RENEWABLE ENERGY AND ALTERNATIVE FUELS

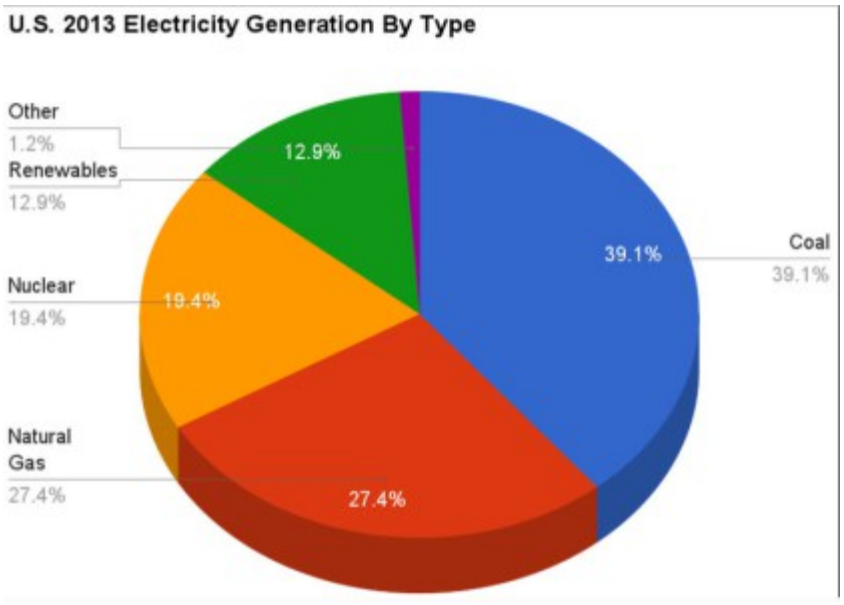
There is absolutely no doubt the entire world is dependent upon the generation and transmission of electricity. Those countries without electrical power are considered third world countries with no immediate hope of improving lives and living conditions and yet there just may be alternatives to generally held methods for generating electricity.

If we look at the definition for renewable energy, we see the following:

Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources.

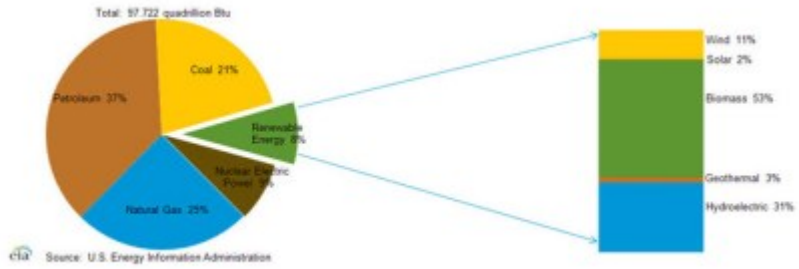
POWER GENERATION:

We are all familiar with current methodologies for power generation. These are 1.) Hydroelectric, 2.) Nuclear, 3.) Coal-Powered, 4.) Oil-Fired, and 5.) Generation using Natural gas. The graphic below will indicate the percentages of each generation type by technique. This is for the United States. Other countries use generation methods relative to the availability of resources, political pressures and cultural pressures. Germany is in the process of abandoning their use of nuclear energy for power generation. This is a cultural and political decision and not entirely based upon scientific considerations.



You will notice that renewable energy was approximately 12.9 percent of the total generation within the United States in 2013. Please note also that hydroelectric is considered to be a source of renewable energy. This is show by the graphic below. To

break this down even further, we look at the following:

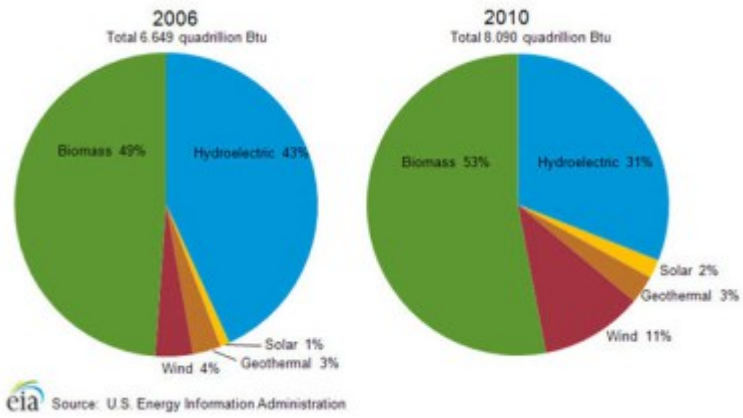


Renewable energy is represented by five (5) categories:

- Hydroelectric
- Wind
- Solar
- Geothermal
- Biomass

One additional possibly is generation of electricity by virtue of tidal processes. This technology is in its infancy with work being accomplished on a “demonstration” scale. It is an up-and-coming methodology but right now does not enjoy a place within the list above.

Just how much energy results from each renewable category?



From above we see there has been growing dependence upon renewable technology as a source of electricity. Wind and biomass production are increasing while hydroelectric decreasing. Geothermal and solar remain about the same. The increase in energy production by biomass is significant. Very significant.

The Energy Information Agency (EIA) has collected the following data:

Trends in Renewable Energy Consumption and Electricity 2010
Release Date: December 11, 2012
Next Release Date: August 2013

Table 3. Renewable energy consumption for electricity generation by energy-use sector and energy source, 2006 - 2010

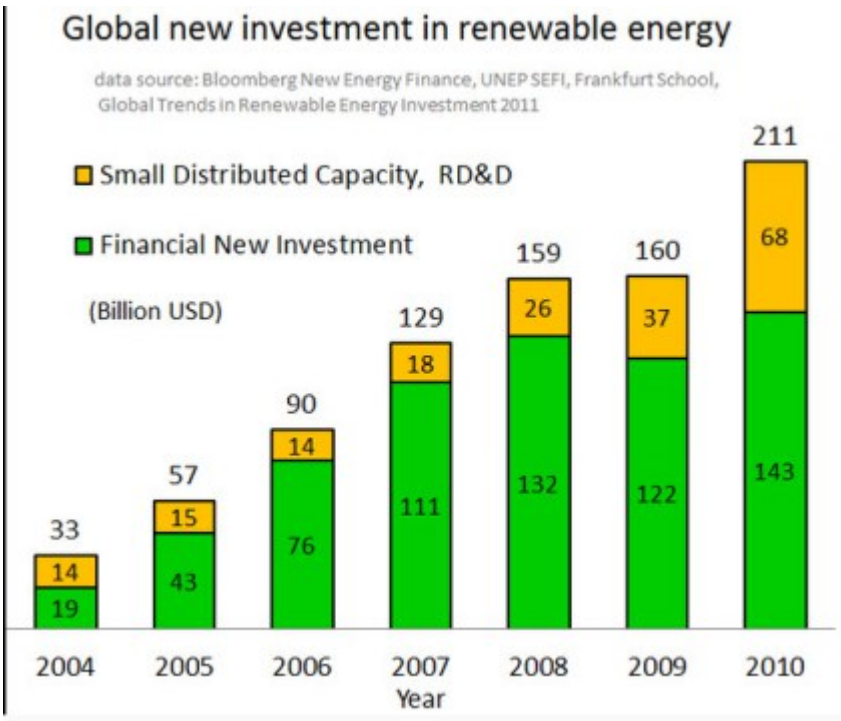
(quadrillion Btu)

