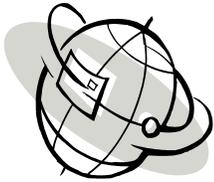


# Energy Issues

## IEP Newsletter



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LED "A" Type Lamp

Picture courtesy of Cree, Inc.

### LED Market Changing

By: Thomas D. Mull, PE, PEM, CEM

As with any developing technology there is a natural evolution. Initially, there is a period where one or two companies tend to dominate the market. Through innovative technology or new designs, their new product(s) or services provide previously unavailable attributes/benefits to customers. Among the most notable recently in the energy arena have been increased customer control flexibility, energy (\$) savings and environmental enhancements.

The initial product offerings tend to be expensive and limited. Quite often the developing companies will provide incentives through distributors, and/or utilities, to increase customer acceptance. As customer acceptance increases and technology improves costs come down and the availability/variety of offerings increases. Greater customer acceptance of a product or service provides an emphasis for additional companies, both foreign and domestic, to enter the market. Over time some of these companies fail due to poor product quality, inadequate customer service or an inability to offer quality products at a competitive price. Until the market matures it can become "top heavy" with providers. The most recent example of this has been LED lighting for general applications.

Initially, LED fixtures and replacement lamps were orders of magnitude more expensive than conventional offerings. For example, four (4) 60W incandescent

"A" lamps cost around \$2.00 in the U.S., while a single LED equivalent lamp (<10W) cost about \$10.00. However, with selected manufacturer incentives the cost for at least one offering was less than \$5.00 in limited locations. Today, the same lamp can be purchased, without an incentive, for less than \$3.00. While still more expensive, through enhanced offering (sizes, color temperatures, fixture designs, etc.), marketing, utility promotions, and local building code requirements for high efficiency lighting, customer acceptance of LED lamps and fixtures has increased exponentially in just a few years.

In 2013-15 Cree, Inc. was the industry leader in LED innovation and product development. They also garnered a significant portion of the retail market. While still recognized as a leader in innovation/product development, Cree is one among many companies offering long life, energy saving, environmentally friendly LED lamps/fixtures. More than 35 companies (Cree, Philips, General Electric, Sylvania Osram, Feit, Utilitec, LEDtronics, Green Energy Lighting, TCP, etc.) now offer LED lamps and/or fixtures for general service interior lighting applications. This increased involvement has resulted in more overall options and lower cost to the consumer.

Since the LED market is not yet mature, additional changes should be expected. Increased lamp/fixture offerings, higher efficacies, and lower cost options will be

## LED Market Changing (cont.)

By: Thomas D. Mull, PE, PEM, CEM

among the primary changes. With these changes the market structure will shift. The main players (Cree, Philips, Sylvania/Osram, GE, etc.) will remain a dominant force. Also, those that have established relationships with major distributors will continue to play a role. However, those that do not continue to innovate and respond to customer

requests for additional options or flexibility will fade and become a footnote in the evolution of LEDs.

With any developing technology we should expect the market to be responsive to innovation and customer input, i.e., change as the technology matures.



Picture courtesy of Cree, Inc.

## U.S. Shale Oil Production at All-Time High

By: IEP Staff Writer

According to *Oil Price.com*, shale oil production in the United States is trending to set an all-time high this summer. U.S. EIA has estimated June production at 5.348 million barrels per day (mb/d), resulting in the first double digit growth since mid-2015. Nearly all (98.5%) of the 5.25 thousand barrels per day (kb/d) production increase over the past year has come from the Permian Basin area\*. July projections are for an increase of 127 kb/day (to 5.475 mb/day), thereby surpassing the previous high set in the first quarter 2015.

With the increased production in the Permian Basin, other shale basins (Eagle Ford, Bakken, etc.) are beginning to grow steadily and contribute to the expansion of shale oil production, thereby solidifying the USA's position as the world's leading producer of oil and natural gas hydrocarbons in 2017.



