

# **The Dawn of the Post-Carbon Age**

**Speech Presentation**

**By**

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I am honored to be back in Parma, Italy again this for this important conference hosted by the Parma Knowledge Network and sponsored by the Società Parmense Insedimenti Produttivi (SPIP). My first visit here was in June of 2007 when the City of Parma and Academia Barilla hosted the International Agribusiness Management Association's (IAMA) Annual Congress. The warm hospitality of the City of Parma was matched that week by the unusually "warm" temperature. We were discussing global warming at a time when the local Italian press was commenting on the heat wave across your country.

Of course, one week of hot weather in Italy does not mean that our climate is heating up to temperatures that will destroy our civilization. There are many views today on global warming and climate change. Is human activity and our industrial economy a major cause of global warming? Is our climate even structurally warming at all, or are we just experiencing normal short term cycles of warming and cooling as in past decades?

### *Emerging Into a New Post-Carbon Age from the Industrial Age*

I would like to discuss with you today my belief that we are at the very birth of a new age in civilization that will transform mankind's political, economic and social footprint on this earth.

**Today, our world is in transition to a new "post-carbon" technological age. In this age, society's mission is the sustainability of the natural resource base of the planet.**

This transition is being driven by emerging technological innovation that is both unlocking what used to be the intangible and unknown molecular, atomic and genetic composition of life and transforming this knowledge into applied solutions for all aspects of modern civilization. Our daily lives will be profoundly affected-- from lighting and building materials, engines and transportation, animal nutrients, crop cultivation and plant functionality; as well as recyclable power and waste, and water conservation—and these are only a few trends already underway. To understand where we are going, we can be guided by where we are today in the evolution of technological progress. Our modern world is the "child" of technologies that emerged in 17<sup>th</sup> century Europe (like steam power) and bloomed in the 19<sup>th</sup> century's "Industrial Revolution". Tangible energy sources--coal and oil extraction from the earth--dominated the march of economic progress.

**We are the last generations living in the "Industrial Age" –an era when society's mission has been the harnessing and extraction of the natural resource base of the planet.**

***It is important to understand that both the Post-Carbon Age and our current Industrial Age have the same motivation: To promote the improvement of living standards and underpin economic and human development.***

So, as we champion today's new environmental movement to reduce Greenhouse Gas Emissions (GHG) and the carbon footprint on our world, we must also respect the enormous contribution that the Industrial Age and fossil fuels have made and are making.

The collective goal of scientific achievement in the industrial age was to optimize methods of extracting and utilizing the earth's natural resources to power the extraordinary transformation of society from a predominantly rural/agrarian base to a dynamic urban/industrial world. Progressively higher living standards accompanied geometric population growth due to the Industrial Revolution's ability to accelerate economic productivity and global trade. Electricity, steel and oil-based petrochemicals dominated the 19<sup>th</sup> and early 20<sup>th</sup> centuries. What were then "high tech" achievements led to mechanized farming and refrigerated shipping of agricultural products around the world. Breakthroughs in modern "IT" (Information Technology) at the dawn of the 20<sup>th</sup> century were the telegraph and telephone, which transformed the global supply chain.

It is hard to remember a world without instant text messaging, voice mails, mobile phones and email; but remember that just 30 years ago, we were still communicating using teletypes and telegrams and telephones—and fax machines were the great leap forward. Power markets have also been transformed, with natural gas(LNG) and nuclear energy already emerged—alongside coal, oil and hydro. And today we are investing significant capital into solar power, biomass/biofuels and recapturing the wind as a source of power—much as ancient vessels powered by wind led to the exploration and discovery of the "new world".

Our world is much smaller due to instant communication and transportation, but, at the same time, it is much larger in two contexts. First, population. Global population has expanded geometrically from 2 billion inhabitants in 1930 to over 6.5 billion people today. Second, complexity. Instant communications move ideas globally in a keystroke, while the lightning speed of scientific discovery is making quantum steps. We can now measure in "micro" and "nano" mathematical formulas the previously "unknown" elements that create life and rule our planet and solar system—much as the earlier quantum achievements in technology changed the civilization during the ages of Galileo, Newton and Einstein.

