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Setting the Stage for Collision or Convergence

As we approached the year 2005, one key question on the minds of corporate Europe was “What effect will the new dynamic of a pan-European emissions market have on the energy markets and industry?” With the rest of the world watching closely, on January 1, 2005 the European Union Emissions Trading Scheme (EU ETS) came into being. The fourth dimension of energy markets was born. Prior to this, traders and energy buyers only had to focus on the price of the fuel, quality of material, delivery time and location. Now, the cost of emissions from the use of that fuel also had to be taken into account in the whole cost equation.

Industry and traders alike could no longer depend on the simple arithmetic of oil, gas, coal and power prices to determine the “best deal”. From this point onwards, energy producers, industry and traders had to examine the emissions cost of their energy production/source as a key component of their financial decision-making. Now, faced with alternative fuel sources, a company might find that the notionally cheaper source might, in fact, prove the more expensive once the cost of emissions generated by that fuel are taken into account.

What we have witnessed since the launch of the EU ETS is a convergence, an embracing of emissions trading and its uses as a commercial advantage, as a marketing tool — as in the case of green, carbon-neutral taxi firms being launched in England — and



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as a mechanism which helps firms finance the upgrading of technology to beat emissions-reduction targets and claim the attendant financial benefits by selling excess emissions credits.

Before going any further, let us clarify what we mean by “emissions trading”. Technically speaking, emissions trading is a market-based approach to reducing levels of pollution. It was developed to help reduce pollution at a lower overall cost for pollution emitters (“emitters”). Since its invention in the late 1960s, it has mostly been used to deal with different kinds of air pollution, although it has also been used with water pollution. According to economists, the advantages of effective emissions trading are that it allows emitters flexibility in choosing how to address their pollution-reduction obligations; it encourages the use of the most economically efficient pollution-reduction measures, thus allowing emitters to save money while placing the minimum possible burden on the economy as a whole; and it encourages innovation in finding less expensive ways to reduce pollution.

Interestingly, soon after the launch of the EU ETS, with gas prices in Europe soaring to record highs in mid 2005 (in line with escalating international oil prices which reached close to US\$70 a barrel in September 2005), the European power-generation community started burning more coal than ever before. This was because the cost of coal plus the emissions cost was still cheaper than burning natural gas or oil for electricity production. This drove an increase in demand for emissions credits and a surge in price which saw emissions credits rise from around €5 per MT of carbon dioxide (CO₂) at launch to over €30 within seven months. The substantial rise in the value of emissions credits started to give a large economic pay-back to those industries covered by the scheme because the credits are transferable, tradable instruments which could be sold at a premium to help subsidize the purchase of cleaner energy technologies or to upgrade plants to reduce emissions.

So where did this approach to emissions reductions — creating a market mechanism that forces industry to cut emissions by a set amount over time while providing economic incentives to do so — come from?

In the late 1960s, John Dales, a Canadian economist, developed the idea of using tradable emissions rights as a way to reduce the economic costs of pollution control. Several emissions-trading programs have been put into place since then, and it may come as a shock to some to hear that the earliest scheme was put in place in the



United States. The largest of these schemes is the American Acid Rain Program for sulfur dioxide (SO₂) emissions from electricity generators, which was started in 1995. This system has so far been regarded as a success: reductions targets have been met and sometimes exceeded, and reductions costs have been lower than they were under other pollution-reduction regimes.

The energy industry (encompassing oil, gas and power producers) is the world's leading emissions polluter but is set to become the leading supplier of environmental solutions because it's good for business. Today, as carbon intensity continues to grow while time to stabilize carbon dioxide and other greenhouse-gas (GHG) emissions is increasingly limited, the industry is at a turning point on global warming. This issue goes way beyond the Kyoto Protocol, which initially operates only for the period 2008 to 2012 (although discussions on arrangements for the period beyond 2012 are already under way), and will engage all countries in greenhouse-gas reductions over the next century.

The oil industry has the financial strength, intellectual capital and global presence to provide these global solutions. BP (with its "De-carbonization of fuel" strategy), Shell and Chevron Texaco have already taken the lead but other companies are not far behind. The carbon footprint of the major oil companies is complex and ever changing as a result of factors that include ever-evolving oil and gas production profiles, new pipeline transportation, refining and marketing, storage, and their growing involvement in the power industry. Therefore, the solutions will come from within the industry and include more efficient, environmentally benign technology but also basic changes in standard industry practices. Industrial best practices will now have a proactive environmental component, because it makes financial and commercial sense.

