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Quarterly Cleantech Update, April 2008

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The Cleantech practitioners at Morrison & Foerster are delighted to share this Quarterly Cleantech Update. This Update profiles the opportunities and risks in the emerging industry of carbon trading, which is predicted to be a trillion dollar market in little more than ten years.

Our Cleantech Group includes more than 100 attorneys from Morrison & Foerster's U.S., European Union and Asian Offices. Our attorneys have been representing energy companies since the 1970s, and in more recent years have concentrated on working with companies and investors in the Cleantech industry. Active areas of our practice include solar, wind, biofuels and other alternative energy sources, energy efficiency, carbon emission management and credit trading, green building and other sustainability areas such as innovative agriculture and organic foods.

Our Cleantech Group is truly interdisciplinary, including attorneys from corporate, litigation, intellectual property/patents, technology transactions, environmental/land use, tax, energy and other practices to better serve our clients in this growing sector of the global economy.

This *Quarterly Cleantech Update* has three sections:

1. [A feature article on the challenges and opportunities related to a cleantech issue—in this update we focus on 'Evaluation and Ownership of Carbon Value.'](#)
2. [An overview of innovative solutions by established corporations, emerging companies, and investors for which Morrison & Foerster's Cleantech attorneys have provided advice and counsel.](#)
3. [An invitation to share these insights and representative matters with your colleagues and community of thought leaders.](#)

Quarterly Cleantech Focus: 'Know What You Have And Make Sure It Is Yours: Evaluation And Ownership Of Carbon Value'

At the center of the global debate over how best to address climate change—specifically, whether to develop a worldwide market, by capping and trading the emission of greenhouse gases—is a fundamental question: Who owns the Environment? Today, scientists maintain that the excessive release of greenhouse gases (which include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) must be halted or even reversed to avoid potentially catastrophic environmental consequences. This scenario, where measurable emissions must be reduced and maintained below a designated threshold, provides a fertile landscape for a relatively new and booming market—one where those able to reduce their emissions, but not required to, are paid by those required, but unable, to reduce their emissions. The Commissioner at the U.S. Commodity Futures Trading Commission was recently quoted in the

Financial Times as saying that he could 'certainly see carbon becoming the biggest of any derivatives product in the next four to five years. And that would, of course, mean overtaking T-bills [Treasury] and any contract that is out there right now.'

New Carbon-Trading Market Could Reach \$1 Trillion by 2020

Estimates on the potential for a global carbon market are startling. Analysts at Point Carbon, a research firm based in Europe, have reported that in 2007 the global market for buying and selling carbon emissions—a market that primarily involves purchasing the right to emit greenhouse gases by industries in European countries that are required to reduce emissions under the Kyoto Protocol, and currently covers only a small fraction of total global emissions—reached \$60 billion. That total represents an 80 percent increase from 2006. Looking forward a decade, New Energy Finance, another research firm, anticipates a U.S. carbon-trading market totaling \$1 trillion by the year 2020, more than seven percent of the current U.S. GDP.

With billions of dollars already at stake, and perhaps trillions on the horizon, the carbon markets have been crying out for a common set of rules from the politicians and regulators, but progress has been slow so far. Even after the scientific community concluded in 1979 that a 'wait and see' approach to addressing human-induced climate-change impacts was ill advised, countries waited nearly 20 years before agreeing to the Kyoto Protocol (and then waited another eight years before the Protocol entered into force). To date, the United States is still waiting—having declined to join Kyoto despite considerable global pressures.

Thus, it is a safe assumption that there will be no quick resolution on a global, or even U.S., cap and trade system. The fundamental policy issues in play for the looming carbon market, such as whether to limit cap and trade programs only to certain industry sectors, whether to auction or allocate the ability to emit greenhouse gases in those programs, whether to implement price ceilings or floors on the markets, and whether to allow for linkage between separate cap and trade regimes (such as between the existing emission trading system in Europe with new systems in the United States), resist swift political action. At the same time, a massive economic force is building behind the cleantech industry and climate change movement—a force that is destined to evolve into a full-blown commodity market at a scale that could influence the entire global economy.

Because establishing rules for a carbon market is, in essence, inventing an entirely new commodity, the decisions on regulation will not be made quickly—the potential shock to future economic activity that may result is simply too daunting for unconsidered action. But, as the regulation occurs, and policy interpretations emerge, any organization or institution with an impact on the environment—business, nonprofit, government, academic—is well advised to investigate its carbon emissions and potential for reductions, and then examine the options for tapping any reduction value. Although the global use of markets is still being debated, a specific strategy can be employed now to capture the opportunities and manage the risks of regulatory change: (1) evaluate your carbon reduction value and (2) ensure and protect your ownership of that value.

