The **PRO** and **CON** statements below give a five minute introduction to the debate on alternative energy.
(Read more information about our one star ☆ to five star ☆☆☆☆☆ Theoretical Expertise System.)

1. Reducing Oil Drilling
2. Green Jobs for Economic Recovery
3. Alternative Energy for Energy Independence
4. Subsidies for Alternative Energy
5. Renewable Energy
6. Biofuels
7. Hydrogen
8. Nuclear Power
9. Solar Power
10. Wind Power

PRO Alternative Energy	**CON Alternative Energy**
1. Reducing Oil Drilling	
PRO: "Despoiling nature to get at the tiny trickle of oil we have left won't make any significant difference in what we pay at the pump - not now and not ever. And it won't make our country any less dependent on foreign fuel. Our thirst for oil is bad for national security, bad for our economy and bad for the environment… The Bush administration's own Energy Department says that lifting the ban on offshore drilling would have a marginal impact on oil supplies and an 'insignificant' impact on prices. Drilling in the Arctic National Wildlife Refuge would be similarly futile, shaving - at the very most - 4 cents off a gallon of gas by 2026... America needs to say no to pumping up Big Oil's profits and yes to forging a new clean energy economy." Natural Resources Defense Council ☆ "Build the Clean Energy Economy," www.nrdc.org (accessed Feb. 25, 2009)	**CON:** "It is estimated that there is enough oil and natural gas offshore and in non-wilderness and non-park lands in the United States - but currently ruled off-limits for production by the federal government - to fuel 50 million cars and heat nearly 100 million homes for the next 25 years... If Congress were to expand the areas available for active exploration, we could make more domestic energy available to Americans in the future, while sending a strong positive supply signal to markets today, potentially putting downward pressure on prices. It would also strengthen U.S. energy security by further diversifying Americans' energy portfolio, and therefore mitigating the impact of a disruption in any one producing region of the world." ExxonMobil ☆ "Putting America's Energy Resources to Work," www.exxonmobil.com, June 2008
2. Green Jobs for Economic Recovery	
PRO: "Citizens and community members everywhere are seeking smart solutions to our two biggest problems - the economic downturn and the ecological collapse. The nation is finally realizing that the solutions to these twin crises are linked. That is because nearly everything that is good for the environment - and practically everything that is good in the fight against global warming - is a job. Solar panels don't install themselves. Wind turbines don't manufacture themselves. Homes and buildings don't retrofit or weatherize themselves. In our industrial society, trees don't even PLANT themselves, anymore. Real people must do all of that work... A well thought out shift to a clean energy economy offers more work, more wealth and better health to disadvantaged communities than does any plausible,	**CON:** "Hard times stir our appetites for easy answers, but those are too often deceptive and dangerous. The Green Recovery plan is a prime example--its proponents would have us believe that pouring taxpayer money into renewable energy like solar and wind would create an estimated 5 million new jobs, end our reliance on imported oil and give us clean air. As welcome as those results would be, they're based on the illusion that renewable fuels are an energy panacea and that the market is ignoring an easy answer that wise politicians can clearly see. But the facts just don't support this. Yes, renewable fuels will constitute a part of our energy mix in the future, but they represent only a tiny fraction of our energy needs and won't lead us out of the economic and environmental wilderness... Taking into account the EIA's [US Energy Information Agency] projected increases in electricity demand, the

business-as-usual scenario...

In a time of economic peril, let us never forget that everything that is required to make America's economy cleaner, greener and more resilient is a career pathway for someone. Or a business contract. Or an entrepreneurial opportunity. We can power America through this recession by repowering America with clean energy. We can create millions of jobs that will make our people wealthier and the Earth healthier. Let us begin."

Van Jones, JD ☆☆☆
President of Green For All
"Opportunities for Green Growth: Myths & Realities About Green Jobs," presented at the US House Select Committee on Energy Independence and Global Warming hearing "Stimulus Package and Energy: Creating Jobs, Opportunities for All," www. globalwarming.house.gov, Jan. 13, 2009

renewable sector would need to grow 19% per year for 22 years consecutively to meet U.S. demand by the year 2030. Clearly, these targets are overly ambitious and impractical...

