

# Renewable Fuels, a Critical Part of a Sustainable Energy Policy

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# Angelo's Story

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## Regular Person

- 40 years old
- Married
- Father of three
- Sole wage earner
- Trying to make ends meet



# Angelo's Story

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## Facing His Bills

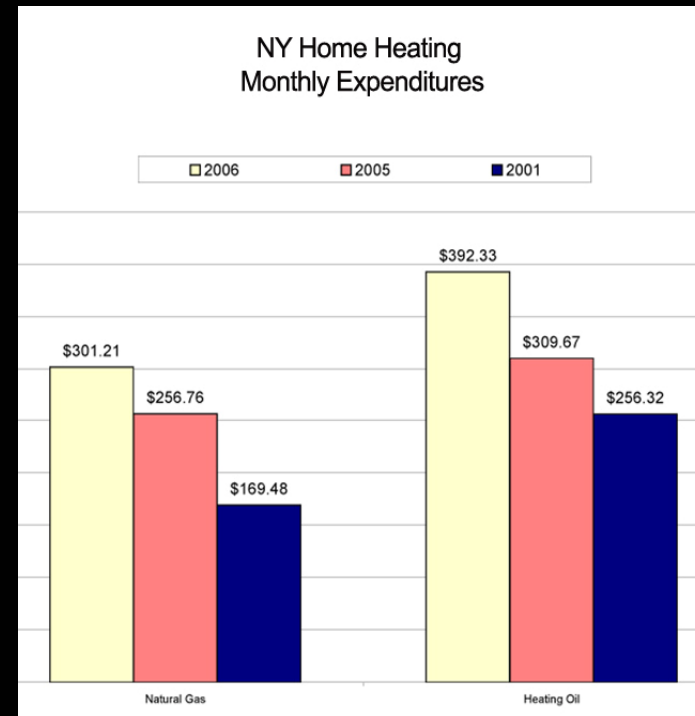
- An increase was expected
- December and January surprise
- \$959 each month (payments overdue)
- Two more months of winter remaining



# Angelo's Story

## Growing Home Heating Costs

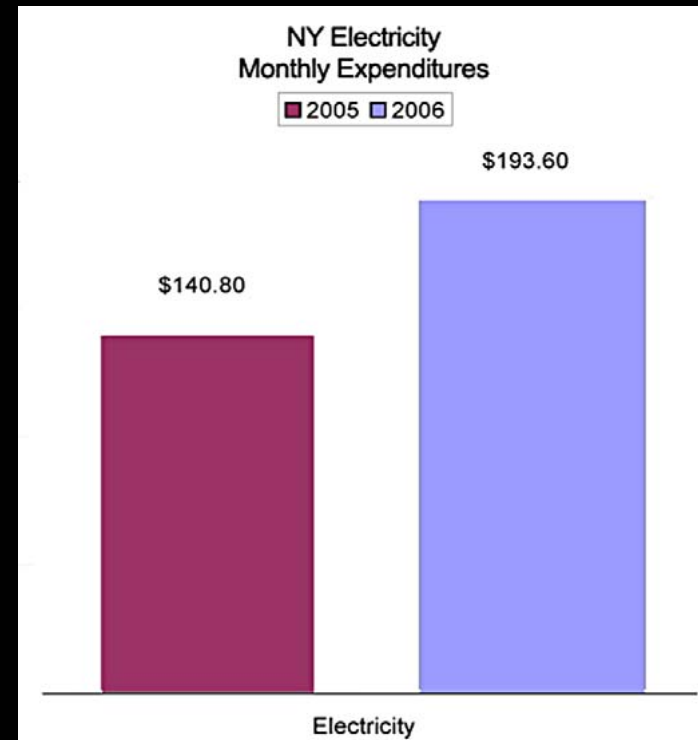
- Between 2005 and 2006
  - 27% increase in home heating oil prices
  - 17% increase in natural gas home heating prices
- Between 2001 and 2006
  - 53% increase in home heating oil prices
  - 78% increase in natural gas home heating prices



# Angelo's Story

## Growing Electricity Costs

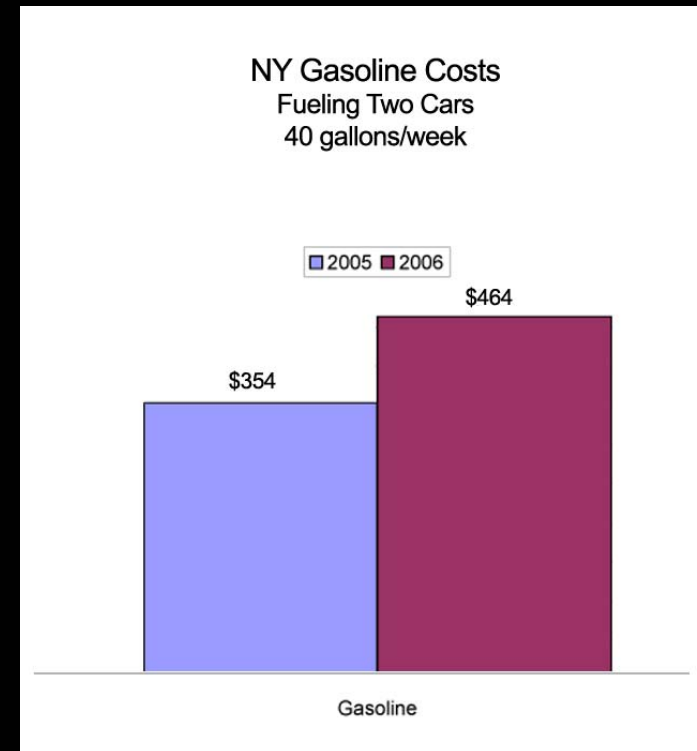
- 55% increase in five years
- 37% increase in one year
  - From \$.17 a Kwh in 2005 to \$.24 a Kwh in 2006



# Angelo's Story

## Growing Gasoline Costs (Fueling Two Cars)

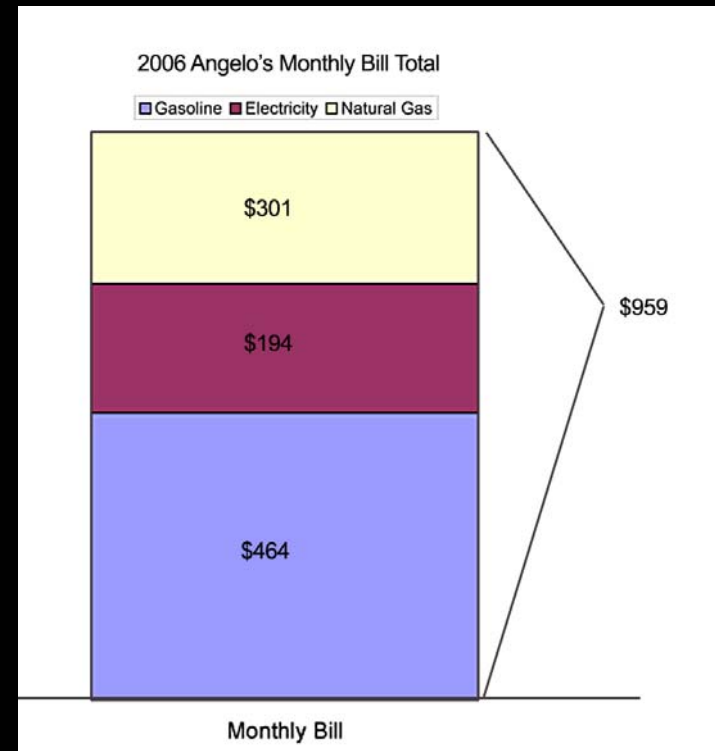
- \$2.90/gallon for premium grade
- 40 gallons/week consumed
- \$116/ week and \$464/month
- Current projections of \$ .30 increase by summer



# Angelo's Story

## Total Monthly Energy Expenditures

- Pretax monthly energy tab is \$959 (\$11,508/year)
- Angelo's shop charges \$20 a haircut
- Assuming Angelo's share is \$10
- It will take 96 haircuts to pay the bill each month



# Angelo's Story

## Energy Has Changed Angelo's Life!

- Drastic changes around his household
  - Checking for drafts and leaks
  - Shrink wrapping his windows
  - Reducing the temperature of his house
  - Unscrewing light bulbs
  - Angelo's not paying his bills on time
  - Sold his boat
  - No vacation this year



# Angelo's Story

## Energy Costs Are Impacting Most Households

- Angelo has an elderly father
- His in-laws live on a small pension and social security
- His fuel costs compete with expenditures for food and medications