Evaluating Your Carbon Reduction Value

The pace of political action on greenhouse gas regulation should not deter businesses that provide technologies, products, and services that could either directly, or tangentially, affect greenhouse gas reductions from being proactive with respect to evaluation and ownership of carbon credits. Already, greenhouse gas reductions have value. Defining that value is more difficult—depending in large measure on where the reduction takes place. Activities within the Kyoto regulated boundaries (either Annex I countries or Clean Development Mechanism nations) may have a slightly better ability to identify how much the reduction of one ton of carbon dioxide is worth by looking at the current prices in existing markets—but even those prices can change dramatically by the time a reduction is actually achieved. In less than a month in 2006, the price of carbon in the EU Emission Trading Scheme plummeted approximately 70 percent, when participants in the market suddenly discovered that allowances had been over-allocated and the regulated entities would easily meet their targets. One can only imagine what the impacts of such an event would have been had a robust global carbon market been in place. Early speculators in the existing markets have been on a roller-coaster, watching their stocks and company values rise and fall (reported on the front page of the *Wall Street Journal* to be as much as 80 percent swings). Going forward, this volatility will be influenced by the increasing volume of carbon credits, the price differences by geographic markets, the type and variety of carbon mitigation projects, and the evolving regulatory and market frameworks.

Nevertheless, anticipating the potential boom in carbon market activity and the consequences of inaction, companies, non-profits and governments are devoting unprecedented efforts to measure emissions, and price and trade their reduction. These reductions are often referred to as 'offsets'—

reductions that are measured, verified, and sold to enable the purchaser to subtract the equivalent emissions from its overall emission balance. Offsets typically come in one of two forms—the capture of carbon from the atmosphere, such as through planting and protecting a forest, or the prevention of emissions that would otherwise be released into the atmosphere, such as by trapping waste gas from a fossil fuel power plant and using that gas for an alternative fuel or product.

To evaluate potential carbon reduction values, Morrison & Foerster helps companies to assess the existing regulatory landscape for emission control in the geographic areas where they conduct business, and also identify the potential regulatory developments that may be relevant to them. More specifically, we advise clients on how their operations, products and services may factor into mandated carbon emission calculations under reporting methodologies such as those recently adopted in California. In addition, we identify opportunities in the existing and developing emission control regimes where client products, services, and operational adjustments have the ability to affect emission reductions. Finally, once these initial two evaluation steps have occurred, existing market information informs the estimation of the potential value (or risk) businesses are holding, including discounting for the possibility that a market may not develop. In the event a positive carbon reduction value is identified, the follow-up strategy that needs to be employed is protecting ownership.

Ensuring and Protecting Your Ownership in Existing and Future Carbon Markets

An important lesson on ownership has already been learned—the hard way—with respect to renewable energy credits (RECs). In 2006, California passed Senate Bill 107 accelerating its renewable portfolio standard (RPS) (which requires that a portion of utilities' energy portfolios come from renewable energy resources). The legislation also refined the use of RECs in the RPS program. The bill included a provision stating:

No renewable energy credits shall be created for electricity generated pursuant to any electricity purchase contract with a retail seller or a local publicly owned electric utility executed before January 1, 2005, unless the contract contains explicit terms and conditions specifying the ownership or disposition of those credits. Deliveries under those contracts shall be . . . included in the baseline quantity of eligible renewable energy resources of the purchasing retail seller . . .

Put plainly, unless the renewable energy provider had the foresight to address REC ownership in its pre-2005 contracts (possibly by negotiating a premium price with the purchaser or by reserving ownership for future sale), the new law assumed that the REC benefits had already been sold to the purchaser in those pre-existing contracts. Applying that lesson to businesses that offer any type of clean technology, product or service that may result in reduced emissions, those businesses should expressly address how ownership of the carbon reducing value of what they sell will be allocated in the contracts or other business arrangements that they are currently negotiating and executing. By leaving this issue unaddressed, however, not only are businesses potentially undervaluing their assets, but they are also exposing themselves to an unnecessary risk that these emission-reducing values will be taken away.