**The "known" world, on which we base decisions by governments, businesses and individuals, is facing a new complexity because we have one foot in the past and one foot in the future at the same time!**

**In this dynamic era, we are running our businesses and homes and communities with traditional industrial technologies, while trying to adapt and respond to the**

**scientists who are unlocking the human genome or to the venture capitalists who are launching enzyme technologies for second generation biofuels.**

*This is the complexity of operating in two worlds simultaneously—the closing days of the Industrial Age and the early days of the Post-Carbon Age.*

Coming from the United States, I stand humbly before you as I raise these issues, because despite my country's size and prominence today, we are a very young civilization. Italian civilization is ancient. Parma's development was established even before the Bronze Age, when the Etruscans built the "terramare" in the city. Parma has been an important link in the "global" supply chain since Roman times, when you served as a critical road hub over the Via Aemilia and the Via Claudia.

And during the Middle Ages, Parma became a vital stage of the Via Francigena, the main road connecting Rome to Northern Europe. Abundant agriculture made your region the most developed and your cities the most populous in Europe until the climate crisis of that age reduced crop yields and led to famines which produced the Black Death. During the Renaissance, Northern Italy's towns again grew and prospered through trade in the Mediterranean of bulk cargoes of grain and other food products.

Parma has been at the epicenter of civilization's transformation throughout successive centuries of challenge and adaptation—most notably in the food industry. As you all well know (probably from birth), and I learned last summer, Parmigiano-Reggiano dates back to the Middle Ages, with the product today virtually identical to that of the 13<sup>th</sup> and 14<sup>th</sup> centuries. It is an awesome thought to consider that what I am eating here today was praised by Boccaccio in the *Decameron* ! As the world pressures the global food system to become more sustainable, Parma's "food valley" has been practicing sustainability and recycling in your production processes for ages—such as using the whey from cheese production to feed the pigs from which Parma Ham is produced! As part of your natural production processes, you are already well ahead on the sustainable food market curve.

In my remarks today, I'd like to briefly consider some specific areas of current carbon management and sustainability issues:

- I. Global Warming and the Climate Change Policy Outlook
- II. Innovation and Emerging Technology for a Post-Carbon Age
- III. Climate Change Priorities for Corporate Social Responsibility

### ***I. Global Warming and the Climate Change Policy Outlook***

The rich soil in the Po Valley knows better than we do here today that the earth has undergone major climate changes many times in the past 55-65 million years. From ice

ages that wreaked havoc in the most recent past 2 million years to warming period when the earth had no permanent polar icecaps. Around 16,000 years ago the latest glacial period started ending and it warmed up to present temperatures around 10,000 years ago. The during the Middle Ages from 1000-1300 AD, European temperatures reached their warmest levels of the last 4000 years; after the Little Ice Age from 1450-1890 AD, the climate has warmed.

Most climate scientists today link current accelerated warming trends to the cumulative effect of the Industrial Revolution, and our use of carbon-based energy as the base of our global economy. They would argue that this episode of warming is much greater than other variations of the past 1000 years, with Northern Hemisphere temperatures rising about 1.1 degrees celsius from 1900 to 2000. Some climatologists claim that 2005 was the hottest year on record.

The scientific debate underway is largely based on reports issued by the UN's Intergovernmental Panel on Climate Change (IPCC) and the Stern Report—the UK analysis conducted by Sir Nicholas Stern regarding the impacts and potential remedies for stabilizing temperatures and reducing emissions of Greenhouse Gases. I've heard proponents argue about whether we need to achieve a global cap of 425 CO<sub>2</sub> e (“e” equals all of GHG normalized to their carbon dioxide equivalent) in order to prevent more than a 2 degree Celsius temperature increase, or whether the world's rock bottom needs to be 450-550 ppm GHG CO<sub>2</sub> e. The EU threshold is a 2 degree temperature increase, but one US scientist claims that 1 degree above current temperature is the dangerous threshold. Trying to follow the debate and bring it down to practical activity is a monumental challenge! At the same time, I can't think of a day that goes by when I don't read or hear something new about climate change. We are being bombarded with “green” news, “green” products, “green” policy, “green” cosmetics---and this is just the beginning. I think that an old adage in the agricultural markets applies directly: a trend in motion is a trend in motion.

