

# Center for American Progress



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***“FUELING THE FUTURE: CLEAN ENERGY, CLIMATE SECURITY &  
SUSTAINABLE DEVELOPMENT”***  
**HARVARD UNIVERSITY CENTER FOR THE ENVIRONMENT**  
**CAMBRIDGE, MA**  
**MARCH 23, 2006**

Thank you Dan for that introduction, and thank you for giving me the opportunity to be here.

The Center for the environment is doing such great work, and it’s a pleasure to participate in this symposium—although I have much more confidence that you, students and scholars, not me, will one day find a solution to our world’s energy dilemma. After all, I chose the default career path and became a lawyer rather than pursuing something socially useful.

I do teach at Georgetown’s law school—but I don’t actually teach energy or environmental policy.

Instead my class is on Congressional Investigations—something I happen to know a lot more about from my time in the White House.

But nonetheless, I have managed to gain some substantive experience in energy and environmental policy during my career, and that’s what I have come to talk to you about tonight.

I have come here to Harvard to ask that you consider together, subjects that traditionally are considered apart: how we power our economy, how we protect our climate, and how we treat the world’s poor.

In our country, discussions about energy policy today tend to be narrowly focused around one question: national security.

We all heard President Bush declare in his State of the Union address that America is addicted to foreign oil—he may have been the last person in our country to have noticed that fact—of course, with the possible exception of Vice President Cheney.

We know that energy is a matter of national security, since the volatile Middle East provides a significant portion of our oil imports and affects the world supply even more. But tonight, I want to take a different tack and broaden the discussion.

Because it has become clear that the sources of fuel for our industrial economies are not only the greatest threat to our environment but one of the greatest threats to the welfare of the poorest people on earth.

No matter whether your measuring stick is moral or economic, scientific or political, we know this: the world must undertake vigorous and determined change to avoid a catastrophe of these converging trends which literally threaten us all.

But there is good news.

The good news is that while time is growing short, there are answers—and I will outline some of them for you this evening. But first I want to begin by addressing the scope of the problem and how the world reached this point.

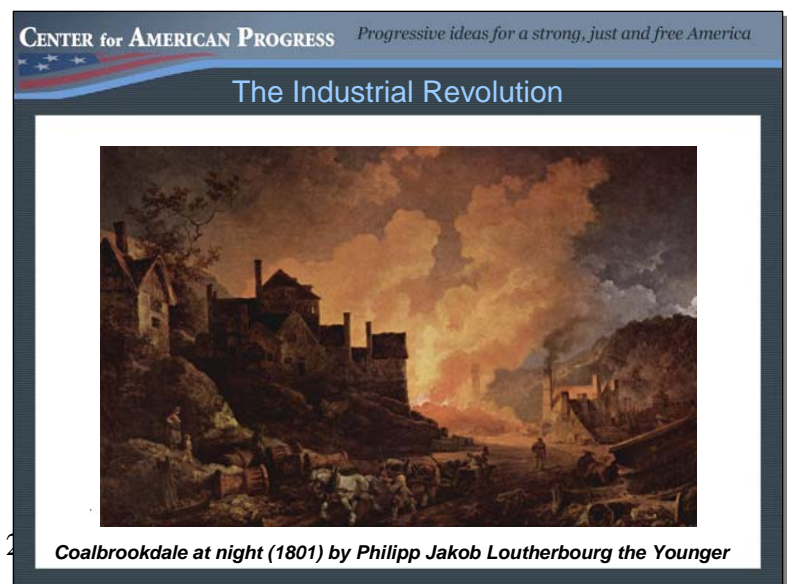
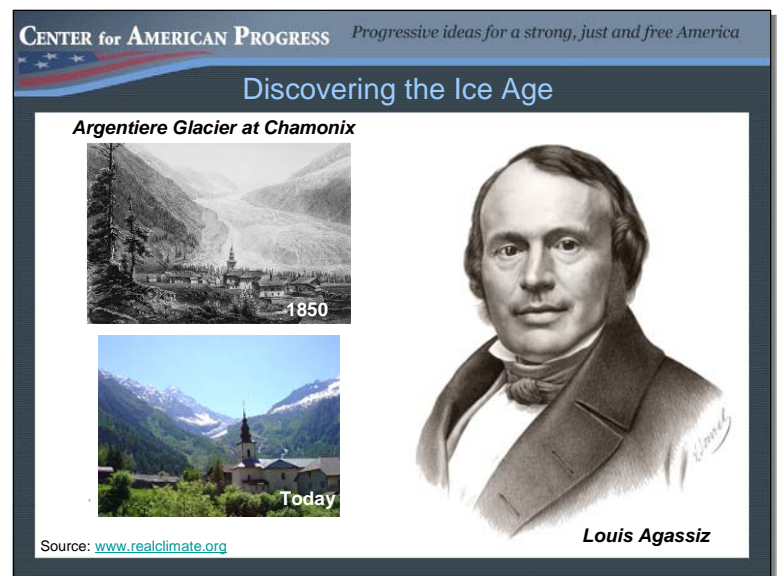
Human history has been marked by dramatic and devastating climatic changes.

For example, 170 years ago, Harvard's eminent geologist, Louis Agassiz (pictured here), first proposed that large parts of the Earth had once been covered in ice—of course, today we call this period the Ice Age. By observing the glaciers near his native Swiss Alps, he concluded that similar geological features far from any glaciers could only be explained by the existence of ancient ice sheets.