The Carbon Disclosure Project (CDP) may foreshadow one way that this ownership tussle could unfold in the carbon context. Many of the world's largest companies presently participate in the CDP, a voluntary effort that encourages businesses to quantify and disclose their greenhouse gas emissions in reports. Some speculate that the Securities and Exchange Commission will require such reporting in the future. These CDP reports often include not just an estimate of a company's current greenhouse gas emissions, but also an estimate of the offsets the company has obtained. One common source of offsets is renewable energy projects that displace existing or planned fossil fuel power plants. In CDP reports, businesses often detail their purchase of renewable energy and then independently calculate the carbon offsets that this energy represents. What these reports may overlook, however, is whether the underlying renewable energy purchases included, excluded, or were silent on the transfer of carbon offsets. One might assume that the carbon offset transfers with the renewable energy. But that assumption may prove incorrect. Several renewable energy providers now market their renewable energy certificates and carbon offsets separately. In fact, certain certificates may even expressly reserve the ownership of the carbon reductions. Because the CDP is still voluntary and evolving, such a misunderstanding on carbon reduction ownership may never be discovered—these voluntary reports do not receive the level of scrutiny that might be imposed in a regulatory context. But as a global carbon market develops, prices for carbon reductions become more stable, and regulatory mandates are unveiled, this ownership allocation issue will become increasingly important.

To be sure, the world is still coming to grips with exactly what a carbon credit is and how best to

define it. Nevertheless, there is universal agreement that any carbon reduction cannot be double-counted. Staking a claim of ownership now to the carbon-reducing value of a technology, product, or service enables businesses to protect their potential assets as the regulatory landscape unfolds. Businesses and organizations with any interest in creating and selling carbon credits should be carefully considering their ownership risks and integrating terms and conditions into contracts covering everything from power purchases, to technology transfers, to intellectual property licensing. With these relatively new assets defined and protected, businesses can then prod the policymakers to make decisions that will send a substantial share of the expected trillion-dollar market their way.

If you would like further information on evaluating or protecting ownership of carbon credits, or to understand other aspects of the new carbon economy, please contact Bill Sloan (wsloan@mofo.com /415-268-7209) or Chris Carr (ccarr@mofo.com /415-268-7246) of our Environmental/Land Use Group.

Innovative Solutions By Leading Companies, Advised By Morrison & Foerster's Cleantech Attorneys

The Cleantech attorneys at Morrison & Foerster LLP are trusted advisors with deep expertise and broad experience in responding to the challenges and opportunities presented by climate change. Recently, Morrison & Foerster has assisted clients in: launching new cleantech products, services and ventures involving carbon emissions and credits; steering cutting-edge emission reduction projects through the regulated and voluntary carbon market hurdles; protecting cleantech companies developing carbon-efficient innovations and positioning them for growth, and helping bring to market technologies for tracking carbon reductions and sustainability. More details are below:

Launching Innovative Information Systems for Mapping, Mitigating and Monetizing Carbon.

Historically, pollution and carbon emissions have only been estimated and quantified by engineers, academics and regulators. The Environmental Protection Agency (EPA) through the Toxic Release Information (TRI) program requires accounting of many forms of air, chemical and other pollutants, but does not comprehensively mandate reductions. Over the past five years, the Carbon Disclosure Project participants (including Fortune 1000 companies and investors) have catalogued voluntary disclosures and carbon-emissions data, practices and programs.

Carbonetworks Inc., an innovator based in Victoria, British Columbia, Canada, provides online information systems that inventory the carbon footprints of corporations, their suppliers and governments, analyzes the risk of carbon emissions as a liability, and enables customers to generate revenue and asset value from net positive carbon positions. The carbon credits can be traded directly through Carbonetworks's marketplaces and partnerships. In addition, the software recommends how best to do so by each jurisdiction across countries, provinces and states as well as provides different views of how to manage at each role in the organization (e.g., Board, executive, facility manager, supervisor). The company also ties its pricing to the client reducing green-house gas emissions.

These unique systems and software services benefited from the expert counsel of Morrison & Foerster's Cleantech practice. As described in the article by Bill Sloan and Chris Carr above, customer agreements need to specify who owns the carbon credit benefits, and how those will be transacted. Structuring the marketplace for both business success and legal compliance benefited from Morrison & Foerster's team approach across disciplines and geographic boundaries, to learn from the European initiatives to date in voluntary carbon trading. Morrison & Foerster most recently has advised Carbonetworks on its financing and alliance choices.

