

Hello All!

In this month's issue of ASEA's newsletter we are tackling some major topics and events. This issue features images. If you cannot view them, please respond to this email.

First and foremost: the annual Solar Tours are happening around the country and state

Second: ASEA call for board nominees for 2006

Third: Chapter News

Forth: Report from the ASES/ISES conference held in Florida this past August

FIRST:

There are 3 tours scheduled for this month.

October 22: Phoenix Metro Area (Rio Salado Chapter) 9-4pm

October 29: Sedona Chapter 10-4pm

October 29/30: Tucson

For details on all, click here:

<http://www.azsolarcenter.com/arizona/tours/2005/index.html>

Phoenix:

The tour is free, and tour guides will be available in the following locations:

APS STAR Center 1500 E University Drive, Tempe

>From the intersection of McClintock and University Drive, go west on University about 100 yards then turn North into the entrance of the APS STAR Center.

Stack Residence

1070 E Jupiter Place, Chandler

>From the intersection of McQueen and Chandler Blvd, go South on McQueen 1/2 mile to Frye Rd. Turn East on Frye, then North on Cross Creek Rd to Jupiter Place. Go West on Jupiter Place to cul-de-sac.

The Orange Table Café

7373 E. Scottsdale Mall #6 (Scottsdale Center for the Performing Arts) (480) 424-6819

>From Indian School Rd and Scottsdale Rd, go S toward 1st Ave. Turn left onto Scottsdale Mall.

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The tour itself will consist of the following homes, whose features and locations are provided below:

APS STAR Center Open House — Large Solar Testing and Research Center

1500 E University Drive, Tempe

>From the intersection of McClintock and University Drive, go west on University about 100 yards then turn North into the entrance of the APS STAR Center.

Beaulieu Residence, The Solar Hydrogen House (* limited opportunity - 3pm - by reservation only) 10989 E Tusayan Trail, Scottsdale

>From the intersection of N Pima Rd and E Happy Valley Rd, go east on Happy Valley Rd about 2.2 miles to Tusayan Trail. Turn North onto Tusayan Trail and continue to Guard House (Group will be escorted from Guard House to the Beaulieu residence).

Fuller Papercrete Presentation and Demonstration (* limited opportunity - 11am & 2pm)

1 Continental Drive, Tempe

>From the intersection of 68th St. and Curry Rd, travel North approx. 1 mile to Continental Drive; then go West approx. 200 yards to the PeraClub. Enter

the gated area and follow signs to the papercrete demonstration site.

MacLeod Residence Residential Solar Grid-Tied Retro-Fit

7340 N 34th Ave, Phoenix

>From the intersection of W Glendale Ave and 35th Ave, head North on 35th Ave. Turn East on Orangewood then South on 34th Ave. Proceed to the 2nd house on the right.

Lee Residence – Sustainable Architecture and Design

209 W Quartz Rock Rd, Phoenix

>From the intersection of 7th Ave and Happy Valley Rd, go North on 7th Ave and turn East on Yearling Rd. Go 1 mile to Central and turn North on Central, the West on Quartz Rock Rd. Home is 1/2 mile west of the intersection on the South side of Quartz Rock Rd.

Foster Residence – Green Building New Home

29457 114th St, Scottsdale

>From N Pima Rd go East on Dynamite (also called Rio Verde) to 114th St. Turn North on 114th to home.

Baron Residence – Green Building Remodel

8325 E Monte Vista Rd, Scottsdale

>From the intersection of E McDowell and N Hayden Rd, go East on Mc Dowell to Granite Reef. Go North on Granite Reef to Monte Vista. Go West on Monte Vista to home.

Gilbert Residence – Energy and Environmental Upgrade – Homegrown Solar Pioneer

6409 E Decatur St, Mesa

>From the intersection of University Dr and Power Rd, go west on University 1/2 mile to 64th St. Turn North on 64th St. to Decatur St. Home is on the southeast corner of 64th St and Decatur St.

Thompson Residence – Permaculture Edible Landscaping

602 W Rawhide Ave, Gilbert

>From the intersection of Cooper and Elliott, go South on Cooper about 200 yards to Madera Parc. Turn East on Madera Parc then take first Right (southeast) on Rawhide. Proceed to third house on the left.

