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worldflow energy monitor



daniel bernoulli



**Oil & Gas
Refining & Petrochemical
Power & Renewables**

Q3 2005

Every quarter the Worldflow Energy Monitor shines its spotlight on the oil & gas, refining & petrochemical, and power & renewables industries, looking for important events to discuss or highlight.

We find the events, report them, and place them in the context of the flow industry. The Monitor explains and interprets the importance of capital spending forecasts, the construction of new refineries and plants, and new regulations that affect the need for more instrumentation.

The Worldflow Monitor gives you the information you need for forecasting, marketing, and making decisions on product features.



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Worldflow Energy Monitor

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Worldflow Energy Monitor

Q3, 2005

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A guide to the Energy Monitor

The Monitor covers the following industries

- Oil & Gas, Refining & Petrochemical
- Power and Renewables

Each Industry Section is divided into these four segments:

- **In the News**—Covers recent developments among the companies and products
- **Industry Pulse**—Covers shipments numbers and regulations that govern the industry
- **New Projects**—Lists new construction projects worldwide that instrumentation companies could potentially bid on
- **Company Korner**—Provides an in-depth look at one of the major companies in this industry

Exciting new stock and news features available on Flow Research websites.

As an added service to our clients, we have added some exciting new features to our websites. On the Flow Research website (www.flowresearch.com), you can follow the stocks of 25 of the top instrumentation and energy companies. Stock prices are listed as they change on the New York stock exchanges. Some of the companies listed include ABB, Badger Meter, Cooper Cameron, Danaher, Emerson Electric, FMC Technologies, Honeywell, Roper Industries, Siemens, and Teledyne. A related feature, the Stock Quote Box, allows you to get a quote on the stock of any publicly traded company. Simply type the stock symbol for the company into the open window. **Feel free to use this valuable feature as a research tool if you need information on any publicly traded companies in any field.**

On another section of our homepage, you will find the latest headlines and news stories relating to Crude Oil. Click on the More News link below this news box to find the latest headlines and news stories from the areas of Oil and Energy, Business, World News, and Asia. Click on the Real Time News Ticker to watch the news stories scroll by. Be sure to take advantage of these free services from Flow Research as a way to keep yourself informed on important developments that may affect the instrumentation markets! Go to www.flowresearch.com to start using these free services immediately.

We have also created a new website devoted to information about the oil industry. This website is called www.oilflows.com. Currently, at this website, you can find 25 top oil and energy stocks listed. Included are companies such as BP, Halliburton, Total, and ExxonMobil. The stock prices are listed as they change on the New York stock exchanges. Watch this site for more timely information relating to the oil industry.



In addition to the website on the oil industry, we have created a new website devoted to information about the gas industry. This website is called www.gasflows.com. Currently, at this site, you can find 25 of the top companies listed who are involved in the gas industry. Included are companies such as Blue Dolphin Energy, Devon Energy, Quicksilver Resources, and The Exploration Company. The stock prices are listed as they change on the New York stock exchanges. Watch this

site for more timely information relating to the gas industry.

Both www.oilflows.com and www.gasflows.com have the handy Stock Quote Box so that you can get a quote on any stock that trades on the New York exchanges. We hope you will take advantage of these new free services from Flow Research!

Issues and Perspectives

A new era in energy generates opportunities for flow

By Jesse Yoder

Those of you who have been following the *Process Industry Monitor* over the past three years will no doubt notice that this edition has a new look. In fact, we have renamed this publication the *Worldflow Energy Monitor*, although we are keeping the name *Process Industry Monitor* to refer to a broader series of publications that, for now, just happens to have only one member – the *Worldflow Energy Monitor*. Why the change, and what are the implications for Worldflow?

What we have done with the *Worldflow Energy Monitor* is to pick a subset of the industries that were formerly being covered in the *Process Industry Monitor*, and make them the center of focus for the *Energy Monitor*. These industries include:

- Oil & gas exploration, production, and transportation
- Refining
- Petrochemical
- Power
- Renewables
- District heating

Putting these industries together in one Monitor, the Energy Monitor, will enable us to provide more adequate coverage for these industries. Furthermore, these industries are related to each other in a way that the chemical, food processing, pulp & paper, and water & wastewater industries are not. Because the energy industries we are covering are related to each other, we can provide more focused and coherent coverage than when we were reporting on six different industries that were largely unrelated.

