

*Olympic Energy Systems, Inc.
907 - 19th Street
Port Townsend, WA 98368
(360) 379-2536*

Renewable Energy

*Solar
Wind
Micro Hydro
Geothermal
Bio/Other Fuels
Efficiency*

Energy Facts

- Heat of Combustion
 - 1 lb Coal = 13,000 BTU
 - 1 gallon Ethanol = 76,000 BTU
 - 1 gallon Propane = 90,000 BTU
 - 1 gallon Gasoline = 105,000 BTU
 - 1 gallon Diesel = 115,000 BTU
 - 1 KWh = 3413 BTU
 - 1 BTU = 252 Calories
- 1 BTU equals the heat energy required to raise 1 lb of water 1 degree F

Inside this issue:

Indigenous Fossil Fuels	1
OES, Inc.—Who we are	2
Book Review “THE PRIZE - The Epic Quest For Oil, Money, and Power” by Daniel Yergin	2
Energy Conservation (Notes from the July 24, 2004 Solar Washington Member Meeting in Port Townsend)	2
New Projects New! OES releases its RCM (RE Cost Model)	3
Continuation of Articles	4

Indigenous Fossil Fuels: Key to our Energy Independence?

By Jonathan A. Clemens

Coal, fuel for our first industrial revolution in the Victorian age, just may be the fuel for our next industrial frontier, which will inevitably follow the world's peak production of oil sometime in the next decade. The US has hundreds of years of coal supply. Some of the cleanest coal exists in Montana, Wyoming, and Pennsylvania. Clean Coal Technologies, embraced by the Bush administration, are those that enhance the efficiency and environmental acceptability and performance of coal.

The US has very limited supplies of domestic oil, with estimates of less than 20 years remaining. Though natural gas exploration is up, the US is facing demand for its use in both clean electricity production and as feedstock for transportation fuel, such as LNG (Liquified Natural Gas) and hydrogen. Reducing harmful emissions and meeting growing demand for energy are compounding challenges.

The transportation sector is the fastest growing segment of our energy demand. Past approaches to addressing this challenge have included improved energy efficiency (higher mileage automobiles), alternative fuels (ethanol blended gasoline, such as E-10, and Natural Gas), and reduced trip miles (carpooling and telecommuting).

Approaches now include hybrid-electric vehicles (Toyota Prius and Honda Insight), fuel celled vehicles (GM buses and the Ford Focus sedan), and increased ethanol blended gasoline (such as E-20, in Minnesota). The State of Hawaii is calling for E-10 gasoline in 85% of gasoline sold beginning in 2006.

Hawaii and Minnesota have no indigenous supply of crude oil, so investment in alternative energy technologies is an obvious imperative. Hawaii has a sugar cane industry and Minnesota has a corn growing industry to supply the feedstock

with which to produce ethanol. The Midwest, including Ohio, produces soybeans in abundance, which can allow a significant bio-diesel industry to grow.

The natural question arises – can bio fuels fully supply a whole nation like the US? The short answer is no, since demand far exceeds the capability of the land to grow the energy to meet the demand. A few encouraging facts: The US ethanol industry set a new monthly production record in June 2004, producing 220,000 barrels per day. Currently, the 81-plant industry in the US has capacity to produce 3.4 billion gallons per year, with 11 plants under construction.

[Continued on Page 4]



Anthracite Coal samples from the JM Anthracite Company in Pennsylvania

News and Announcements

WHAT	WHEN	WHERE
Eco-Building Guild Meetings	1st Thursday 6:00 pm	WSU Ext. Port Hadlock
Solar Home Tour	Saturday October 2	Nationwide, including NOP
Olympic Energy Expo	October 2004— <u>Cancelled</u>	Port Angeles

WHO WE ARE—Olympic Energy Systems, Inc.

Olympic Energy Systems, Inc. was founded by an electrical engineer in 2001 as a renewable energy consulting firm specializing in solar photovoltaic design. The company can now assist in the application of a variety of alternative and clean energy technologies—solar, wind, micro-hydro, fuels, energy efficiency, energy management, and cost analysis.