Carbon management is without a doubt “a trend in motion” that is starting to impact every part of our lives. The UN's IPCC has said that our civilization's existence is threatened if we don't take immediate global commitments to reduce GHG emissions by 80 percent from current levels. Governments and businesses are responding.

Of course, European national governments and the European Union (EU) have led the way in implementing the Kyoto Protocols through carbon reduction mandates and allocations to power companies and other large carbon emitters; a cap-and-trade carbon market has grown up overnight—not only in Europe but globally. Offset providers in emerging countries are making money as being part of the carbon “supply chain” solution. Regulators around the world are proposing solutions to reduce local and national carbon footprints, businesses are managing their energy inputs and outputs, and civil society stakeholders are actively participating in markets as well.

Significant trading volume is building up in Europe's mandatory carbon emissions reduction regime, both on trading platforms like the European Climate Exchange (ECX) and over-the-counter markets. Even in the US, an explosion in voluntary emission reductions (VERs) is underway at the Chicago Climate Exchange (CCX). Other major

players are getting into carbon markets. The NYMEX has founded the Green Market exchange, a range of carbon trading is taking place on other major European exchanges as well as in other parts of the world; Hong Kong, New Zealand, India and China—to name a few—are actively seeking to develop carbon markets.

Earlier this year, government officials from 187 countries met in Bali, Indonesia to seek agreement on GHG reduction commitments to curb global warming, extending beyond the Kyoto Protocol mandate. Negotiators agreed to a 2009 deadline to reach that agreement. They also agreed to help poor countries adapt to the impacts of adverse climate change (such as droughts and flooding), to give developing countries access to green technologies and to support pilot projects that could lead to carbon credits for avoided deforestation, afforestation and reforestation in the 2009 agreement.

No firm targets for GHG reduction were set, but the text does include the need for “deep cuts”. Additionally, Bali did not set forth a blueprint for burden sharing by developed and developing countries or whether carbon capture and storage projects would be eligible for official carbon credits under a new system. At the Bali meeting, UN Secretary General Ban Ki-moon hailed the dawn of a “green economy.” I would suggest that the green economy is no longer at the “dawn” hour, but the climate clock has reached the time for a mid-morning espresso!

I am sure that you are quite familiar with the EU system and know that the US has refused to ratify the Kyoto Protocol under the Bush Presidency. The US remains the largest annual emitter of CO<sub>2</sub>, soon to be surpassed by China. Others in the top 10 are Russia, India, Japan, Germany Canada, the UK, South Korea and Italy. On a cumulative basis calculation (1840-2004), the US stands out as the major emitter (30% of the global total). However, it is worth recalling that the Clinton Administration was similarly unable to win Congressional ratification of the treaty—with a majority of both Democrats and Republicans in opposition. Members opposed to ratifying the treaty argue that if China and India—the emerging economic giants of the world—are not brought under controls, then US industries will be at a competitive disadvantage.

Times have changed on the US political landscape this year. There is a sea change of opinion today in the US Congress and among US voters in favor of establishing national mandates to reduce GHG. More than 20 states already have enacted various forms of legislation to curb GHG emissions, and some have formed regional blocs to regulate carbon reduction regimes, like RGGI (Regional Greenhouse Gas Initiative) in the Northeastern U.S. states. Importantly, all three presidential candidates: Senator John McCain (Republican-Arizona); Senator Hillary Clinton (Democrat-New York) and Senator Barack Obama (Democrat-Illinois) all have endorsed a cap on carbon-dioxide emissions. They all support cap-and-trade systems for carbon emission reduction, though they have different approaches for managing a system and different goals. Senator McCain proposes to allocate the initial GHG emission rights to companies based on their level of current emissions; Senators Clinton and Obama prefer to auction pollution rights, making the biggest emitters pay the most just to keep operating.