Sector and Source	2006	2007	2008	2009	2010
Total	3.873	3.536	[R]3.817	4.137	4.253
Biomass	0.591	0.598	0.606	0.592	0.630
Waste	0.241	0.245	0.267	0.272	0.281
Landfill Gas	0.076	0.080	0.094	0.100	0.106
MSW Biogenic[1]	0.147	0.146	0.148	0.147	0.145
Other Biomass[2]	0.018	0.019	0.024	0.025	0.030
Wood and Derived Fuels[3]	0.350	0.353	0.339	0.320	0.350
Geothermal	0.145	0.145	0.146	0.146	0.148
Hydroelectric Conventional	2.869	2.446	[R]2.511	2.669	2.539
Solar Thermal/PV	0.005	0.006	0.009	0.009	0.012
Wind	0.264	0.341	0.546	0.721	0.923

Why should governments and independent companies continue to consider renewable energy as a source of power? There are compelling reasons.

BENEFITS:

- **ENVIRONMENTAL BENEFITS**– For the most part, renewable sources of energy have minimal negative impact on our environment. They are paramount in reducing carbon dioxide emissions. Millions of people are exposed to toxic fumes from cooking fuels and kerosene lanterns, emissions from automobiles and energy sources for generating electricity. All result in chronic eye and lung conditions. Countries such as China and India have days where atmospheric particulate requires masks or face coverings when prolonged periods of outdoor activity are needed.
- **ENERGY FOR THE FUTURE**—Coal, oil, natural gas, and even nuclear energy are expendable non-renewable sources of energy. Once exhausted—gone forever. Prolonging their use is paramount. We will never completely remove ourselves from being a petro-based economy. Too many bi-products are made from petroleum. It is fantasy to suspect total elimination of petroleum usage.
- **JOBS AND ECONOMY**—Investments in hardware and infrastructure for renewable energy use requires money but can creates jobs. If you have been following the insanity relative to approval of the Keystone Pipeline you know the argument. On a global basis, we can see the following: (PLEASE NOTE: The numbers are in billions of US dollars)



The point with this graph is showing the increasing investment dollars for R & D efforts and production of infrastructure in allowing generation of energy.

- **ENERGY SECURITY**– The U.S. imported approximately 10.6 million barrels per day of petroleum in 2012 from about 80 countries. We exported 3.2 MMbd of crude oil and petroleum products, resulting in net imports (imports minus exports) equaling 7.4 MMbd. Net imports accounted for 40% of the petroleum consumed in the United States, the lowest annual average since 1991.

"Petroleum" includes crude oil and refined petroleum products like gasoline, and biofuels like ethanol and biodiesel. In 2012, about 80% of gross petroleum imports were crude oil, and about 57% of all crude oil that was processed in U.S. refineries was imported.

The top five source countries of U.S. petroleum imports in 2012 were Canada, Mexico, Saudi Arabia, Venezuela, and Russia. Their respective rankings vary based on gross petroleum imports or *net* petroleum imports (gross imports minus exports). Net imports from OPEC countries accounted for 55% of U.S. net imports.

DISADVANTAGES:

One disadvantage with renewable energy is that it is difficult to generate the quantities of electricity that are as large as those produced by traditional fossil fuel generators. This may mean that we need to reduce the amount of energy we use or simply build more energy facilities. It also indicates that the best solution to our energy problems may be to have a balance of many different power sources.

Another disadvantage of renewable energy sources is the reliability of supply. Renewable energy often relies on the weather for its source of power. Hydro generators need rain to fill dams to supply flowing water. Wind turbines need wind to turn the blades, and solar collectors need clear skies and sunshine to collect heat and make electricity. When these resources are unavailable so is the capacity to make energy from them. This can be unpredictable and inconsistent. The current cost of renewable energy technology is also far in excess of traditional fossil fuel generation. This is because it is a new technology and as such has extremely large capital cost.

CONCLUSIONS: It remains right and proper that the Unites States and other countries continue research and development relative to renewable sources of energy. The cost of power generation is increasing and depletion of non-renewable sources is of great concern. We must continue efforts to improve technologies of renewable power to reduce the cost of infrastructure and delivery.

Source : http://cielotech.wordpress.com/2014/09/01/renewable-energy-and-alternative-fuels/