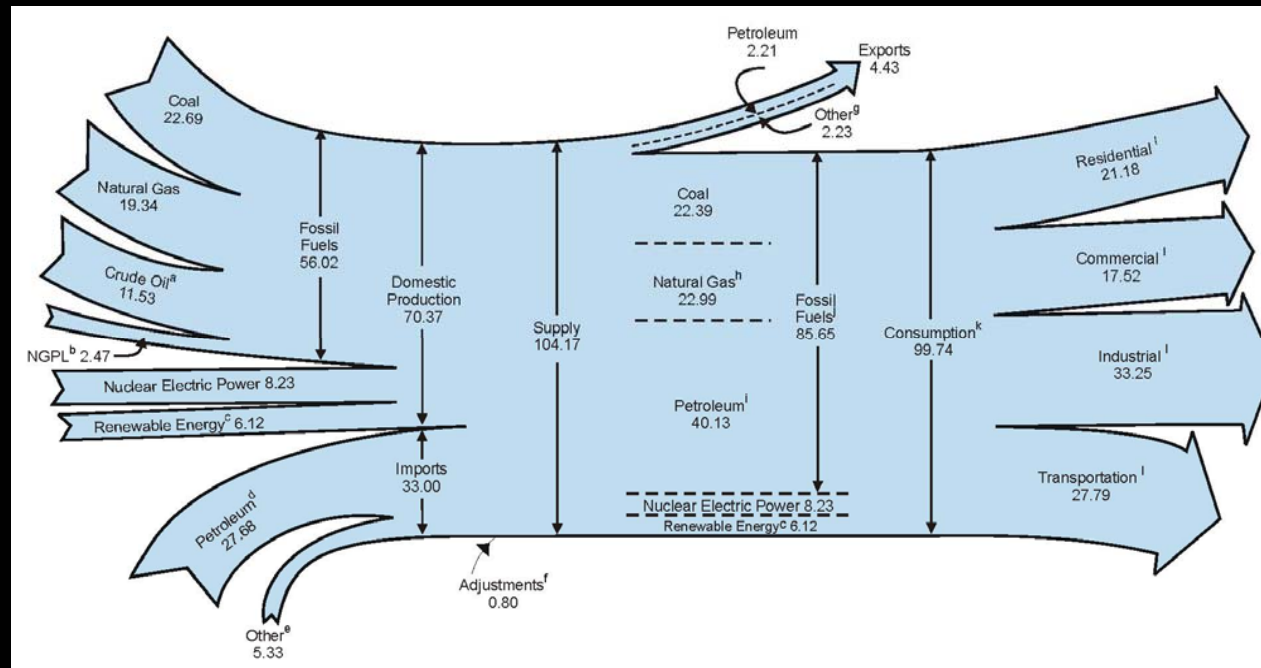
**How different is Angelo from you or me?**



# Angelo's Story

## What Got Him To This Point?

A Nation Dependent on Fossil Fuels – In 2004 the US used 99.74 Quadrillion Btu of Energy

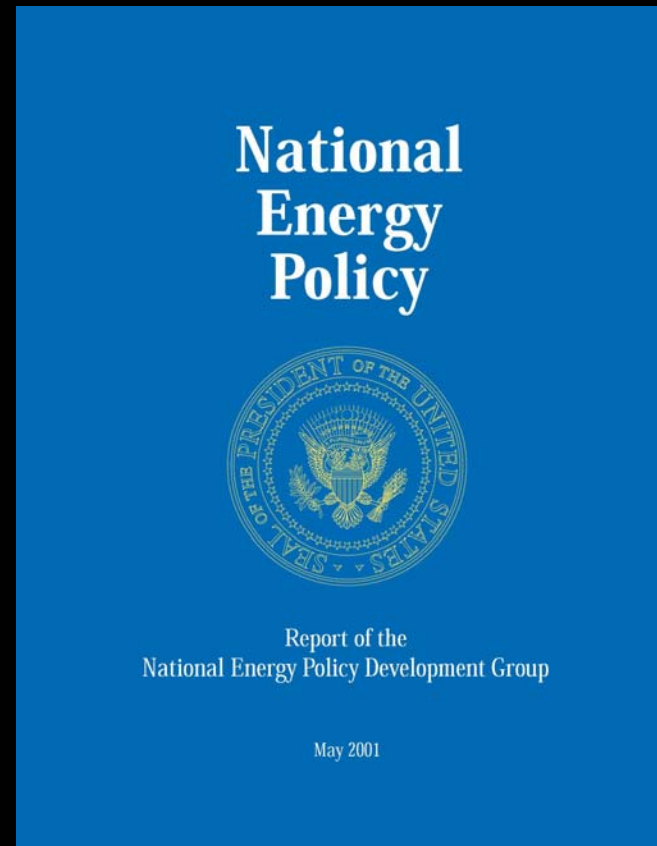


- 86 Quadrillion Btu From Fossil Fuels (84% of the total energy consumed)
- 8% From Nuclear Electric Power
- 6% From Renewable Energy

# Energy Policy 2001

## The National Energy Policy Development Group (NEPD) – 100 Recommendations

- Modernize & increase conservation
- Modernize expand our energy infrastructure
- Diversify energy supplies
- Improve & accelerate environmental protection
- Strengthen America's energy security



# Energy Policy 2001

## A Controversial Plan Anchored In Fossil Fuels

“Conservation may be a sign of personal virtue, but it is not a sufficient basis for a sound, comprehensive energy policy.”

- *Speech given by Dick Cheney, in Toronto at the end of April, concerning the National Energy Policy of 2001*



# Energy Policy Matters

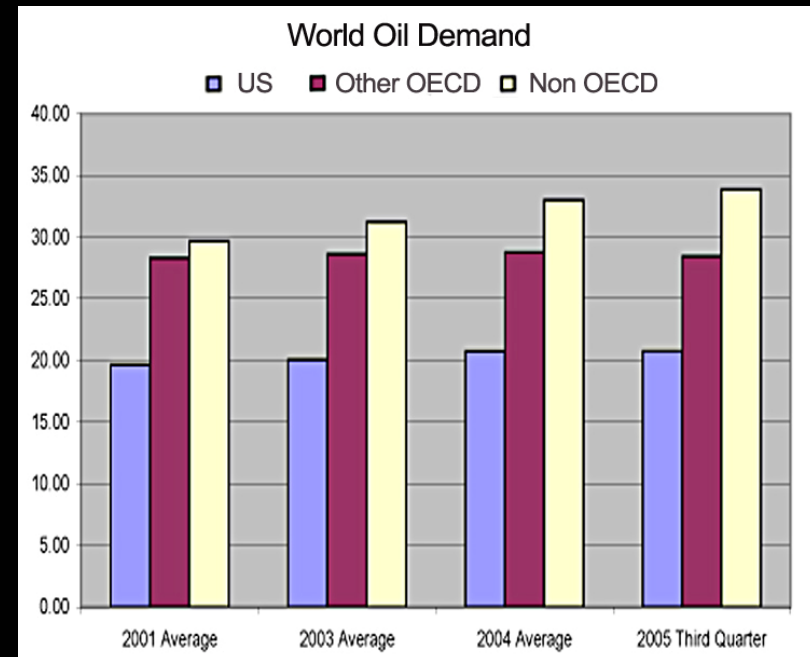
## Increase In World-wide Oil Demand (million barrels/day)

2001 World demand = 77.66  
China's demand = 4.92  
US demand = 19.64

2004 World demand = 82.49  
China's demand = 6.52  
(32.5% increase)  
US demand = 20.73  
(5.4% increase)

2005\* World demand = 83.08

\*3rd quarter



# Energy Policy Matters

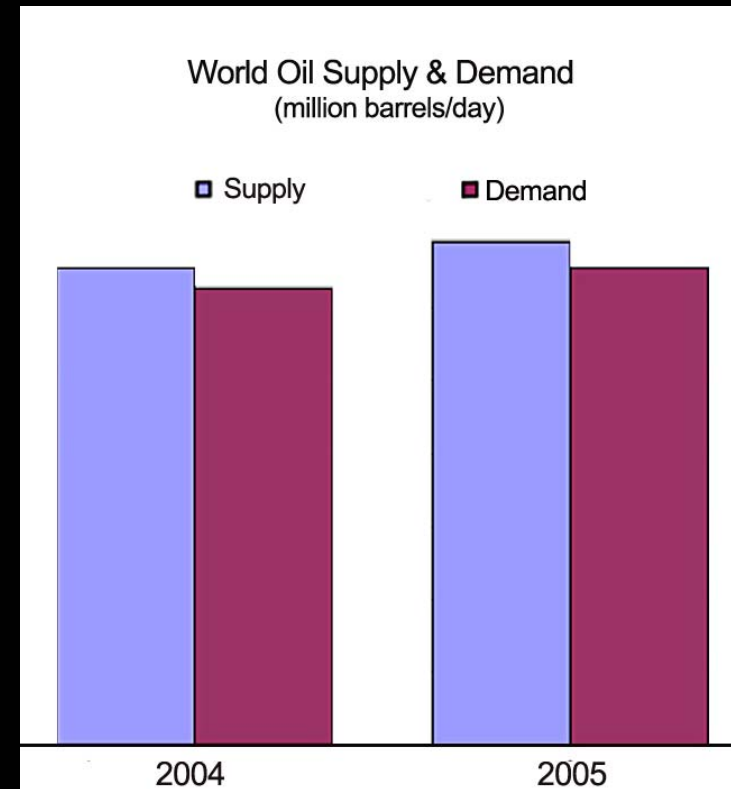
## World Oil Crisis (million barrels/day)