Environmental issues are now framed as corporate financial issues. Greater financial disclosure of corporate environmental risks, including climate change, has brought environmental issues in from the periphery to the forefront of corporate fiduciary responsibility. Increasingly, the environmental performance and the financial performance of companies are intertwined.

This also influences how consumers use energy and has an impact on automobile manufacturers, electric utilities, building owners, commercial banks and insurance companies.

Automakers are increasingly concerned about carbon dioxide emissions per vehicle and utilities now pay more attention to cutting



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their greenhouse-gas and other air emissions. Oil and gas companies are increasingly concerned about their emissions as production, refining, transportation and distribution liabilities and we have seen in Europe oil majors investing in what is called “carbon capture” and storage techniques, where carbon dioxide is captured from oil fields or from power stations and fed back in to the ground, sometimes back in to the oil fields.

Bank share valuations could fall if they lack adequate risk-management strategies for carbon, and several banks such as JPMorgan Chase have now enunciated new environmental lending policies with teeth. Insurance and reinsurance companies are at the forefront of confronting and addressing financial risks arising from, for example, catastrophic crop failures as a result of climate change, and health-related risks arising from linkages between climate change and infectious disease. These new financial risks for insurance and reinsurance companies may actually prompt them to drop coverage for certain companies. These new risks are beginning to prompt change and the creation of environmental markets.

The future promises more financial disclosure about potential liabilities. Indeed, Innovest Strategic Investors, the green Moody’s, has already shown that companies perceived to be more environmentally aware are also more financially successful.

The EU ETS has had a positive effect on industry and its strategy towards emissions reductions by focusing attention on emissions as a potential financial liability which, if not handled properly, could run into many hundreds of millions of euros for some companies. If managed properly, however, the strategy promises substantial rewards for those achieving faster reductions than required, with the emissions credits above and beyond a firm’s requirements being sold at a profit.

The EU ETS is an example of how market-based solutions through emissions trading are undoubtedly the way forward for the energy industry and energy-intensive industries. Environmental financial products for SO₂, which causes acid rain, and nitrogen oxides (NO_x), which cause urban smog, began in the U.S. in 1995 and 1999, respectively. These pollutants were reduced through “cap and trade” mechanisms which are also now part of the Kyoto Protocol. Despite general perceptions to the contrary, emissions trading was made in America, and proposed by the U.S. delegation at the Rio Climate Convention Treaty in 1992. Today, we have a US\$10 billion environmental financial market for SO₂ and NO_x. The



carbon markets are using the same template developed by the U.S. under the auspices of the first Bush Administration and proposed by the Environmental Defense Fund (now called Environmental Defense), an environmental group based in New York, with the implementation of the Clean Air Act Amendments of 1990. Contrary to the widespread perception that the U.S. is doing nothing on global warming, environmental law in America continues to focus on more stringent regulation of emissions reductions. In fact, in March 2005 the Clean Air Interstate Rules (CAIR) were passed to reduce SO₂ and NO_x emissions by 2015 by a further 70% and 65% respectively — once again, the most exacting standards in the world. Furthermore, the U.S. is now looking to implement the first emissions-trading rules for mercury, another known toxin. It is the energy industry that bears the brunt of this clean up. Trading mechanisms have been proven to work and also be cost effective.

The U.S. has one of the most advanced emissions-trading markets in the world, trading US\$3 billion in notional-value SO₂ allowances each year as prices rose to over \$800 per ton in the spring of 2005. It also has the most advanced nitrogen oxide (NO_x) markets in the world, with allowances trading at up to US\$40,000 per ton during the summer of 2004 in the Houston/Galveston area, which has the worst air pollution non-attainment in America and has to reduce its NO_x levels by 80% in 2008. Additionally, the California RECLAIM market for Southern California air quality has had active SO₂ and NO_x markets as well. Such market-based solutions are now being embraced by several green hedge funds trading in SO₂, NO_x, carbon and renewable-energy credits, as well as by emitters. After all, emissions trading is also about speculation.

Europe begins its regime

Signed in December 1997, the Kyoto Protocol is the international agreement intended to reduce emissions of greenhouse gases (especially CO₂, methane and CFCs) in developed countries. The Protocol requires, for example, that the European Union reduce its emissions by 8% below 1990 levels by 2012, which equates to a reduction of 340 million tons of CO₂ emitted into the atmosphere.