Rapidly changing industry prompts focus on energy

Probably the single most important reason for making the switch from the broader *Process Industry Monitor* to the more narrowly focused *Energy Monitor* is that the energy industries are changing more rapidly than the other industries. The primary reason for the change is the combination of increased demand for oil and natural gas, together with diminishing long-



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Issues and Perspectives

A new era in energy generates opportunities for flow

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term supply of both those commodities. The result has been a doubling in price of a barrel of crude oil over the past year, and a dramatic shift in the economies involved in oil production and exploration. The rise in the price of oil to nearly \$70 a barrel is making it profitable to drill in areas and fields that were formerly unprofitable. It is also doing what environmentalists have been unable to do up to this point – dramatically increase the search for alternative sources of energy. The “alternative” here means “alternative to fossil fuels.”



This does not mean that we think that following the chemical and water & wastewater industries is unimportant. On the contrary, these industries, along with food processing, are among the most vital industries to flowmeter manufacturers. It simply means that the changes that are occurring in the energy industry are so dramatic and important that we believe it deserves its own *Monitor*. We leave open the possibility of doing another *Monitor* on chemical, food, and pharmaceutical, for example, or on water & wastewater and pulp & paper. We welcome your input on these subjects.

The beginning of a new era in energy

We are at the beginning of a new era in energy. This new era is brought about by fundamental changes in the availability of the traditional sources of energy that industrialized countries have relied on for many years. Briefly put, we are coming to the end of the time when we can behave as if the supply of oil and natural gas is unlimited. Instead, we need to begin to take seriously the idea that there is only a finite and limited amount of oil and natural gas left in the world, and that over time industrialized countries will have to find new sources of energy. While some people have been aware of this for many years, it is only within the past year that this awareness has penetrated into the ranks of the energy suppliers themselves.

Greater demand for flow measurement and multiphase flow

We believe that this is the optimal time to launch the new *Worldflow Energy Monitor*. The increased value of oil and natural gas means that the companies will be willing to spend more money measuring oil and natural gas. Increased demand is already resulting in increased drilling activity worldwide. This is generating more demand for flow measurement at well sites, including an increased need for multiphase flow measurement. On the downstream side, higher oil prices are likely to generate demand for more accurate methods of measuring oil that is delivered by truck to homes and offices. The rising price of jet fuel means it is a more valuable

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A new era in energy generates opportunities for flow

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commodity that may have to be measured more precisely.

Renewables poised for an explosion of interest

At the same time, the renewables industry is at the early point of what is likely to be an explosion of interest. Of special interest to flowmeter manufacturers is the development of fuel cells, the production of which requires flow measurement. It is less clear to what extent wind energy generation or the development of solar energy require flow measurement. But it is safe to say that the changes in the energy sector that are occurring represent a substantial opportunity for suppliers of flow, pressure, and temperature measuring equipment. What is vital is having the right information and intelligence to take advantage of these opportunities, and that is where the *Worldflow Energy Monitor* comes in.

Flow Research rides the waves with you

How does Flow Research fit into the equation? Flow Research is like a steamboat that rides on the waves of

the flow-meter industry. Founded in 1998, we have become much more comfortable and established in our native waters of the flow-meter business. We have also



successfully voyaged into the inlets that represent pressure and temperature products. As we grow, we pick up steam, and become more of a fixture in these waters. We are here to stay, and we are privileged to be cruising alongside you.

Issues and Perspectives

Feeling energized about our new focus



By Belinda Burum

Welcome to the first issue of *Worldflow Energy Monitor*, which flows from our successful three-year-old *Worldflow Process Industry Monitor*.

It's no secret that the importance of energy is heating up around the world, affecting industry, economy, politics, and individual consumers. At Flow Research we feel oil & gas, refining, petrochemicals, and renewables are so important that we decided to focus our own precious resources on those industries every quarter.

We're excited about our first issue and hope you'll find it useful and informative. We're pleased to report on the new U.S. Energy Bill, China's effect on the energy scene, unconventional gas resources becoming more mainstream, district heating for greater end-user energy efficiency, and wind power's growing ability to meet energy needs.