More on Carbonetworks unique software-as-a-service at www.carbonetworks.com

Global Project Development to Reduce Emissions and Spur Voluntary Market Growth. China's aggressive industrial development has resulted in fast growth in income, but also in greenhouse gas emissions. At the same time, many rural regions of China are transforming into desert from industrialization, urban growth, and climate change.

A global insurer of political risk (requesting confidentiality) sought to develop and assist mega-projects to both combat greenhouse gas emissions and halt environmental degradation in rural provinces of China. The projects not only seek to capture and prevent emissions through alternative land use practices, but they also aspire to demonstrate the viability of new emission reduction

measurement methodologies to enable these and other rural and impoverished areas to generate assets and revenue from voluntary carbon credits.

With Morrison & Foerster's global presence and expertise in the evolving carbon credit markets, including experience with Clean Development Mechanism projects in China, we advised on which instruments to employ, how to structure and register the projects and business relationships for optimal value, and how to position the resulting credits for potential cross-border exchange in voluntary markets. Also, Morrison & Foerster has advised this client on emissions-reduction projects in the U.S., as well as energy efficiency projects in other regions.

More on Morrison & Foerster's Cleantech expertise and experiences at www.mofo.com/cleantech

Cultivating Healthy Food and Farms from Carbon-Efficient Innovations. Agriculture worldwide has benefited from nitrogen fertilizers, boosting both crop yields and the bottom line of farmers. Unfortunately, most plants absorb less than half of the nitrogen applied—resulting not only in wasted inputs, but also environmental degradation of air, soil and water pollution. Compounding the issue is that Nitrogen Oxide (N₂O) is almost 300 times more polluting than typical CO₂ (or carbon equivalent), and lasts for 100 years.

Arcadia Biosciences Inc., headquartered in the agricultural valley of Davis, California (with offices in Seattle and Phoenix), develops and licenses agricultural innovations that optimize nitrogen use, enable plants to grow in saline waters, and enrich safflower seeds with anti-inflammatory benefits.

Morrison & Foerster's expert attorneys in Cleantech have guided Arcadia since its inception in crafting an IP strategy designed to broadly protect Arcadia's inventions. In assisting Arcadia to implement its IP strategy, Morrison & Foerster has delivered numerous seminars to the company on various IP topics including notebooks and record keeping, inventor-ship determinations, preparing for patent litigation and updates on new Patent Office Rules and changes in the case law. In addition to this strategic IP counseling, Morrison & Foerster's attorneys have crafted broad strategic patent applications covering Arcadia's innovations—creating benefits in greenhouse gas reduction as well as increased health of food, farms and the environment. As a high-growth company, Morrison & Foerster has advised Arcadia Biosciences on attractive stock-option plans, as well as corporate structures that prepare for global expansion.

More on Arcadia's agricultural innovations at www.ArcadiaBio.com

Energy and Carbon Tracking at Work, Home or School. In your home, office, factory or school, building systems and utility meters track your use of electricity, gas and water – but rarely provide real-time feedback on energy usage or the carbon footprint it creates. As residences and commercial buildings represent 40% of power usage, everyday users and building managers need timely feedback on how their behaviors link to higher or lower energy and carbon impacts. The patent-pending *Resource Monitor* touch-screen and web-enabled information system by AgileWaves, founded by former NASA engineers and based in Palo Alto, California, does just that – connecting all the utility meters and electric circuitry to a live energy-information display that customers view on the Web or on-site touch screens.

At the Nueva School for gifted children in Hillsborough, California, **AgileWaves's** connection to the energy systems and two green roofs help students learn about how they can use energy more efficiently, set up experiments that also count for class credit, and discover how to live a low-carbon and lower-energy life at school and home – and coach their parents how to do so at work. Initial customer usage of AgileWaves products results in up to a 15% reduction of energy and carbon.

With AgileWaves breakthrough systems and solutions, Morrison & Foerster's Cleantech attorneys have added substantial value from: helping to establish the corporate form and capital structure, to designing the founders and employee agreements and innovation assignments, to providing trademark and intellectual property advice, and most recently, to securing debt financing from the company's first outside investors. More on AgileWaves and its Resource Monitor at www.agilewaves.com

For More Information

Future issues of the *Quarterly Cleantech Update* will focus on topics related to Litigation, Intellectual Property, Energy and other key areas facing the industry.

For a pdf version of this update, [click here](#).

For more info on the Cleantech Practice, our expert attorneys or details about representative clients and matters of Morrison & Foerster, go to www.mofo.com/cleantech or email Cleantech@mofo.com.

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