Agassiz's work revealed that these climatic changes were a function of natural fluctuations.

But climate change today is different. It is, for the most part, the product of human endeavor and it will take more than adaptation to restore the natural order.

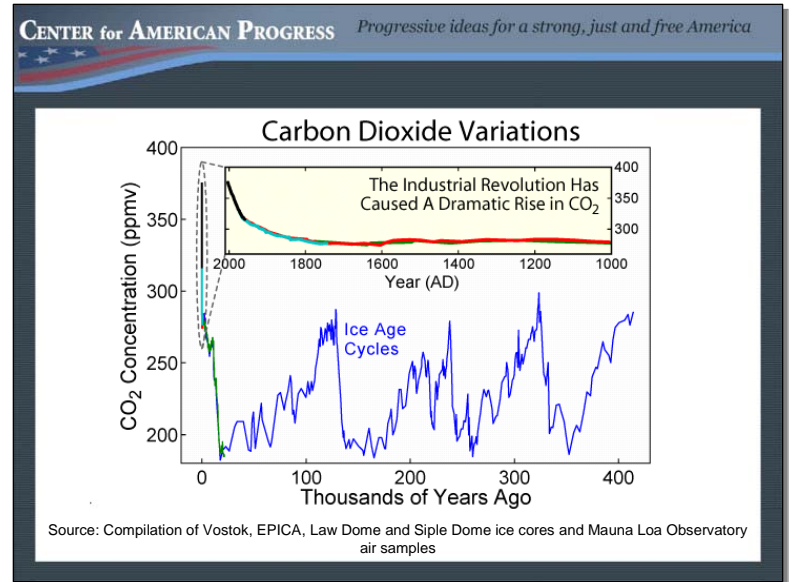
That natural order was disrupted beginning in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries, when fossil fuels—first coal then oil—were used to power the industrial revolution.



Soon, factories emerged, industries became automated, and goods were produced in little time and in mass quantities.

But 100 years ago, we did not know that burning fossil fuels would produce the greenhouse gas pollution that is most responsible for rising global temperatures.

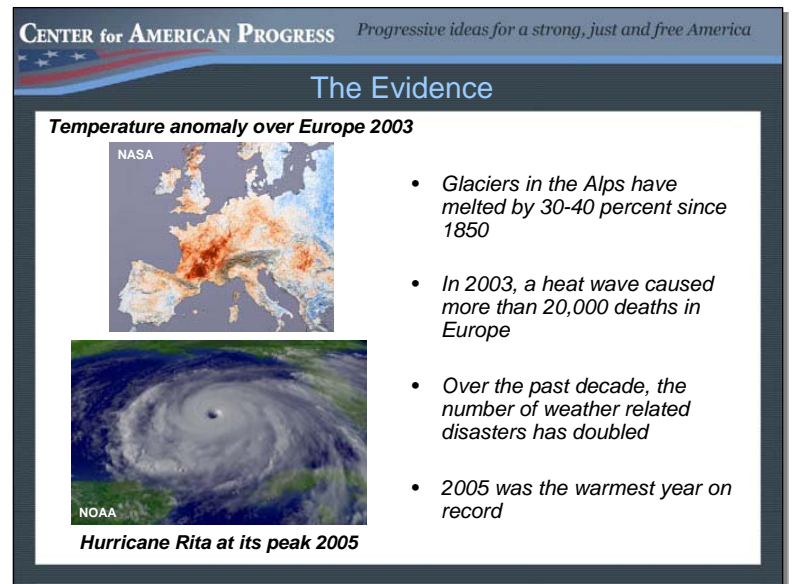
For those of you who are not geologists, the chart on this slide reads from right to left. What is evident here is a pattern of natural climate fluctuation caused by imperfections in the Earth's orbit and rotation throughout history. But what this slide also shows is that the carbon dioxide levels in the atmosphere today are well beyond anything in the geological record—going back 400,000 years.



It is clear now, then, that the 19<sup>th</sup> century fuels that still drive our 21<sup>st</sup> century economies have resulted in a dangerous interference with the global climate.

And the physical evidence of climate change is all around us.

- The glacial area in Western Europe that Agassiz observed has melted by 30-40 percent since 1850;
- In the past few years, extreme heat waves have caused more than 20,000 deaths in Europe and thousands more in South Asia;
- The 2005 Atlantic hurricane season broke all records for the number and intensity of tropical storms and hurricanes;



- Over the past decade, the number of weather related disasters has doubled; and
- This past year was the warmest year on record.

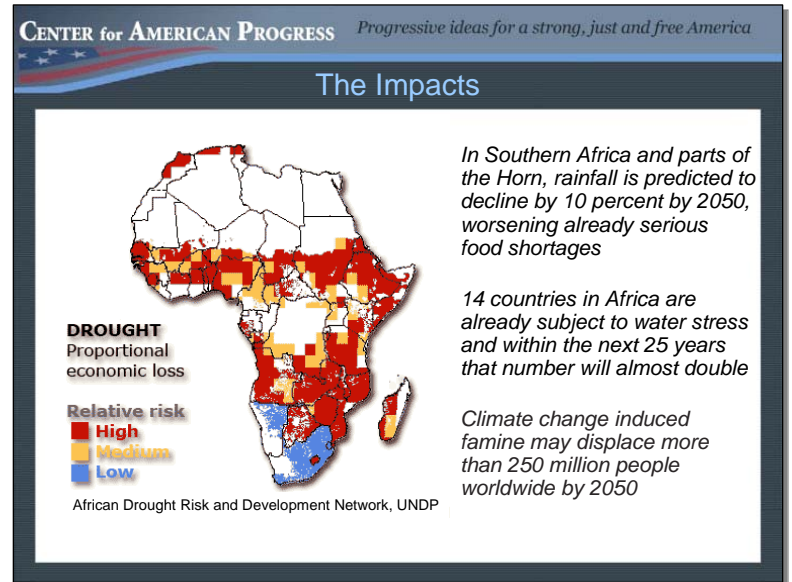
But beyond the scientific evidence, it is important to recognize that the world's poorest people—those least responsible for climate change—are most prone to suffer from its effects.

