trade (GATT) applies to international trade in "goods" (also referred to as "products" or "commodities"). Therefore, a threshold question in analyzing GATT's coverage of TRCs is its applicability to the underlying electricity associated with the creation of TRCs.

Under GATT, solid fuels such as oil and coal, which are easily traded across borders, are clearly goods. Electricity's non-storability led the original drafters of GATT to assume that it should not be classified as a good. However, electricity has come to be viewed as covered by GATT because most WTO members now regard it as a commodity and apply tariffs to it when it is traded internationally. Electricity generated by the combustion of other fuels ("secondary energy") or by renewable resources and nuclear ("primary energy") is covered by GATT. There is no generally accepted view about whether generation should be treated as a separate service or seen as a production cost included in the price of the electricity.

As electricity is generally considered a commodity covered by GATT, TRCs are most likely to be treated similarly in cases when they are sold in combination with the sale of electricity. It is not clear what, if any, difference it would make if the TRCs were tied to the underlying electricity associated with their creation or unrelated electricity. TRCs exchanged in the context of an investment project might also be covered by the investment agreements discussed below.

The most important GATT rules are contained in Article I-Most Favored Nation Treatment, Article III-National Treatment and Article XI -General Elimination of Quantitative Restrictions on Trade. Failure to comply with the requirements in any of these articles can result in a GATT violation. However, a trade measure could still be found to be consistent with GATT obligations if it met the requirements of one of the exceptions in GATT Article XX.

Article I on Most Favored Nation Treatment requires a WTO member to afford to all other WTO members the same trading privileges on exports and imports of "like products." Treating "like products" as equivalent has interpreted by GATT dispute panels to mean that a WTO member can not discriminate against imports or exports of goods based on how they were manufactured unless the production method changed the characteristics of the final product.

In the case of electricity, the characteristics of final product are the same whether it is generated using renewable or non-renewable energy. This raises a concern that restricting the import of electricity produced using fossil fuels under a Renewable Portfolio Standard might be found to be inconsistent with GATT Article I. Similarly, discriminating against the use of imported TRCs created during electricity generated with nuclear power or hydropower to meet the requirements of a Renewable Portfolio Standard might raise problems under GATT Article I.

Under GATT Article III, WTO members must apply the same requirements to imported and domestic products to avoid protection of domestic production. Under this provision, a WTO member could be constrained from favoring domestically produced renewable energy over electricity imports. State Renewable Portfolio Standards that require that electricity generated within the state be purchased to meet the standard could create problems under Article III of the GATT. This type of RPS creates a GATT problem because it discriminates against foreign electricity imports which are "like products" when compared to intra-state produced electricity,

GATT Article XI prohibits the use of quotas and other restrictions on imports and exports, including trade bans. Under Article XI, for example, restricting electricity imports from foreign power plants that cause transboundary air pollution could run afoul of GATT because the method of producing the electricity generally cannot be used as a basis for limiting imports. The reason for this, as noted above, is GATT's requirement that "like" products such as electricity be treated equally regardless of its production process. A country might be allowed to impose this restriction under GATT, however, if it falls within one of the exceptions in Article XX.

GATT contains two exceptions from the obligations in Articles I, III and XI in Article XX based on health and environmental effects. Article XX (b) provides an exception for measures "necessary to protect human, animal and or plant life or health" and Article XX (g) provides and exception for measures "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." Both of these exceptions are subject to the requirement "that such measures are not applied in a manner which would constitute a means of arbitrary or

unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade."

To the extent that a WTO member can show that discrimination against TRC and/or electricity imports is "necessary to protect human, animal and or plant life or health," it will fall within the exception contained in Article XX (b). For example, Article XX (b) could probably be used to justify discrimination against electricity generated with fossil fuel if production caused transboundary air pollution and damage to human health or the environment.

