

## Business Ethics – Green Companies

### **BMW Group**

#### *Introduction*

##### Message from **BMW of North America, LLC**

—Tom Purves, Chairman, BMW (US) Holding Group

- It's been three decades since BMW first looked to the future of mobility and saw the need to move away from our dependence on fossil fuels. Why?
  - The supply is finite and rapidly becoming depleted
  - Burning fossil fuels pollutes the environment and creates greenhouse gases
  - Our dependence on fossil fuels leaves us vulnerable to the demands of oil-producing countries.
- New Approach: In the long run, the never-ending source of fuel could be provided not by petroleum, but by the world's most plentiful element – hydrogen
- BMW has been working in this hydrogen-powered area since 1979, and has the most experience with this technology of any carmaker.

##### Formulation of the **BMW CleanEnergy** strategy

- Addresses our impact on the environment throughout the entire life cycle of BMW vehicles
  - Where and how they are manufactured
  - The type and amount of the fuels they use
  - The impact of their emissions
  - How they are disposed of at the end of their useful lives
- Result: BMW is an award-winning industry leader in environment-friendly practices
  - BMW hydrogen-powered racecar has set numerous world speed records
  - BMW Hydrogen 7 is the first luxury/performance production sedan that can run on either hydrogen *or* gasoline.
  - At the forefront in helping to make hydrogen fuel widely available to all!
  - Still, the need to continue the momentum remains as strong as ever.
  - Dr. Michael Ganal, Member of the Board of Management of BMW AG, addressed BMW's ongoing commitment to clean energy.
    - “The BMW Hydrogen 7 perfectly captures the essence of the BMW CleanEnergy strategy... The complete change from a fossil fuel infrastructure to a hydrogen economy will require decades, and I am proud that BMW is paving the way.”

#### *Key Processes*

##### **‘Running On Water’**

- World Premiere: this is the first time [ever] that a hydrogen-powered automobile has been developed in conformity with the strict BMW standards for volume-produced vehicles
- The new BMW Hydrogen 7 has virtually *no emissions*
- Hydrogen fuel is also capable of reducing CO<sub>2</sub> emissions by 90 percent.

#### **Energy**

- In relation to weight, the energy density of hydrogen is nearly *three times* that of gasoline.
- Problem: Hydrogen liquefies at  $-418^{\circ}\text{F}$

### **Rationale—Purity [H<sub>2</sub>]**

- Hydrogen is a colorless, odorless and tasteless gas.
- It is lighter than air and weighs less than all other gases.
- Hydrogen is the most common element in our universe, considered by many to be a fuel with a big future.
- It is not poisonous, corrosive, nor is it a carcinogen.
- It does not diffuse into the environment and cannot contaminate underground water sources.

### **The Future**

- Experts predict cars will run on hydrogen when the oil wells dry up.
- Unlike fossil fuels, burning hydrogen doesn't create harmful emissions, CO<sub>2</sub> or greenhouse gases that contribute to global warming – just a little haze of clean water vapor.
- Engineers around the world have been researching vehicles with hydrogen drivetrains for decades.
- BMW took on the challenge and has become a dedicated pioneer in hydrogen technology, committed to driving this development forward.

### **The Decisive Step**

- Series production of the Hydrogen 7 started at the end of last year with a limited-production run at BMW's Dingolfing plant in Bavaria.
- Hydrogen 7 will not be sold on the public market—they will [only] be made available to influential public figures who, by driving these near-zero-emission BMWs, will demonstrate the start of an exciting new era of clean energy.

### **Hydrogen 7**

- First hydrogen-powered automobile in the luxury class to pass through the standard development process for volume production.
- Hydrogen 7 could, in fact, run exclusively on hydrogen
- Challenge – not enough hydrogen refueling stations
- Solution – Hydrogen 7 designed to also run on gasoline when necessary [once one fuel tank is empty, the engine switches fuel automatically]
- Allows drivers to switch at will between gasoline and hydrogen simply by pressing the 'H<sub>2</sub>' button on the steering wheel – there is no change in ride smoothness, so passengers remain unaware that anything unusual is happening.
- BMW has set up a dedicated hydrogen infrastructure with mobile fuel stations, workshops and test rigs to facilitate global testing –otherwise, this all would have remained a pipe dream.
- Authorization for volume production is the key moment in series development

### **Progress**

- [www.bmw.com/cleanenergy](http://www.bmw.com/cleanenergy)
- BMW—NASA

- August 2007, BMW and NASA announced the completion of an eight-week test period for the Hydrogen 7
- Both companies have a common research interest: the use of liquid hydrogen
- The high energy content of liquid hydrogen is the reason why NASA uses it to send the space shuttle into space – BMW applied the same reasoning to the Hydrogen 7