U.S. Shale Oil Production areas in lower 48 states

Source: U.S. Energy Information Administration

### U.S. Shale Oil Production (Four Major Oil Contributing Regions)

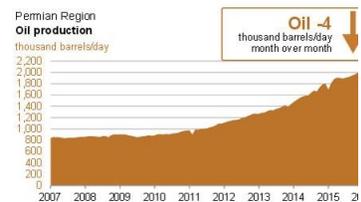
Month	Yr-over-Yr % Change in Shale Oil Production							Sequential % Change in Shale Oil Production				
	Bakken	Eagle Ford	Haynesville	Marcellus	Niobrara	Permian	Total (a)	Bakken	Eagle Ford	Niobrara	Permian	Total (a)
Jun 17 Est	-1.5%	4.7%	1.9%	5.1%	8.4%	25.0%	11.8%	0.6%	2.9%	1.4%	3.0%	2.3%
May 17 Est	-4.0%	-0.9%	-0.8%	1.1%	5.1%	21.9%	8.0%	0.2%	3.0%	1.7%	2.6%	2.1%
Apr 17	-4.0%	-7.5%	-4.0%	-5.1%	0.9%	18.8%	4.4%	-0.3%	2.2%	1.8%	2.7%	1.8%
Mar 17	-9.3%	-12.3%	-5.4%	1.1%	-2.1%	16.2%	0.4%	-0.8%	0.9%	2.6%	2.3%	1.3%
Feb 17	-9.2%	-16.1%	-9.9%	-4.9%	-6.8%	14.5%	-2.1%	4.3%	-0.5%	2.5%	4.7%	3.1%
Jan 17	-12.6%	-18.0%	-11.9%	-7.3%	-11.2%	11.6%	-5.1%	3.4%	0.1%	0.0%	1.7%	1.6%
Dec 16	-18.2%	-20.3%	-12.2%	-7.5%	-12.8%	14.6%	-6.8%	-8.2%	0.2%	-2.0%	0.3%	-1.8%
Nov 16	-13.2%	-20.2%	-11.6%	2.7%	-13.4%	7.7%	-7.6%	-1.3%	-0.3%	-1.7%	1.0%	-0.1%
Oct 16	-11.5%	-21.7%	-10.6%	-2.7%	-12.4%	8.6%	-7.4%	7.4%	-0.4%	0.4%	2.0%	2.3%
Sep 16	-17.0%	-21.5%	-13.4%	-5.3%	-10.4%	5.9%	-9.4%	-1.4%	0.2%	-1.0%	-0.6%	-0.7%
Aug 16	-17.7%	-22.4%	-13.7%	2.6%	-12.1%	7.8%	-9.3%	-4.7%	-2.1%	-0.6%	1.1%	-1.2%
Jul 16	-15.1%	-23.6%	-16.2%	-4.9%	-10.6%	9.0%	-8.7%	0.1%	-1.5%	3.0%	1.9%	0.6%
Jun 16	-15.5%	-22.2%	-16.2%	-9.3%	-12.0%	5.5%	-9.7%	-2.0%	-2.6%	-1.7%	0.4%	-1.1%

Sources: U.S. Energy Information Administration (EIA) Drilling Productivity Report and Forge River Rqsearch.

Notes:

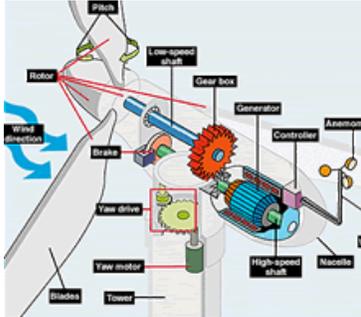
(a) Totals include oil production from Haynesville, Marcellus, and Utica.

\* Permian Basin is a major oil and gas production area that covers a portion of West Texas and eastern New Mexico.



U.S. Energy Information Administration | Drilling Productivity Report

Diagram of Wind Turbine Components



Source: National Renewable Energy Laboratory, U.S. Department of Energy



Commercial Solar Application



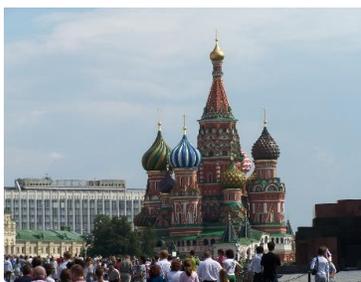
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## Energy Subsidies Favor Wind and Solar

By: IEP Staff Writer

In a May 30<sup>th</sup> article appearing in Forbe's online publication, contributor John Conca asked the question *Why Do Federal Subsidies Make Renewable Energy So Costly?* In the article he stated that on a total dollar expended basis wind energy has received the largest portion of U.S. government federal energy subsidies, with solar coming in second. Collectively, wind and solar energy have received more in subsidies than all other energy sources combined.

According to the U.S. Energy Information Administration and the University of Texas, from 2010 through 2013 federal renewable energy subsidies increased by 54% (to \$13.2 billion), while total federal energy subsidies overall declined by 23%.

When the actual production of electrical energy (kWh) is considered, solar energy has received more than ten (10) times the subsidies of all other energy sources combines. Over the past six (6) years

solar increases have ranged between \$0.10 and \$0.88 per kWh, while subsidies for wind were between \$0.013 and \$0.057¢ per kWh.

Solar also gets the most state-funded subsidies, some of which greatly exceed the federal subsidies. In the State of Washington for example, where residential electricity prices are in the range of \$0.08¢/kWh, the State pays \$0.54 for every kWh generated by rooftop solar arrays, making residential electrical costs negative.

While subsidies incentivize renewables, the author stated that *they ultimately increase the cost of electricity generated by them*. His position is that when considering the total cost of production, these subsidies should be added to the retail cost of that energy. Instead, this additional cost is transferred from the ratepayer to the taxpayer. Therefore, it essentially goes unnoticed and can grossly understate the true cost of the energy produced.

## Russian Plans to Privatize the Oil Industry on Hold

By: IEP Staff Writer

There is no doubt the Russian economy is highly dependent upon its energy production. While the specific contribution is a question of speculation, according to the Russian Finance Ministry in 2016 about 40% of the country's revenue came from the oil industry. In 2014 oil contributed approximately 50% of the country's income. The lower value last year was the result of the decline in the price of oil.

The former Finance Minister Alexey Kudrin, at the recent International Economic Forum in St. Petersburg was quoted as saying *"The oil sector should be fully privatized in the next 7-8 years, no state companies are required there now as the statehood brings more harm than benefit to those companies,"*

In stark contrast Dmitry Peskov, Kremlin spokesman, said that Russia does not plan to further privatize the oil sector. Peskov noted that while Kudrin's opinion is a *"well-known expert point of view"* and while he reasonably defends this position, it is not the only opinion on the table. For now, Moscow has no plans to privatize any state-owned companies.

Source: Oil Price.com