Prior to liberalization of energy markets, WTO members relied on the exception to GATT obligations in Article XX (g) to preclude coverage of energy "goods," including electricity, based the need to conserve exhaustible natural resources, basically oil, coal and other fossil fuels. Following energy market restructuring, Article XX (g) is no longer used to create a general exclusion for energy goods. Generally, the natural resources being protected by a trade restriction must be those of the country imposing the measure. The WTO did find in a dispute over the effects of U.S. Clean Air Act regulations on imports that air is "an exhaustible natural resource." Because the production of energy in another country can cause transboundary air pollution, it could be argued that discriminating against imports of electricity or TRCs generated using fossil fuels is aimed at conserving domestic air resources.

WTO General Agreement on Trade in Services

While WTO General Agreement on Trade in Services (GATS) does not include specific commitments on energy services, it has been interpreted to include electricity generation, transmission and distribution as well as some investment activities in projects that provide energy services. Energy services are covered under the GATS to the extent that they are provided independently of the production of energy. Other activities classified as services under GATS include consulting, engineering, construction, technical testing and analysis, services incidental to energy distribution and maintenance and repair of equipment.

Energy services are covered under general GATS provisions as well as under specific commitments in sectors such as transportation and construction. Proposals for adopting a broad definition of energy services and negotiating specific commitments in the energy sector also are discussed within the WTO.

GATS contains most favored nation and national treatment provisions similar to those in GATT as well as protection for foreign direct investment in projects related to the production

of energy services. These provisions require WTO members to extend the same opportunities available to their own nationals to all other member countries.

Determining the applicability of GATS to TRC sales is not straight forward and could depend on factors such as: 1) whether a TRC can be characterized as providing the "service" of reducing pollution, 2) whether creation of the TRC is seen as being "incidental" to other energy services such as distribution, or 3) whether the TRC is created in the context of investment activities which are covered by GATS.

When TRCs are sold in combination with imported electricity, they could be classified as services. Classifying TRCs sold in combination with electricity as services would be most likely in those cases in which a foreign company carries out transmission or distribution services in the country of import.

When TRCs are created and exchanged in the context of foreign participation in the construction, operation, maintenance of a larger project, GATS could also apply to the transaction because of its coverage of these categories of investment activities.

NAFTA Chapter 6-Energy and Basic Petrochemicals

Chapter 6 of NAFTA contains specific commitments for liberalization of the energy sector, including trade in electricity goods, services and investments. Chapter 6 states that activities related to energy and petrochemicals are covered by all other NAFTA provisions including Part Two concerning trade in goods, Chapters 12-14 on trade in services and Chapter 11 on investment,

Chapter 6 reiterates that GATT obligations on national treatment and in other parts of the treaty also apply specifically to the energy sector. In Article 603(1), GATT provisions banning prohibitions or restrictions on trade are noted to be applicable to trade in energy, emphasizing the general application of GATT-like obligations under NAFTA. While GATT Article XX exceptions can generally be used to justify deviation from obligations in Chapter 6, Article 605 limits the their use to avoid disruption of existing trade.

Mexico has entered a number of "reservations" to Chapter 6 that remove from NAFTA coverage of nearly all energy sector activities. The following activities fall within Mexico's reservations to Chapter 6: 1) all energy exploration, refining, transportation, storage and distribution of oil, gas and petrochemicals, 2) the supply of electricity as a public service in Mexico, including generation, transmission, transformation, distribution and sale of electricity, and 3) all activities associated with the production and use of nuclear energy.

Trade and investment in the energy sector is generally not permitted by foreign entities in Mexico but is allowed under some conditions. For example, foreign entities can enter into supply contracts for natural gas with Mexico. While the Mexican government reserves the right to supply electricity as a public service, investment in energy related activities is permitted under the following conditions: 1) production is for the use of the generator, with excess electricity sold to the Mexican Federal Electricity Commission (CFE), 2) co-generation of electricity is for use by the producer and excess is sold to the CFE, and 3) independent power production of electricity for sale to CFE or export. Under Mexican law, the Mexican government must approve each of these activities. In addition, Mexico does not prohibit the import of electricity but CFE is the only entity allowed to purchase.

The reservations to Chapter 6 are consistent with Mexican investment law that exempts the energy sector from most liberalization measures. In addition, Mexican law generally prohibits private investment in the energy sector even by Mexican nationals.