They struggle already.

They struggle to feed their families...to acquire basic medicine...and to earn a meager living. Their daily struggle to survive will only become that much more difficult with climate change.

In part, this is because the world's poor live in areas more prone to natural disasters, drought and disease.

- Consider that 14 countries in Africa are already subject to water stress and within the next 25 years that number will almost double;
- In Southern Africa and parts of the Horn, rainfall is predicted to decline by 10 percent by 2050, worsening already serious food shortages; and
- Between 260 and 320 million people are likely to find themselves living in malaria infested areas by 2080.



Additionally, as we have seen in Bangladesh and the Philippines in the past year, the increased frequency and intensity of storms means that poverty ridden communities in remote areas will not receive advance warning...will not have immediate access to relief services...and will not have adequate resources to recover from disasters—leaving hundreds of thousands of people to perish.

On top of this, climate change threatens developing communities in particular because they—more than most—depend on natural resources for income. As the *Washington Post* reported yesterday, the Inuit in the Arctic are already feeling the effects of climate change. As the ice melts, the earth opens up and drives away animals they hunt for food and swallows their homes and fishing equipment.

But temperature fluctuations will not only adversely affect individual income; on a broader scale, it will adversely affect poor countries' economies that are dependent on agriculture.

- For example, crop yields in sub-Saharan Africa are projected to fall by 20 percent under global warming;

- As yields fall and demand rises, Africa will become more dependent on expensive food imports. Already the poor in sub-Saharan Africa spend 60 to 80 percent of their total income on food – that compares to approximately 10 percent in the U.S.;
- Climate change induced famine may displace more than 250 million people worldwide by 2050; and
- As families are left roaming the countryside in search of food and fighting disease, countries lose their communities, their workforce, their teachers, and their farmers. Inevitably, as a result, they lose focus on development priorities such as increasing access to education, promoting economic opportunity, improving gender equity, and enhancing their health care infrastructure.

Climate change not only inhibits progress on sustainable development, it has begun—and will continue—to disrupt and destroy every aspect of the daily struggle to survive in poor countries around the world.

And what I think can only be characterized as a cruel twist of irony, the same communities who stand to suffer from climate change the most, cannot afford the oil we use to generate economic growth and that at the same time generates the pollution that threatens their very survival.

For the poorest countries, energy is not a source of economic prosperity—it is a source of their poverty. And dependence on oil for energy is deepening deprivation in the developing world.

- Consider that oil priced at \$60 per barrel has had a disproportionate impact on the poorest countries, 38 of which are net importers and 25 of which import all of their oil;
- The top recipients under the Heavily Indebted Poor Countries Initiative are spending the money saved from debt relief on the increasing price of oil rather than on educating their kids, fighting HIV/AIDS, providing clean water, or increasing access to health care;

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### Oil's Impact on the Developing World

- *38 of the world's poorest countries are net importers and 25 of which import all of their oil*
- *Developing countries consume roughly twice as much oil per dollar of GDP as the United States*
- *Nigeria is Africa's richest oil producing country with \$11 billion in oil revenues in 2002, but in that same year its debt increased by \$5.6 billion*



Photo credit: John Christian Lonningdal

- Nigeria is Africa’s richest oil producing country and yet its people are impoverished—in 2002, revenue from crude oil was approximately \$11 billion, and yet that year, half of that revenue was stolen or wasted by corrupt officials. The corruption stemming in part from a centralized oil revenue system is not just fueling poverty, but helping to fuel an armed conflict in the oil rich Delta region; and
- All the while, the high cost and inaccessibility of fossil fuels, leaves approximately 2 billion people worldwide without reliable energy sources, without refrigeration, basic communication, heat, or even light—as this satellite image of the world at night demonstrates.

For developing countries, then, climate change and our world’s energy policies are a source of oppression, a source of sickness and a source of human suffering.



And soon, science suggests we will be powerless to do anything about it. Because when it comes to climate change, we are quickly approaching what is known as “a tipping point”—where our continued pollution will render catastrophic climate change inevitable and its impact on the poor irreversible.

In sum: climate change is real; it is occurring; and it is caused mainly by the developed world’s burning of antiquated fuel sources—the same sources that are inaccessible, unaffordable and producing poverty in developing nations.

And the situation is only worsened by our President’s denial. For the past five years, President Bush has governed in what appears to be a fact free zone—refusing to cut emissions and choosing to formulate policy around special interests rather than scientific evidence.