Senators Clinton and Obama call for cutting emissions 80% by 2050; Senator McCain calls for a 65% cut by 2050. A cap-and-trade system operates to permit the market to allocate emission reduction. The government sets a cap and the system for allocating those permits; then, any business which wants to emit more than its cap would have to buy pollution permits from someone emitting less or making other environmental contribution to reduce CO2 emissions (ie, reforestation).

The most likely legislation to be enacted is the Warner-Lieberman bill, which is expected to be debated this year. The bill would cap GHG emissions from power plants, factories, oil refineries and other polluters. US Environmental Protection Agency (EPA) analysis projects that capping and reducing emissions could be implemented over the next two decades without harming the nation's economic growth; however, EPA projects that GHG caps could lead to sharply higher prices for gasoline and electricity.

The US business community is also deeply engaged in climate change solutions. According to the December 2007 report "Reducing U.S. Greenhouse Gas Emissions: *How Much at What Cost?*" prepared by McKinsey & Company for The Conference Board, the U.S. has significant potential to reduce emissions by 3.0 to 4.5 gigatons of CO2 e by 2030 from the projected 2030 level without reduction (9.7 gigatons)-- GHG emissions in 2007 were 7.2 gigatons. Analysts concluded that by applying high potential technologies and tested approaches, the US would be able to meet this goal. Proposed abatement options would cost less than \$50/ton, if there is the ability to capture gains from energy efficiency.

Key clusters of abatement potential are:

- (1) Improving energy efficiency in buildings and appliances;
- (2) Increasing fuel efficiency in vehicles and reducing carbon intensity of transportation fuels;
- (3) Pursuing options across energy-intensive portions for the industrial sector (such as equipment upgrades, process changes, combined heat and power applications);
- (4) Expanding and enhancing carbon sinks (increasing forest stocks and improving soil management practices); and
- (5) Reducing the carbon intensity of electric power production (shift to renewables like wind and solar, added nuclear capacity, improved power plant efficiencies and the eventual use of carbon capture and storage in coal-fired electricity generation).

The Conference Board—a pre-eminent think tank of major US corporations—understands that the risk:reward equation on climate change calls for taking action today vs waiting to see whether temperatures really do rise and cause climatic disaster. Two other factors are propelling the demand for reduced carbon technologies, improved natural resource use and sustainable management. First, as I noted earlier, several billion more people in the world are becoming richer consumers in the global market. Today's rising prices of industrial and precious metals and minerals, as well as agricultural commodities, is triggered by greater competition for productive inputs and resources. And, this is only the beginning of bringing 3 billion more citizens in emerging countries

to living standards that we enjoy in the developed world—with more to come until population peaks in the middle of this century.

Second, oil production is not keeping up with growing demand for fuel and power. Proven reserves (utilizing existing technologies) are generally expected to peak in 2040 and decline from there, with some analysts estimating a decline even sooner. Moreover, additional oil is going to be even more expensive to extract and, in some cases, lies in very politically unstable regions of the world. Both oil and coal will still be part of our power mix in the decades ahead, but we will not be able to burn fossil fuels alone to fuel economic growth and, at the same time, stabilize and lower the earth's temperature. The "Post-Carbon Age" will rely increasingly less on these extractive industries in providing the energy that will drive our planet's progress. From wind and solar to nuclear, biomass, hydrogen fuel cells and ocean waves—we are at the tip of the iceberg (melting quickly at this time) in emerging technologies that will be major power sources that sustain and accelerate economic productivity, and that will be both locally distributive and grid-linked. Oil prices today topping US\$120—up from \$10 barrel just 10 years ago—are telling markets to invest in renewable and alternative sources of energy. The markets are responding.

## II: *Innovation and Emerging Technology for a Post-Carbon Age*

The world is on the brink of reinventing energy. Public and private investment capital is flooding the environmental markets. Academic and industrial labs around the world are racing to develop technologies that will change production processes and reduce CO2 emissions to zero. There's a new trend to develop technologies that go beyond being "Carbon Neutral" to being "Carbon Negative" (ie, draw additional carbon out of the atmosphere).

I must have received invitations over the past 6 months to at least 25 conferences in the U.S. alone on renewable energy, capital markets, biofuels and climate change. Venture capital is powering fast-moving technologies that will be part of the solution to reducing carbon footprints on our planet.