Stack Residence – Near Zero energy Solar Retro-fit, Energy and Environmental Upgrade (*
Tour Guides available)

1070 E Jupiter Place, Chandler

>From the intersection of McQueen and Chandler Blvd, go South on McQueen 1/2 mile to Frye Rd. Turn East on Frye, then North on Cross Creek Rd to Jupiter Place. Go West on Jupiter Place to cul-de-sac.

Titmus Residence – Urban Solar Permaculture

2652 E Butte Circle, Mesa

>From the intersection of University Dr and Gilbert Rd, travel east on University through the light at 24th St - then turn South on Yale (across from Discount Tire). Follow Yale (curves a little) to Butte Circle. Turn East on Butte Circle and go to cul-de-sac.

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Sedona Tour:
tour 10-29, sat time 10-4

homes:

an 80's contemporary passive solar home with trombe wall for heat
a newly built passive solar home with pv for electricity
a strawbale home with ground-mount pv array for elec.
a newly constructed adobe home passively heated
an owner built strawbale home, highly insulated, comfortable year-round

More info available on the website soon: <http://www.azsolarcenter.com>

For TUCSON information, and other tour information, click here:
<http://www.azsolarcenter.com/arizona/tours/2005/index.html>

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SECOND:

ASEA statewide is calling for nominees for the 2006 board. Please send all nominations and questions to us by responding to this email.

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THIRD:

Rio Salado (Phx Metro) Chapter:

Thurs. Oct 20 | The City of Scottsdale Community Design Studio, 7506 E. Indian School Rd.
NE corner of 75th st. & Indian School Rd.

Free, 7-9pm

Topic: MOTIVATIONS: Incentives and Opportunities Using Renewables. Economic and environmental benefits from using renewable energy.

Mon, Nov 14 | Thunderbird International School of Business, Glendale | Speaker double-header

1. Solar Industry Heavyweight Glenn Hamer will give a speech, drawing from his experience in high level state and federal government activities as well as his high level executive position for solar panel manufacturing giant, First Solar.

2. Geoff Sutton, energy industry investor and venture capitalist will give one of the most detailed accounts you will hear of the state of the energy and oil industry from an investor's viewpoint. The focus will be on Peak Oil. ***Date tentative. Stay tuned.

Sedona / Verde Valley Chapter:

The monthly meeting / lecture series continues the 4th Wednesday of each month at 7:15 PM at the Sedona Winds Retirement Center on Jacks Canyon Road in the Village of Oak Creek. Always free and open to the public. There are NO meetings Nov. and Dec. because of holidays.

Wed. Sept. 28 | TBA. Check <http://www.azsolarcenter.com> for update.

FOURTH:

Report from the ASES/ISES conference held in Florida this past August.

ASES and ISES turned 50 this year, and were born in Phoenix, Arizona. This was my first encounter with ASES (the American Solar Energy Society) and ISES (the International Solar Energy Society), and I must say I came to it with few expectations or pre-conceived ideas of

what it would/should be like. This event is the link between our parent organizations and us. It is very important that what they have to offer gets filtered down to the Arizona chapter. Here's what I found:

Over 1,600 people from around the world came to the largest collection of renewable energy experts in the world. With over 300 presentations, over 700 technical papers, and 92 exhibitor booths, this 5 day solar event had tons of action going on from 7am to 10pm every day. As the solar electric industry grew by 62% in 2004, there was a lot of excitement (www.solarbuzz.com).

