

***Clean Energy Options:  
How Renewable Energy and  
Energy Efficiency Can Affordably  
Save the Planet***

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# Mass Energy

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- Celebrating our 25<sup>th</sup> anniversary
- Along with People's Power & Light of Rhode Island, we are the Energy Consumers Alliance of New England
- Nonprofit organization with mission of making energy affordable and environmentally sustainable
- Discount heating oil, biodiesel, green electricity, advocacy, and charitable programs are main activities
  - consultants to Mass. Audubon Society, Heifer International, Cape Light Compact, City of Newton, and others
  - also experience in solar energy, green building, and energy efficiency



# Mass Energy's Green Power Programs

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- National Grid customers only (for now)
- Payments are at least 57%:
  - tax deductible
  - matched by MTC



- For Anyone
- Payments are:
  - 100% tax deductible
  - 100% matched by MTC



# Race Against Time

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- Can we make reduce total greenhouse gas emissions by 80% by 2050?
- Regional Greenhouse Gas Initiative calls for reducing power plant emissions (only) by about 11% by 2018
  - should be viewed as a warm up



# Mass Energy's View

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- Yes, we need public policies that will put caps on emissions
- But we also need to act in our homes, businesses, schools, places of worship, and everywhere we use energy



# Who Is Knocking?

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- Great Britain analysis – addressing problem will hurt world economy by 1%, but neglect would hurt by 20%
- Union of Concerned Scientists show that increasing % of renewables in our mix pays for itself because prices for fossil fuels would be less
  - big part of solution is energy efficiency



# Opportunity is Knocking

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- Mass. clean energy cluster supports 14,400 jobs now, is 10<sup>th</sup> largest cluster in state, and fastest growing
- Since 2001, > \$500 million of venture capital has been invested in Mass. clean tech industry, and more than 116 new green tech companies have been founded in Mass.

Sources: Mass. Technology Collaborative and Boston Business Journal



# What is Clean Energy?

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- Start with energy efficiency and conservation (two different things)
- For energy we must use, make it as
  - clean and renewable as possible
    - natural gas is better than coal, wind and solar are cleanest
    - energy crops can be renewable and produce a positive energy balance, but not always



# In the Race Against Time

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- Conservation, energy efficiency and wind make sense today to buy in large scale
- Solar and biofuels need policies to keep improving
- We need to buy time for solar, cellulosic ethanol, and even greater advancements in energy efficiency and wind, particularly off-shore



# Reducing Your Carbon Footprint

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- EPA calculator:  
[http://www.epa.gov/climatechange/emissions/ind\\_calculator.html](http://www.epa.gov/climatechange/emissions/ind_calculator.html)
- Energy Efficiency
  - Cars
  - Homes and Businesses
- Electricity – use less, then buy green power
- Space and Water Heating – use less fuels, maybe solar hot water, maybe biofuels
- Air travel – consider buying carbon offsets



# Energy Efficiency

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- Even at today's prices for fossil fuels, demand is increasing:
  - worldwide demand increasing
    - Cars get > 40 mpg, but hybrids are just 2% of light-vehicle sales in 2007
  - American demand for natural gas is increasing by 4.6% in 2007
  - American demand for coal is increasing by over 2% in 2007
- Buildings use less energy per square foot, but we have many more and they are larger
- Cheapest energy is that which you do not use!



# Energy Efficiency Resources

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[www.masssave.com](http://www.masssave.com)

[www.energystar.gov](http://www.energystar.gov)

[www.aceee.org](http://www.aceee.org)



# Renewables - A Quick Overview

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- Wind and biomass are affordable today
- Solar hot water is economical today for large users of hot water
- Solar electricity (photovoltaic, or PV) is economical for businesses because of incentives, otherwise it's a long road, but progress is being made every day



# Overview cont'd

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- Biofuels
  - “oil-based” (biodiesel) and “alcohol-based” (ethanol)
  - progress being made economically and environmentally, still requires subsidies
  - remember the term “Cellulosic Ethanol”