The restrictions on foreign activity in the Mexican electricity market are a major legal barrier to the development of a U.S.-Mexico TRC market. The greatest legal barrier is created by a Mexican prohibition on private party investment in the energy sector.

In addition, Mexican law does not allow the CFE to report negative cash flows. Because renewable energy facilities operating costs have been high relative to other forms of power generation, the CFE has not invested in renewable energy on the basis of economic considerations. The Global Environment Facility (GEF) has recently agreed to provide funding for renewable energy development in Mexico, raising its profitability relative to other power sources. This is expected to result in increased CFE investment in renewable energy.

NAFTA and Cross Border Trade in Goods

Part Two of NAFTA covers cross border trade in goods and includes provisions based on the GATT providing for national treatment, tariff elimination and non-discrimination for imports.[35] Electricity is considered a good under NAFTA and its trade is subject to the protections in Part 2. NAFTA Chapter 6 allows the parties to impose certain trade restrictions not included in GATT, including import and export licensing and limitations on energy trade involving energy that is either going to or did not originate from another party.

Mexico has reserved exclusive authority of most energy sector activities, removing them from coverage under Part Two. However, Mexico does allow export and import of electricity

[35] / For example, the national treatment requirement in Article 301 of NAFTA states "Each Party shall accord national treatment to the goods of another Party in accordance with Article III of the General Agreement on Tariffs and Trade and its interpretative notes.

and neither export nor import is subject to licensing requirements. If TRCs are sold in combination with their underlying electricity and characterized as goods, the non-discrimination protections of Part Two would apply to their trade. TRCs sold independently of electricity could also be classified as commodities and come under the coverage of NAFTA Part Two.

TRCs coverage under Part Two would create a similar legal effect as their coverage under GATT except that it extends only to NAFTA parties. Potentially the greatest impact on TRC trade derives from its prohibition on distinguishing among imported TRCs based on the type of renewable energy generated during their creation. Discriminating against import TRCs created during electricity generated with nuclear power or hydropower to meet the requirements of a Renewable Portfolio Standard would probably be inconsistent with NAFTA obligations.

NAFTA and Trade in Services

The bases for characterizing TRCs as services under NAFTA Chapter 12 are essentially the same as those used under the WTO GATS. Whether TRCs fall within the coverage of Chapter 12 could depend on factors such as: 1) whether a TRC can be characterized as providing the "service" of reducing pollution, 2) whether creation of the TRC is seen as being "incidental" to other energy services such as distribution, or 3) whether the TRC is created in the context of investment under NAFTA Chapter 11.

INTERNATIONAL INVESTMENT AGREEMENTS AND TRCS

NAFTA Chapter 11 on Investment

NAFTA Chapter 11 on investment provides foreign investors with rights and protections concerning investments from certain actions by governments as well as remedies for violation of these rights. TRCs seem to fall within several categories of "investment" as defined in Chapter 11.

For example, Article 1139(g) defines investment as "real estate or other property, tangible or intangible, acquired in the expectation or used for the purpose of economic benefit or other business purpose." A TRC could certainly be characterized as an intangible property acquired in the expectation of economic benefit. Presumably, a U.S. entity that purchased Mexican TRCs is doing so in the expectation that it is the most economically efficient way to meet a state Renewable Portfolio Standard.

NAFTA Chapter 6 applies measures related to investments in energy and basic petrochemicals. If TRCs were classified as investments, both Chapters 11 and 6 would cover them. TRCs would be particularly likely to be treated as an investment when they are generated as part of foreign investment in a project. TRCs exported in combination with their underlying electricity could also fall within the Chapter 11 definition.

If TRCs are created in pursuant to a contract for investment in Mexico by a U.S. company, they might be characterized as investment property. Investment by a U.S. company in Mexico is subject to Mexican foreign investment laws, the WTO Agreement on Trade Related Investment Measures and NAFTA Chapters 6 and 11. The potential implications of these laws for U.S.-Mexico TRC transfers are discussed below.