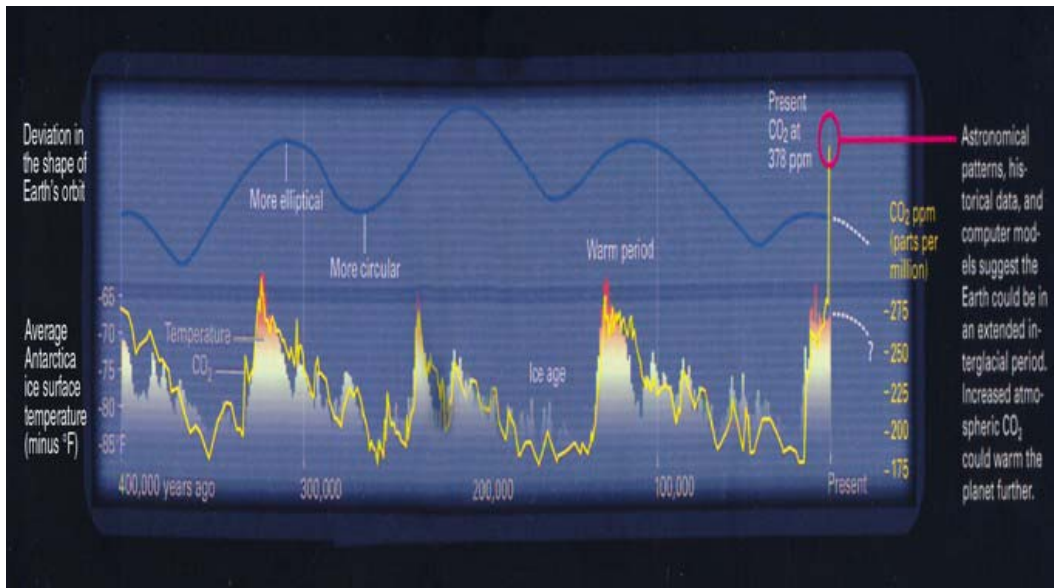
All week we had been alternating between cheering for actions taken and ideas made concrete, and weeping for the scale of the problems we were facing, and the failures and mistakes of the past and present. As I'm sure it is with every year, for this was my first, we all felt one step closer, with no end in sight.

The general vibe of the conference can be summed up by ASES' current chair, Tom Starrs' closing comments during the conference's opening plenary speech: "I fear that my two young children will grow up in a world plagued by cataclysmic weather events and the serious social and economic disruption that will accompany these events. I fear that my children will be considered pariahs for having been born citizens of a country that continued mindlessly consuming fossil fuels long after the risks became clear, because we allowed defenders of the status quo to convince us that the risk of environmental calamity was 'only' 20 percent. I fear what every parent fears: that my children will suffer terribly, and that it will be my fault."

Although the official theme of the conference was, "Bringing water to the world," (in the US we use over 400 billion gallons of water EVERY DAY, half of which is used to cool electric plants (1)) the real themes were CO2 emissions and energy. After hearing lecture after lecture, and fact after fact, it became obvious that we are currently in a real danger zone, the extent of which was made clear in a speech by Senior Research Fellow at the U.S. National Renewable Energy Laboratory, Dr. A. J. Nozik, who has prepared to request \$100 million from the U.S. Department of Energy's Basic Energy Sciences to fund R & D projects for "An initiative on the scale of the Manhattan Project for basic energy research in order to assure a secure energy future for ourselves and future generations worldwide."

CO2 Emissions

The effects of climate change are already being felt by our planet: warmer oceans mean raising sea-levels and increasing intensity and occurrence of hurricanes. The number of Category 4 and 5 hurricanes occurring globally has doubled since the 1970's (2). Global warming also means rainfall occurring in fewer, more extreme weather events, which are perfect conditions for spreading disease and facilitating soil erosion, and bad conditions for growing crops. The arctic ice-cap has been reduced 40% in the last 25 years (Nozik), and average surface temperature of the Antarctic Peninsula has risen 4.5 degrees F in the in the last 50 years (3). CO2 emissions are the highest they've been in at least the last 400,000 years by at least 25%, and 36% higher than 250 years ago (Nozik).