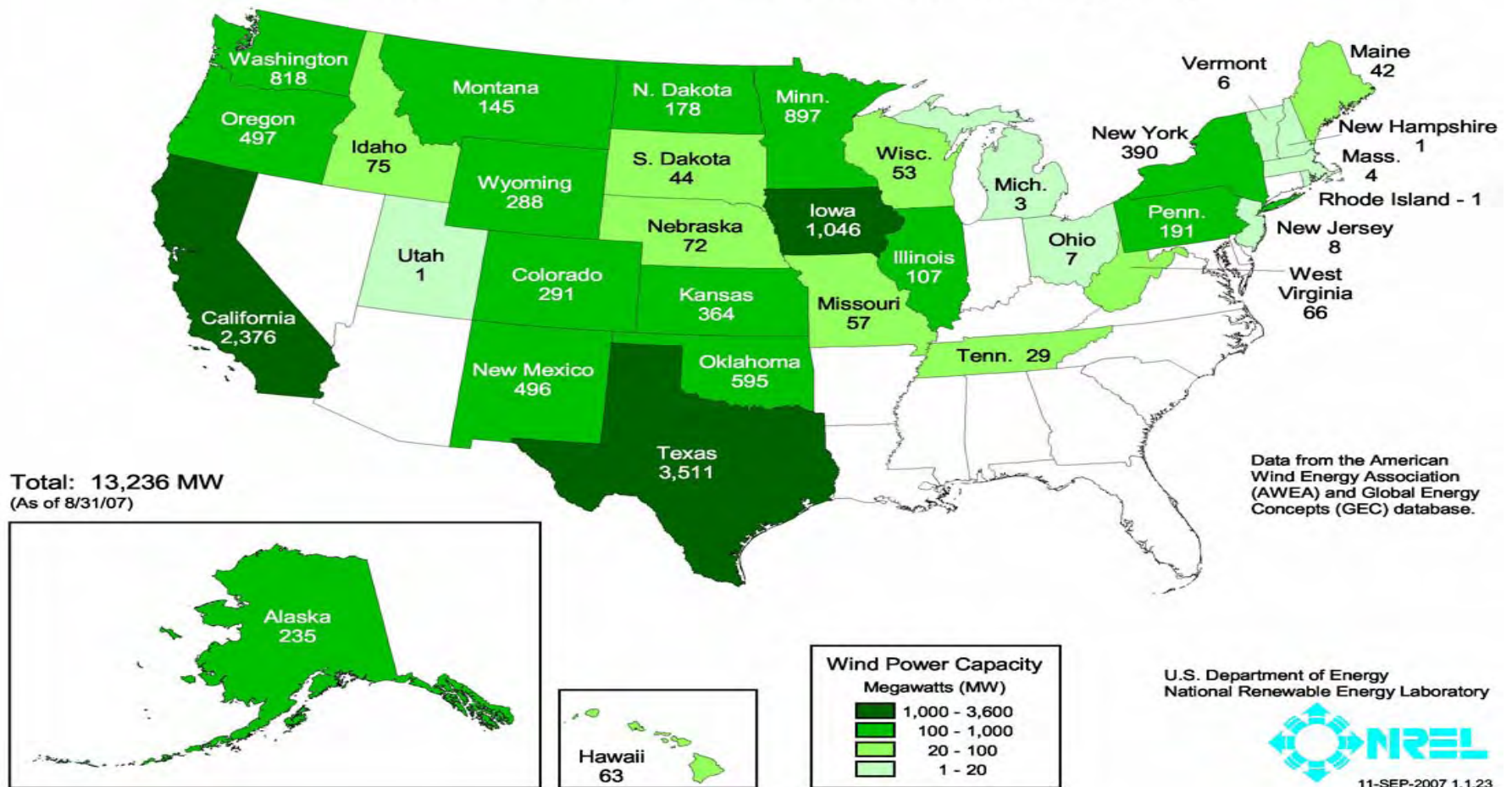
# Why Wind?

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- It's an affordable source of zero emission electricity!
- 119 cities and towns in Massachusetts have an average wind speed capable of making wind power economically viable
  - not just Cape Wind or Buzzard's Bay!
  - not just Hull!