I serve as an advisor to the Board of an Irish company which is now invested in Wind, Solar-thermal, Waste Management and Recycling, and Biofuels/Biomass—with major operations in the United States. Every day I am learning more about how we can better extract energy from renewable sources—with existing technologies. And, as I attend meetings and meet venture capitalists, I learn about exciting emerging technology.

One particular ethanol process captured my special interest, having seen the terrible impact of uncovered landfills in many developing countries—landfill waste emitting methane, causing health and safety hazards to these people. BlueFire Ethanol, with funding from the US Department of Energy (DOE) is engaged in producing ethanol from

cellulose; the source of that cellulose comes from wood wastes, rice and wheat straws—and, importantly to me, urban trash (post-sorted Municipal Solid Waste or MSW). To consider the possibility that we can be reducing landfills, because they become an important positive feedstock for energy/transportation fuels is quite amazing. Think of not only the impact on carbon management, but also on the lives of people in poor country who will have a source of power supply and improved living conditions!

But this is just one of thousands of reports about emerging energy technology that are published daily—not only in the business press, but popular press and on radio and tv. Just to give you a small sample of the innovation taking place, please consider these wide ranging potentials that were presented in one single *NY Times* article “For Carbon Emissions, a Goal of Less than Zero”(Matthew L. Wald, 26 March 2008):

- Robert Williams, a research scientist at Princeton University, said that not only could coal be gasified; you could also make the same fuel by starting with plant matter or other biomass. You take the concept of a coal plant that captures and stores CO<sub>2</sub>, that would have zero emissions—the coal would be turned into gas and processed to produce hydrogen and CO<sub>2</sub>; the plant would burn the hydrogen and the CO<sub>2</sub> pumped underground for permanent storage.
- Two professors at Columbia University, Per M. Einsenberger and Graciela Chicilnisky, have a plan to such CO<sub>2</sub> out of the air, using waste heat from a solar plant, which has no smokestack.
- George A. Olah, a Nobel laureate in chemistry and a fellow faculty member at the University of Southern California, G.K. Surya Prakash, have developed a type of reverse fuel cell, which produces methanol by mixing the gas with water and applying a jolt of electricity (the electricity provided by a carbon-neutral source from a windmill or nuclear reactor, for example) making the process carbon negative.
- The U.S. Department of Agriculture is considering carbon storage as a new “crop”; calling the method “agrichar” in which a biological material (such as grass or trees grown specifically for the purpose, cornstalks or other agricultural waste) is cooked at a very high temperature in the absence of oxygen. It produces an oil that with some chemical transformation, can be used as a vehicle fuel. The remaining charcoal-like material that retains most of the carbon can be plowed back into a field, providing minerals like potassium and phosphorus as a nutrient to the soil.
- Covanta Energy of Fairfield, New Jersey operates plans making electricity by burning municipal solid waste—about 80% paper and other organic materials. The President of the company is hoping to collect carbon credits, because each ton burned reduces landfill where bacteria digest garbage to make methane—a potent GHG.
- The Solena Group, a Washington Company, is in discussion with a Kansas electric co-op to build a 40 megawatt power plant that would be run on gasified algae; the algae would be fertilized with sodium bicarbonate captured from the co-op’s coal plant.

- An American civil engineer, Mark Capron has developed the plankton ocean digester concept—carry out the natural process of the bacterial breakdown of algae in the ocean within an underwater tank without air; that process would produce methane, which could be piped to shore for use as fuel, with the remaining CO<sub>2</sub> pumped to the ocean depths.

And just look at who is investing in trying to find solutions to carbon reduction! IT/Silicon Valley entrepreneurs are getting into the action. Well-known IT entrepreneurs like Vinod Khosla (Sun Microsystems founder) and John Doerr, Google's first funder, are diving into clean energy on the belief that not only will they help save the planet, but that they will make another fortune. While government officials are developing climate policy mandates at the national and local levels, entrepreneurs are investing vast "climate capital", as quickly as they did to launch the IT, or "information revolution". In Silicon Valley, California, for example, firms are working on technologies that harvest solar energy more cheaply by dissolving silicon nano-crystals in ink, or re-engineering yeast to ferment sugar into pure hydrocarbon fuels that have the energy density of gasoline and can be shipped through existing pipelines, making biodiesel from the algae that feed on the CO<sub>2</sub> from power plant smokestacks. (*Wall Street Journal*, April 8, 2008; "Climate Change Opportunity" by Fred Krupp, President of the Environmental Defense Fund).

