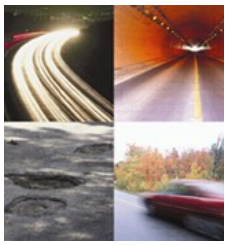


The Future of Energy

April 2013

This info package is created to mark the Earth Day on April 22, 2013.

The Earth Day is an annual U.S. celebration of the environment and a time for Americans to assess the work still needed to protect the natural gifts of our planet.

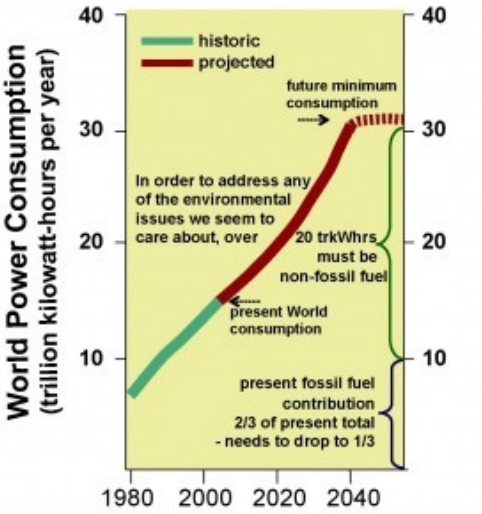
What Is Our Energy Future?

By James Conca, Contributor Forbes, ENERGY 5/13/2012 @ 5:52PM

Global energy consumption will double by mid-century, regardless of what the United States does. It's not from the 1 billion people already using vast amounts of electricity, or the 1 billion using modest amounts of electricity. It results from the 1.6 billion people that do not have any access to electricity whatsoever, the 2.4 billion that have almost no access to electricity and still burn wood and manure as their main source of energy, and the 3 billion new people that will be born by mid-century who will need electricity.

Since humans need about 3,000 kWhr per person per year just to have what we consider a decent life, this means the world must produce over 30 trillion kWhrs per year just to eradicate global poverty, war and terrorism.

Without a more sustainable and balanced energy mix, the increase in fossil fuels will be appalling and costly, and the environmental effects devastating. To counter this future dystopia, we propose a ⅓-⅓-⅓: a third fossil fuel, a third renewable and a third nuclear (figure below). To achieve this will require heroic efforts and infrastructure construction on a scale this planet has never seen:



World energy consumption growth curve. The green line is historic use up to the present and the red is projected use based upon United Nations population estimates and assumptions for per capita increases in both developed and developing countries. We are presently at 15 trillion kWhrs/yr. Hopefully we can keep it to just 30 trillion kWhrs/yr.

a. Replacement of all existing coal with a combination of combined cycle gas and fluidized bed coal reactors which are somewhat cleaner,

b. 3 trillion kWhrs/year from hydroelectric

c. 1,700 new nuclear reactors to produce electricity totaling 10 trillion kWhrs/year from GenIII and GenIV designs including small modulars (China, alone, is planning about 400 new reactors)

d. Over two million 3+ MW wind turbines or equivalent totaling 3 trillion kWhrs/year

e. Concentrated, ordinary and distributed solar arrays totaling 3 trillion kWhrs/year

f. 100 bbl/yr of biofuels from algae, cellulosics and high-efficiency biomass, not ethanol

g. Over a trillion kWhrs/year from other alternatives such as wave, tidal and biogas.

The cost to implement and operate this mix will be about $65 trillion over 50 years, about $30 trillion of that in construction alone. (A business-as-usual mix of two-thirds fossil fuel would cost about the same to provide 30 trillion kWhrs/yr, with slightly less capital costs but more fuel and O&M costs.) About 2% of global GDP will be needed annually to provide for either of these futures. Financing this level of investment will be the real challenge. This⅓-⅓-⅓ mix would result in:

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President Obama's Blueprint for a Clean and Secure Energy Future

FACT SHEET

March 15, 2013

The United States is on the path to a cleaner and more secure energy future. Since President Obama took office, responsible oil and gas production has increased each year, while oil imports have fallen to a 20 year low; renewable electricity generation from wind, solar, and geothermal sources has doubled; And our emissions of the dangerous carbon pollution that threatens our planet have fallen to their lowest level in nearly two decades. In short, the President's approach is working. It's a winning strategy for the economy, energy security, and the environment.

But even with this progress, there is more work to do. Rising gas prices serve as a reminder that we are still too reliant on oil, which comes at a cost to American families and businesses. While there's no overnight solution to address rising gas prices in the short term, President Obama today reiterated his commitment to a sustained, all-of-the-above energy strategy and urged Congress to take up common-sense proposals that will further reduce our dependence on oil, better protect consumers from spikes in gas prices, and reduce pollution.