2001 World supply = 77.73  
World demand = 77.66

2004 World supply = 83.04  
World demand = 82.49

2005\* World supply = 83.79  
World demand = 83.08

\*3rd quarter



# Energy Policy Matters

## Post Katrina Implications

- Gulf of Mexico oil production reduced by over 1.5 Mb/day<sup>1</sup> (100% of daily Gulf production)
- 10 Bcf/day of natural gas production shut down<sup>1</sup> (95% of daily Gulf production)
- Oil prices briefly spiked to \$70+/per barrel<sup>1</sup>
- Gasoline prices spiked to \$3.15/gallon<sup>2</sup>



# Energy Policy Act of 2005

Four Years & Major National Disasters later...

August 8th new legislation signed

- Promoting efficiency
- Reducing government energy usage
- Modernizing energy infrastructure
- Diversifying energy supply
- Supporting energy-efficient vehicles



# Energy Policy Act of 2005

## Energy Efficiency

- Improve consumers tax credits<sup>1</sup>
- Improve energy efficiency<sup>2</sup> standards
- Enact federal energy management goals
  - Reduce energy use
  - Expand use of renewable energy
  - Install 20,000 solar energy systems
  - Implement best management practices
  - Reduce GHG emissions



# Energy Policy Act of 2005

## Research & Development

- Clean coal technologies
  - Provides funding
- Studies & program support
  - Authorizes oil and gas programs
  - Authorizes conservation activities
  - Provides funding for renewable and fossil fuel efforts



# Energy Policy Act of 2005

## Provisions For Renewable Energy

- Renewable energy production incentives
- Goal of using 7.5% of total energy consumed from renewables or more by 2013
- DOE rebate program
- Renewable fuel standard
- Expands hydrogen research
- Provide vehicle tax credits



# Energy Policy Act of 2005

## Emphasis On Cellulose Ethanol Production

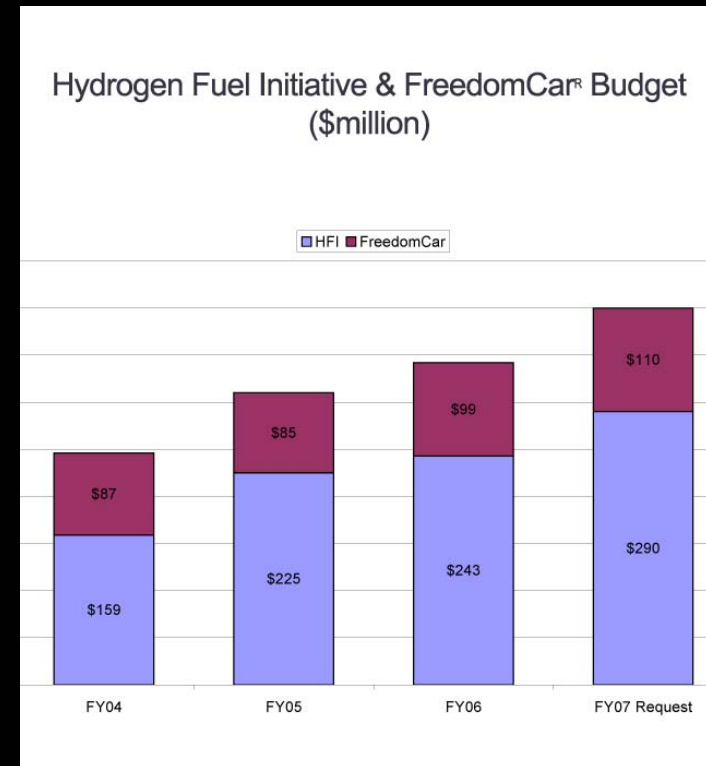
- Every gallon = 2.5 gallons of fuel
- By 2013, 250 million gallons should be in use
- Loan guarantee program (subject to funding)
- Creates an Advanced Biofuels Technologies Program (subject to funding)



# Energy Policy Act of 2005

## Emphasis On Hydrogen

- Hydrogen Fuel Initiative and FreedomCar<sup>®</sup> Budget
  - 2005 = \$ 310 million
  - 2006 = \$ 342 million
  - 2007 = \$ 400 million



# Energy Policy Matters

## EPA - Renewable Fuel Standards (RFS)

- In 2006, 2.78% of the gasoline sold must be renewable fuel
- Ethanol and biodiesel can be used to meet the requirements
- Refineries, blenders and importers are responsible for meeting 2006 requirements
- By 2012, double the use of fuels produced from American crops



# Energy Policy Matters

## Federal Government Defines Renewables as ...

- Wood and other wood waste
- MSW, landfill gas, sludge waste, tires, agricultural by products, and other biomass
- Ethanol blended into motor gasoline
- Geothermal
- Solar and photovoltaic
- Wind
- Not Included: Hydroelectricity generated by pumped storage



# Energy Policy Matters

## A Vulnerable Nation

“Some of the nations we rely on for oil have unstable governments or fundamental differences with the United States. These countries know we need their oil and that reduces our influence. It creates a national security issue when we’re held hostage for energy by foreign nations that may not like us.” - *President Bush, Monday February 20, 2006*



# Energy Policy Matters

## Recent Events

**Feb. 27, 2006**, Saudi Arabia, the largest oil exporter, thwarted an attack on one of its processing plants, but concern about future attacks led to an immediate \$2 (£1.15) rise in the price of a barrel of oil on the New York Mercantile Exchange.<sup>1</sup>

**January 1**, Russia temporarily cuts natural gas supplies to Ukraine over a pricing dispute. The incident prompts a discussion in Europe over its future energy security, with many countries calling for concerted action by the European Union (EU) to reduce reliance upon Russian natural gas.<sup>2</sup>



# Fuel Crisis

## The New Bet

- Google “energy crisis” - 73,300,000 hits
- Significant debate
- Energy production is not the issue
- Lack of fuel
- By 2020, our already voracious appetite for energy is projected to increase by about 32%



# Fuel Crisis

## Current Consumption Of Energy – (quadrillion Btu)

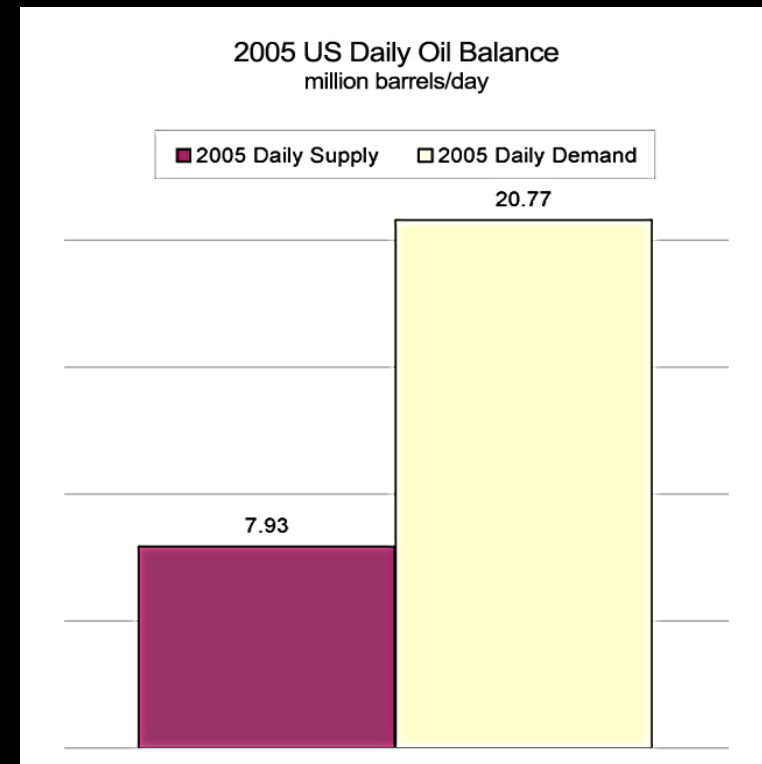
- 2003
  - World supply = 417
  - World demand = 421
  - US supply = 70.52
  - US demand = 98.05
  