The government cannot create wealth or jobs; all it can do is take from Peter to pay Paul, opening up a job in 'green industry A' by eliminating one in 'fossil fuel industry B.'"

Robert P. Murphy, PhD ☆☆☆
Economist at the Institute for Energy Research
"The High Costs of 'Green Recovery," *Forbes*, Nov. 15, 2008

3. Alternative Energy for Energy Independence

PRO: "The legislation I am signing today [Energy Independence and Security Act of 2007, HR 6] will address our vulnerabilities and our dependence in two important ways. First, it will increase the supply of alternative fuel sources. I proposed an alternative fuel standard earlier this year. This standard would require fuel producers to include a certain amount of alternative fuels in their products. This standard would create new markets for foreign products used to produce these fuels. This standard would increase our energy security by making us less vulnerable to instability--to the instability of oil prices on the world market.

The bill I sign today takes a significant step because it will require fuel producers to use at least 36 billion gallons of biofuel in 2022. This is nearly a fivefold increase over current levels. It will help us diversify our energy supplies and reduce our dependence on oil."

George W. Bush, MBA ☆☆☆
43rd President of the United States
Statement at the signing of the Energy Independence and Security Act of 2007, Dec. 19, 2007

CON: "'Energy independence' is a favored placebo - a rarely defined goal trotted out for energy crises but not achieved...

There is now no liquid fuel that can largely replace oil for transportation. We are stuck because of the scale of the industry and - despite criticism - oil's efficiency. A gallon of gas, refined from African oil, is cheaper than a gallon of Maine sparkling water. Political alternatives like corn-based ethanol have required huge subsidies and convulsed food markets but produced only 430,000 barrels per day in 2007 - 2 percent of U.S. oil consumption...

Politicians pose with gimmicks like hydrogen cars, but they will have little near-term impact. Breakthrough technologies, such as cellulosic ethanol, are theoretically attractive - but don't exist."

J. Robinson West, JD ☆☆☆
Founder of PFC Energy
"Two Takes: Energy Independence Is Neither Practical nor Attainable," *US News & World Report*, July 10, 2008

4. Subsidies for Alternative Energy

PRO: "The subsidies in place allow the [alternative energy] industry to grow and technologies to be developed and mature and drive costs down...

Alternative energy is most developed in countries where government subsidies have been in place for some time. Germany put in place strong incentives in the early part of this decade to encourage demand for solar modules, to encourage installations of wind farms

CON: "Several recent bills would either subsidize or mandate alternative fuels and/or vehicles. However, the 30-plus-year history of federal attempts to encourage such alternatives includes numerous failures and few, if any, successes...

After all these years, Washington has failed to grasp the serious economic and technological shortcomings of these energy alternatives, which is why they needed