Background: The Energy Security Trust

The Obama Administration is calling on Congress to establish a new Energy Security Trust, which is designed to invest in breakthrough research that will make the technologies of the future cheaper and better – technologies that will protect American families from spikes in gas prices and allow us to run our cars and trucks on electricity or homegrown fuels.

The Energy Security Trust, which builds on a proposal supported by a broad bipartisan coalition including retired military leaders, will provide a reliable stream of funding for critical, breakthrough research focused on developing cost-effective transportation alternatives. It builds on this historic progress, continuing to increase momentum towards to a cleaner, more efficient fleet that is good for consumers, increases energy independence, and cuts carbon pollution.

Producing More American Energy

President Obama is committed to an "all-of-the-above" approach that develops all American energy sources in a safe and responsible way and builds a clean and secure energy future. That's why the President's plan:

- Challenges Americans to double renewable electricity generation again by 2020.
- Directs the Interior Department to make energy project permitting more robust.
- Commits to safer production and cleaner electricity from natural gas.
- Supports a responsible nuclear waste strategy.

Investing in Energy Security

During the President's first term, the United States cut foreign oil imports by more than 3.6 million barrels per day, more than under any other President. To ensure that we continue on a path towards greater energy security, the President's plan:

- Sets a goal to cut net oil imports in half by the end of the decade.
- Commits to partnering with the private sector to adopt natural gas and other alternative fuels in the Nation's trucking fleet.

Making Energy Go Farther Across the Economy

Cutting the amount of energy we waste in our cars and trucks, in our homes, buildings, and in our factories, will make us a stronger, more resilient, and more competitive economy. Improvements in energy efficiency are critical to building a clean and secure energy future. To advance this priority, the President's plan:

- Establishes a new goal to double American energy productivity by 2030.
- Challenges States to Cut Energy Waste and Support Energy Efficiency and Modernize the Grid.
- Commits to build on the success of existing partnerships with the public and private sector to use energy wisely.
- Calls for sustained investments in technologies that promote maximum productivity of energy use and reduce waste.

International Leadership

The Administration has worked not only to strengthen our energy security at home, but also around the world. In concert with our domestic actions, we have pursued a robust international agenda that:

- Leads efforts through the Clean Energy Ministerial and other fora to promote energy efficiency and the development and deployment of clean energy.
- Works through the G20 and other fora toward the global phase out of inefficient fossil fuel subsidies.
- Promotes safe and responsible oil and natural gas development.
- Updates our international capabilities to strengthen energy security.
- Supports American nuclear exports.

Read complete fact sheet from http://snip.state.gov/511

Related link:

Develop and Secure America's Energy Resources at snip.state.gov/512

The Energy Picture: Where Are We Now? Where Are We Headed?

Energy Strategy for the Future

"Of one thing we can be sure: energy will be more challenging and more important in the future. Will you, and your business, be ready?"— Peter Schwartz, Chairman, Global Business Network

EPA's experience, through its interactions with U.S. companies, is that many are initiating energy programs. For companies operating formal energy programs, these programs are typically less than 5 years old. And, the involvement of senior executives in energy planning and decision making is just beginning.

Market trends suggest that the demand for energy resources will rise dramatically over the next 25 years:

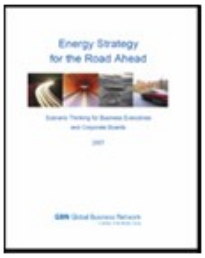
- Global demand for all energy sources is forecast to grow by 57% over the next 25 years.
- U.S. demand for all types of energy is expected to increase by 31% within 25 years.
- By 2030, 56% of the world's energy use will be in Asia.
- Electricity demand in the U.S. will grow by at least 40% by 2032.

Sources: Annual Energy Outlook (DOE/EIA-0383(2007)).

The Future of Corporate Energy Management

Global Business Network (GBN), in cooperation with the U.S. Environmental Protection Agency (EPA), gathered senior executives from twenty major U.S. companies to consider the potential energy impacts that U.S. businesses may face over the next decade. Based on four plausible scenarios of the world in 2020, the report Energy Strategy for the Road Ahead identifies a set of strategies that will help businesses act now to prepare for future energy-related risks. Source from www.energystar.gov at http://snip.state.gov/549

Please download full report of Energy Strategy for the Road Ahead in PDF using the following link: http://snip.state.gov/510



Note: ENERGY STAR is a U.S. Environmental Protection Agency voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency.

What Is Our Energy Future?