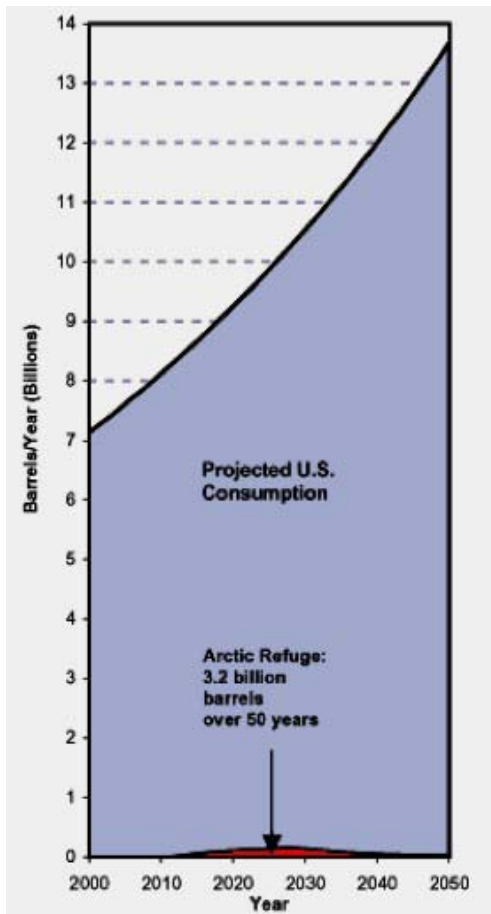


(the yellow line represents CO2 concentrations in the atmosphere over the last 400,000 years. The wavy blue line at the top shows changes in the shape of the Earth's orbit. The blue stuff at the bottom represents average Antarctic ice surface temperature in -F)

As the world produces 50 trillion pounds of CO2 per year from fossil fuel combustion (4), almost 1,100 new coal-fired power plants are planned to be constructed over the next 7 years (5). CO2 equiv. emissions from coal, petroleum, natural gas, and flaring of natural gas increased 2.9% from 2002-03 (EIA).

Energy

In addition, energy demand will increase 50% in the next 25 years, and double in the next 50 (Nozik). Not only will this increase our emissions, but destroy the environment, and diminish our resources. "More than 1/2 the world's total supply of oil and 70% of the U.S. supply will be consumed by the U.S. Baby Boomers," (Eisenberg's presentation at conference). As worldwide consumption of primary fossil fuels grew around 2.9% in 2003, (6) Mexico's largest field, (7) Russia, (8) and China (Beyond Oil: The View From Hubbert's Peak, Deffeyes, 2005) claim that their oil production has peaked out terminally this year. ExxonMobile calls for a non-OPEC (Organization for Petroleum Exporting Countries) peak in 2011. Energy investment guru, world leading expert on Saudi production, and consultant to President Bush, Matt Simmons claims that everything hangs on Saudi production, and that their largest field (the largest in the world) "Has got to be in decline," (9) "They [Saudi Arabia] may already have peaked in their ability to grow oil production, and if that's so, the world has peaked, as well." ("Simmons Hopes He's Wrong," Petroleum News Vol. 9, No. 31. Week of August 01, 2004). The head of Saudi production claims they can only keep pumping at current levels for another 15 years, which itself is probably an exaggeration (9). What's more is that OPEC has done away with their quota system entirely (10). Even with record high prices, most of them cannot meet their current quotas anyway. This means the taps are running full out. There are only a few new projects scheduled to come online in the next few years, and those will be barely enough to replace dying fields, not to be able to satisfy much of growing demand.

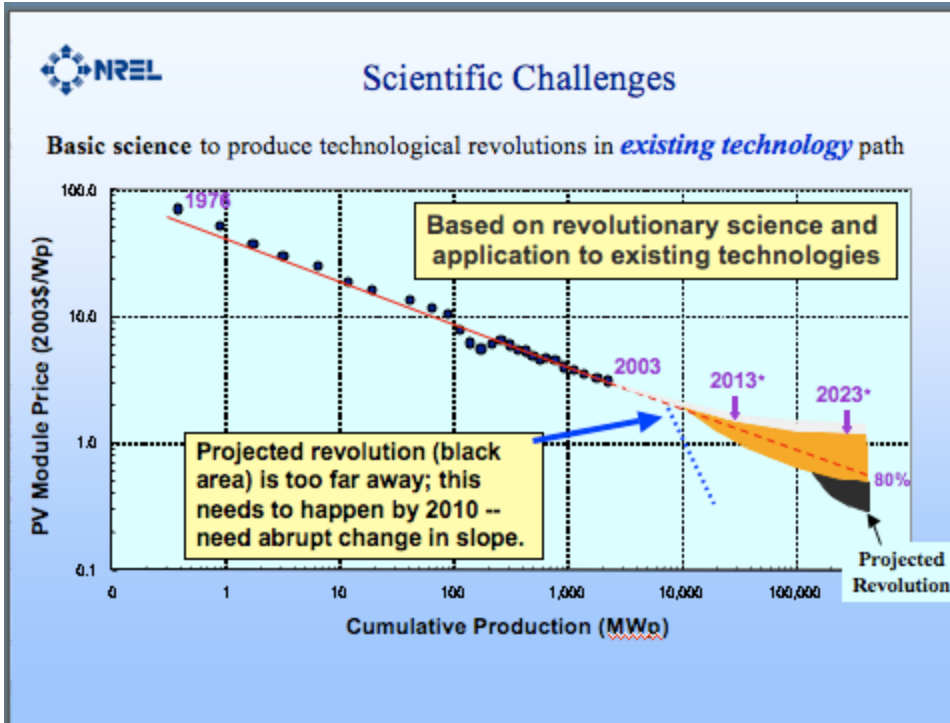


(ANWR Graph, from Starrs presentation cited earlier)