NAFTA Article 1110 allows a private investor to bring an action against a foreign government for compensation for expropriation of its investment. This provision of NAFTA has been the subject of tremendous controversy, particularly over the issue of what constitutes an expropriation. Expropriation is defined broadly and includes "creeping" or regulatory takings of private property by a governmental entity—an expropriation not based on change in ownership but rather affecting the property's value. It is unclear whether the owner must be deprived of virtually all of the property value or a substantial portion.

If TRCs are classified as investments under NAFTA, then a host government decision not to certify valid TRCs or to retire TRCs rather than allowing their transfer could constitute expropriation under Chapter 11.

As TRCs represent "environmental attributes" of electricity and natural resources and the environment has generally been considered a "public good," they could be seen as belonging to the state rather than the parties that created them, making them vulnerable to expropriation by the government. Avoiding even the possibility that TRCs could be classified as investments covered by Chapter 11 or under national laws on expropriation is a key reason that governments are not eager to clarify the property rights associated with TRCs.

A number of investor claims for compensation for expropriation related to environmental issues have been brought under NAFTA. Recently, a Canadian company with operations in California brought a claim against the state arguing that new regulations eliminating the use of a toxic gasoline additive it manufactured substantially deprived it of its property rights under NAFTA. A recent panel report ruled against the company in major, but further litigation is expected.

WTO and Investment

Investment protection is much more limited under WTO treaties than under NAFTA. However, two agreements, the Agreement on Trade Related Investment Measures (TRIMs) and the General Agreement on Trade in Services do provide some investor protection.

GATS provides some protection for investments related to the provision of services by prohibiting local content rules giving investors the right to use imported goods as inputs even in the production of energy services for export. In contrast to the protection afforded services related investment, investment for the production of energy, is generally considered to be incorporated in the cost of the electricity produced. As a result, this investment is covered, along with electricity, under GATT, which does not provide investment protection.

LAWS GOVERNING INTERNATIONAL SALE OF GOODS

International trade in TRCs will require the parties to the transaction to agree on a number of issues in order to complete a sale and purchase. All of these issues must be addressed in a contract that details the agreement between the parties. These contracts may be negotiated on an individual basis, such as those cases where TRC transfers take place in the context of a foreign investment or project financing. If TRCs are exchanged on a recurring basis, standard contracts should include terms specific to the transaction such as quantity, price and delivery date filled in by the buyer and seller.

Whether they are negotiating a one-time agreement or using a standard form, it is very important that the parties be clear about which laws will govern the contract in the case of a dispute over its validity or terms. Depending on the parties "choice of law," a contract may be interpreted to mean something quite different from what the parties intended or even be found to be unenforceable. TRC sales involve issues that are governed by different areas of law such as contracts, finance, banking, securities, international trade, foreign investment, environment and energy. At the same time, international transactions require the parties to designate which jurisdiction's laws will govern the contract.

For U.S.-Mexican trade in TRCs, there are basically three sets of laws that could be chosen to govern a particular area involved in the contract: international, Mexican and American. This section discusses primarily the possible choices for the parties in choosing which jurisdiction's laws govern contracts for the sale of goods.

On the international level, contracts for international sale of goods are covered by the Convention on the International Sale of Goods (CISG). If TRCs are characterized as commodities, their trade will be covered by the Convention on International Sale of Goods (CISG). The convention, which was drafted by the United Nations Commission on International Trade Law (UNCITRAL), contains rules for determining if a contract was entered into legally and interpreting its terms. Both Mexico and the U.S. are parties to CISG. If an international contract for the sale of goods states that CISG governs the form of the contract, it will serve as the basis for enforcement of the issues covered by the Convention.

The parties can also specify in the contract that either Mexican or US contract law will be applied in the case of a dispute. This paper discusses some aspects of U.S. law on the sales of goods to illustrate the difference between domestic and international law in contracts. It does not cover parallel Mexican contract law.