In fact, this past Sunday, *60 Minutes* did a story on NASA scientist James Hansen, one of the world’s foremost climate experts. Watching the story, the only thing perhaps more frightening than his findings, is the fact that this administration has thrown the full force of the Executive into silencing him...into editing his evidence, restricting who he can talk to and what he can say.

It has become clear that they are re-writing the science to protect the interests of the oil companies, rather than protecting the welfare of the American public—or the global public at large.

This is the grim reality of our energy situation today.

But I don't believe, and I don't want you to believe, that environmental Armageddon is inevitable.

I believe we can chart a different global energy future. And that's what I want to focus on tonight: how we can slow the progress of climate change while, at the same time, promoting sustainable development in the poorest countries around the world.

And don't be mistaken: we *cannot* do one without the other.

We cannot expect to stop the assault on our environment if only the wealthiest countries in the world have access to the cleaner, safer more modern energy sources that will drive economic growth in the 21<sup>st</sup> century.

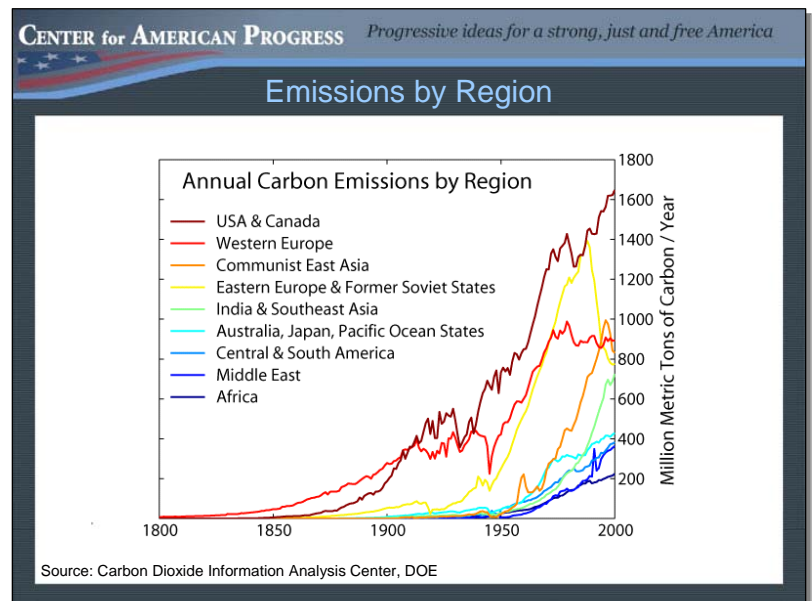
To prove my point, consider what is happening in India and China today.

We celebrate the fact that millions of people have been lifted out of poverty by economic growth. In fact, the Millennium Development Goals—the goals set out by the UN for poverty reduction worldwide by 2015—may be achieved by the economic efforts of India and China alone.

But with this economic growth, these developing countries are becoming more like us: they are becoming big time polluters.

While India today ranks fourth in the world in carbon dioxide emissions, its emissions output is increasing at an alarming rate as its population and its economy continue to grow.

From 1991 to 2001 India's emissions rate increased by 61 percent. This number was only surpassed by China, a country which is both the largest consumer and producer of coal in the world and is second only to the United States now in greenhouse gas emissions. The evidence demonstrates just how fast they are catching up to us.



In fact, India's per capita carbon emissions—still tiny in comparison to the U.S.—are expected to triple by 2020. And with China accounting for a fifth of the world's population, increases in its emissions could render any cuts made by industrialized countries irrelevant.

Let me be clear: with millions of people living in poverty, no one can or should ask the developing world to restrain its economic growth...and no country is going to forfeit its ability to raise living standards for its poorest people.

Our ability to stop climate change, then, depends on our ability to manage economic growth responsibly... to fuel development in environmentally and economically sustainable ways.

And we can do it. Today, in meetings and discussions with your science faculty and students, I've heard a lot about low carbon and zero carbon technology, clean coal, and carbon sequestration. But tonight, I want to focus on renewable energy.

Energy that is cleaner and safer, more accessible and affordable. Energy that will be a source of opportunity rather than a source of oppression for the world's poor.

The foundation for our global renewable energy future is already being built.

Numerous countries are seeing incredible growth in renewable energy—including the United States through both private sector and state government action. Let's look at New England, for example.

Massachusetts is home to more than 600 clean energy projects and nearly 100 green building projects.

One example is Princeton, Massachusetts—home to two state-of-the-art 1.5 megawatt wind turbines, which, when operational, will create 40 times more energy than the existing machines. At the same time, the clean energy produced by the wind turbines will reduce carbon dioxide emissions by 11 million pounds—the equivalent of taking 1,000 cars off the road per year.

Developing nations are also beginning to build their own sustainable energy future.

In India, solar water pumps are replacing diesel generators to power irrigation. This increases the productivity of the farms; it saves farmers money on fuel, and creates jobs for manufacturing the pumps and replacement parts.



These are just a couple examples of the increasing use of renewable energy.

With demand increasing, it's no wonder, then, that renewable energy is also becoming big business.

For example, the solar industry raised \$2 billion in capital last year. In both the developed and the developing world alike, renewable energy is one of the fastest-growing sectors.

Worldwide, direct employment in renewable energy manufacturing, operations, and maintenance exceeded 1.7 million in 2004. Companies continue to ramp up production to meet both domestic and international market demands for renewable energy.

Renewable energy, then, has proven to be both an economically viable and environmentally sound investment in our energy future. Over time, diversifying our global energy portfolio through the development and deployment of various renewables such as wind and solar is a priority.