Meanwhile ExxonMobile's president of Exploration Jon Thompson claims, "By 2015, we will need to find, develop and produce a volume of new oil and gas that is equal to eight out of every 10 barrels being produced today." (The Lamp, 2003) And Chevron claims, "it took us 125 years to use the first trillion barrels of oil. We'll use the next trillion in 30." I STRONGLY recommend everybody visit Chevron's site: www.willyoujoinus.com.

Needless to say, between resource limitations and the dangers of experimenting with never-seen-before levels of CO2, there is an energy gap that needs to be filled. First, let's examine what it would take to get ourselves to put down the "fossil fuel crack pipe," and stop burning 83 million barrels of oil, (ExxonMobile), more than 11 million metric tons of coal (11), and 252 billion cubic feet of natural gas EVERY DAY (12)! Keep in mind that we need to replace electricity AND liquid fuels, replacing coal, petroleum, and natural gas.

In order to fill the energy gap with non-CO2 emitting sources alone, we'd either have to produce 25,000 1 Gigawatt nuclear power plants over the next 40 years. That's 1.7 per day for the next 40 years, and currently there are only 450 1 Gigawatt equivalent plants worldwide (Nozik). Or we could do the same thing with solar, starting with our current 2.4 gigawatts solar electricity installed worldwide, increasing to 25 terawatts would take installing 1.7 gigawatts per day for the next 40 years. In order for that to happen, the price needs to come down from \$.27/kWh to \$.02/kWh, which would take SEVERAL revolutions in solar technology (Nozik, note: the \$.02 price is higher if you add recent fuel price increases, take away massive subsidies away from current fossil fuel industries, as well as other hidden costs and environmental costs. No matter what, these numbers are at least a little fudgey, but still very on point).



(Graph by Nozik from his presentation cited above)

Current CO2 levels are 378 ppm. To hit a 750 ppm target by 2040, we'd need ~450 MW of non-CO2 capacity installed Every Day for Decades, or to hit a 550 ppm target, ~920 MW of non-CO2 capacity installed Every Day for Decades (to see these numbers in context, view the 1st graph in this article). "The longer we delay the transition, the more painful it will be." (Starrs)

Obvious problems with nuclear are that it has large political costs, as we are trying to force other countries not to produce any. It also produces toxic waste that we don't know what to do with, as well as fuel for atomic bombs. It also is so energy intensive, that the Palo Verde Nuclear plant outside of Phoenix, AZ took 14 years to produce as much energy as it took to install it (Garrett). Then there are expensive, energy intensive, and environmental decommissioning issues as well. Aside from all that, in the new Energy Bill, billions of dollars were set aside to install and develop this technology (see last month's e-newsletter).

Below is the estimated amount of extractable energy from renewables:

- 2-4 Terawatts of wind
- 5-7 Tw of biomass
- 2 Tw ocean
- 12 Tw geothermal
- 1 Tw hydro
- 600 Tw solar (Nozik)

A terawatt (Tw) is bigger than a gigawatt. A terawatt = 1,000,000,000,000 watts

As you can see, although we need all the help we can get from all renewables, solar is the only one with enough potential to power our Earth.

Our role, good leaders, efficiency, and what's being done now.

So, enough of the sky is falling stuff. What are we going to do about it? Since all of us use energy, and too much energy, all of us are responsible. Even though we are innocent, we are the problem. Each one of us needs to step up and consciously make decisions. Consciousness

is our greatest gift. We have used it to gain this wonderful information that I have organized before you. Information and consciousness is what we are, and what we will use to save ourselves from a catastrophic fate. We need to organize, and spread both to others. We need to show and lead others in a positive way. We must be outspoken and proactive. We must put individuals in power who know what needs to be done, and who know how to lead. This is our greatest challenge. Collectively we have the potential to accomplish anything, but we need good leadership. In order to get it, we must demand it. Without good leadership, this is what we get:

"Join me to make our air significantly cleaner, and our country much less dependent on foreign sources of energy."