In the U.S., the Uniform Commercial Code (UCC) covers contracts for the sale of goods. Article 2 of the UCC addresses issues concerning the form of a sales contract, title to the property being sold, obligations of buyers and sellers, performance of the contract, remedies for breach of contract and rights of third parties. The U.C.C. governs commercial but not consumer contracts. States have jurisdiction over contract law in the U.S. and the UCC was developed to serve as a model for the enactment of state laws. All fifty states have adopted the UCC, but it has been amended and localized so there are some differences among state laws.

If U.S. contract law is chosen to govern the agreement, it is critical to designate which state U.C.C. will apply. If this is not done and Mexican TRCs are to be sold in more than one state, the choice of which law applies will be made by the body resolving the dispute, not by the parties.

The parties may also designate the CISG as the governing law. In the U.S., CISG has been adopted as federal law. If a U.S. company is a party to an international sales agreement, the CISG governs all contracts unless the parties have designated otherwise.

If TRCs were classified as securities, Article 8 of the U.C.C. would apply to TRC sales within the U.S.. For the sale of a security, evidence of ownership and registration are some of the key issues covered by U.C.C. Article 8, issues of particular importance for the developing TRC markets. The U.C.C. applies whether or not a certificate has been issued as evidence of ownership of the security. As discussed below, federal securities laws govern many aspects of certificate transactions.

Obviously, avoiding disputes by carefully drafting international TRC sales contracts to be sure that they clearly reflect the terms agreed by the parties and are in compliance with applicable laws is the most effective approach for facilitating international exchanges. By the time a choice of law provision is being considered, a break down has already occurred in the relations between the parties that might have otherwise been avoided.

TRCS SECURITIES LAWS

The most likely scenario contemplated by CRS for U.S.-Mexican trade in TRCs is that TRCs created in Mexico will be transferred to parties located in the U.S.. The U.S. purchasers of TRCs could be companies with obligations under renewable portfolio standards or consumers with an interest in promoting the development of renewable energy. This paper examines the possible application of U.S. securities laws to Mexican TRCs bought by companies based in the U.S. under U.S. securities laws. Because the CRS project is primarily focused on TRC export from Mexico, this paper does not discuss the applicability of Mexican securities law to TRCs created in the U.S. for export to Mexico.

The basic purpose of the U.S. securities laws is to protect investors from manipulative and deceptive practices in the solicitation of sales. The U.S. has a dual track regulatory system consisting of both federal and state securities laws that are duplicative in many respects and different in others. The federal regulatory scheme was created primarily by two laws, the Securities Act of 1933 (1933 Securities Act) and the Securities Exchange Act of 1934 (1934 Securities Act), enacted shortly after the stock market crash of 1929. Together these laws deal with initial issuance of securities and trading of securities in the secondary markets. The 1934 Securities Act also created the Securities and Exchange Commission (SEC).

The key focus of federal securities laws is on information disclosure. This approach is based on the view that providing potential investors with sufficient information will enable them to evaluate risks and make informed investment decisions and that requiring financial disclosure will have a positive effect on corporate behavior. The federal scheme does not protect investors by reviewing the quality or merit of securities or by withholding registration. Rather the federal securities laws protect investors from deception or manipulation by requiring financial disclosure and transparency while leaving them free to make their own, possibly bad, investment decisions.

Many financial instruments in addition to stocks and bonds are considered “securities” within the definitions in the 1933 and 1934 Securities Acts. The primary requirements that apply to regulated securities concern registration, disclosure of all material information

about the security in a prospectus for potential investors and prohibitions on fraudulent and deceptive practices. All securities sold over national securities exchanges must comply with the registration and disclosure requirements that are expensive and burdensome to meet.

Securities that are not sold on a stock exchange are said to take place "over the counter" or "OTC." Securities sold OTC are not subject to federal registration and disclosure requirements but must comply with the anti-fraud provisions of the federal securities laws. Fraud violations are enforced by means of criminal and civil penalties. Federal law also grants private investors the right to sue the securities issuers for losses sustained due to fraud. TRCs are already being sold in the OTC markets and are listed on computer exchanges such as those of Texas' ERCOT Exchange and Cantor Fitzgerald. Other products that are similar to TRCs, such as NOx and SOx credits are also sold OTC.