and to support the biofuels industry. Companies in countries with a more progressive alternative energy policy framework therefore developed technology and intellectual property at an earlier state. Other European countries such as Denmark, Spain and Portugal also embraced alternative energy therefore companies tend to be more mature in Europe. However the potential for growth in the U.S. is greater, and once a longer term framework has been put in place, we would expect the U.S. to catch up fast." Edward Guinness, MA ☆ Co-Manager of the Guinness Alternative Energy Fund at Guinness Atkinson Funds "Q&A with Fund Managers of Guiness Atkinson Alternative Energy Fund," www.altenergystocks.com, Oct. 29, 2007	special treatment in the first place. Federal efforts to pick winners and losers among energy sources-and to lavish mandates and subsidies on the perceived winners-have a dismal track record relative to allowing market forces to decide the direction of energy innovation." Ben Lieberman, JD ☆☆☆ Senior Policy Analyst in Energy and the Environment at the Heritage Foundation Thomas A. Roe Institute for Economic Policy Studies Nicolas D. Loris ☆ Research Assistant at the Heritage Foundation Thomas A. Roe Institute for Economic Policy Studies "Energy Policy: Let's Not Repeat the Mistakes of the 70s," www.heritage.org, July 28, 2008
5. Renewable Energy	
PRO: "[A] zero-CO2 U.S. economy can be achieved within the next thirty to fifty years without the use of nuclear power... The U.S. renewable energy resource base is vast and practically untapped. Available wind energy resources in 12 Midwestern and Rocky Mountain states equal about 2.5 times the entire electricity production of the United States... Solar energy resources on just one percent of the area of the United States are about three times as large as wind energy, if production is focused in the high insolation [strong sunlight] areas in the Southwest and West… With the right combination of technologies, it is likely that even the use of coal can be phased out, along with nuclear electricity. Complete elimination of CO2 could occur as early as 2040. Elimination of nuclear power could also occur in that time frame." Arjun Makhijani, PhD ☆☆☆ President of the Institute for Energy and Environmental Research "Carbon-Free and Nuclear-Free: A Roadmap for US Energy Policy," *Science for Democratic Action* July 2007	**CON:** "We want to be very clear: solar cells, wind turbines, and biomass-for-energy plantations can never replace even a small fraction of the highly reliable, 24-hours-a-day, 365-days-a-year, nuclear, fossil, and hydroelectric power stations. Claims to the contrary are popular, but irresponsible... We live in a hydrocarbon-limited world, generate too much CO2, and major hydropower opportunities have been exhausted worldwide..." Tad W. Patzek, PhD ☆☆☆ Chairman of the Petroleum and Geosystems Engineering Department at the University of Texas at Austin David Pimentel, PhD ☆☆☆ Professor Emeritus of Ecology and Evolutionary Biology at Cornell University "Thermodynamics of Energy Production from Biomass," *Critical Reviews In Plant Sciences*, Mar. 14, 2005
6. Biofuels	
PRO: "Biofuels can provide a number of environmental advantages over conventional fossil fuels-most notably a reduction in greenhouse gas (GHG) emissions. Since the transportation sector accounts for about a third of total U.S. emissions of carbon dioxide (an abundant GHG), cleaner transportation fuels can play an important role in addressing climate change. The level of GHG emissions associated with a	**CON:** "Using food crops, such as corn, to produce ethanol raises major nutritional and ethical concerns. Nearly 60 percent of the people on earth are currently malnourished according to the World Health Organization. Growing crops for fuel squanders land, water, and energy vital for human food production. The use of corn for ethanol has led to major increases in the price of U.S. beef, chicken, pork, eggs, breads,

particular biofuel depends on the energy used in growing and harvesting the feedstock, as well as the energy used to produce the fuel (e.g., coal, natural gas, biomass). On a full fuel-cycle basis, corn ethanol has the potential to reduce greenhouse gas emissions by as much as 52% over petroleum-based fuels. Even better, ethanol made from cellulosic feedstocks, such as switchgrass, or agricultural residues such as corn stover, has the potential to reduce greenhouse gas emissions by as much as 86%, compared to gasoline.

Biofuels have the added benefit of providing a 'carbon sink.' As crops grow to produce the feedstocks for making the biofuel, they absorb carbon dioxide from the atmosphere."

US Department of Energy Office of Energy Efficiency and Renewable Energy ☆
"Environmental Benefits of Biofuels," www.doe.gov (accessed July 8, 2008)

cereals, and milk -- a boon to agribusiness and bane to consumers...

As global population soars to 8 or 9 billion toward mid-century, and as we burn more grain as fuel, shortages and production costs could cause grain prices to skyrocket, taking food from the mouths of the world's poorest people.

The science is clear: The use of corn and other biofuels to solve our energy problem is an ethically, economically, and environmentally unworkable sham."

David Pimentel, PhD ☆☆☆
Professor Emeritus of Ecology and Evolutionary Biology at Cornell University
"Corn Can't Save Us: Debunking the Biofuel Myth," *Kenebec Journal*, Feb. 25, 2008

7. Hydrogen

PRO: "While the fossil-fuel era is entering its sunset years, a new energy regime is being born that has the potential to remake civilization along radical new lines. Hydrogen is the most basic and ubiquitous element in the universe. It is the stuff of stars and, when properly harnessed and made from renewable sources... it produces no harmful CO2 emissions when burned; the only byproducts are heat and pure water. We are at the dawn of a new economy, using hydrogen as the energy carrier, which will fundamentally change the nature of our financial markets, political and social institutions, just as coal and steam power did at the beginning of the Industrial Age...