-- President George W. Bush
State of the Union Address
January 28, 2003

But according to the U.S. Energy Information Administration:

* Increase in U.S. oil imports by 2025 under "business as usual": 84.9%

* Increase in U.S. oil imports by 2025 with the energy bill in force: 82.9% (Starrs)

And the Vice President claims that energy conservation is little more than a "personal virtue." Ok, do we have any other leaders, maybe someone who isn't heavily involved in the oil industry? The Western Governor's Association, currently headed by Arizona governor Janet Napolitano, is working on 30 gigawatts of solar electricity by 2015 (13). This truly is a bold step, considering worldwide capacity is 2.4 gigawatts currently. This is truly miniscule, considering we are going to need several terawatts by then. What's worse is, there's no way in hell they'll even reach the 30 gigawatt goal (me). None-the-less, in politics, change is slow, at least at first. Take the car industry, for example. Well, first, let's talk about car emissions in context of total world output:

Let's step back and ask, where EXACTLY do emissions come from?

Human respiration creates 48 billion lbs of CO₂ / year (<0.1% total emissions)

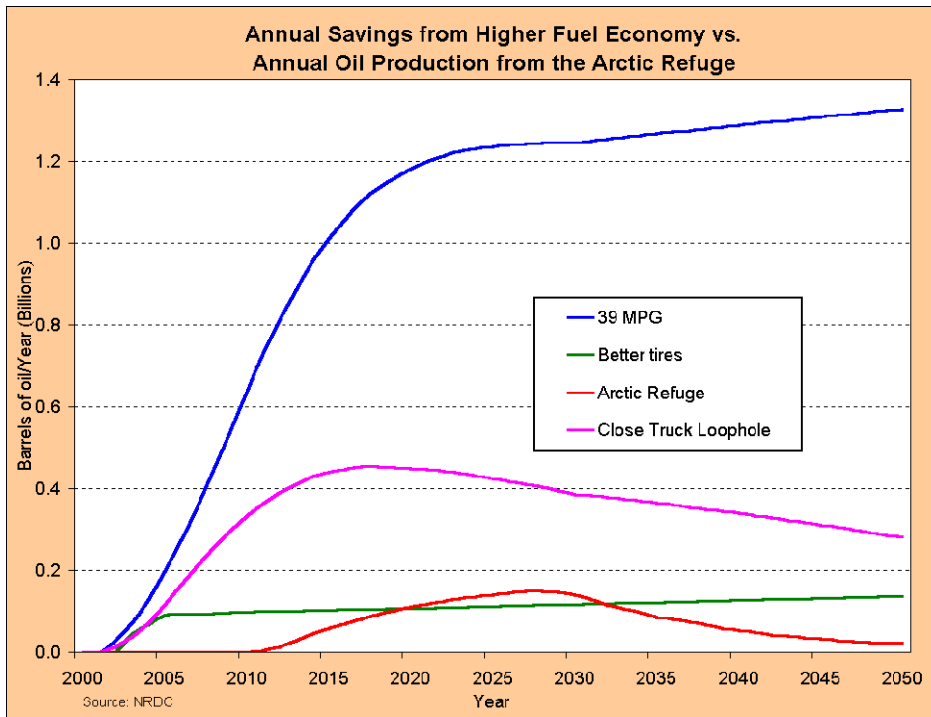
Coal (~33%), petroleum (~33%), and natural gas including natural gas flaring together (~33%) create about 50 trillion lbs of CO₂ / year, a 2.9% increase from 2002-03. (EIA)

1 gallon of gas creates 20+ lbs of CO₂.

1 pound of coal generates 1kWh of electricity and 3 lbs of CO₂ (14). Coal use has increased 38% over the past 20 years (11).

There are at least 600 million motor vehicles in the world today (this may be as high as 800 million). In 1995, the American Petroleum Institute estimated that the average passenger car consumes 551 gallons of gas per year. A relatively idealized model of combustion would put the CO₂ production of a car at roughly 10000 pounds of CO₂ per year.

So, with oil prices and CO₂ at record high levels, it seems like a perfect setting for low consumption, low emission autos. This is where efficiency comes into play. It makes more sense to be much more efficient and discriminative in our energy use than to try and produce these immense amounts of energy from renewable sources.