Even if TRCs are characterized as securities under federal securities laws, they are probably exempt from the registration and disclosure requirements because they are sold OTC. TRCs could also be exempt from registration if they meet certain criteria concerning the value of the securities issued, solicitation of buyers, restrictions on resale and the qualifications of the investors.

In addition to federal laws, states have also passed statutes to protect investors. State Blue Sky Laws, named after the speculative schemes that aimed at selling unsuspecting investors even the "blue sky," were enacted before the federal statutes beginning with the Kansas Law of 1911. These laws provide significant investor protection by means of securities registration, disclosure, anti-fraud and merit reviews.

In contrast to the federal laws that focus on disclosure, some states can refuse to register a security if it is found to be unfair, unjust or inequitable to investors after a review of its merits. This approach to investor protection—preventing investment mistakes by prohibiting the registration and sale of securities found to be unfair or inequitable—contrasts sharply with the federal reliance on disclosure. To promote uniformity among the states, most Blue Sky Laws are now based on the Uniform Securities Act, though some states have modified the Act in their legislation.

While state securities laws had been found to be a constitutional exercise of state police powers and not preempted by the federal government, the National Securities Markets Improvement Act of 1996 (1996 Act) significantly revised the allocation of authority between the states and the federal government and preempted state securities laws in several areas. This reform of U.S. securities laws was broadly supported due to the widespread perception that duplicative requirements on the state and federal level were confusing and unnecessarily burdensome.

Under the 1996 Act, the SEC has exclusive authority over registration of four classes of "covered securities" including those sold over national securities exchanges such as the New York Stock Exchange and most securities that are exempt from registration under the 1933 Securities Act. All securities that fall into one of the four covered classes are also exempted from registration requirements under state Blue Sky Laws. To the extent that TRCs are characterized as securities, the preemption of state laws in the 1996 Act significantly reduces the regulatory requirements that could apply to their issuance and sale.

Whether TRCs constitute securities under U.S. law depends on how their exchange is structured and who the parties to the transaction are, in other words, TRCs could be characterized as securities in the context of some exchanges but not others. TRCs are clearly not stocks or bonds; their characterization as securities rests on the economic reality of the exchange and the relationship of the parties to the transaction. A key issue in determining whether a financial instrument is a security is the ability of the investor to evaluate the financial risks of the purchase.

The value of a TRC is heavily dependant on the underlying generation of electricity and the quality of the measurement and tracking of the credits. To the extent that the buyer of TRCs has knowledge of or participates in the underlying activity, it is in a better position to judge the quality of its investment without the protection of the securities laws disclosure and fraud provisions. For example, if TRCs are transferred to a U.S. company pursuant to an agreement with a Mexican entity to undertake a joint venture to develop a renewal energy facility, they are not likely to be characterized as securities under U.S. law. Similarly, TRCs sold in combination with the electricity generated during their creation are less likely to be classified as securities because the buyer could be deemed to have sufficient knowledge of the underlying activity that affects their value to make a reasonable evaluation of financial risk.

If the buyer of TRCs is a large corporation or a sophisticated (i.e. wealthy) individual, the transaction is less likely to be viewed as a sale of securities because the investor is seen as having the ability to obtain information and evaluate the risk associated with the investment. On the other hand, when sold over an exchange to parties with no connection to the underlying activity, TRCs are more likely to be characterized as securities because the buyers do not have direct access to information that affects the value of the TRC. For this reason, TRCs are highly likely to be classified as securities when they are offered for sale to small customers.

TRCs are most likely to be characterized as securities when sold: 1) independent of their underlying electricity, 2) over an exchange, 3) to unsophisticated consumers. If investors are solicited from the general public e.g. through mailings to energy customers, TRCs are very likely to be deemed securities.

A market for TRC derivatives could also develop in the future. If these derivatives took the form of TRC futures, they would come under the jurisdiction of the Commodity Futures Trading Commission, which has responsibility over all futures, including both commodity and securities futures. TRC futures traded over the counter, however, are not be subject to CFTC regulation.