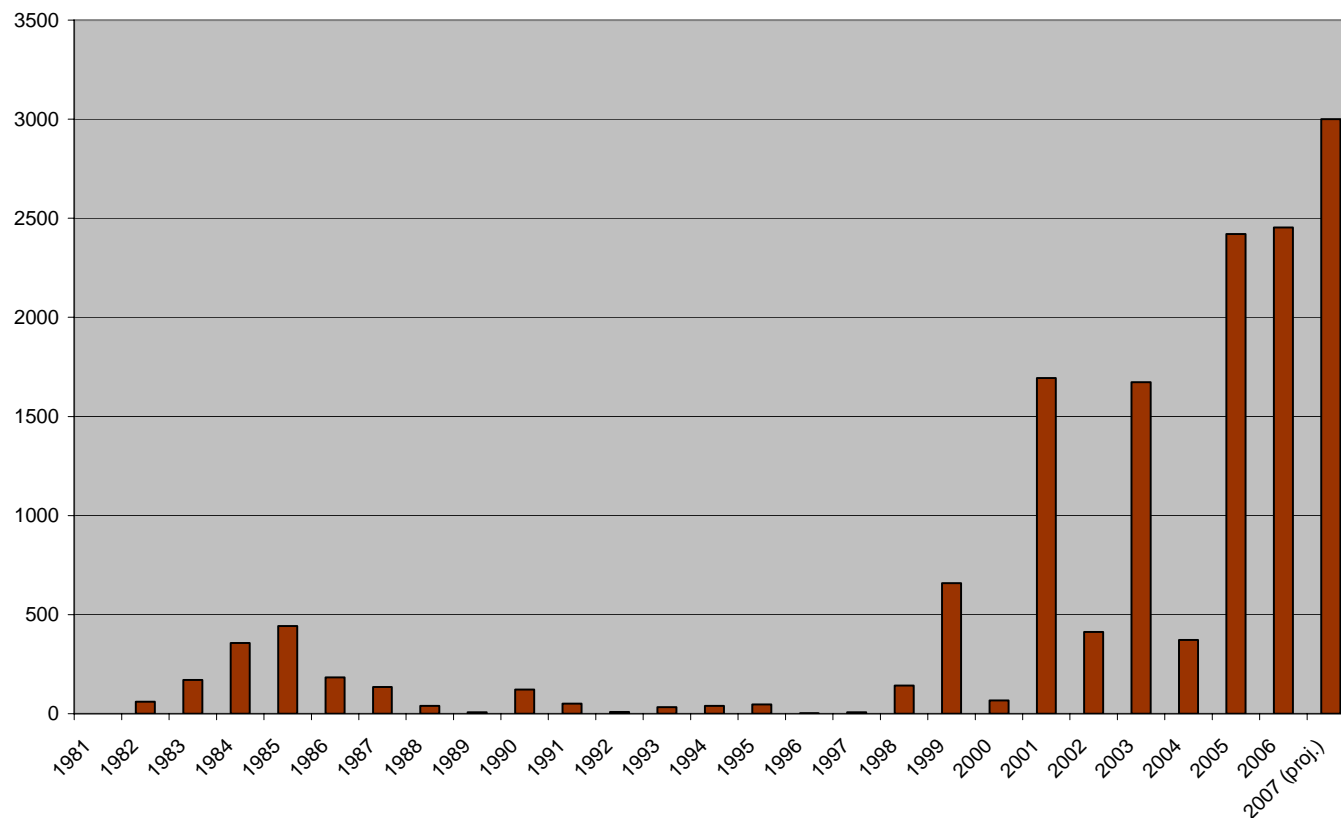
# Massachusetts is lagging

United States - Current Installed Wind Power Capacity (MW)



# U.S. Wind Power

U.S. Annual Wind Power Capacity Additions (MW)





# Hull I and II

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Hull 1 = 660 kW, 1500 MWh/yr.  
Hull 2 = 1,800 kW, 4000 MWh/yr.  
[www.hullwind.org](http://www.hullwind.org)

10/28/2007





# IBEW Local 103, Dorchester

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# Mass Maritime Wind

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Massachusetts  
Maritime Academy,  
Buzzards Bay MA

660 kW

Installed early 2006



10/28/2007

Source: Renewable Energy Access website



Princeton



Computer Simulation

10/28/2007

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# Mass Energy Wind Turbine

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- \$400,000 grant from Excelerate Energy
- Location – TBD, probably North Shore
- We'll leverage grants from MTC and create a “Community Wind Investment Program” so that people can make loans to the project