Company operations are located in Port Townsend, Washington and primarily serve the North Olympic Peninsula. Olympic Energy Systems uses local licensed contractors for installation.

The founder, Jonathan Clemens, relocated from Texas, where he was involved in local renewable energy activities. Serving on the board of the Texas Solar Energy Society (TxSES) proved a valuable experience for him. TxSES and the Texas Renewable Energy Industries Association (TREIA) hosts the annual Renewable Energy Roundup and Sustainability Fair in Fredericksburg, TX, where Jonathan has spoken about the Economics of Renewable Energy.

Olympic Energy Systems enjoyed hosting a booth at the Jefferson County Fair for the past 3 years.

Plans call for a continued local presence, through participating in the annual Solar Home Tour, Northwest Ecobuilding Guild activities, and other events.

For more information, contact:

Olympic Energy Systems, Inc.
907—19th Street
Port Townsend, WA 98368
(360) 379-2536
www.olympicenergysystems.com

Solar, Wind, and Micro Hydro Power

System Design and Consulting

Cost and Economic Analysis



Jonathan with Chris Stafford, an architect member of the Ecobuilding Guild

Curious? Bored? Want to jump into clean energy?

E-mail
OlympicEnergy@aol.com

BOOK REVIEW—"THE PRIZE—The Epic Quest For Oil, Money, and Power..."

Daniel Yergin's "THE PRIZE—The Epic Quest For Oil, Money, and Power" is nothing short of a documentary of modern life—it reads like a novel yet has the veracity and completeness of the most academic of scholarly publications. Mr. Yergin, PhD, is the President of Cambridge Energy Research Associates, and a past Lecturer at Harvard Business School.

Copyright: 1991 [a recent version is available]

Theme: Oil, Hydrocarbon Man, Modern History; Capitalism's Rise and its tie to Oil

Outline: Chronological, from the 1850's, addressing history, business, politics, economics

Notables: George Bissell (noted father of the oil industry), James

Townsend, Benjamin Silliman Jr., Colonel Edwin Drake, John D. Rockefeller (Standard Oil), Culouste Gulbenkian, Marcus Samuel (Shell) Winston Churchill, Henri Deterding, The Rothschilds, Nobel Brothers, Mellons, Dad Joiner, Doc Lloyd, George Bush, Saddam Hussein, many others

Quotables: "This is a narrative history at its finest—written in a grand and sweeping style with dramatic and compelling characters and events. *The Prize* is at once a history of oil, of the forces that have shaped the modern world, and a work of literature", says Doris Kearns Goodwin.

Facts: Too numerous to even summarize. Of note, in the 1950s and 1960s world energy consumption tripled, with US consumption of oil

tripling as well

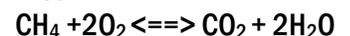
Highlights: First oil discovery in the US (Pennsylvania), the rise of Standard Oil, the work of independents, the dissolution of Standard Oil in 1911, discoveries of oil in Baku (Russia), Indonesia, Mexico, Venezuela, Middle East, Texas, Oklahoma, California, Libya, Alaska, and the North Sea; causes of wars and conflicts

Names: Aramco, Shell, Royal Dutch, Gulf, Texaco, Phillips, Continental, Occidental, Standard Oil derived Exxon, Mobil, Chevron, and Marathon (from the Ohio Oil Company, the Standard Oil's largest oil producer in 1911)

Footnotes: Each chapter is extensively researched and referenced

Length: Long at almost 900 pages (short for a history!)

Nice...



Nicer...



Check out the great workshops at Solar Energy International's website:
www.solarenergy.org

The San Juan Series occurs in Spring and Fall annually.

Energy Conservation—Topic at the July Solar Washington Member Meeting

Energy conservation – the efficient use of energy, with or without reducing the services or work provided – is simply doing more with less. The Solar Energy "industry" will have a challenge countering the predicted 1.4% average annual increase in US energy consumption through 2020, especially with energy efficiency improvements already included in the prediction. We might see the US consumption of 100 Quadrillion BTUs in 2000 climb to 130 Quadrillion BTUs in 2020. One quadrillion, or Quad, is a billion million BTUs, equivalent to the energy output of a PV array about 20 miles square.