But now, I would like to focus your attention on one particular renewable that I believe is the most practical and potent way *in the very near term* to promote sustainable development and a sustainable environment: biofuels.

Biofuels are derived from plants and agricultural waste that can provide a cleaner, more sustainable alternative to oil.

Because biofuels can be generated from crops, they hold enormous potential for farmers in the near future—especially for the two-thirds of the people in the developing world who derive their incomes from agriculture.

Today, many of these farmers are too small to compete in the global market, especially with the playing field tilted against them through trade distorting agricultural subsidies. They are mostly subsistence farmers who, in a good year, produce enough to feed their families, and in a bad year, grow even poorer or starve.

But biofuels have enormous potential to change this situation for the better.

At the community level, farmers that produce dedicated energy crops can grow their incomes and grow their own supply of affordable and reliable energy.

At the national level, producing more biofuels will generate new industries, new technologies, new jobs and new markets. Of the 1.7 million jobs in 2004 tied to the renewable energy industry, almost a million of them were related to biofuels. At the same time, producing more biofuels will reduce energy expenditures and allow developing countries to put more of their resources into health, education and other services for their neediest citizens.

Many countries are already demonstrating the potential of biofuels to drive environmentally friendly development—and Brazil is leading the way.

Over the past 30 years, Brazil has turned its rich supply of sugarcane into a source of fuel and jobs by processing the crop into a biofuel called ethanol.

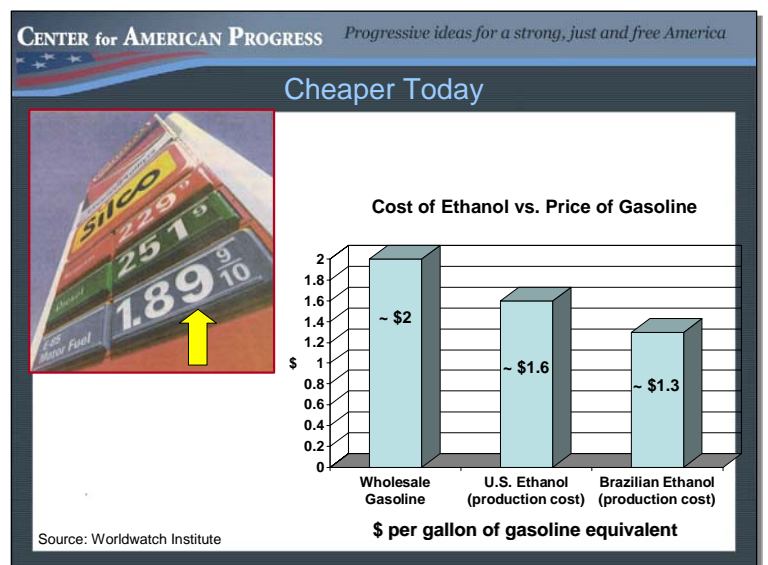
By using policy tools, such as requiring fuel-blending and tax incentives, Brazil has spurred a new transportation industry — producing a fleet of vehicles—so called Flex Fuel vehicles—that can run on gas, ethanol or a blend of the two.

In 2003, Brazil sold almost no Flex Fuel Vehicles. By the end of 2005 they made up 70 percent of their new car sales. And more and more cars being manufactured today are capable of running on pure ethanol.

Average consumers pay 40 cents less per gallon to fill up their cars on ethanol. As you can see in this slide, the cost to produce ethanol in the United States and Brazil is significantly lower than the wholesale price of gasoline.

It is no surprise then, that demand for this biofuel is up, and farmers are growing more and earning more as a result.

And they are not the only winners.



Brazil's economy has saved nearly 100 billion dollars in anticipated debt from oil import costs, and created nearly 1 million new and better paying jobs for its citizens.

And we all benefit from Brazil using biofuels rather than fossil fuels. Because they use sugarcane waste to power their ethanol processing plants, Brazilian ethanol is estimated to reduce greenhouse gas emissions by as much as 80 percent compared to gasoline.

Our use of corn for ethanol, while a positive step, is not nearly as efficient. However, as we move to cellulosic sources like switch grass we can improve efficiency and catch up.

Brazil's biofuels-based transportation sector provides an important lesson for us and for the rest of the world – you don't need a radical technology shift, you don't need a brand new energy infrastructure, and you can make change now.

For developing countries in the tropics and sub-tropics, Brazil has also demonstrated a possible competitive advantage from longer and more productive growing seasons—an advantage that can be realized if we can mitigate the effects of climate change on crops.

Additionally, rather than importing other countries' ancient natural resources, they could be using their own living resources to power their development and enhance their economies. Instead of looking to the Mideast for oil, the world could look to the tropics for biofuels.

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### Ethanol and Employment in Brazil

VEHICLES	RATIO OF JOBS CREATED
<b>100% ETHANOL</b>	<b>21.87</b>
<b>25% ETHANOL/ 75% GASOLINE</b>	<b>6.01</b>
<b>100% GASOLINE</b>	<b>1</b>

( IN THE PRODUCTION OF THE VEHICLE AND OF FUEL )

Source: Copersucar/Unica/ANFAVEA/PETROBRAS

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### Comparative Energy Balance

Raw Material	Total Energy Ratio
<b>Corn</b>	<b>1.21</b>
<b>Switchgrass</b>	<b>4.43</b>
<b>Sugarcane</b>	<b>8.32</b>

Source: Leal, Regis, CO2 Life Cycle Analysis of Ethanol Production and Use, LAMNET, Rome, May 2004

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### The Competitive Advantage of the Tropics

The COMET Program

Source: University Corporation for Atmospheric Research

Brazil is a biofuels success story—this developing country has already achieved what the rest of the world is only just beginning to talk about.