You may notice that Swiss mathematician Daniel Bernoulli, who appeared on earlier editions of the Monitor, is back on the cover. Although his hairstyle is dated, we feel his principle of energy conservation — a foundation of modern flow technology, particularly differential pressure — is still apt.



As many of you probably know, Bernoulli (1700-1782), discovered the relationship between the density of fluid in a pipe, the speed it travels in the pipe, and the pressure. Bernoulli's theorem (also sometimes called the Venturi effect) states that the total mechanical energy of an ideal flowing fluid — the energy associated with fluid pressure, the gravitational potential energy of elevation, and the kinetic energy of fluid motion — remains constant. If fluid flows horizontally with no change in gravitational potential energy, a decrease in the pressure of the fluid is associated with an increase in the velocity of the fluid. When flowing through a horizontal pipe that has cross-sectional areas that vary in width, the fluid speeds up in constricted areas so that the pressure exerted by the fluid is lowest where the cross-section is smallest.

In addition to research in other fields, Bernoulli discussed pumps and other machines to raise water, and developed a basis for the kinetic theory of gases. His medical work on blood flow and blood pressure helped stimulate his interest in fluid flow.

Today we are interested in a different kind of energy conservation, looking for ways to be more efficient and exploring alternatives as we reach for more fossil fuel to keep our society moving, our buildings heated, our airplanes flying, and our cars on the road.

How the world navigates the myriad energy challenges facing all of us should be exciting. We look forward to sharing those developments with you in the months to come.

Issues and Perspectives

Long-awaited \$14.5 billion U.S. Energy Bill won't lower prices now, but may help over the next 5 to 10 years

*A Flow Research Special Summary
by Belinda Burum*

The U.S.'s first major overhaul of the national energy policy in 13 years may help reduce dependency on oil imports in the longterm, but is expected to do little to reduce oil prices in the immediate future.

The bill provides \$14.5 billion in tax breaks and potentially billions more in loan guarantees to encourage oil and gas drilling, improve natural gas and electric transmission lines, build new nuclear power reactors, and expand renewable energy sources, especially construction of wind turbines.

Its cost, put at \$12.3 billion after revenue offsets, is nearly twice the \$6.7 billion the White House had sought. The bill's cost was overridden by its widespread political support, in part because it includes something for virtually everyone, including a wide array of tax incentives and tax breaks to virtually every energy industry.

Both sides say oil prices will stay high

Proponents say the bill will eventually lower prices and reduce pollution from traditional fossil fuels as it boosts energy production and efficiency through new nuclear power plants, clean coal technology, and wind energy.

Critics say the nation's first comprehensive energy legislation will do little to change the nation's energy course — and grants too many subsidies to industry.

Both proponents and critics, however, including the president and the bill's sponsors, acknowledge that in the short term the new plan

will not reduce the cost to consumers of either gasoline or natural gas any time soon.

"This bill is not going to solve our energy challenges overnight," President George W. Bush said in Albuquerque, New Mexico, on Monday, August 8, when he signed the 1,724-page bipartisan bill that passed July 29 after a year-long standoff.

"Most of the serious problems, such as high gasoline costs and rising dependence on foreign oil, have developed over decades. It's going to take years of focused effort to alleviate those problems."



Sen. Pete Domenici, R-New Mexico, who led the Senate negotiations with the House in crafting the legislation, said the bill provides financial incentives and federal policies "that we as a nation will benefit from not tomorrow, but for the next five or 10 years."

Improving the infrastructure

Under political pressure to do something about the nation's energy problems in light of soaring oil and gasoline prices, Bush challenged Congress to provide him a bill before lawmakers departed on a five-week summer recess in August. Both branches had passed versions of the bill, which a conference refined. Capping nearly four years of debate, the House of Representatives approved the report on July 28 by

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Issues and Perspectives

Energy Bill may help over the next 5 to 10 years (cont.)

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a vote of 275-156 and the Senate passed it a day later 74 to 26. They avoided a fight in the Senate by leaving out one of President's Bush's top energy goals: opening the Arctic National Wildlife Refuge (ANWR) in Alaska to oil drilling. House Republicans promised to pursue that issue separately. President Bush signed the bill into law August 8.