# Solar

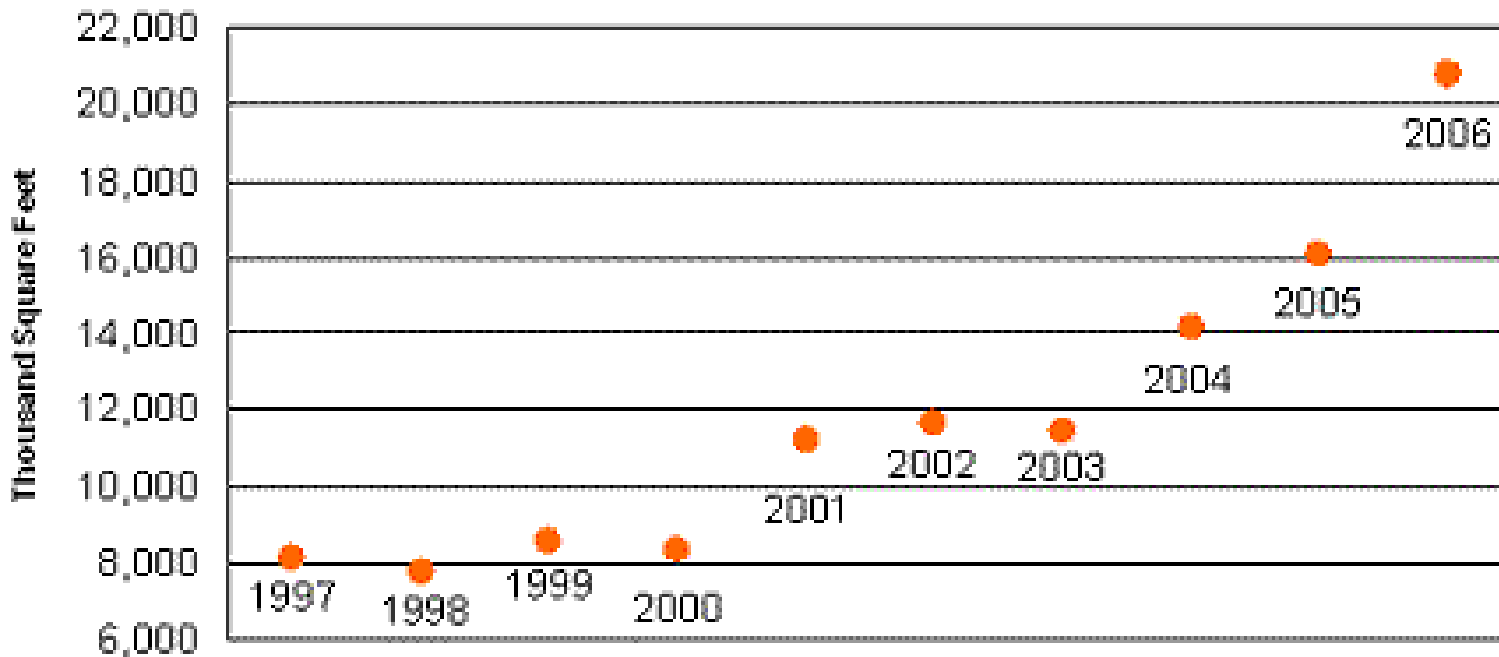
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- South-facing, unshaded roofs
- Solar thermal for large users
- Solar electricity still expensive, but cost coming down