And we can no longer afford to let Brazil remain an anomaly.

If the future of our environment, the future of sustainable development—and to some extent the future of our industrial economies—lies in renewable energy, as I have argued, the rest of the world must take steps now to follow Brazil’s lead on biofuels in the near term. We must take measured action now to ensure that we—and especially the world’s poor—are not left languishing in the past.

Before I get to the specific steps we need to take, I want to reflect a moment on why now is such an opportune time to act.

Because when it comes to climate change and what to do about it, there is political disagreement. But despite that disagreement, politicians and policymakers are now realizing that a sustainable energy supply is essential to future economic growth and to energy security.

Even though President Bush has consistently given tax breaks to the big oil companies while cutting funds for renewable energy—the political climate is shifting. Since his State of the Union Address, the President has burnt a considerable amount of jet fuel talking about switch grass at events around the country.

Governors and mayors are stepping up to the plate by enacting their own emissions caps. The number of states with renewable portfolio standards has now climbed to 22.

Grassroots organizations are also doing their part. The California Clean Alternative Energy Initiative, slated to appear on the November 2006 statewide ballot, will fund a \$4 billion dollar effort to reduce California’s dependence on gasoline and diesel by 25 percent by promoting renewable energy use.

As a result of such action, and as a result of two years of historically high oil prices, Americans like the rest of the world are finally talking about renewable energy.

In fact, a Gallup poll conducted last week showed that 76 percent of Americans think that most cars will run on alternative fuels within 30 years, and 85 percent say they favor “spending government money to develop alternate sources of fuel.”



Given current price levels and public sentiment, the marketplace and policymakers are finally responding.

We have an opportunity now to make substantial reforms. More than that, though, we have the opportunity to make good on our moral obligation.

Because, beyond the price and the politics that are necessitating change, we, in the United States, have a moral obligation to change.

As I said earlier, for over 200 years, developed nations have used energy to increase their own economic wealth and prosperity while polluting the global environment and hindering growth, happiness, and security in poor countries.

We have indirectly worsened the plight of people around the world. It is simply a matter of fairness, then, for us to devise solutions for the problems we have created.

But at the same time, we cannot bear the burden alone.

And the developing world wants to do more—to leapfrog the industrial energy technology of the 19<sup>th</sup> century and develop clean, affordable fuel supplies. 14 developing nations have already set renewable energy standards.

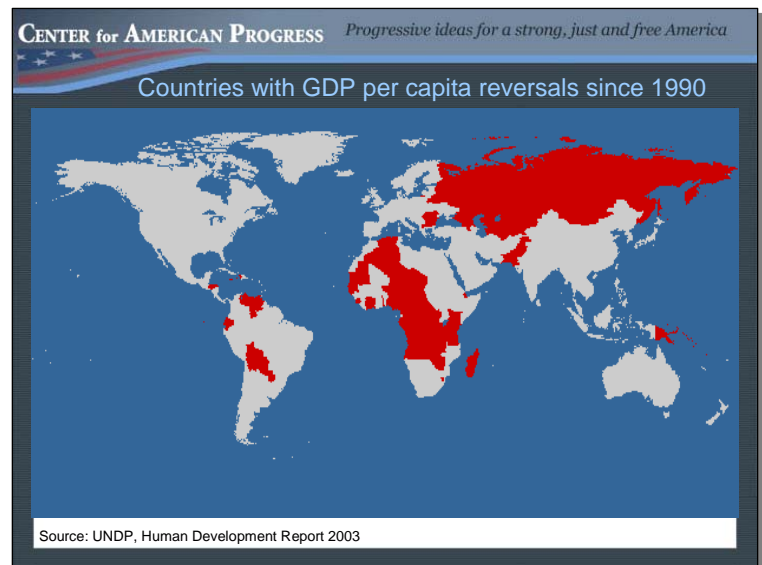
But their overall capacity to change is another matter.

Consider that 54 countries are poorer today than they were 15 years ago. And that almost half of the world's people – the vast majority of them working people – live on less than two dollars per day.

We have a responsibility to make renewable energy available and affordable to all...to ensure that the poorest countries in the world are not forced to choose between feeding their people and fueling their economies.

The moral imperative to change our global energy policies has been apparent for some time.

But, given these current circumstances, now is the time for nations on both sides of the development divide, in practical and powerful ways, to reduce emissions while promoting renewable energy for sustainable development around the world.



With all that I have said here this evening, we are left with one lingering but large question: *how do we do that?*

How do we embark on a united, global effort to promote renewable energy for sustainable development and a sustainable environment?

The answer to that question is not easy, but I'll do my best to make it brief.

The answer involves getting international agreement from several entities—from government to NGOs to industry leaders—and acting on that commitment to move forward, faster—together.

I could lecture for at least another 30 minutes on each of the specific steps each of these entities needs to take.

But instead, I thought I would focus on how we can increase biofuels production from agriculture, which I believe is the most practical way to promote development while preserving the environment *in the near term*.