The Solar Washington member meeting attendees on July 24 in Port Townsend all agreed that energy conservation is a top priority for the chapter, ASES, and the nation. The US per capita energy consumption is 4th out of 180 countries (at about 350 million BTUs per year) and is ¼ of the world's total, with per capita water consumption at the top of the list (at 1,932 cubic meters per year).

When the energy policies of the presidents since Carter are analyzed, one finds varying approaches and objectives in each administration. President Carter believed in government responsibility and

conservation. President Reagan sought less government and cut renewable energy funding, with President Bush I following a similar philosophy, with little or no conservation. President Clinton increased R&D and promoted appliance efficiency standards. President George W. Bush seeks energy security, pushing for more drilling and clean coal.

The US lags the world in energy conservation and efficiency. Per unit of GDP, the US consumes about 30% more energy than France, Germany, or Japan. The US per capita Green House Gas emissions are the world's highest. The federal government continues to reduce its annual consumption through its FEMP

(Federal Energy Management Program) program, which sets and pursues goals. Ongoing efforts (like variable speed fans, appliance efficiency standards, magnetic drive couplings, etc.) show investments in new equipment and technology, largely benefiting industry and utilities with reasonably short payback periods. Building efficiencies, particularly for residences, are stabilizing the demand for energy in that sector. Over 52% of the electricity generated in the US is derived from the burning of coal, so end use efficiency directly reduces the demand and use of coal. *Continued on Page 4*

New Projects



Grays
Harbor
College
Hydro



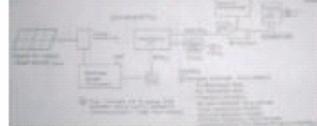
Forks Hydro



Olalla
Hydro



Carlsborg
Wind



Quilcene
Wind



Port Angeles
Solar

Olympic Energy Systems, Inc.

NEW! OES Releases its *Renewable Energy Cost Model (RCM) - Simplified Version SV1*

The **RCM** is a parametric model (run with Microsoft Excel) that allows for the computation of system costs and related economic aspects of renewable energy systems. The Simplified RCM is intentionally limited to Solar Photovoltaic and Solar Hot Water systems, allowing reasonable confidence cost estimates above that of ROM (Rough Order of Magnitude) estimates to approaching firm (quote or bid) estimates. The Simplified RCM requires the user to provide only a modest number of inputs, while not requiring the user to have more than a cursory knowledge of systems.

The RCM is a decision support tool, allowing anyone from the absolute beginner to a know-

ledged user or owner to evaluate the costs and economics of renewable energy systems. The user performs comparative analysis of various system options, without the tedious and repetitive computations and extensive research normally involved with such analysis. A user evaluates options easily and with reasonable confidence, instantly able to know whether or not a system investment pays back, either under current economic conditions or under a defined set of economic conditions.

Groundrules & Assumptions

The RCM provides estimated cost for fully installed and operational systems.

The RCM estimates in current year (2004) dollars and does not forecast prices or costs.

The RCM does not account for inflation. Discounting is based on specified interest rates.

The RCM does not provide firm quotes or bids, though estimates may be comparable.

The RCM assumes that no new superstructures (buildings, sheds, etc.) are built.

The Simplified RCM contains predefined variables or factors, including peak sun hours per day or the utility rate annual increases (throughout the operating life), that are not typically defined by the user. These variables or factors are accessible in cells outside the input region and are either not subject to change (as the Peak Sun Hours per Day annualized average) or not knowable or predictable (as the future increases in utility rates).

The Simplified RCM covers basic components and not optional or luxury items, such as extra monitors or meters or over specification.

The Simplified RCM model assumes basic installation techniques and does not consider special circumstances or custom installations.

