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**The 21st Century Imperatives for Business:
Energy and the Environment**

Good morning everyone.

Thank you, Dan (Dalton) for that kind introduction.

Today I like to cover two items:

Number one, to make a realistic appraisal of the world's use of energy both now and in the future.

Number two, how we in industry, particularly the chemical industry, have a major role to play in shaping our future ... where higher growth is compatible with responsible stewardship of the planet.

I'll start with the observation that energy powers civilization ... it heats and cools our homes, runs our ships, trains, planes and automobiles; our computers, telephones, refrigerators, our hospitals, and of course, our great manufacturing plants.

We cannot avoid the simple fact that energy is the indispensable element of modern civilization.

Now, at a time when whole new regions of the world are taking advantage of unprecedented opportunities for economic growth ... with the promise of greater prosperity more equitably distributed than ever in human history to hundreds of millions of people across the globe ... places like India and China ... we need to remind ourselves that this prosperity depends on energy, most of it in the form of fossil fuels.

And that's not likely to change any time soon.

In fact, by the year 2030, the world's use of energy will likely have grown between 50 and 60% ... and the proportion of fossil fuels in that mix will remain roughly at what it is today ... about 80%.

This increased use of energy is occurring despite its dramatic increase in price ... and this is something of a departure from the past.

During the first oil shock of the early 1970s, when the per barrel price of oil increased from \$3 to \$12, demand fell. The same happened with the second oil crisis later in the decade.

However, during the past four to five years, prices have gone from about \$20 to as high as \$70.

But unlike the oil shocks of the 70s, demand has grown.

And what's interesting is that in the industrialized world demand has stabilized at about 50 million barrels a day. But in the emerging economies demand has increased.

So as we look at our future, we see a growing tension between rising living standards on the one hand – which everyone welcomes – and on the other, the daunting prospect of generating and using 60% more energy ... mostly fossil fuels, including the much greater use of coal ... whose known global reserves, incidentally, are estimated to last 165 years, while natural gas is 70 years and oil, 45 years.

Coal, of course, is the least clean-burning fuel. It is also the one that is in great abundance and located in some of the world's largest and most robust economies ... namely, China, India and the United States. Within the next two years, China alone is slated to build 168 traditional coal-fired plants.

Given the increase in the use of fossil fuels that we are facing ... and adding to that the greater the use of coal ... we have reason to be even more concerned about the future health of the planet, particularly in the area of global warming.

Essentially the question is, do we achieve greater and more equitable prosperity at the risk of the planet's health ... and therefore our own ... or do we deny economic prosperity to hundreds of millions of people in order to safeguard the environment?

[Pause]

Well, realistically speaking, there is zero chance of denying economic prosperity to the world, but I think there is a fair chance of getting the best of both worlds ... prosperity and environmental stewardship, but it's going to require a global consensus on the use of energy that we do not have at the moment ... in fact, that we are nowhere close to having.

Let me briefly describe what that consensus must involve.

The first step is energy efficiency, which is the most important of our short-term options. Energy efficiency begins with the notion that the cleanest, most reliable and most affordable source of energy is energy saved.

Greater energy efficiency means, of course, pursuing the “usual suspects” of conservation; for example, power plants that use fuel more efficiently ... and cars that do the same.

It means doing all of the little things that are well within the power of ordinary people ... better insulating our homes, switching to compact fluorescent lights, turning down the water heater, keeping our tires properly inflated, to name just a few.

Did you know that the average American home has the equivalent of a 3 foot hole in it? Sealing cracks and gaps can save a lot of energy. In fact our Styrofoam insulation product saves more energy worldwide than our entire company uses.

This new consensus also means running our great manufacturing engines more efficiently.

Essential to conservation and efficiency is government support ... by which I mean all governments, including those in both the industrialized and industrializing worlds that encourage conservation and technology solutions through real incentives ... like tax breaks.

Leaving conservation to *laissez faire* economics will not get us to where we want to be. There must be some form of government intervention and we shouldn't rely solely on market-based mechanisms to get us there.

In addition to conservation, we must also place much greater emphasis on the efficient deployment of our energy resources ... and this is an area that is sometimes overlooked by policymakers.

For example, in both the United States and in Europe there has been, in recent years, a decided tilt towards the use of natural gas ... and for very good reasons ... natural gas is a clean-burning, environmentally friendly fuel, both abundant and, not so long ago, inexpensive.

But an unintended consequence of the preference for natural gas prices is its dramatic increase in price ... which is squeezing profit margins for many industries that rely on it as a key feedstock and threatening to further de-industrialize both Europe and the United States.

Here in America's heartland there is great hope being placed on renewable fuels from corn, soy beans and eventually switch grass. Yet natural gas is the key source of fertilizer ... and the key source of energy to make ethanol.

We can't afford to solve one energy problem by exacerbating another.

The natural gas situation highlights the importance of both diversity of supply and security of supply to the overall energy challenge.

For example, is nuclear power being used to its fullest potential, in the way, for example, that countries like France ... where 75% of its electricity is derived from nuclear energy ... use it? Is there, after all, an inordinate fear here in the U.S. of nuclear power?

And are we making a consistent effort in increasing, over the long term, the use of alternatives like biomass and solar power ... or do those alternatives tend to ebb and flow with the price of conventional fossil fuels?

No one is more aware of the issue of energy deployment than the governments of emerging economies, who are putting in place measures to minimize their "addiction to oil" and to maximize the use of many sources of energy ... with an eye towards the effective deployment of coal and nuclear in the short term, and later on, biomass and other renewables.

And speaking of government – I cannot leave the subject of energy and environmental stewardship without saying a word about climate change.