To make biofuels a major source of liquid fuels, there are a number of challenges we must confront.

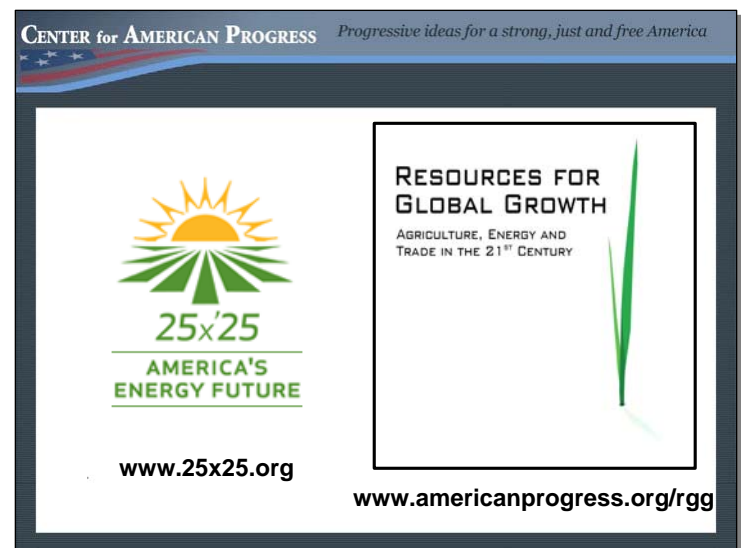
First, to see an increase in production and consumption of biofuels in the world, we will need government support.

Here in the United States, an ever increasing number of elected officials, policymakers and private sector investors are mobilizing behind a vision called 25 by 25—an effort to produce 25 percent of US energy from agriculture by the year 2025.

This is an achievable goal, and one that could mean big gains for farmers here and in the developing world.

At my organization, we're calling on our government to dramatically increase investments in renewable energy production, especially biofuels, from farms in America. The government can do this by providing incentives, risk insurance, and other tools to family farmers willing to make it a focus of their work.

Over time this will have twin benefits: one, it will dramatically diversify our fuel mix; and two, it will reduce trade distorting agricultural subsidies—subsidies that keep farmers abroad impoverished and keep us from making headway at the Doha Development Round of trade talks.



Success or failure in the current round of trade talks will largely be determined by the long term agricultural policies of the rich trading partners.

A robust commitment to producing 25 percent of our energy by 2025 will provide the U.S. with an opportunity to demonstrate leadership at the WTO talks by reducing trade distorting agricultural subsidies.

At the same time, it will improve market prices for farmers world wide, while allowing us to shift away from the policies that encourage agricultural overproduction and make it difficult, if not impossible, for farmers in vulnerable developing countries to compete on the global market.

Breaking the impasse at Doha by bringing biofuels to the negotiating table is a first step for the global governing community.

Second, we need a much bigger, more concentrated investment in science and technology—and if there is one message you take away from my talk tonight, I hope this will be it.

Because for over 40 years now, science has warned us about the advance of climate change, and in the next 40 years, technology may very well save us from suffering its full effects. But only if we fully support scientific research in renewable energy.

One of the greatest challenges to the widespread deployment and use of biofuels is developing dedicated energy crops that are cost-effective, easy to sustain and can produce greater yields.

For example, going forward, we will depend on science to figure out:

- Genetic sequencing to ferment cellulose and turn it into ethanol, which currently requires expensive chemical and mechanical pre-treatment;
- Technologies for biomass gasification which are lower-cost, more efficient, and able to handle a wider range of resources such as agricultural waste;
- Manipulation processes of photosynthesis and gene structure so that crops become more efficient at converting biomass; and
- How to make sure bio-refinery processes keep up with the advances in plant science.

Scientists here at Harvard, over at MIT, and around the country have made significant scientific discoveries in renewable energy. But this is the challenge of a generation...it is a global challenge, and it will take all the world's scientific scholars to meet it.

Brazilians, for instance, have been able to triple the liters of ethanol per hectare of sugarcane for their farmers. Indian scientists have sped up the process for the Jatropha plant to yield oilseeds used for bio-diesel—cutting output time from 2 years to 7 months.

With the right resources, the global scientific community can continue down the path to progress, and it’s our job to see that they get the support they need.

At my organization, we convened an International Climate Change Taskforce, co-chaired by Republican Senator Olympia Snowe and British Labour Party MP, Stephen Byers, and comprised of experts, including Harvard’s own John Holdren. One recommendation in the Taskforce’s final report was that the governments of the G8 double their investment in science and technology for zero and low carbon energy by 2010.

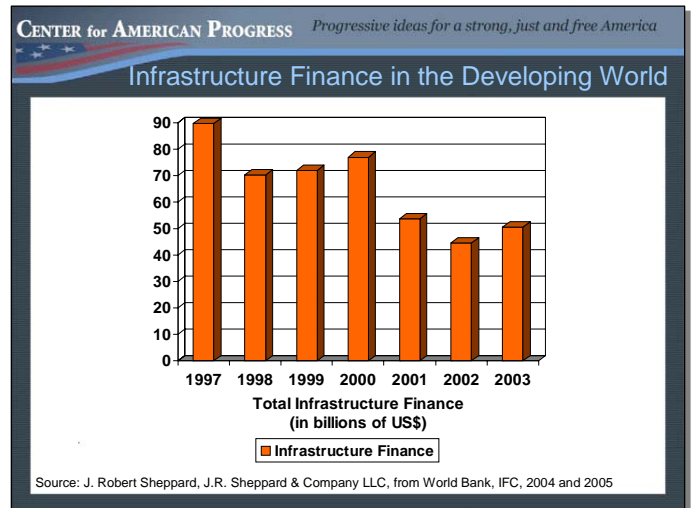
Last July in Gleneagles, the governments of the G8 met and established a group of both developing and developed countries to address emissions reductions, clean energy, and sustainable development.