Scientists are exploring possible micro-organisms from deep sea vents to Siberian volcanoes, exploring how to harvest the waves, or how to clean smokestack gases using the same enzyme that removes CO<sub>2</sub> from the human bloodstream.

While venture capital is investing in cost and carbon-effective technologies, companies are working to manage their carbon emissions, lower costs and improve efficiency with existing technologies in their operating platforms. Basic steps like turning down thermostats and switching off unnecessary lights are obvious practices. "Green software" programs have emerged to help companies monitor their energy use and manage their power consumption. Some of those software programs are being developed in-house, but independent green software sales businesses have emerged. Other technologies, like Current's "Smart Grid" are used not only in households or factories to regulate consumption, but have proven successful in regulating, allocating and monitoring power throughout the utility's grid systems.

These very brief examples of US technology developments highlight the fast-paced transformation underway. We are in the process of a rapid and radical transformation to the Post-Carbon era, no less encompassing than the speed and breadth of the IT revolution that swept across our lives in the late 20<sup>th</sup> century—and is still in an early stage. The energy revolution will impact your community, your business and your family's life. Hybrid cars, wind farms, solar thermal electricity plants and first generation biofuels are only the starting line.

***I believe that the pace of change will be unprecedented because the urgency is unprecedented and technology's fast response time is also unprecedented.***

First movers or early adaptars, leading the carbon markets, are already setting the pace. Members of the Chicago Climate Exchange (CCX), for example, are shaping the voluntary market . More than 400 companies, as well as organizations, governments and academic institutions from 5 continents, have made voluntary but legally binding commitments to cut their emissions 6% by 2010 (from a 1998-2000 approved US baseline, with an annual true up audit). CCX members do business with offset providers in the US and around the world, including livestock farmers who have adopted anaerobic digesters and grain crop farmers using no-till conservation practices. Forest management companies are part of the market through reforestation in Brazil and Chile, along with wind energy producers in India, and a Colombian candy company. Trading volumes and carbon values have risen dramatically over the past 4 years since the market was launched in 2005.

Major Chinese and Indian companies are looking to CCX, as they consider potential voluntary markets in their countries to reduce GHG emissions. Aggregators who are trading emission reductions already are benefiting from carbon market transactions; these lower the operating cost of a business and can reduce costs to their customers.

Every major investment bank has set up a carbon trading desk and the US Commodity Futures Trading Commission (CFTC) Commissioner Bart Chilton in a *Financial Times* interview (10 March 2008) said: "I can see carbon coming the biggest of any derivatives product in the next four to five years."

The city of Chicago, a CCX government member, is "greening" the rooftops of public buildings and re-surfacing the city's alleyways with environmentally friendly materials, including permeable asphalt, permeable concrete and light-reflecting concrete (the permeable surface allows water to seep through to the ground and the soil then filters out the pollutants, while the light reflecting concrete reflects the sun's heat rather than absorbing it—in effect cooling the city). Mayor Richard M. Daley wants to make Chicago the greenest city in the United States. Other cities are calling to learn about how to initiate their own "Green Alleys" project.

Carbon markets will explode exponentially when the successor to Kyoto is negotiated in the next few years, beginning in 2009, and when the U.S. enacts mandatory carbon legislation next year. Once government-mandated caps and reduction targets are in place, an unprecedented flow of investment capital will transform every aspect of our infrastructure, our dwellings and work places, transportation fleets, consumer products and industrial processes.

### **III. Climate Change Priorities for Corporate Social Responsibility**

An expanding global consensus on climate change is driven by a range of range of forces: the scientific community, consumer perceptions, rising economic costs of energy, natural disasters, expanding demand from emerging market populations and financial opportunities.