People often ask: Why generate electricity twice, first to produce electricity for the process of electrolytic hydrogen and then again to produce electricity and heat in a fuel cell? The reason is that electricity can be stored only in batteries, which are cumbersome to transport and slow to recharge, while hydrogen can be stored at much lower cost...

The hydrogen economy makes possible a vast redistribution of electricity, with far-reaching consequences for society. Today's centralized, top-down flow of energy, controlled by global oil companies and utilities, can become obsolete. In the new era, every human being with access to renewable energy sources could become a producer as well as a consumer-using so-called 'distributed generation.' When millions of end-users connect their fuel cells powered by renewables into local, regional and national publicly owned hydrogen energy webs (HEWs), they can begin to share energy-peer-to-peer-creating a new decentralized form of energy generation and use..."

Jeremy Rifkin ☆

CON: "The idea of a hydrogen economy has burst like a supernova over the energy policy landscape, mesmerizing us with its possibilities while blinding us to its weaknesses. Such a fierce spotlight on hydrogen is pushing more promising strategies into the shadows...

The focus on building a national hydrogen distribution and fueling network to supply fuel cell powered cars ignores shorter term, less expensive and more rewarding strategies encouraged by recent technological developments. The most important of these is the successful commercialization of the hybrid electric vehicle (HEV)...

Hydrogen's high cost, poor energetics and scant environmental benefits for the near and medium term future must be taken into account when evaluating it against alternative fuels and strategies...

For a hydrogen economy to have any impact the nation must change virtually every aspect of its energy system, from production to distribution...

The electricity network is already in place. Why not focus on expanding the portion of this delivery system that relies on renewable energy rather than spend the next generation creating a new delivery infrastructure [for hydrogen]...

This is the time to make a major effort to move solar energy from the margins of energy production to its center rather than to shift our intellectual and scientific and capital resources toward constructing the infrastructure demanded for a hydrogen economy..."

David Morris, PhD ☆☆☆

President of the Foundation on Economic Trends "The Hydrogen Economy: After Oil, Clean Energy from a Fuel-Cell-Driven Global Hydrogen Web," *E* magazine Jan. - Feb. 2003	Vice President of the Institute for Local Self Reliance "The Hydrogen Economy and a Proposal for an Alternative Strategy," www.ilsr.org, Dec. 2003 [**Editors Note:** While this statement is Con to Hydrogen, it is not necessarily Con to Alternative Energy. Dr. Morris has made Pro alternative energy statements, and he is listed as Pro to our core question "Can alternative energy effectively replace fossil fuels?"]
8. Nuclear Power	
PRO: "Nuclear energy may just be the energy source that can save our planet from another possible disaster: catastrophic climate change. Look at it this way: More than 600 coal-fired electric plants in the United States produce 36 percent of U.S. emissions -- or nearly 10 percent of global emissions -- of CO2, the primary greenhouse gas responsible for climate change. Nuclear energy is the only large-scale, cost-effective energy source that can reduce these emissions while continuing to satisfy a growing demand for power... Wind and solar power have their place, but because they are intermittent and unpredictable they simply can't replace big baseload plants such as coal, nuclear and hydroelectric. Natural gas, a fossil fuel, is too expensive already, and its price is too volatile to risk building big baseload plants. Given that hydroelectric resources are built pretty much to capacity, nuclear is, by elimination, the only viable substitute for coal." Patrick Moore, PhD ☆☆☆ Chair and Chief Scientist of Greenspirit Strategies Ltd. and former International Director of Greenpeace International "Going Nuclear, A Green Makes the Case," *Washington Post*, Apr. 16, 2006	**CON:** "We can cut carbon dioxide (CO2) emissions in the United States nearly 75% by 2050 without relying on dangerous nuclear power or expensive new coal technologies. With rapid deployment of energy efficiency and renewable energy we can stop global warming... The solution to our future energy needs lies in greater use of renewable energy sources for both heat and power. Nuclear power is not the solution... Renewable energy technologies vary widely in their technical and economic maturity, but there is a range of technologies that offer increasingly attractive options. These include wind, biomass, solar, geothermal, ocean, and hydroelectric power. Their common feature is that they produce little or no greenhouse gases, and rely on virtually inexhaustible natural sources for their 'fuel'... We need to phase out coal and nuclear power... And we cannot continue to fuel the myriad nuclear threats by pretending nuclear power can in any way help to combat climate change. There is no role for nuclear power in the energy [r]evolution." Greenpeace International ☆ European Renewable Energy Council ☆ "Energy Revolution: A Blueprint for Solving Global Warming," www.energyblueprint.info, Jan. 2007 [**Editors Note:** While this statement is Con to Nuclear Power, it is not necessarily Con to Alternative Energy. Greenpeace International is listed as Pro and the European Renewable Energy Council is listed as Not Clearly Pro or Con to our core question "Can alternative energy effectively replace fossil fuels?"]
9. Solar Power	
PRO: "Solar power is a prime choice in developing an affordable and feasible global power source that can substitute fossil fuels in all the world's climate zones. The solar radiation reaching the earth's surface in one year provides more than 10,000 times the world's yearly	**CON:** "For decades, there have been delirious proclamations that the world would soon run on solar energy. Those statements always have sounded too good to be true...and, sure enough, they always have