Last November, this group held a dialogue with energy and environment ministers, where promises were made for collaboration. But concrete action needs to be taken. If the desire to do something about climate change is there—and I believe it is—this group must do more and move forward *faster*.

Third, besides global government support, we must have more funding across the board for the development and deployment of biofuels. We not only need a substantial increase in funds, but we need new creative forms of financing.

There is not enough public foreign aid. The sum of money spent on overseas foreign development assistance by all the countries that comprise the OECD, put together, amounts to less than 0.5 percent of the aggregate GDP of those countries. They’ve committed to giving at least 0.7 percent, but even if we were there, it still simply wouldn’t be enough.

Meeting the United Nations’ Millennium Development Goals using only public foreign aid would require an additional \$50 billion a year—roughly double the current amount. We need a way to increase private capital flowing to the developing world for sustainable projects.



Instead of relying on traditional and scarce foreign aid funds to spur project development, we need to create new financing partnerships to mobilize more money for renewable energy. One promising public-private partnership option is Global Development Bonds.

Global Development Bonds are a new class of debt securities that could be created by any country with a capital market and would increase the percentage of development financing provided by the private sector—financing that could be targeted toward renewable energy and clean water projects.

Global Development Bonds provide many advantages over traditional foreign aid funding.

They would enlist the professional skills of private money managers to meet the world's development goals. They would open up economic development abroad and provide new opportunities for U.S. businesses and new revenue for the economy. Finally, they would be able to more effectively assess risk and market potential.

The U.S. government would play a small but critical role: to minimize investor risk by providing political risk insurance and foreign exchange coverage.

In addition to new funding and governmental support, the fourth challenge we must confront in order to bring widespread use of biofuels to the developing world, is ensuring that we do not cause further environmental damage or adversely impact food production.

These are valid concerns, and I admit we don't know all the answers right now. But looking at research such as the Natural Resource Defense Council report, "Growing Energy," I believe we can effectively manage biofuels production to address these concerns.

When it comes to food shortages, a bio-based local economy can actually help reduce hunger and poverty by diversifying agricultural and forestry activities, attracting new farmers, and investing in small and medium enterprises.

When it comes to environmental preservation, we can manage the possible adverse impacts by carefully selecting and cultivating dedicated energy crops. The NRDC report argues that the United States can meet its energy needs and protect the environment, in part, through the use of cellulosic biofuels produced by farmers.

One dedicated energy crop that produces biodiesel and holds particular promise for improving local economies and environments is Jatropha.



Jatropha is a drought resistant perennial that can grow in the poorest of soils. Today, in India it is being used to bring agricultural wastelands back under cultivation. In Mali, women's groups use biodiesel generators that run on oil from Jatropha shrubs. Villages with these generators have increased the number of girls in school and increased local incomes.

More promising still is the potential for the widespread use and production of the plant for biomass—over half of the land in Africa is considered suitable for Jatropha cultivation.

This brings me to my last point.

To see the widespread use and distribution of biofuels in the developing world, we need to ensure that project planning takes local needs and local production capacities into consideration... we need to consult and engage local residents in renewable energy project planning... we need to couple energy projects with existing development work... and we need activists, grassroots organizations, and even students like yourselves, to keep driving us towards change... to help us harness our collective intellectual and financial resources to come up with workable solutions to a complex problem.

I know you are doing your part.

I recently read that Harvard's Center for International Development and the Italian Ministry for the Environment and Territory signed an agreement to create a fund of \$2.5 million for sustainable development, focusing on environmental protection issues and the promotion of economic growth.

You have been given a broad research mandate, and I have no doubt that you will break out of the conventional scholarship silos and find new ways to put environmentally sound sustainable development strategies and technologies into practice.

With your help, and with the steps I have just outlined—government support, scientific research, new funding, and effective project management—we can make significant progress in the near term.

Tonight, I have outlined the many challenges we face when it comes to protecting our environment while promoting sustainable development.

But with countries like Brazil and its biofuels based transportation sector, we know that it *can* be done.

And now, given the current political and public attention to energy, we have an unprecedented opportunity to make policy changes not just of necessity but out of our fundamental belief in justice.

Because when it comes down to it—how we power our economy, how we protect our climate, and how we treat the world's poor, are all matters of justice.

In his inaugural address in 1961, John F. Kennedy noted that, “Man holds in his mortal hands the power to abolish all forms of human poverty, and all forms of human life.” He said, “...to the half of the globe struggling to break the bonds of mass misery, we pledge our best efforts to help them help themselves, for whatever period is required... not because we seek their votes, but because it is right.”

Over 40 years later, I contend that we must continue our efforts to make good on that pledge.

I contend that we still hold in our hands the power to alleviate all forms of human poverty.

I contend that there are steps we can take now to address the climate challenge through renewable energy.

And in doing so, I am confident that we can make your generation one of greater promise.

Thank you.

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