- 2005
  - US supply = 70.72
  - US demand = 100.49



# Fuel Crisis

## Crude Oil – (Million Barrels per Day )

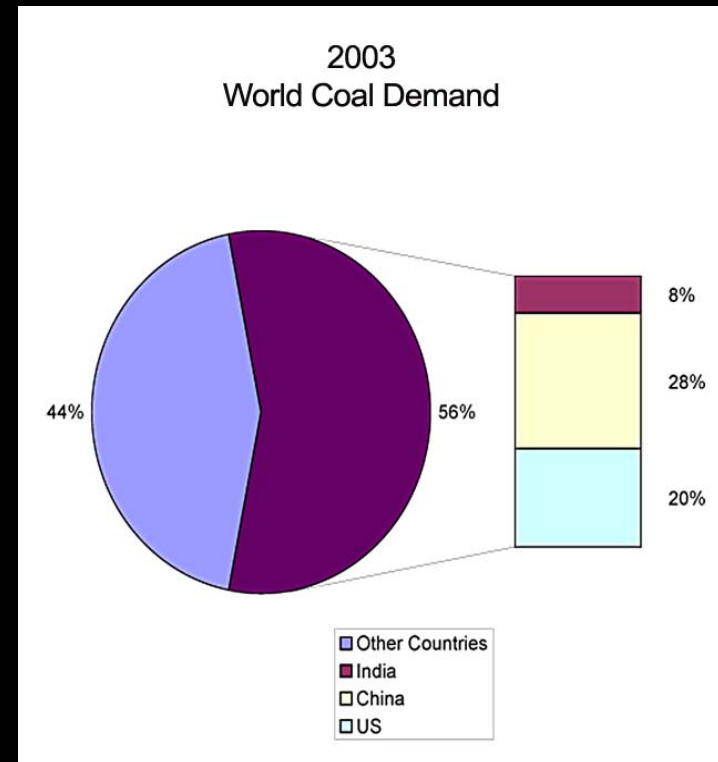
- 2004<sup>1</sup>
  - World supply = 83.04
  - World demand = 82.49
  - US supply = 7.6
  - US demand = 20.7  
(25% of world total)
- US top consuming country<sup>2</sup>
- Japan & China second at 7%<sup>2</sup>
- Saudi Arabia is top producing country at 9.10MB/day<sup>3</sup>



# Fuel Crisis

## Coal – (million short tons)

- 2003
  - US supply = 1,069.50
  - US demand = 1,094.13
  
  - China supply = 1,634.97
  - China demand = 1,531.09
  
  - India supply = 403.12
  - India demand = 430.62
  
  - World demand = 5,439.33

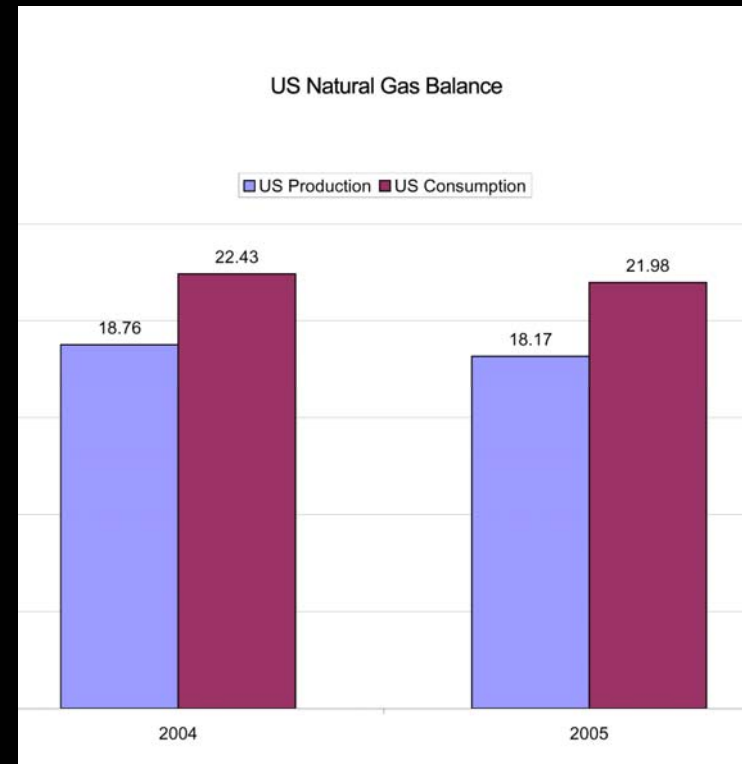


# Fuel Crisis

## Natural Gas

- US and Russia are the top NG producers and consumers world-wide
- In 2003
  - US supply = 19.04 tcf\*
  - US demand = 22.4 tcf
  - World supply = 95.2 tcf
  - World demand = 95.5 tcf
- In 2004
  - US supply = 18.76 tcf
  - US demand = 22.43 tcf

\* trillion cubic feet



# Fuel Crisis

## US Government - Climate Change Action Plans

- In 2002, US government committed to reduce the greenhouse gas emissions per unit of economic activity by 18 percent, by 2012
- Increased Budget for Climate Change Activities
  - FY 2006 = proposed \$5.5 billion for climate-change programs and energy tax incentives

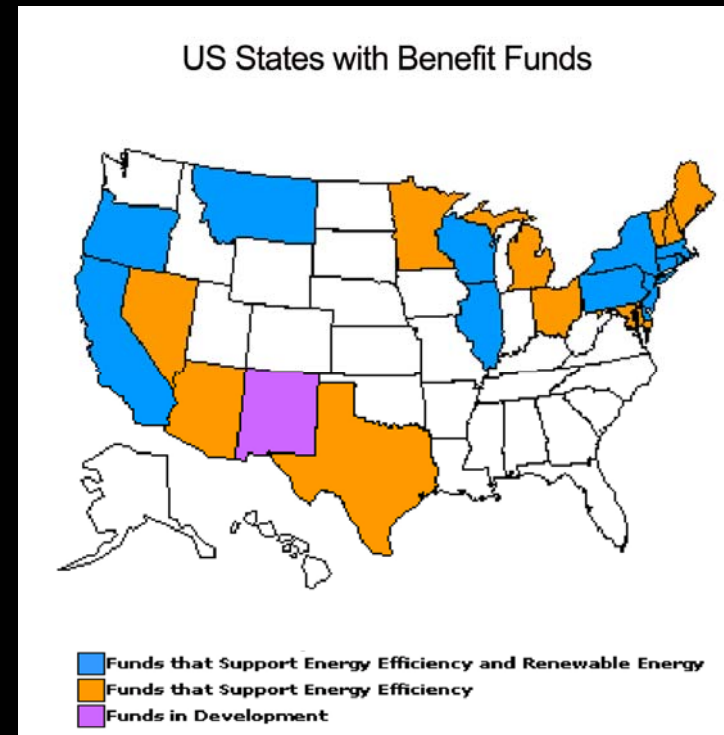




# Fuel Crisis

## Emerging Voice At The State Level – Public Benefit Funds

- A fund created by levying a small fee or surcharge on customers' electricity rates
- This fee can be used by states to invest in clean energy supply
- 23 states have funds dedicated to supporting energy efficiency and renewable energy projects