The emissions-trading scheme started in the 25 EU Member States on January 1, 2005 and, after the launch value of approximately €5 per MT of CO₂, it rose quickly to a high of around €30 in mid



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2005. If we take an average value of €20 per MT of CO₂ emission credits, the EU trading scheme was handling emissions credits worth €6.8 billion. A key aspect of the EU scheme is that it allows companies to use credits from Kyoto's project-based mechanisms, joint implementation (JI) and the clean-development mechanism (CDM) to help them comply with their obligations under the scheme. This means the system not only provides a cost-effective means for EU-based industries to cut their emissions but also creates additional incentives for businesses to invest in emissions-reduction projects in developing nations such as China and India, and in South America and Africa. In turn, this spurs the transfer of advanced, environmentally sound technologies to other industrialized countries and developing nations, giving tangible support to their efforts to achieve sustainable development.

The launch of the EU ETS and the implementation of the Kyoto Protocol in February 2005 have provided a wake-up call to corporate America. Multinational corporations in the U.S., Canada and around the world are starting to realize that they have compliance difficulties in many locations. The consensus emerging in the U.S. is that a climate-change regime will be in place in the next two to three years.

The issues of environmental financial liabilities and the emergence of climate-change risk have made U.S. companies extremely nervous about proceeding in market development with such near-term uncertainty and potential impact to their bottom line. In December 2004, Fitch Ratings issued the first ratings agency report on emissions trading, and with emissions trading now clearly on the balance sheet, clarity is starting to come to the issue of climate change in the U.S.

The long-term impact of these market-based solutions has been to reduce pollution in a cost-effective manner and accelerate the introduction of more environmentally benign technologies. It has also given industry time to implement new, cleaner technology and fuel sources, with minimal economic disruption to the capital-intensive energy industry, the agricultural industry and other industrial sources of pollution. The markets have actually created concrete and measurable emissions reductions for American business, although the news media turns a blind eye to it.

Emissions-trading markets are not true commodity markets in that they are "cap and trade", which means that emissions are ratcheted down over time. For the U.S. SO₂ markets, this involves



a 35-year regime of reductions and more stringent standards until the year 2030. For CO₂ and other greenhouse-gas reductions, we will need a 100-year program that engages the entire world and sets quantifiable long-term benchmarks to reduce emissions. Implementation of the Kyoto Protocol is a modest first step to global emissions reductions, but the larger question is whether there will be significant CO₂ reductions in the next two decades to meet carbon stabilization in the atmosphere. The reality is that the entire world is in this for the long haul. There is no quick technological fix as long as the world is addicted to fossil fuels, whose consumption continues to rise. That habit is not going to change, as has been evidenced in the past year with record oil, coal and natural-gas consumption, despite higher prices. We need a climate-change regime that will aggressively reduce global carbon intensity, including both stationary and mobile sources, accelerate technology transfer and increase energy efficiency. The U.S. will lead in this effort.

Already, commodity CO₂ used for enhanced oil recovery in Texas and Wyoming is now married to carbon sequestration efforts in those states. The use of naturally depleted geologic formations is being pushed forward by the oil industry and the U.S. Department of Energy. Again, unknown to most of the world, the U.S. is leading in these green efforts.

In the United Kingdom, British Petroleum (BP) announced in early 2006 that it will remove CO₂ from natural gas out of the North Sea before burning it in an onshore power station, and then, using existing pipeline, transport the CO₂ gas back out to sea down in to a nearby depleted oil field.

Turning to mobile sources of pollution, hybrid gasoline/electric vehicles that reduce CO₂ tailpipe emissions and increase fuel economy are now being embraced by the U.S. public as well as other nations. In California, tailpipe emissions will be regulated in 2009, with these regulations subsequently being adopted in New York and other states, despite legal challenges from the automobile industries. Once again, these will be the first such standards in the world. We also have many energy-efficiency devices that reduce building loads from both commercial and residential buildings, again leading to a reduction in greenhouse-gas emissions.

What has been lacking in America is the mandate of the federal government. This is now beginning to change. Federally mandated standards are needed to create fungible commodity markets so that the rules bring a realistic financial value to emissions reductions,



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rather than the US\$1–2 per ton shown on the Chicago Climate Exchange. The point is that both the SO₂ and NO_x programs are mandated and have financial penalties for non-compliance. The low carbon prices of today reflect the market valuation of “voluntary” standards. Companies would rather sit on their carbon inventories today as prices will surely appreciate tomorrow.

Another driver behind the greenhouse-gas (GHG) market is that we now have institutional shareholders forcing corporations to acknowledge the environmental risk on their books. This has been done mostly by pension funds and is similar to the strategy that proved quite effective in tobacco litigation. There are also several litigation efforts to get the U.S. federal government to change its present oppositional position.

Nevertheless, global environmental markets are beginning, with GHG trades valued at about US\$2 billion in notional value so far. The European trading scheme that started in January 2005 traded more than 49 million metric tons of CO₂ equivalent in its first six months.