Carbon and other GHG reduction to prevent a climate crisis is part of the overarching global trend toward “sustainability”, which is challenging both public and private enterprises to respond with sustainable policies and practices.

One leader in sustainability in capital markets, Sustainable Asset Management (SAM) specializes in sustainable investments. The framework that SAM applies in its Sustainability Assessment Criteria links closely environmental and economic trends. On the environmental side is the focus on: risk reduction, opportunities, environmental management, resource efficiency and product stewardship. Climate change similarly impacts economic trends, including: speed of innovation, enterprise risk management, global trade, regulatory environment, access, aging infrastructure and brand value protection.

Environmental stewardship and the issue of climate change is a priority issue for businesses seeking: to reduce risks and manage energy costs and resource allocation, to enhance the potential for revenue gain in carbon market strategies, to build shareholder value and to meet expectations from stakeholders. Weather, or climate change, RISK is one of the key factors, as a higher level of serious adverse climate events raise costs for industries and communities.

Non-financial audits, in addition to financial audits, have been added to public companies’ financial reporting, including management policy to address climate change and environmental stewardship. Many companies are voluntarily reporting on their own carbon footprints, and introducing initiatives to reduce and manage their energy profile.

Carbon management in corporate boardrooms is being propelled both by “top down” government regulatory pressure and “bottom up” stakeholder activism. In many cases, there is a shared interest from all the stakeholders of a business: shareholders, customers/consumers, employees and communities..

In other words, climate change is pushing the envelope on consumer product companies.. *The New York Times Magazine* (20 April 2008) featured a range of articles under the heading “The Low-Carbon Catalog”, including an article by Michael Pollan, whom some of you may know as an author of books about the modern food industry. He sums up sums up what is happening in these prescient terms:

***“...the climate-change crisis is at its very bottom a crisis of lifestyle—of character, even. The Big Problem is nothing more or less than the sum total of countless little everyday choices, most of them made by us (consumer spending represents 70 percent***

*of our economy), and most of the rest of them made in the name of our needs and desires and preferences.”*

So, if you are a producer of consumer products, including agricultural and food products, you are most likely already responding to retail demands for you to quantify and reduce your carbon footprint.

But you are also not alone and are facing a potential systemic transformation. An emerging debate over the carbon footprint of “food miles” is growing in force. Is it more carbon-neutral to grow flowers in the tropics vs energy-intensive European greenhouses, despite the transportation distance? Or, are transportation emissions lower in shipping fresh apples and lamb from New Zealand to Europe than emissions from long months of refrigerated storage of European local production? Some studies calculate that as little as 3 percent of emissions from the food sector are caused by transportation; they assert that the packaging and refrigeration (perishable foods) generate even more emissions.

In other words, as we are transitioning into this Post-Carbon era, the entire structure of the global food system may be in question. In our modern food system, consumers are accustomed to year-round access to virtually every type of fruit and vegetable; distribution systems move raw and processed and consumer- ready products in complex supply chains to optimize production and marketing efficiencies and opportunities.

As one example close to home for you, Italy has become the world’s leading supplier of New Zealand’s kiwis (the national fruit of New Zealand)—taking over the market during the counter-seasonal Southern Hemisphere winter. Will carbon emissions from exporting become a barrier to growth in this new market? Will governments seeking to protect their domestic producers of like or competitive products try to use carbon labeling as a new trade barrier? As you know, the EU has proposed to incorporate environmental costs into the price consumers pay for food.

Even without governmental initiatives, the consumer product supply chain is already becoming carbon-sensitive. Major enterprises and consumers are demanding sustainable practices in packaging and water use. Small suppliers are being pushed to improve their green practices by major industrial companies. L’Oreal, Dell and Hewlett-Packard are now asking a test group of their suppliers to measure and disclose their carbon footprint (the amount of greenhouse gases they emit). Tesco, Nestle, Unilever, Proctor & Gamble and Cadbury Schweppes have implemented this same initiative, launched by the Carbon Disclosure Project (a not-for-profit organization with more than 300 institutional investors, which has coordinated the initiative for these multinational companies). The Carbon Disclosure Project is seeking to develop methods that let suppliers use a single standardized method for establishing their carbon footprint.