The intended operating region of the subject RE systems is the Pacific Northwest and the North Olympic Peninsula in particular, at PSH per Day = 4.5. The model works anywhere, with only a need to compensate for different solar insolation levels.

**The Simplified RCM is
For Sale**



Olympic Energy Systems, Inc.
907 - 19th Street
Port Townsend, WA 98368
(360) 379-2536
E-mail: OlympicEnergy@aol.com

The solution on the horizon

JOIN THE
AMERICAN SOLAR ENERGY SOCIETY
WWW.ASES.ORG

Continued from Page 2...Conservation

But, the rising swell of energy demand (increasing faster in commerce and transportation) still threatens to undermine the gains from renewable energy and energy efficiency efforts. What more must we do?

Certainly, we all want good health, the ultimate goal of clean energy. We also want energy security and to save money.

What we need is the concept of energy conservation embedded into our very psyche, our being, our habits, our activities, and our goals. Solar Washington must find a way to mainstream energy conservation. For starters, we self-educate and learn all we can about conventional energy – the science, production, usage, and flow.

Continued from Page 1...Indigenous

The manufacture of liquid (and gaseous) fuel from coal was well known by the 1930s. Pulverized coal, heated with steam and oxygen to as high as 2000 degrees Fahrenheit, produces hydrogen and carbon monoxide, which can either directly feed turbines to produce electricity, or which upon the use of a catalyst is converted into gaseous and liquid fuel. In the 1940s Germany met over half of its military demand for fuel with synthetic fuels developed from coal, indigenous to Germany. In the 1950s and 1960s, demand for gasoline in the US tripled, largely met by existing US sources, by freely available foreign imports, and regulated (huge) supplies of Texas crude.

Secondly, we educate others, especially the young and school age. Thirdly, we involve ourselves up and down the energy realm – from government policies to industry cooperation and personal adoption.

Sustainable living resides at the elusive intersection of diverging energy demand and converging clean energy supply. Therefore, Solar Washington must build relationships with energy efficiency organizations (such as NWEA and ACEEE) and the host of sustainable living organizations (such as NWEI and The Sierra Club), government programs, industry, and personal activists to assure that energy – the foundation of our modern and globalizing economy – is central in all our efforts.

In the 1970s, the post Middle East oil crisis investment in domestic alternatives included the production of oil and fuel from shale found in Colorado and elsewhere, as well as the Alaska pipeline. The relative glut of world oil in the 1980s removed the incentive to further such R&D in shale oil. Removal of federal subsidies did not help, either. In the 1990s technical and economic viability allowed for the continued research in deriving fuel from Shale (and Coal Tar), available in natural deposits in western Canada. Coal Tar, originally considered a useless byproduct of making coke (for steel production), is known to contain over 125 compounds – leading to the manufacture of thousands of useful household and industrial products.

Solar Washington must build a diverse membership and do the do – formulating strategies, planning and implementing campaigns, and providing for individual activities in areas where each of us are strongest, whether it is writing, talking, studying, analyzing, promoting, teaching, building, or coordinating. And, we must start now and not just when the energy prices go up. Data sources: Energy Information Agency and the World Watch Institute



In 2002, plans were laid by the Gilbert Power Company (and Waste Management & Processors, Inc., with \$350M to back them up) to build the first commercial-scale plant in the US to produce oil from Anthracite Coal in Pennsylvania.. The end result will be a clean transportation fuel – indigenous, too.

According to the Energy Information Agency of the US Department of Energy (in 2003), the US demand for energy is expected to rise at an average 1.4% per year for the next 20 years, despite planned energy efficiency gains. Total US demand will rise from 100 to 130 Quadrillion BTUs by 2020. The proportion of renewable sources will remain at a few %.

If the US is to seriously pursue energy independence, then either the demand must be leveled and reduced (hardly possible in today's consumptive society), or else a portfolio of bio-fuels and coal-derived fuels must be developed on a large scale. What is needed? Public and personal will, government policies, money, research in science, and development of large-scale production plants. Above all, energy independence starts and continues with conservation.

[See related article "Energy Conservation", page 2]