What the bill provides

The bill as signed:

- Offers tax breaks for the purchase of hybrid-electric cars and for home energy conservation improvements in their homes.
- Directs doubling of corn-based ethanol use in gasoline to 7.5 billion gallons in 2012, a provision embraced by Farm Belt lawmakers, both Democrats and Republicans.
- Expands the federal government's authority over citing liquefied natural gas import terminals, overriding local or state opposition if necessary.
- For the first time, requires utilities to meet federal reliability standards for the electricity grid to try to avoid a repeat of the massive 2003 blackout that hit the Midwest and Northeast.
- Permits MTBE (methyl tertiary-butyl ether) claims to be moved to federal courts



- Repeals the 2% oxygenate requirement in reformulated gasoline.
- Allows refineries to expense 50% of cost of equipment used in refining liquid fuels through 2011.
- Provides exclusive authority to FERC (Federal Energy Regulatory Commission) for LNG terminal siting.
- Provides for a seismic inventory of oil and gas reserves on the outer continental shelf.
- Directs federal agencies to plan to limit "boutique" fuels and establish an advanced biofuel technologies program.
- Takes steps to address numerous infrastructure problems, especially with pipelines and electricity transmission.
- Promotes adoption of hybrid vehicles through tax cuts and backs growth in renewables such as solar and wind power.
- Expands daylight-saving time by one month, adding three weeks in the spring and a week in the fall, beginning in 2007.

What the bill does not provide

The bill does *not include*:

- Provision for ANWR oil drilling
- Limited liability for MTBE or an MTBE ban
- Provisions for the transportation sector, which accounts for more than two-thirds of U.S. oil consumption. Congress voted down measures to raise fuel-efficiency requirements.

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Issues and Perspectives

Energy Bill may help over the next 5 to 10 years (cont.)

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Industry applauds bill, but wants more

The **National Petrochemical & Refiners Association** (NPRA) believes the bill makes “some progress” in increasing energy supplies and encouraging improvements in the U.S. energy infrastructure. It gives thumbs up to the bill for:

- Encouraging additional investment to expand U.S. refining output.
- Obtaining greater access to LNG supplies.
- Language requiring an inventory of U.S. offshore gas resources, which they feel will benefit: both the petrochemical and refining industries.

NPRA give thumbs down for:

- Absence of provisions regarding limited MTBE liability. “This means that industry resources — better employed to produce fuel — will have to be used instead to contest legal actions that seek to penalize our members for obeying the requirements of the Clean Air Act.
- The mandate for the use of 7.5 billion gallons of *ethanol in the nation’s gasoline by 2012*, which it says *will make it more difficult and costly for refiners to manufacture gasoline.*

The **American Petroleum Institute** applauded the bill, saying it looks forward to working with Congress to produce *follow-on* energy legislation.

The **American Wind Energy Association** (AWEA) *praised the extension* to the end of

2007 of the wind energy Production Tax Credit (PTC) which was scheduled to expire on December 31, 2005. It provides a 1.9 cent-per-kilowatt-hour (kWh) tax credit for electricity generated with wind turbines over the first 10 years of a project’s operations, and is a critical factor in financing new wind farms.

The **Coalition for Affordable and Reliable Energy (CARE)** said the bill represents a significant milestone in promoting energy price stability, energy resource diversity, and in pioneering technologies and reliable supply for the first time in years.

“After years of serious debate, Congress has finally passed comprehensive legislation that ultimately will help ensure energy security, economic growth and energy price stability, while protecting the environment,” said Paul Oakley, executive director of CARE.



American Gas Association (AGA) President David Parker said, “*Our work is just starting.*” While the top levels at the Interior Dept. are dedicated to increasing land access for drilling, “*they need help at the lower levels.*”

Parker said the AGA is working closely with the House, particularly on National Environ-

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Issues and Perspectives

Bill — a ‘mixed blessing’ — focuses on traditional sources

Commentary by Jesse Yoder

The new energy bill is a mixed blessing. The bill is primarily oriented towards the traditional energy industries. Of the \$14.5 billion in tax breaks contained in the bill, almost \$9 billion is earmarked for the oil and gas industry, while less than \$5 billion is designated for energy efficiency and renewable energy programs.

Both the coal and the nuclear industries will benefit from this bill. Nuclear power advocates say this bill will encourage the building of nuclear power plants. No new nuclear power plants have been built in the United States since the Three-Mile Island accident in 1979. The bill provides incentives for coal-fired plants to cut pollution.