And, let’s not forget the major retail giant, Wal-Mart, which is the biggest company leading this initiative. Wal-Mart’s CEO Lee Scott delivered a speech in October 2005 entitled “21<sup>st</sup> Century Leadership” in which he endorsed both solid commercial as well as ethical reasons to pay attention to environmental problems. Once the world’s biggest

retailer set on a path to address waste and energy use, Wal-Mart set off a series of aftershocks along the supply chain to its major suppliers. Reduced product packaging size specifications by Wal-Mart for suppliers, for example, have made products “greener” because more inventory can fit into the same container or truck. And this decision additionally has reduced the company’s fuel consumption and costs.

Financial institutions also are becoming “green”—and that is not just in the “color” of \$US currency. Both Goldman Sachs and Merrill Lynch are members of the Carbon Disclosure Project. A recent study of the world’s 40 largest banks by Ceres (a coalition of investors, environmental groups and public interest organizations) found that few have as yet fully integrated climate risks into their lending policies and setting GHG reduction targets into their loan portfolios. The best performance (rank) went to HSBC Holdings plc and ABN AMRO Holding NV.

Moreover, many of those major financial institutions are now catching up rapidly. They are focusing research on the risk to their investments from climate change; and they are cutting their own GHG emissions (setting internal reduction targets) and directly funding clean energy projects

Climate reporting will become firmly established in financial statements over the next few years, and boards of directors will start requiring management to develop methodology that analyzes the financial and material risk posed by climate change to the company’s operations. *We all know that “capital is a coward”; and climate risk or climate opportunity will become a key factor in deploying investment capital in global markets.*

### **Conclusion:**

In closing these remarks, I’d like to return to my introductory observations about Parma’s history. I personally cannot help but marvel at the magnificent architecture of your 12<sup>th</sup> century Duomo. A good friend and art historian explained to me that Italy constructed buildings before and throughout the Renaissance with the plan for design and materials that to last 1000 years. The result of that great “sustainable” vision is here before our very eyes. What would those who built the Duomo say to “us” if they could speak about our modern focus on sustainability and carbon management? I would venture that they would urge us to achieve this goal—just as they did with their technological knowledge.

Human ingenuity is taking us rapidly from what we know as the Industrial Age into the Post-Carbon Age. Markets will play a major role in making this transition at the lowest possible economic and societal costs, and with the optimal benefit. Voluntary carbon markets will adapt to the mandated systems that are going to be established nationally and through global agreements. These secondary markets where GHG emissions will be traded are going to be the largest markets in the world. Early adapters who are willing to be leaders in undertaking commitments to manage the carbon footprint in their supply chains will attain the maximum benefit the most in this rapidly transforming marketplace.

Global warming is not an Italian or American or Chinese problem. We have a shared global responsibility to preserve our planet and to provide continually improved living standards for all of us who share this earth. ***To sum it up: Managing carbon is more than just good business; it is a global imperative. The risk of inaction is just too great.***

Parma's long-standing vision and commitment to quality and innovation has stood the test of time. In the case of carbon management, Parma's food industry has a great advantage, because products like Parmigiano-Reggiano and Parma Ham already have strong environmental stewardship as the traditional base of your production process. As you apply innovation on carbon management, your effort will be simply to better manage your energy use—not alter your product quality. When I buy Parmigiano-Reggiano, for example, in New York City, I know what the brand means--the quality process that merits this appellation. I recently read the description on the Consorzio's website:

***“Parmigiano-Reggiano is a true miracle of nature and of the traditions of the people who produce it. It is for the enjoyment of those who seek in what they eat not only nourishment, but also incredible flavor, love for the earth, and respect—a lot of respect—for nature and its mysteries.”***

What those words convey is a powerful message for this challenge we are facing. As we meet the challenge of climate change, and emerge into a Post-Carbon age, I believe that Parma's food valley can lead this transformation and that the Parma “brand” will symbolize your love for this earth and respect for nature through your carbon sustainable achievement.

Thank you.