### **Going Green – Sustainability 13**

#### **BMW Group is the most efficient user of resources**

- The Berlin Institute of Future Studies and Technology Evaluation (IZT) recently took a close look at 28 German companies
- It evaluated them in economic, ecological and social areas, using 10 criteria that included waste production, water consumption, and workplace accidents.
  - The BMW Group topped the Institute’s list as having the most sustainable policies
  - In the past 10 years, for example, BMW has reduced the amount of energy needed to produce a car by 26 percent, and CO<sub>2</sub> emissions by 24 percent.
  - BMW has also headed the worldwide list of automotive companies with the most environment-friendly policies for years – the Dow Jones Sustainability Index provides the evidence.
  - In 2001, BMW Group signed the UN’s “Cleaner Production” declaration.
  - In 1999, BMW Group was the first automobile manufacturer to certify that its production sites all conformed to the international environmental management standard ISO-14001.

#### **A Time for “Truth” – An Inconvenient Truth**

- “An Inconvenient Truth” is the 3<sup>rd</sup> highest-grossing documentary in history
- Its political impact has been enormous, transforming the national and international debate over global warming.
- It won two academy awards—for best documentary, and best song.
- Producer, Lawrence Bender, and director, Davis Guggenheim had no difficulty securing the \$1.15 million required to make the documentary.
- Jeff Skill, founder of eBay, funded most of the project. All said and done, no one made a cent. The proceeds all went to charity – to the Alliance for Climate Protection.
- All the vendors engaged in the project recognized the need to get out Al Gore’s message; everyone believed in the issue.

#### **What’s happening now?**

- The year 2005 was, in fact, the hottest year on record.
- The IPCC [Intergovernmental Panel on Climate Change] report came out – there’s enormous consensus, 2500 scientists from over 100 countries
- They all have to agree on one report, so the document itself tends to be on the conservative side.
- 90 percent likelihood that we’re causing global warming—and that it’s getting worse.
- In this century the temperature on earth is going to rise between 3-7°F

- At 3.6°F, which is at the bottom end, they're saying that Australia will no longer be able to grow crops; the entire Brazilian rain forest will disappear; and there will be no ice on the North Pole. – And that was at the low end.
- People are getting that – Congress is now acting.
- Over 400 mayors have voluntarily signed on to the Kyoto Accord
- But what's wonderful is that most global corporations – everyone from **GE, Wal-Mart, Home Depot, to Lowe's** – are making huge commitments to sustainable products.
- There's a group of major corporations calling for mandatory caps on carbon emissions; that would never have happened a couple of years ago.
- People are now starting to understand that if they find ways to conserve energy, they will save money, too!
- While different people frame the issue in different ways, our national security depends on decreasing our energy dependence. – that is, no matter which side of the aisle you're on, energy independence is directly linked to our national security.
- There's no longer any debate; the question is, what are we doing to do, and how fast are we going to do it?
  - A great bill was passed in California: **Assembly Bill 32**
    - It's the strongest legislation in the country aimed at reducing our carbon emissions—greatly, in a short amount of time.
    - This is the wave of the future
    - Governor Schwarzenegger, who signed AB 32, wouldn't have signed it if he hadn't seen the political expedience of it.
    - He sees that the tide has shifted. He believes in it, but he also knows that if he doesn't do it, the next candidate will.
    - Surprisingly, this 'movie' is what helped Schwarzenegger push this bill as it was going through.

### **What's Next for the Auto Industry?**

- They are late to the game, but they have a huge rule to play.
- The ones that have adapted are doing well; the other that haven't adapted are perishing.
- It's just a matter of time before the federal legislation on miles per gallon goes way up – just a very short amount of time.
- The political wind is there now – and the auto industry understand that [now]

### **The Convert on GLOBAL WARMING**

- From a skeptic to a firm believer, Congressman Bob Inglis expects the Hydrogen Economy will bring America to higher levels of prosperity in the near future
- “I see a triple play for the 21<sup>st</sup> century: cleaning up the air, creating jobs, and improving our national security,” says Inglis (R-SC).
- The inevitable “H-Economy,” Inglis believes, will have three effects:
  - (1) it will dramatically reduce air pollution
  - (2) it will ramp up employment, as new hydrogen-related industries are established
  - (3) it will reduce America's reliance on oil imported from volatile regions.
 “And that's not only good for our national security,” Inglis concludes, “it's also good for the national security of all our key allies.”
- Inglis concedes that his initial response to global warming was “skepticism.”