energy needs... In many cases solar electricity is already cost competitive... The cost of manufacturing both solar cells and modules and other components has been falling steadily. As a result, the price of PV [photo-voltaic] systems has fallen by an average of 5% per annum over the last 20 years. It is expected that this rate of price decrease can be maintained in the future... With the right product, therefore - offering customers the type of added value they are looking for, coupled with innovative marketing - technologies such as solar electricity should be able to compete with grid power in industrialised countries." Greenpeace International ☆ European Photovoltaic Industry Association ☆ "Solar Generation: Solar Electricity for Over One Billion People and Two Million Jobs by 2020," www.epia.org, Sep. 2006	been false... The sun's energy is too widely dispersed and the land area required to collect it too vast for solar to become a large-scale power source.... In reality, solar and wind power remain on today's radar screen only as a result of wasteful tax breaks to appease the green community... The solar problem is that no matter how you design the system it will always be inefficient and capture only a small, uneconomical amount of solar energy... There is a seductive fallacy about solar cells: that more exotic materials and increasingly clever computer-type designs will cause the price of the cell to drop dramatically... this just is not so." Jay Leher, PhD ☆☆☆ Science Director for the Heartland Institute "Solar Power: Too Good to Be True," www.heartland.org, June 2005
10. Wind Power	
PRO: "Wind power is an important part of the strategy to combat global warming. Wind power is currently the most economically competitive form of renewable energy. It provides nearly 15,000 megawatts of power in the United States, enough power for more than 3 million households, and could provide up to 20 percent of the country's electricity needs. Every megawatt-hour produced by wind energy avoids an average of 1,220 pounds of carbon dioxide emissions. If the United States obtains 20 percent of its electricity from wind power by 2020, it will reduce global warming emissions equivalent to taking 71 million cars off the road or planting 104 million acres of trees. Expanding wind power instead of fossil fuels also avoids the wildlife and human health impacts of oil and gas drilling, coal mining and fossil fuel burning." National Audubon Society ☆ "Audubon's Position on Wind Power," www.audubon.org, (accessed Oct. 23, 2008)	**CON:** "Wind power is certainly a candidate for the perfect imperfect energy. It is uneconomic to produce and more uneconomic to transmit. It is unreliable moment-to-moment (the intermittency problem). It is at its worst when it needs to be at its best (those hot summer days). Its aesthetics are bad. It attracts the worst political capitalists (the late Ken Lay, the current T. Boone Pickens). W. S. Jevons was right in 1865 when he concluded that wind power was unsuitable for the industrial age." Robert L. Bradley Jr., PhD ☆☆☆ Chairman and CEO of the Institute for Energy Research, Email to ProCon.org, Feb. 18, 2009
PRO Alternative Energy	**CON Alternative Energy**