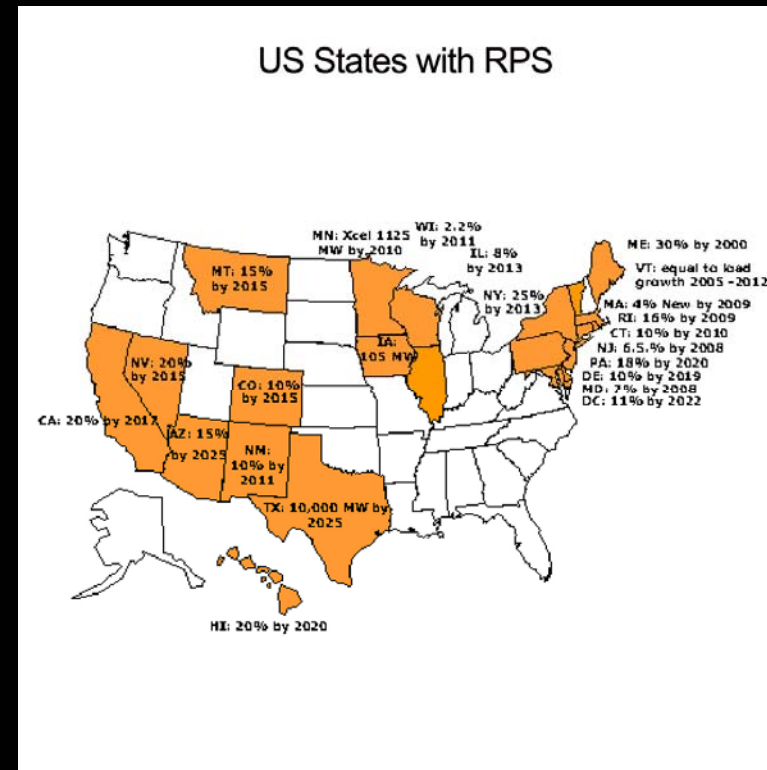
# Fuel Crisis

## Emerging Voice At The State Level – Renewable Portfolio Standards (RPS)

- Electric utilities must use a percentage of renewables
- 22 states & District of Columbia

### Benefits

- Reduced emissions
- Increased diversity & security
- Reduced price volatility
- Economic development
- New jobs





# Energy Policy Matters

## States & Renewables

- Biomass = wood and wood waste, methane emissions, and energy crops
- A few states include MSW, animal wastes & landfill gases as biomass
- New York, Rhode Island, & Wisconsin exclude MSW
- Maine requires recyclable before incinerating of MSW
- New Mexico refers to MSW as anaerobically digested waste

Renewable Type	Number of States
Solar Photovoltaic	13
Solar	18
Wind	21
Biomass	22
Large Scale Hydropower	3
Small Hydro-Electric	16
MSW	12
Bio Gases	2
Landfill Gas	17
Geothermal	13
Waste Tire	1
Digester Gas	4
Fuel Cells	13
Animal Wastes	5
Ethanol	3
Ocean Tides & Waves	9

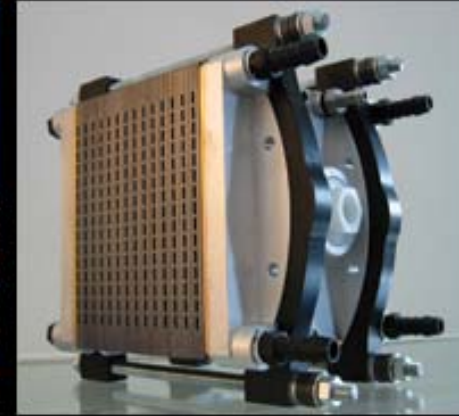
# Renewable Fuels



ETHANOL



MSW



HYDROGEN



WIND



SOLAR



BIOMASS

# Renewable Fuels

## Ethanol

- 95 refineries located in 19 states
- Produced 4 billion gallons (increase of 17% from 2004 & 126% since 2001)
- In 2005 alone - 29 new refineries and 9 in construction with a annual capacity of more than 1.5 billion gallons

### U.S. ETHANOL PRODUCTION CAPACITY BY STATE

	Online	Expansion	Under Construction	Total
IA	1134.5	95	470	1699.5
NE	543	14.5	491	1048.5
IL	780	57	50	887
SD	475	18	110	603
MN	495.6	8	90	593.6
IN	102		180	282
WI	188		40	228
KS	172.5		40	212.5
MI	50		157	207
MO	110		45	155
CO	43.5	1.5	40	85
ND	33.5		50	83.5
CA	33		35	68
TN	67			67
KY	26.4	9		35.4
NM	30			30
TX			30	30
WY	5			5
OH	3			3
GA	0.4			0.4

# Renewable Fuels

## Ethanol

In 2005

- 34+ countries produced 12.15 billion gallons
- US produced 4.3 billion gallons
- Brazil is second producing country at 4.2 billion gallons

### ETHANOL PROGRAMS WORLDWIDE

Brazil	Requires 25% ethanol blends; provides preferential tax treatment
Argentina	Requires use of 5% ethanol blends over the next five years
Thailand	All gasoline sold in Bangkok must be 10% ethanol
India	Requires 5% ethanol in all gasoline
Australia	Voluntary blending of up to 10% ethanol
Great Britain	Provides incentives for ethanol production at 36 cents per liter
European Union	2% (energy content) biofuels target by 2005, increasing to 5.75% by 2010
Canada	Tax benefits for ethanol since 1992 (provincial mandates)

# Renewable Fuels

## Ethanol

- 8+ countries have RPS that include Ethanol
- Brazil requires 25% ethanol blend in fuels
- In Thailand all gasoline sold in Bangkok must be 10% ethanol
- Brazil, Great Britain, and Canada provide tax benefits



# Renewable Fuels

## Ethanol's Contribution To The US Economy In 2005

- Added \$32.2 billion to gross output
- Spent almost \$5.1 billion on raw materials & goods and services
- Created 153,725 jobs
- Increased household income by an additional \$5.7 billion
- Added tax revenue for the Federal and state government



# Renewable Fuels

## Impact Of The Renewable Fuel Standard By 2012

- Reduce crude oil imports
- Reduce the outflow of dollars
- Create new jobs
- Increase U.S. household income
- Increase GDP
- Create new investment
- Result in spending on goods and services



# Renewable Fuels

## Waste-To-Energy

- 89 facilities in 27 states producing electricity
- Reducing landfill volumes
- Collecting ferrous & non ferrous metals for recycling



# Renewable Fuels

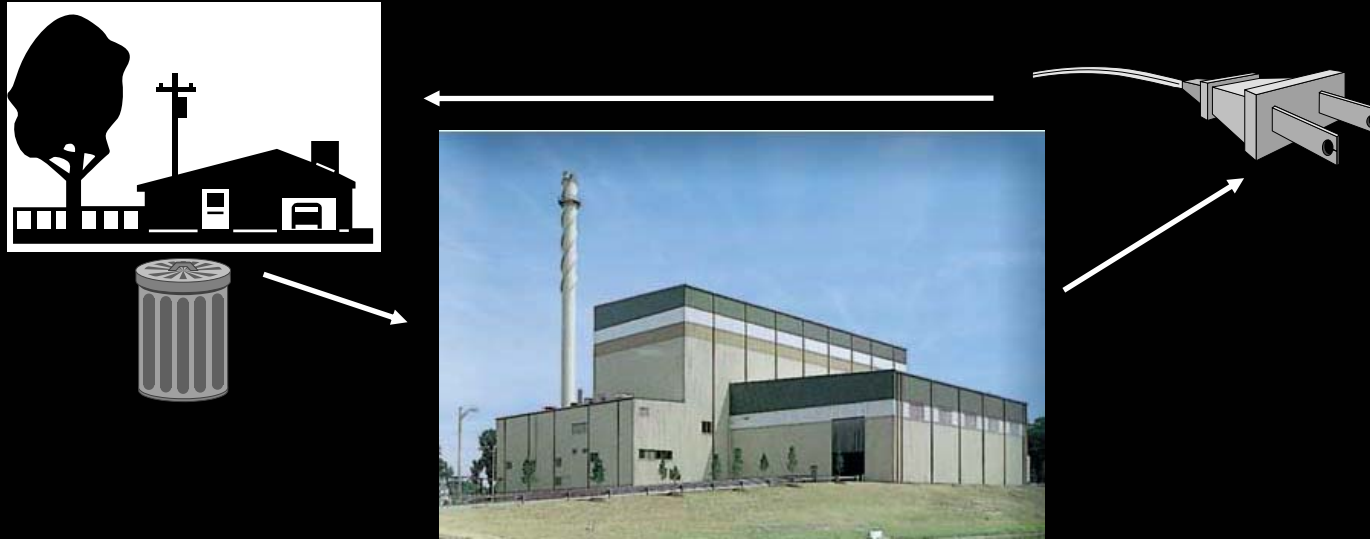
## Municipal Solid Waste – Recovered Solid Fuels (rsf)

- One ton rsf = 1.5 barrels of oil
- US annual rsf = 236 million tons
- 236 million tons = 354 million barrels of oil
- That is \$22.3 billion dollars worth of oil poured down the drain
- Enough energy to power over 12 million American households



# Renewable Fuels

## WTE – Power Generation Capacity



Power Generation Capacity:	2500 Mw
Annual Power Generation:	6 million Mw-hours
Homes served:	1.98 million
% of Total National Generation:	0.4%
% of Total Renewable Energy <sup>1</sup> :	18%

# Renewable Fuels

## WTE – Worldwide

Location	Number of Facilities	Amount of MSW Managed as a % of Total MSW Generated
USA	89	8 - 15% based on MSW reported by EPA and Biocycle data
Europe	400	varies from country to country
Japan	>100	70 to 80%
Other nations (Taiwan, Singapore, China, etc.)	70	varies from country to country

# Renewable Fuels

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## Why Use WTE?