Included in the bill are provisions to provide oil and gas companies with royalty relief for production in the deep waters of the Gulf of Mexico. Other tax breaks will go to refineries for enlarging capacity.

In terms of renewables, the bill required doubling the supply of corn-based ethanol used in gasoline by 2012. It also encourages the construction of wind turbines as a source of power.

How the energy debate is framed: a classic division in problem solving

The energy bill reflects a classic division in thinking about how to proceed to solve our growing energy problem. The energy problem is a result of the fact that we face steadily increasing demand along with diminishing energy supplies.

The more traditional or “conservative” solution to this problem is to increase our search for oil and gas, and also to go back to the older ways of producing energy: nuclear energy and coal.

While these solutions are not necessarily bad, they may have a negative effect on the environment, depending on how they are handled.

The more progressive or “liberal” way of thinking is to try to place limits on our use of fossil fuels, to conserve the environment, while simultaneously pursuing new methods of generating energy. These new methods include fuel cells, hydrogen, wind turbines, and solar power. Ethanol could also be placed in this category.

This is a situation where both sides are right. Clearly, we need to find more oil and gas, where it is available, and to improve our technologies for oil and gas recovery. At the same time, we need to develop alternative sources of energy that can eventually take the place of oil and gas, as that finite supply winds down.

The energy bill is the product of a Republican White House, and a Republican dominated House and Senate. So it is not surprising that the Energy Bill is tilted towards the more conservative solutions to our energy problem. Unfortunately, we will eventually run out of fossil fuels, and so will be forced to look at new and innovative energy solutions. We plan to chronicle these events in the *Worldflow Energy Monitor*.

Energy Bill may help over the next 5 to 10 years

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mental Policy Act “*to make sure the regulations that are written are something we can live with because we will have to live with them for the next 20 years.*”

Parker said utilities are becoming very active in the drive to remove restrictions to drilling.

Issues and Perspectives

Arctic drilling supporters plot new tactics

Monday, August 8, 2005, WASHINGTON (AP) — Conspicuous by its absence in the sweeping energy bill that President Bush signed is his top energy priority: opening an Alaska wildlife refuge to oil drilling.

But the fight over the future of the Arctic National Wildlife Refuge will flare anew in Congress next month with drilling advocates saying they have their best chance in more than two decades of making it happen.

Tapping what is believed to be at least 10 billion barrels of oil within the refuge's 1.5 million-acre coastal plain has been the centerpiece of Bush's energy agenda dating back to his first presidential campaign in 2000. Bush has repeatedly said the oil is important to the nation's national and economic security.

But the idea that drilling proponents might win has produced outrage among environmentalists, who see the region as a pristine refuge where caribou, polar bears, migratory birds and other wildlife thrive and should be protected.

A coalition of most Democrats and a handful of moderate Republicans repeatedly has thwarted attempts to open the refuge to energy development through the power of the Senate filibuster.

But drilling advocates have a backup plan that is expected to unfold in mid-September.

Domenici said he will include a provision authorizing ANWR drilling as part of a budget procedure that is immune to filibuster. A similar maneuver is being planned in the House, although the final strategy is still being worked out. Unlike normal legislation, the budget process is not subject to filibuster, so only 51 votes will be needed in the Senate for it to clear Congress and be signed into law by the



president. Just such a tactic was used a decade ago when Congress approved ANWR drilling as part of the budget process, only to see the measure vetoed by then-President Clinton, a drilling opponent.

Sen. Lisa Murkowski, R-Alaska, said her state's delegation is determined to push for opening the refuge, calling it "the final component" of a national energy plan that she hopes will be put in place later this year.

Alaska would get half of the proceeds from oil leases, which the Congressional Budget Office has estimated at \$5 billion over five years, shared equally by the federal government and the state.

This expected revenue is at the heart of the strategy drilling supporters plan to pursue to end more than 20 years of debate over access to ANWR's oil. The budget will assume \$2.5 billion in federal revenue from ANWR lease sales, beginning in 2007. That, in turn will allow lawmakers to draft an accompanying document authorizing such drilling — a so-called "reconciliation" document which is not subject to filibuster and when signed by the president will have the force of law.

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Global Spotlight: China

In this issue we focus our global spotlight on China, whose rapid growth and industrialization are making waves in the world energy market.