# Solar Thermal

Figure 2.1. Total Solar Thermal Collector Shipments, 1997-2006

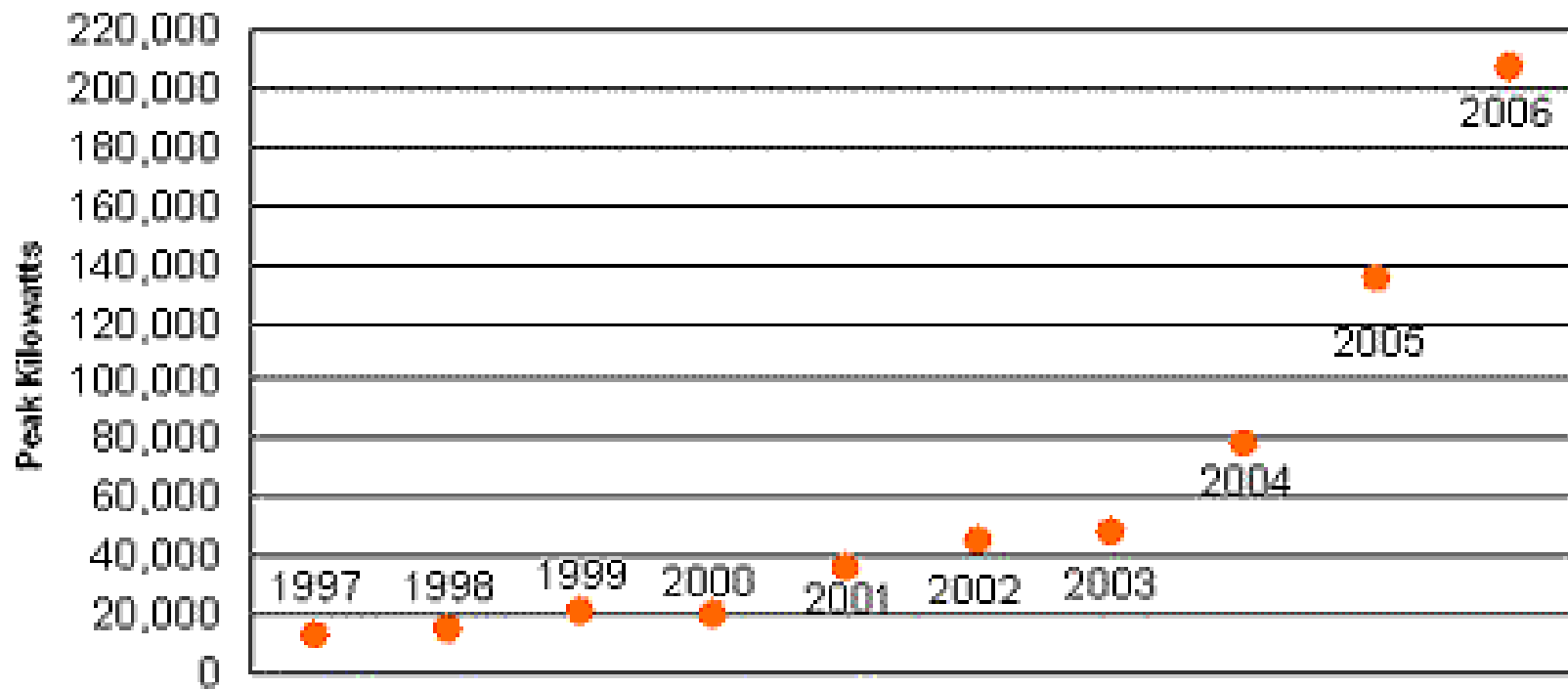


Source: <http://www.eia.doe.gov/cneaf/solar.renewables/page/solarreport/solar.html>



# Solar PV

Figure 2.5. Photovoltaic Domestic Shipments, 1997-2006



Source: <http://www.eia.doe.gov/cneaf/solar.renewables/page/solarreport/solar.html>



# Solar Electric in Mass.

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- Governor Patrick wants to have 250 MW of solar by 2017, requiring 40% annual growth
  - Mass. now doing 4 MW per year, in 2017 would be 70 MW per year
- Solar Rebates from MTC:
  - Kelly Dexter: (508) 870-0312 x 1602
    - [smallrenewables@masstech.org](mailto:smallrenewables@masstech.org)
  - Jon Abe: (508) 870-0312 x 1216
    - [abe@masstech.org](mailto:abe@masstech.org)

# A Wind and Solar Challenge for Needham

- Step 1. 150 Needham households or businesses make contributions to the New England Wind Fund by April 30, 2008.
  - Result: All the money goes to support wind projects in New England.



Mayor Menino of Boston and students view solar panels installed at the Boston Arts Academy because of Clean Energy Choice Matching Funds.



# Needham Challenge

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- Step 2. The Mass Tech Collaborative pays for a 2kW solar array for a Needham municipal building.
  - Result: The city saves money on electricity costs, creates fewer greenhouse gases, and helps New England take steps towards energy independence!
- [www.newenglandwind.org/Needham](http://www.newenglandwind.org/Needham)



# Addicted to Oil?

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- <http://www.oilendgame.com/>
  - we can make dramatic improvements in:
    - gas mileage and HVAC efficiency
    - use of plug-in hybrids, fueled by clean electricity
    - carefully grown and harvested energy crops
    - smart growth

# Mass Energy's Biodiesel Program

- Working with four heating oil dealers in eastern Mass.
  - also
    - Cape and Islands Self Reliance
    - Center for Ecological Technology in west
- Blends of B5 to B20





## Thomas Edison said:

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- "Some day some fellow will invent a way of concentrating and storing up sunshine to use instead of this old, absurd Prometheus scheme of fire..."
- You see, we should utilize natural forces and thus get all of our power. Sunshine is a form of energy, and the winds and the tides are manifestations of energy...Do we use them? Oh, no! We burn up wood and coal, as renters burn up the front fence for fuel."



***Thanks!***

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