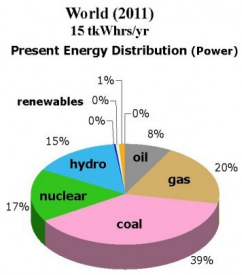
Continued from page 1.

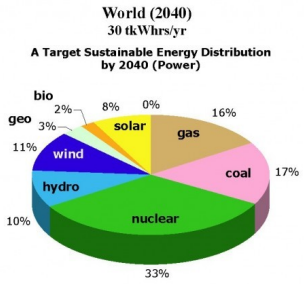
- a more diverse, stable and secure energy supply for over 1,000 years for 10 billion people
- a 50% reduction in global CO2 emissions over the present mix, and
- a leveling of worldwide fossil fuel use at about 2006 levels.

Others have appealed for similarly ambitious goals:

- the President's call for an 80% reduction in U.S. CO2 emissions by mid-century,
- the push by the American Council on Renewable Energy for 50% renewable for the U.S. by 2050, or
- the European Union goal of 50% alternatives by 2040.

If we do not aggressively change direction by 2020, it will be too late and we will be taken, by default, down the fossil fuel path. Sure, we have lots and lots of fossil fuel, enough to cover our needs for the next 500 years. Or do we? We geologists know that the concept of peak oil and peak gas referred only to conventional fossil fuel with standard methods of extraction. Peak is now irrelevant in the face of huge reservoirs of the so-called "unconventional", i.e., tar sands, gas shales and heavy oils, with the concomitant new methods of extraction to recover them including dangerous solvent injection and hydro fracking. We cannot ignore the horrendous environmental and health costs of a fossil fuel-dominated future because these costs are real and someone has to pay them. These very dirty "unconventional" will not peak until far into the future, well past the next major global demographic and environmental tipping points that will alter our future beyond recognition. We must resist the temptation that they will solve all our problems.





Proposed ⅓-⅓-⅓ target global energy mix: a third fossil fuel, a third renewable and a third nuclear. Note that the absolute magnitude of fossil fuel use does not decrease much as the total pie doubles from 15 trillion kWhrs/year to 30 trillion kWhrs/year. The increase must be covered by alternatives.

Source: snip.state.gov/513

IRC Reference Resources

Books/Magazine/Video

Driven to Extinction : The Impact of Climate Change on Biodiversity / Richard Pearson. Sterling, c2011.

E - The Environmental Magazine is a bimonthly "clearinghouse" of information, news and resources for people concerned about the environment.

Global Energy Innovation : Why America Must Lead [Book]/ Woodrow W. Clark II and Grant Cooke. Praeger, c2012.

The Renewable Revolution : How We Can Fight Climate Change, Prevent Energy Wars, Revitalize the Economy, and Transition to a Sustainable Future [Book]/ Sajed Kamal. Earthscan, 2011.

Saved by the Sun [DVD] / produced by Steve Latham, Larry Klein, Evan I. Schwartz. c2007

Checked our catalog for more titles at http://snip.state.gov/53k

Online Databases

These are online some databases that covers environment and energy related issues.

Academic OneFile: This database provides access to over 42 million journal articles going back to 1980.

Ebrary: Online, full-text collection of over 20,000 books in English. Covers a wide range of topics including environment.

Filmakers Library Online: Documentaries available through Filmakers Library Online covering environmental issues.

Gale Science in Context: It is an engaging online experience for those seeking contextual information on hundreds of today's most significant science topics. .

Global Issues in Context: Researched reports about current affairs are published alongside newspaper articles, videos, and other materials.

GreenFILE: Information covering all aspects of human impact to the environment.

GREENR: The Global Reference on the Environment, Energy, and Natural Resources focuses on the physical, social, and economic aspects of environmental issues.

owerKnowledge Earth and Space Science; Science and Physical Science: Provides information on earth and space science, life sciences, and physical science geared to science learners in grades 3 to 6 and their teachers.

IIP Publications

eJournal USA: Growing Up Green

This issue explores how young people are leading the way to a cleaner, greener, more sustainable future.

eJournal USA: Climate Action Goes Local

This issue USA examines what it means to think globally about climate change and to act locally.

eJournal USA: Climate Change Partnerships

This issue explains one proven and one proposed partnership structure relevant to today's climate issues.

For more publications please visit http://iipdigital.usembassy.gov/ejusa.html

About the Information Resource Center

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Three professionally trained reference specialists will help you to retrieve needed-information quickly, conveniently, and free of charge.

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For all IRC information products, including this Article Alert are available online at: http://jakarta.usembassy.gov/infoproduct.html

Information queries may be submitted to us by phone, fax, mail, and e-mail. You are also welcome to visit us by appointment for personal research assistance.

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