Another mechanism that could be used for the exchange of TRCs is the use of forward contracts. A forward contract is a current contract to buy at a set price and date in the future. Several online brokers including Cantor Fitzgerald and CO2E sell other kinds of emission credits as forward contracts. TRCs sold as forward contracts over the counter would probably be exempt from registration requirements under federal and state securities laws. Anti-fraud provisions of federal securities laws, however, would apply to these instruments.

INTERNATIONAL ENVIRONMENTAL LAW --
THE KYOTO PROTOCOL ON CLIMATE CHANGE AND TRCS

Over the past several years, CRS has been pivotal in shaping the development of a domestic TRC market in the U.S.. In this regard, it has been active in promoting uniformity among regions particularly in creating mechanisms and infrastructure for measuring, registering and tracking the sale of TRCs. In particular, CRS has been a strong advocate for environmental integrity and consumer protection safeguards, including a system to ensure that TRCs can be traced accurately and are not double counted.

Developing a national TRC trading system that is uniform, accurate and comprehensive is critical in building a robust market in the U.S.. The need for uniformity and accuracy in measuring and tracking during the entire life cycle of a TRC will be heightened as markets develop for additional environmental attributes of renewable energy. In addition, by anticipating the development of markets for other environmental attributes created during the same process that generates TRCs, a trading system can be created that can accommodate the inclusion of new products without compromising the integrity of TRC sales.

On the international level, harmonizing measurement standards, registration requirements and tracking procedures with other programs in other countries will facilitate the development of robust regional and global markets. This is particularly pressing in the case of the development of a North American market for TRC trade because Mexico and Canada are parties to the Kyoto Protocol on Climate Change and the U.S. is not. As a result, in Mexico and Canada, projects that generate TRCs could also create green house gas emission credits under the Kyoto Protocol.

On one hand, the opportunity to generate revenue from the sale of both TRCs and GHG emissions could enhance the economics of developing renewable energy in Mexico and increase interest in these projects. However, unless systems for measuring and tracking TRCs and GHG emission reduction credits are consistent and compatible, inaccurate measurement and reporting, double counting and loss of environmental integrity could become serious problems.

Even though the U.S. is not a party to the Kyoto Protocol, ensuring the development of robust and long term regional and global TRC markets requires that trading mechanisms and procedures "build in" the capacity to include GHG emissions. In order to do this, it is critical to create a system for measuring and tracking TRCs that can accommodate the inclusion of documentation required on creation and transfer of GHG emission credits under the Kyoto Protocol. Obviously, creating a system that is generally consistent with that being developed in the European Union would be much easier and more efficient than trying to harmonize divergent schemes in the future.

It is also important to note that while in the past other countries have generally harmonized around U.S. rules for securities trading in order to participate in the U.S. capital markets, this is not likely to be the case for GHG emission trading. Because of its current non-participation in the Kyoto Protocol, Europe is leading the development of international GHG emission credit markets and exchanges and the U.S. will need to harmonize its scheme to participate.

CONCLUSIONS

While the TRC market is still at an early stage, there are no insurmountable legal obstacles to the development of a North American market. Defining TRCs and the property rights associated with them is the most important legal issue to be addressed. There are reasonable bases for characterizing TRCs as commodities, services, investments or securities. The characterization of TRCs and the legal rules applicable to their international

trade generally hinge on the structure of the TRC exchange and the parties to the transaction.

The long-term vitality of the North American TRC market depends on designing in the capacity for trading other environmental attributes of renewable energy. In this regard, the non-participation of the U.S. in the Kyoto Protocol on Climate Change should not be a reason for developing a TRC trading system that is inconsistent with the Protocol's requirements for measuring and tracking GHG emission reduction credits. An important issue in developing a robust U.S.-Mexico TRC market is the capacity to structure projects which enable Mexico to generate both TRCs and GHG emission reduction credits, thereby further enhancing the economics of renewable energy development.

Because the North American TRC market is still in its infancy and the legal character of a TRC has not been established, an opportunity exists now to resolve these issues in a manner that limits transactional costs. In addition, legal barriers can be minimized to facilitate international trade and foreign investment.