(Really, I don't know where all these ANWR graphs keep coming from. Source: NRDC)

Ford recently announced that by 2010, they will produce 250,000 hybrids per year (15). To put it in context, Ford currently produces 9 million cars every year (16). Toyota plans on making 1 million hybrids by 2010 (15). Worldwide, 60.76 million cars will be produced in 2005 alone (17). So, 250,000, where did that number come from? It turns out that in the new Energy Bill, there are incentives for making hybrid cars, BUT, there is a cap at 250,000. Why? I don't know. I really don't know. As far as I can tell, it looks like bad leadership. You know what also looks bad: "Light trucks today [2003] get fewer miles from a gallon of gasoline per pound of vehicle weight and per engine horsepower than those made 20 years ago (18).

To end on a good note, Dr. Nozik's request for funding of advanced solar products has some interesting promise. Currently, 1 photon (unit) of light hitting a solar panel will push one electron pair into usable current. By the time the electrons leave the solar cell, around 20% of the photons that hit it have successfully produced electricity. New studies show possibilities of having each photon release 3 or even 7 electron pairs.

Synopsis? Things are coming around, the increase of hybrids is a good thing, and so is the goal of the Western Governor's Association. These are substantial actions that took risk. Yet, there is infinitely more that needs to be done. These leaders have laid some groundwork that we need to take to the next level in coming years. By itself it is still too slow. It only took a war, 2 hurricanes, and the largest energy bill in decades to give it this jumpstart. Crisis brings about the most rapid change. The Manhattan Project got its funding out of a competitive fear. Same with the Man on the Moon Mission. The next time a crisis comes about, we need to be in a position to demand the necessary transition from being energy hunters and gatherers to energy farmers. 9/11 was a missed opportunity to cut off Saudi Arabia. A vast majority of the hijackers were from there. We could have spent that war money on setting up a new energy infrastructure. Instead, our President, who is an oil man like the Saudis, used it as an excuse to get better access to the last cheap oil left. Awareness of what is going on is the first step towards making a change for the better. Our leaders don't care about our interests; they care about our votes. And if we know what's going on and what our interest are, and let them know we know, good leaders will emerge who will win our votes. This is something we can do every day by taking every opportunity to communicate and educate, make informed, conscious

decisions, buy the right products, and not buy the wrong ones, etc.

ASEA, ASES, and ISES work to spread good information about energy from our membership of researchers, academics, and industry professionals, through a communication infrastructure to the public, industry, utilities, and government. If you would like to help, let us know. A membership application has been attached to this email.

Anyway, thanks for reading.

Ben Marcus
ASEA

If you would not like to receive these emails, or are receiving multiple copies of them, please respond to this email and let me know. I will fix the problem asap.

Internet Sources:

1. <http://pubs.usgs.gov/circ/2004/circ1268/>
2. <http://www.environmentaldefense.org/article.cfm?contentID=4792>
3. <http://www.msnbc.msn.com/id/6870853>
4. <http://yosemite.epa.gov/oar/globalwarming.nsf/content/EmissionsNational.html>
5. <http://www.renewableenergyaccess.com/rea/news/story?id=35664>
6. http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/S/statistical_review_of_world_energy_full_report_2004.pdf
7. http://www.greencarcongress.com/2005/03/mexicorsquos_la.html
8. http://www.nzherald.co.nz/index.cfm?c_id=3&ObjectID=10011306
9. <http://society.guardian.co.uk/societyguardian/story/0,,1491029,00.html>
10. <http://www.petroleumworld.com/storyt05092202.htm>
11. <http://www.worldcoal.org/pages/content/index.asp?PageID=104>
12. http://www.eia.doe.gov/oiaf/ieo/nat_gas.html
13. <http://www.westgov.org/wga/initiatives/cdeac/solar.htm>
14. http://globalwarming.enviroweb.org/ishappening/sources/sources_co2_facts3.html
15. http://www.usatoday.com/money/autos/2005-09-21-ford-hybrids_x.htm
16. http://www.gm.com/company/investor_information/docs/sales_prod/05_10/schedule_1005.xls
17. <http://www.theautochannel.com/news/2005/07/20/137928.html>
18. <http://www.net.org/relatives/4240.pdf>