The European program is a company-to-company cap-and-trade program, and the tradable unit is EU allowances. We have seen over three million tons traded on the Chicago Climate Exchange, with more than 80 companies participating, and carbon trading at less than US\$2 per ton. However, many larger trades, including a one-million ton trade by electric utility Entergy in December 2004, have been traded on the over-the-counter (OTC) bilaterally traded market (directly traded between market counterparts). And we have seen the emergence of several green hedge funds that will actually trade carbon and renewable-energy credits speculatively.

The banks step in

As well as the usual suspects such as electric utilities, oil companies and automakers, financial houses will be needed as market makers to ensure that these environmental financial markets work more effectively. Today, Morgan Stanley is the largest SO₂ emissions trader in North America, and now Goldman Sachs has a 4,000 MW portfolio of renewable-energy projects with its recent purchase of Zilkha Energy. Wall Street can ramp up for emissions trading very quickly, having both the talent and the balance sheet to make markets. In London, Barclays Capital, Calyon Financial, Rabobank and others are making a concerted effort to make carbon markets in Europe. We



are witnessing a market transformation similar to developments in the oil market in the late 1970s; that is, opaque price discovery and little liquidity. But the good news is that this time it is happening all over the world at the same time. We are now positioned for the beginning of a liquid spot market instead of the one-off trades that have occurred up until now. On April 22, 2005, the European Climate Exchange, sister of the Chicago Climate Exchange, was launched.

Where we are going in the U.S.

Today, 28 different U.S. state greenhouse-gas programs are in place or taking shape. We are seeing shareholder pressure. We are seeing U.S. multinational companies worried about double environmental standards in the U.S. and the rest of the world. The federal government will now have to act, and it will move faster than imagined as the EU and Japan start out on the learning curve of environmental financial markets. The U.S. is now into its eleventh year of action in this area and, contrary to uninformed public perceptions, the fact is that more stringent standards are being implemented for SO₂ and NO_x. It is only a matter of time before the carbon regime takes place, and that will be sooner rather than later. Already U.S. utilities are moving forward since they are the most severely affected by this. But the economic pain will be shared and this will not be as disruptive as claimed. Every American wants clean air and clean water. A small price for human health is not much of a sacrifice for a country that gobbles up 20 million barrels of oil per day and has over 900,000 MW of peak capacity. The surprise to many will be that, as the emissions markets continue to roll forward, many companies will bite the bullet and make the necessary investment in new, cleaner, energy-efficient technology. This means that less coal will be used to produce the same energy, and it will be gasified coal. Just as hybrid cars use less fuel and reduce emissions, so will new power-generation equipment. It will boost investment in an under-invested sector and create jobs.

The U.S., with its entrepreneurial culture, risk capital and knowledge base in trading, is still well positioned to lead in developing environmental financial markets. This may be the best thing that has happened to America, as new jobs are created in emissions trading, clean technology and energy efficiency. At today's high prices, it's now or never.



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It is now a critical time for the emissions-trading sector, and the next 10 to 15 years will throw up signals that will induce both optimism and pessimism. These might include:

- Threats to human survival posed by global climate change and the spread of infectious disease
- New technologies in the generation and management of renewable energy
- Growth in relevant financial products and increasing interest from major financial players and investment banks such as Goldman Sachs, AIG and others, who are quietly entering the emissions and renewables space
- Growing financial liabilities driven by the climate issue
- The reality that the stabilization of emissions is a long-term target
- Elements supporting growth in greenhouse-gas (GHG) emissions markets, such as potential fungibility of its derivatives, growth in GHG emission levels, increased public perception, and increased liabilities of potential shareholder lawsuits related to GHGs.

State-level Renewable Portfolio Standards (RPS), which mandate a percentage of energy that must be generated from renewable sources, provide a driver for renewable-energy markets, augmenting solar-panel power generation's 30% annual market growth and wind energy's 40% annual growth. Financial products for energy efficiency ("negawatts") are emerging.

GreenTrading™, the triple convergence of GHG, renewable energy and negawatt markets, could become a US\$3 trillion commodity market opportunity over the next 20 years. Admittedly, though, its development will require greater liquidity, standardization and indexed construction, market making by major players and cross-border trading.

Out of all that has been said to introduce the scope and huge scale of emissions markets, the risks, the opportunities, and the potential rewards, one thing is certain: despite possible lack of clarity in how emissions controls and the markets built around them will evolve beyond Kyoto's current 2012 limit, emissions markets have arrived. They are here to stay, their industry reach will get broader and broader and, as a result, they will undoubtedly continue to become an increasingly key focus for global energy markets and industry.