Discussions of solutions to climate change have accelerated in Washington, and that's a good thing ... because the time to debate the science is over ... the time for action must begin.

The nation needs a climate change policy that meets the following two principles ...

- We need a national commitment over the next 50 years to slow, stop and reverse the growth of greenhouse gas emissions.
- And we need participation from all economic sectors and commitments from all countries.

Think about it. It may quite possibly be the greatest peaceful undertaking the world has ever known.

[Pause]

So with that overall framework in mind, let me look specifically at my industry ... chemical and plastics ... how energy is affecting us and the role we can play in reconciling the tension between growth, greater energy use and the health of the planet.

First, there's the practical matter of production. Given the likelihood that energy and feedstock costs will remain high by historical standards, there is every reason to believe that productive assets will continue to gravitate to regions that offer advantaged energy costs ... namely, the Middle East and Asia.

Over the medium term, by which I mean 5 to 15 years, we in the industry are likely to see a breakthrough in olefins, with the commercialization of technology that produces olefins directly from methane ... which will enable greater utilization of both coal and stranded natural gas.

Over the long-term, say 15 to 30 years, we will probably see a further breakthrough involving the use of biomass as a feedstock. This, by the way, is already underway; Dow, for example, produces a plastic foam from soybeans that is used in furniture and mattresses. And the use of plants as feedstocks means that bio-engineering will have a major role to play ... genetically altering plants to enhance the performance of a plastic or chemical.

And we will also probably see some major breakthrough in solar energy ... panels that capture much more of the sun's energy and do so more economically. At Dow, we're a leader in providing materials to the solar panel industry. This technology shows great promise in efficiently harnessing a source of renewable energy to solve long-term energy needs of society.

As I draw these timelines around these projected breakthroughs, I am mindful of the old saying ... and I'm sure Alvin Toffler will agree with this ... that the future almost always arrives sooner than we think.

So it would not surprise me if these breakthroughs arrive sooner rather than later.

Finally, let me offer some thoughts on the role of the chemical industry in helping to relieve this tension between economic growth and stewardship of the planet.

Some people ask, “Do we need chemicals?” The only rational answer is, “We cannot do without them.”

Over 95% of the things that touch our lives every day ... from a glass of water to a tube of toothpaste ... to the clothes we wear, the food we eat, the computers and telephones we work with ... the cars we drive ... the medicines we take ... all of these things are made possible by the science of chemistry.

Our industry is based on the science of chemistry ... and chemistry can do wonders ... creating new materials and new technologies that can have a direct impact on energy efficiency ... such as lighter-weight cars ... or filters that make diesel fuel run cleaner ... or breakthrough manufacturing processes like those I’ve just mentioned using methane or bio-materials.

But we are also mindful that our industry is one of the world’s largest and the most intensive users of fossil fuels.

It is now clear to many of us that the world’s climate is being impacted by increases in greenhouse gases, of which CO₂ is the single largest component.

And I think reasonable people can agree that although global warming’s effects are difficult to predict in any exact measure, it most certainly has the potential to generate catastrophe for future generations, if left unchecked. So reasonable prudence would dictate that not reducing emissions would be a foolish risk ... given the possible catastrophic effects of warming on the health of our planet.

Some have said our industry’s intense appetite for fossil fuels disqualifies us from being part of the solution.

On the contrary, no industry is more acutely aware of the need to reduce our dependency on oil and natural gas than ours.

In other words, we can lead the way on energy because we have to. In fact, we have already taken some important steps.

From 1996 to 2005, for example, we at Dow cut our consumption of energy per pound of product by more than 20% ... which required an investment of one billion dollars, but returned 4.4 billion dollars to the bottom line.

And, over the next ten years, we are confident we can improve our energy efficiency by an additional 25%.

Let’s talk about greenhouse gas emission reductions. Dow reduced its absolute greenhouse gas emissions since 1990 to a level that exceeds Kyoto targets.

We have also pledged to reduce the intensity of our company's greenhouse gas emissions by 2.5% annually between 2005 and 2015.

Because of our scale, that step alone will reduce the equivalent of CO₂ emissions from 3 million automobiles or 6 million homes over this time period.

We at Dow are also expanding our commitment to the much broader realm of sustainability including not only the energy and climate change issues, but other challenges ...

- Sustainable water supplies.
- Adequate food supply.
- Decent housing.
- Personal health and safety.

[Pause]

So to the question, what is the impact of energy on our standard of living and the health of our planet ... my answer is ... "We don't know yet ... at least, we don't have the complete answer, because it depends on how we respond."

But there are a few things we do know.

We know that a large increase in greenhouse gas emissions is gambling with the future of the planet, and poses too large a risk to be left unaddressed ...

We know that energy is the sine qua non of economic growth.

We know that fossil fuels will comprise the lion's share of energy for the foreseeable future.

We know that conservation and diversity of supply are key to the efficient use of energy, and that alternative sources, like biomass and solar, if done on a large scale, would be an enormous breakthrough.

Finally, we know that chemistry can play a large role in resolving the conflict between energy, growth and the environment.

Certainly, we don't have all the answers ... no one does ... but we do know that the world's people are not going to give up on industrialization and higher living standards ... and that fossil fuels will be a part of that for a long time to come ... so we first have to take short-term measures ... and do so immediately:

- Conservation
- Diversity of energy sources and
- Alternative sources of energy ...

... as we work on breakthrough technologies that cure our addiction to fossil fuels and reduce greenhouse gases.

But to do so will require the efforts of all of us in the private sector as well as the cooperation of our governments.

This won't be easy, but it is not impossible.

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