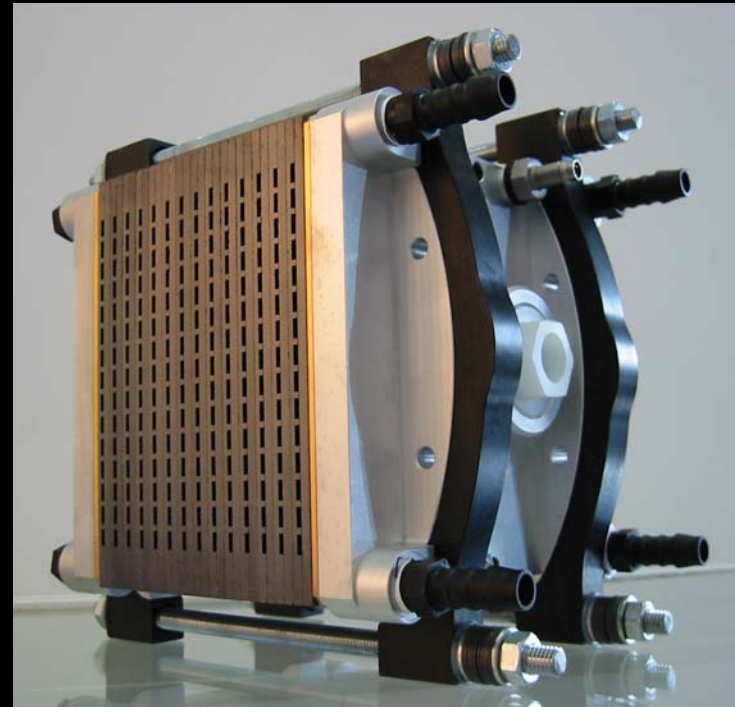
- Reduce volume of landfills
- In 2003, U.S. produced more than 236 million tons of MSW<sup>1</sup> (4.5 pounds/person/day)
- Reduce dependency
- Fuel diversity
- Reduce use of transportation fuels



# Renewable Fuels

## Hydrogen Is Produced Using.....

- Natural Gas
- Coal
- Nuclear Power
  - Produce in large quantities
  - Low cost
  - Low emission of GHG
- Renewable Resources
  - No emissions



# Renewable Fuels

## Why Hydrogen

- Highest energy content per unit of weight of any known fuel
- Produced from abundant domestic energy resources including fossil, nuclear, and renewables



# Renewable Fuels

## Hydrogen Technology Challenges

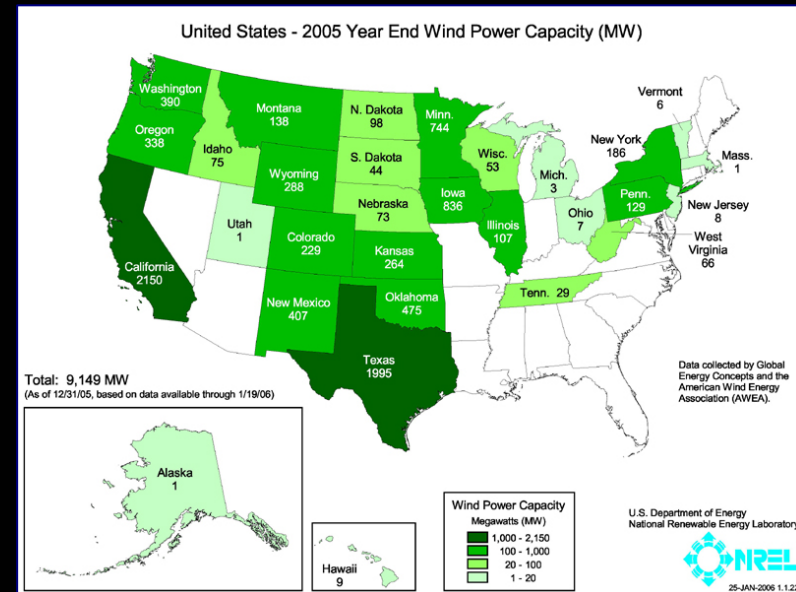
- Lowering the cost of hydrogen
- Creating effective hydrogen storage
- Creating affordable hydrogen fuel cells



# Renewable Fuels

## Wind

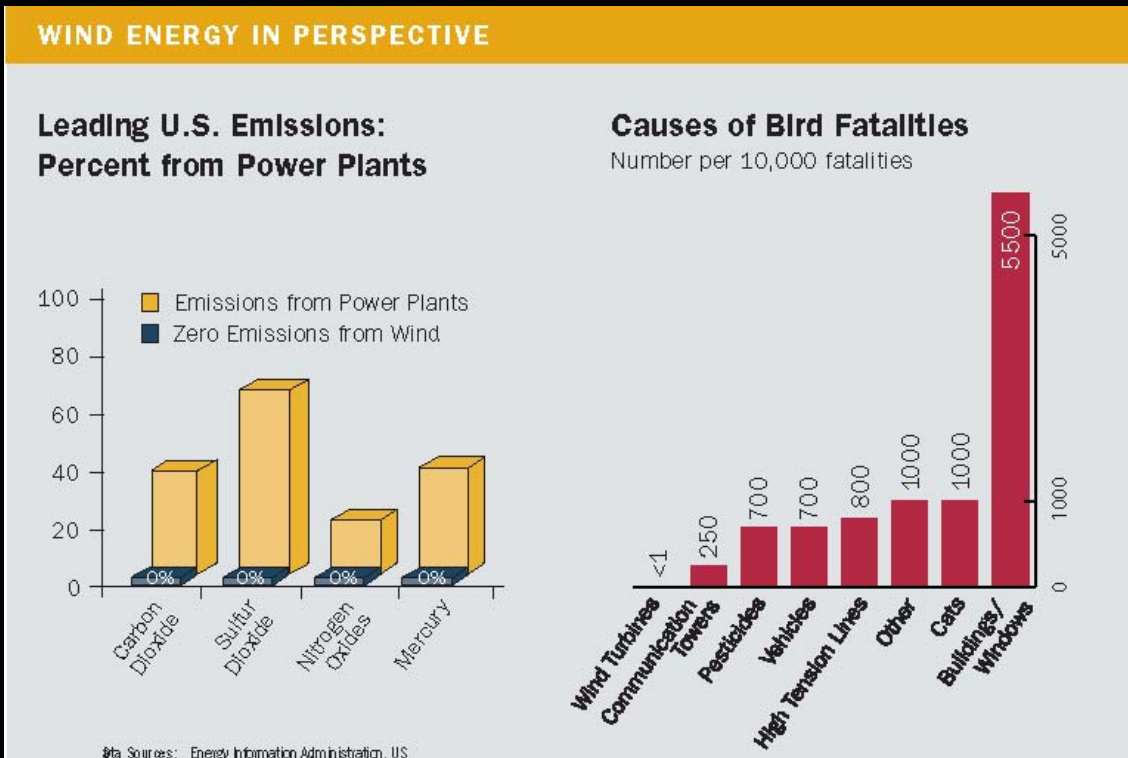
- 2005
  - 30 states = 9,149 Mw
  - 22 states = 2,500 Mw (additional installed)
  - US facilities produce electricity for 2.3 million households
- 2006
  - New capacity = 3,000 Mw



# Renewable Fuels

## Wind – Additional Benefits & Concerns

State	Potential Number of New Wind Manufacturing Jobs	New Investment (\$ Billions)
California	12,717	4.24
Ohio	11,688	3.90
Texas	8,943	2.98
Michigan	8,549	2.85
Illinois	8,530	2.84
Indiana	8,317	2.77
Pennsylvania	7,622	2.54
Wisconsin	6,956	2.32
New York	6,549	2.18
South Carolina	4,964	1.65
North Carolina	4,661	1.55
Tennessee	4,233	1.41
Alabama	3,571	1.19
Georgia	3,532	1.18
Virginia	3,386	1.13
Florida	3,371	1.12
Missouri	3,234	1.08
Massachusetts	3,210	1.07
Minnesota	3,064	1.02
New Jersey	2,920	0.97
<b>20 State Total</b>	<b>120,017</b>	<b>40</b>
<b>U.S. Total</b>	<b>150,000</b>	<b>50</b>



Source: Wind Turbine Development: Location of Manufacturing Activity, Renewable Policy Project, 2004; Leading US Emissions: Energy Information Administration, US Environmental Protection Agency. Emissions data is for 2002, mercury data 1999; Causes of Bird Fatalities: Erickson, 2002. Summary of Anthropogenic Causes of Bird Mortality.