- But now he sees it as a threat – and as a spur to action
- His turnaround came during a 2006 trip to Antarctica, where he saw ice-core samples dating back hundreds of thousands of years, each showing beyond any doubt that CO<sub>2</sub> levels have risen rapidly in the last few centuries.  
“Human beings are a substantial cause of global warming,” he says with finality.
- “Environmental stewardship is an ancient *ethical* concept,” Inglis declares. Pollution, for him, is an obvious disregard for the rights of future generations.
- “I shouldn’t be able to do something on my land that can do harm to my neighbor’s land.” Yet for too long, he adds, polluters have been able to simply dump their waste into global commons, at no immediate cost to themselves.
- Such dumping offends Inglis on an *ethical* level, and it bothers him on a practical economic level, as well.

### **Top Notch Corporate Citizen**

- Markets only work when the true costs of everything are properly factored in: “The market can only evaluate a product if all the externalities are internalized.”
- Happily, innovation can turn “negative” externalities into “positive” externalities.
  - For example, more than half the power that the BMW plant uses to operate comes from methane generated at a nearby waste dump.  
Inglis is admiring of this ingenuity – “Turning trash into treasure – BMW leads the way.”
  - Citing all the efforts that BMW has made toward total sustainability, from the manufacturing of a car through the ultimate recycling of that same car, Inglis concludes, “They make an excellent product, excellently.”

### **ECO-SAVVY**

#### **BMW Manufacturing Co. Shows How It’s Economically Smart to be Ecologically Friendly**

- Now, at the dawning of a new era of responsibility among automakers, environmental responsibility is the new watchword.
- From its inception in 1992, BMW Manufacturing Co. has used its Spartanburg County, SC plant as an incubator for environmentally sound practices; as a result, the plant has become a true friend of the earth.
- Reducing the use of solvents and using water-based paints was only the beginning of a company-wide effort to reduce BMW’s impact on the environment.
- Waste reduction also became a priority – in 2005 alone, the plant went through more than 3,600 tons of cardboard.
  - Once used, however, almost all of it was recycled to produce more cardboard.
  - And many BMW *suppliers* use that same, recycled cardboard to ship their products to the factory.
- BMW’s production facilities also use wooden container support beams and pallets – which, when worn out, create large amounts of wood waste materials.
  - But at BMW Manufacturing Co., this wood has two possible futures:
    - (1) it might be sent to a mulch factory
    - (2) or, if it is sturdy and of high enough quality, it might be sent to *Habitat for Humanity* for building material.
- The facility’s cafeteria, which feeds 4,500 people a day, generates waste – and opportunity.

- The aluminum cans and plastic bottles that are tossed into the trash are then baled and sold to recycling groups.
- This policy has led to deeper community involvement, with the proceeds from such sales donated to local charities.
- An obvious source of recyclable materials is scrapped vehicles.
  - Since up to 85 percent of the material in a BMW can be reused, this plays a big part in BMW's waste reduction efforts.
  - These scrap materials are compressed and sent to a recycling group, which ingeniously transforms the metal and returns it to the factory as containers.
- Non-recyclables don't go to waste, either.
  - Tires are sent to other manufacturers, who use them as fuel.
  - Paint sludge is utilized as waste energy for other production facilities.
- Items that cannot be recycled are designed to reduce the volume being sent to landfills.
  - Even cafeteria food waste doesn't make it away from this facility without going through a system that breaks it down into its smallest particles, screens it, carries it into waste water, and then compresses it into a brick.
  - BMW also uses near-zero-impact drinking cups for cold liquids.
    - These clear, polylactic acid cups, made of cornstarch resins, disintegrate at 150 degrees and 80 percent humidity – the environment found in most landfills.
  - For hot liquids, the factory uses non-waxed paper cups.
  - "To go" foods are put in envirofoam containers—this material requires no ozone-depleting gases, and its production uses a third less plastic than previous containers.
- Of course, the cafeteria encourages the use of dishes that can be washed, but when needed, the disposable cups and containers provide an earth-pleasing alternative.
- The Paint Shop – is the world's first automotive manufacturer's Paint Shop to be powered by recycled methane gas.
  - In a partnership that started back in 2002, BMW Manufacturing Co. started purchasing methane gas piped from a nearby landfill; this gas fueled the four turbines at the Factory's Energy center.
- When it became clear that the landfill was producing even more methane than could be used by the turbines, the company began converting 23 ovens in the Paint Shop from using natural gas to methane.
  - The paint department is the largest consumer of energy in any automotive manufacturing plant.
- Although the conversion was no easy task, the move has since saved the company at least \$1 million per year in energy costs.
- Using methane also reduces greenhouse gases the equivalent of driving a car around the globe 4,300 times.
- "Three of our core principles are innovation, protecting the environment, and being a good corporate citizen," says Briggs Hamilton, BMW Manufacturing's environmental section manager.
  - "This is a positive for everyone involved. There literally hasn't been a downside of this project. It allows us to take a previously wasted energy source and use it to generate electricity and heat for our plant. This results in lower emissions, which helps to protect the environment and the community."