# Renewable Fuels

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## Why Use Wind Power?

- Current facilities will displace 15 million tons of CO<sup>2</sup>
- In 2006 wind power will reduce natural gas use for power generation by approximately 5%
- Land Lease Payments & Local property tax revenues to land owners
- 100-200 new jobs/100 Mw



# Renewable Fuels

## Solar Energy Historical Statistics

- 2003
  - Total US demand = .064  
Quadrillion BTu
  - Used by residential and  
electrical utilities
- 2004\*
  - Total demand = .063  
Quadrillion BTu



\* Preliminary Data

# Renewable Fuels

## Solar Energy Projects World-Wide

Country	Type Of Plant	Capacity
Algeria	ISCC Plant	35 Mw
Australia	Compact Linear Fresnel Reflector (CLFR)	35 Mw
Egypt	ISCC Plan	29 Mw
Greece	Steam Cycle	50 Mw
India	ISCC Plant	35 Mw
Israel	Solar Hybrid Operation	Not Available
Italy	Steam Cycle	40 Mw
Mexico	ISCC Plan	29 Mw
Morocco	ISCC Plant	26 Mw
Spain	Steam Cycle	Two, 50 Mw
US	Steam Cycle	50 Mw
US	Organic Rankine Cycle (ORC) Engine	1 Mw

# Renewable Fuels

## Why Use Solar Energy

- Highly reliable
- Minimal maintenance
- Costs efficient
- Virtually no environmental impact
- Produced domestically
- Flexible in terms of size and applications
- Demand and capacity challenges



# Renewable Fuels

## Biomass Facts

- Worldwide, biomass is the fourth largest energy resource after coal, oil, and natural gas
- There are estimates of about 35,000 Mw of installed capacity using biomass worldwide, with about 7,000 of that in the United States
- Most of this capacity is in the pulp and paper industry in combined heat and power systems



# Renewable Fuels

## Why Use Biomass

- The largest US renewable energy source
- Ethanol and biodiesel are alternative for liquid fuel
- Biomass use strengthens rural economies
- Decreases dependence on imported oil
- Reduces greenhouse gas emissions



# Return on Investment

## Total Value Analysis – Coal vs WTE

- Coal generates 54% of our electricity, and is the most significant source of air pollution in the US
- A typical (500 megawatt) coal plant burns 1.4 million tons of coal each year
- US Coal plants emit 3.7 mmt\* of CO<sub>2</sub> per year



\* million metric tons

# Return on Investment

## Total Value Analysis – Coal vs WTE

- WTE produces more CO<sup>2</sup> than NG, but far less than coal
- Emissions technology = large reductions in pollution
  - EPA estimates WTE annually avoids 33 mmt\* of CO<sup>2</sup>
- Emissions are offset by
  - Landfill space and gases saved
  - Reduced mining
  - Increased metal captured
  - Pollutants captured in furnace
  - Electricity produced



\* Million metric tons

# Return on Investment

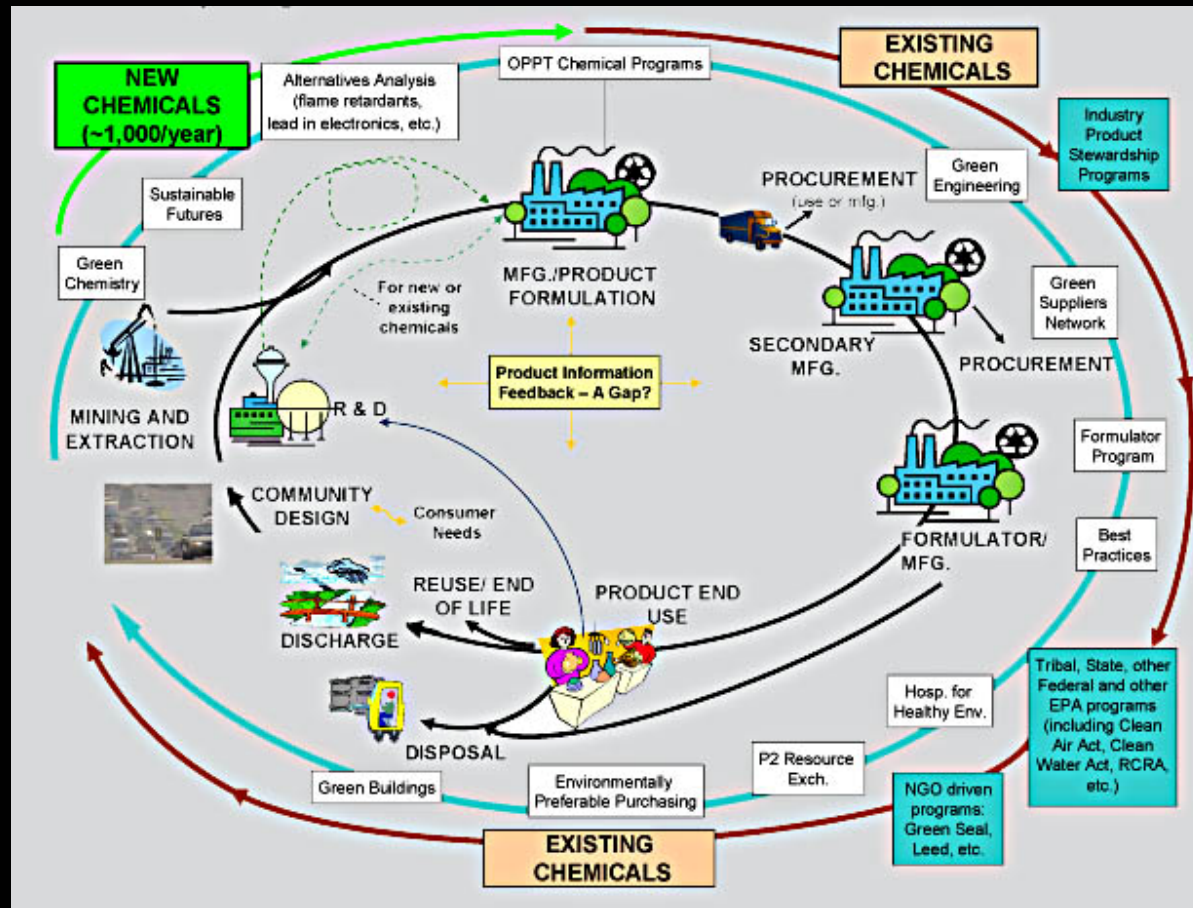
## Total Value Analysis – Coal vs WTE

- Average coal emissions = 3822.74  
(pounds CO<sup>2</sup>/short ton)
- Average WTE emissions = 1999  
(pounds of CO<sup>2</sup>/short ton)



# Return on Investment

## Life-cycle Perspective



Measuring “cradle to grave” impact and benefits

# Return on Investment

## Total Valuable Approach

### Objective environmental measures

- Pros
- Cons

### Service Attributes

- Dependability
- Output
- Efficiency

### Social Benefits

- Jobs
- Long-term Risks
- Ancillary benefits



# Time for a Closer Look

## Collaborative Effort – Wal-Mart Example



# Emerging Energy Plans

## States Taking The Lead

- California
- New York
- Minnesota
- Florida



# California

## Energy Action Plan of 2003

- Electricity
  - Aggressive energy efficiency goals
  - New building & appliance standards
  - Increased electricity generation & transmission
- Renewables
  - Acceleration of the RPS
  - Access renewable resources
  - Achieve 3,000 Mw new solar
- Natural Gas
  - Increase pipeline & storage
  - Establish NG R&D
- Establish CO<sup>2</sup> reduction targets



# California

## California's Renewable History Beginning In 1976

- 1978 tax credits were increased 44%
- Target of 500 Mw of wind capacity by the mid-1980s
- In 1996, 1.5 cents/ Kwh credit for purchase of renewable electricity
- In 2002, introduced RPS requiring utilities to purchase 20 from renewable generators by 2017
- 2003, 27% of California electricity was produced by renewable resources