- This methane partnership, which supplies the plant with 63 percent of its energy needs, has not only greatly reduced BMW Manufacturing Co.'s dependence on fossil fuels, it has reduced CO<sub>2</sub> emissions by approximately 17,000 tons per year.
- In late 2004, Paint shop associates were also challenged to reduce water overflows by 10 percent – at the time, the Paint Shop was generating nearly 100 gallons of water per minutes, or approximately 120,000 gallons a day.
  - As the Paint Shop perfected its ability to use the least amount of water possible, it was able to reduce its consumption not by a mere 10 percent, but by an incredible 30 percent.
  - Such an effort added up to a savings of nearly 9.5 million gallons of water per year.
- One positive side effect of the water reduction effort was the decrease in the amount of water being returned to the city's wastewater treatment plant, which lowered the need for treatment chemicals.
- Another benefit: "It saves money," said John Braswell, as section leader in the Paint shop. "People think of water as just a free commodity," but the plant has to buy its water, too.
- After successfully reducing its water usage, the Paint Shop was asked to come up with a beneficial reuse for its old purge solvents.
  - They are deemed hazardous by the EPA, and must be managed by the factory accordingly.
  - With approximately 550 gallons of purge solvents gathered each week, the facility began shipping it to a company that uses these chemicals to clean the interior of tanker trucks, tanker cars, and rail cars.
  - From a legal standpoint, it's not the factory's waste... but it wants to make sure it is used and disposed of in an environmentally friendly way.
  - Although the cost of shipping the purge solvents offsets any money made from selling them, the benefit comes from finding a new use for hazardous chemicals.
- Furthermore, the company was able to save nearly \$60,000/yr by switching to a new supplier for the lint-free rags used to wipe down new vehicles.
  - These rags clean the abundance of PVC that is used as a seam sealer and underbody spray as the vehicles come through the Paint Shop.
  - The new supplier was able to reduce the cost of not just the rags, but also managing their waste.
  - Soiled rags had previously been sent out for incineration – the factory now sends the baled rags out through this supplier to a local plant.
    - There, they are recycled at no cost to BMW, and then turned into insulation pads that go under the interior of vehicles.
    - In addition to the bottom-line benefits, by recycling these rags, BMW also reduces the amount of waste sent to the landfill.

### **BMW is also pursuing ways to improve the environment**

- Starting in 2004, workers at the facility have been celebrating Earth Day by inviting suppliers and local conservation organization to share information on more ways to become eco-friendly.
- By maintaining the quality of its vehicles while reducing environmental impact, BMW Manufacturing Co. won *Plant Engineering* magazine's "Top Plant" in 2006.
- And in January 2007, the company, along with partner Durr Systems Inc., was named the EPA Landfill Methane Outreach Program "Energy Partner of the Year."

- “BMW is viewed as a leader of the sustainability movement, and as a role model company, we are expected to aid in defining the educational and socially responsible programs that ensure a better way of life and future for our communities,” said Robert M. Hitt, Department Manager for Public Affairs at BMW Manufacturing Co.
- “BMW has a responsibility to aid the development of future resources to combat threats to quality of life.”
- BMW Manufacturing Co. is also working to help other BMW manufacturing facilities find ways to go green.
  - “We must remain innovative in our thinking,” Hitt said. “This is what keeps BMW a leader in the industry and not a follower.”

### **BMW Maintains an Outstanding Track Record with the EPA**

- To wit: BMW’s association with the National Environmental Performance Track, offering proof that BMW can rise to meet the challenges of industrial conservation and corporate responsibility
- A division of the U.S. EPA, the National Environmental Performance Track partners with businesses across the nation, providing eco-positive criteria for manufacturing facilities of all stripes.
- To qualify for the Performance Track program, applicants must meet four criteria:
  - (1) they must have an Environmental Management System (EMS) – a set of best standards and practices designed to reduce environmental impact – in place at the facility.
  - (2) applicants must have a record of compliance with environmental laws and regulations
  - (3) they must demonstrate consistent overall improvement in favor of the environment, with both external and on-site examples
  - (4) the applicant must commit to remain involved in their communities, sharing their accomplishments with the public for the greater good.
- And in the interest of meeting current goals and setting new ones, each participant must reapply every three years to renew its Performance Track member status.
- If the past five years are any indication, BMW’s continued commitment to the environment – and to the National Environmental Performance Track – are sure to build an even greener reputation for the automotive world to follow.