# California

## Renewable Energy Program of 2005

- Incentives & Rebates for Renewable Resources
  - Supports market competition
  - Encourages prospective renewable electricity generation
  - Stimulates technology market by providing rebates to purchasers
- Customer Credit – Discontinued
- Consumer Education



# California

## Highlights Of Renewable Energy Program

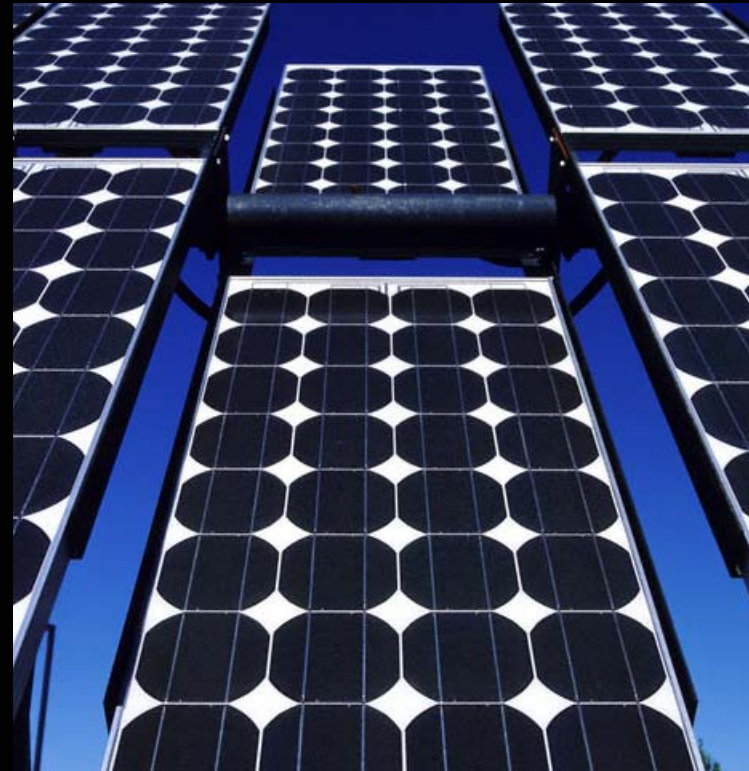
- Incentive payments totaling more than \$4.36 million
- Since 1998 a total of \$54 million in production incentives to 45 renewable generating facilities for 5,400 (GWh) of generation.
- 47 projects producing electricity (488 Mw of renewable capacity)
- 378 facilities are registered as renewable suppliers



# New York

## New York State Energy Plan of 2002

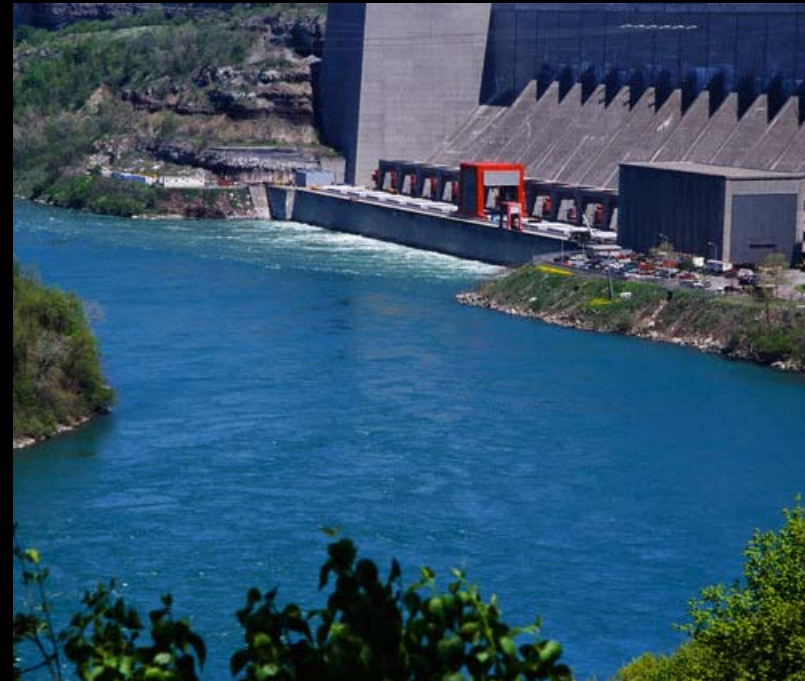
- Secure and reliable energy and transportation system infrastructures
- Competitive market development and government support
- Increasing energy diversity through energy efficiency and renewable-based energy
- Cleaner and healthier environment
- Ensuring fairness in a competitive market economy



# New York

## New York State Energy Plan of 2002

- 300 Mw wind power facility in Lewis County
- \$17 million in funding for five wind farms
- Funding for development of a biomass fuels
- Development of three or more E - 85 ethanol fueling facilities
- \$900,000 R & D for biodiesel fuel for city transit vehicles



# New York

## New York State Renewable Incentives

- Corporate & personal tax credit
- Property & sales tax exemption
- State grant & loan programs
- Utility rebate program
- Alternative fuel and vehicle incentives
- Green power purchasing
- Net metering rules



# Minnesota

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## CAP X 2020

- Capital Expenditures by the year 2020
  - major upgrades and expansion to support growing demand for electricity



# Minnesota

## Minnesota Renewable Mandates

- **Wind**
  - Xcel\* is required to acquire 1,125 Mw of capacity
- **Biomass**
  - Xcel is required to acquire 110 Mw of capacity
- **Renewable Energy Objective**
  - Utilities must make a "good faith effort" to generate or purchase electricity from renewable resources
  - 2005 = 1% of total sales
  - 2015 = 10% of total sales



# Minnesota

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## Minnesota Financial Support

- State wind production incentive
- LCMR Community wind rebates
- Net metering
- Low-interest loan programs
- State sales tax exemption (Wind & Photovoltaic)
- State property tax exemption
- State production tax exemption
- Xcel Renewable Development Fund



# Minnesota

## Research And Development

- Establishment of the Initiative for Renewable Energy and the Environment (IREE)
  - Develop bio-based and other renewable resources and processes
  - \$20 million for initiative
- Xcel Energy must contribute \$16 million annually to the Renewable Development Fund



# Minnesota

## Minnesota Renewable Energy Initiative

### Environmental Benefits

- 11% renewable electricity generation avoids over 5 million tons of CO<sup>2</sup>
- In 2015, when at least 20% of the state's electricity is from renewable fuels, 12.7 million tons of carbon dioxide avoided



# Florida

## Florida Energy Plan Of 2005

- Review current and projected energy needs, infrastructures, security, storage and cost for electric generation and fuels
  - Oil, natural gas, coal, renewable fuels, ethanol, biodiesel, and hydrogen
- Review diversification of electric power supply
- Methods for protecting energy supplies during an emergency



# Florida

## Florida Energy Plan Update January 2005

- Electric Power Generation & Transportation Fuel
  - Diversity
  - Conservation
  - Energy Efficiency
  - Economic Incentives
  - Grant funding R & D
- Improve fuel infrastructure
- Before the 2006 hurricane season, register 10% of retail fueling stations in a generator program



# Florida

## Current Renewable Energy Projects

- Hydroelectric generation accounts for less than 0.1 percent of Florida's generation mix
- Landfill gas = nearly 40Mw statewide
- 7 utilities purchase 506Mw from MSW and biomass
- The City of Lakeland Electric and Water Department has a solar thermal program where the utility installs and owns the solar water heater and sells the produced hot water to the customer



# Florida

## Florida And Alternate Fuels

- **Ethanol**
  - No ethanol production plants Florida's seven ethanol fueling stations
- **Biodiesel**
  - 18 million gallons
  - 9 companies
- **Hydrogen**
  - One station in operation,
  - Two stations in the construction
  - Two stations in the planning phase



# Emerging Energy Plans

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## Progress So Far

- Progress
- Need for improvement
- Consistency issues
- Definition of renewables
- Stand alone plans
  
- **A prototype plan would be helpful**



# A Call To Action

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What Can New Graduates Do?



# It Is Wrong To Waste Energy

- Blaming OPEC is not an energy plan
- All energy sources should be evaluated
- American households are reaching their own dramatic conclusions
- Political strategies are needed to achieve peace with nature\*
- Our standard of living is in jeopardy
- A fuel versus production issue
- Pragmatic national energy policy required
- 130 million tons of RSF wasted
- Recycling left-overs are valuable energy resources
- The US trails Europe and Asia
- This winter has reminded us all that **It Is Wrong to Waste Energy**

# Renewable Fuels, a Critical Part of a Sustainable Energy Policy

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