

POWER



ECOSYSTEMS

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High hopes and hard truths dictate future

Click on the headline (link) for the full text.

Jeroen van der Veer, CEO Royal Dutch Shell as published in UK Times

Efforts to fight global warming will be wasted unless we concentrate on energy efficiency

When it comes to the future of energy, the world needs a reality check. Contrary to public opinion, renewable energy is not the silver bullet that will soon solve all our problems. Indeed, in the years ahead, three hard truths will generate turbulence in the global energy system.

We all know that global demand for energy is growing, but the reality of how fast hasn't registered. The first hard truth is that demand is accelerating. Energy use in 2050 may be twice as high as today, and higher still. The main causes are population growth, from six to more than nine billion people, and higher levels of prosperity. China and India are entering the energy-intensive phase of their development. At the point when people buy their first television or car, or board a plane for the first time, and they consume much more transport fuel and electricity. And most people in China and India have not yet boarded a plane yet! The pace of change is startling. Last year, China enlarged its electricity generating capacity roughly the equivalent of Great Britain's entire stock of power stations.

The second hard truth is that the growth rate of supplies of "easy oil", conventional oil and natural gas, which are relatively easy to extract, will struggle to keep up with accelerating demand. Just when demand is surging, many of the world's conventional oilfields are going into decline. The problem is not the availability of resources as such. Overall, the International Energy Agency believes that there are roughly 20 trillion barrels oil equivalent of oil and natural gas in place. This includes both conventional and unconventional resources, such as oil shale and sands. In theory, this is enough to keep us supplied for about 400 years at the current rate of consumption. In practice, though, less than half can be produced with existing technology. The world now produces 135 million barrels oil equivalent a day

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gas. We could still raise that number with new technologies, but only gradually and certainly not indefinitely.

The third hard truth is that increased coal use will cause higher CO2 emissions, possibly to a level that we deem unacceptable.

...So what about renewables, such as wind and solar energy? The share of renewables in the energy mix could go up from its existing very low base of about 1 per cent to about 30 per cent in the middle of the century. ...But even then, fossil energy will still make up most of the remaining energy. However, this is out of sync with what opinion polls show that most Americans and Europeans believe that renewable energy will have replaced most fossil energy by 2050. As the hard truths mentioned simply isn't going to happen.

That is why energy efficiency is so important. More than half the energy we generate even

...The world's energy system is entering a turbulent phase, and the only question is: how will a more cooperative world will respond more effectively than a fragmented one. Provided governments set the right rules and incentives, and don't throw up barriers, the global market will direct money to the best solutions.

The author is chief executive of Royal Dutch Shell
(25 June 2007)

Oil and Gas Execs Say Focus on Renewable Energy Sources Key to Address Declining Oil Reserves, KPMG Survey Finds

***But Mass Production of Renewable Fuel Not A Near-Term Possibility, Say 60 Percent
60 Percent Believe Trend of Declining Reserves is Irreversible***

HOUSTON, May 11, 2007 - Oil and Gas Executives say government involvement in supporting the development of renewable energy sources is necessary to alleviate the problem of declining oil reserves, according to a survey conducted by KPMG LLP, the audit, tax and advisory firm.

In the KPMG survey, which polled 553 financial executives from oil and gas companies in April 2007, two-thirds of the respondents said that at least 75 percent of government funding into energy should be directed at renewable energy sources and a further 44 percent said that at least 50 percent of funding should be allocated in that way. These feelings stem from the overwhelming majority, or 82 percent, citing declining oil reserves as a concern.

"These executives are deeply concerned about declining oil reserves, a situation they see as irreversible," said Bill Kimble, National Line of Business Leader, Industrial Markets for KPMG LLP. "They see renewable energy sources as a lifeline but our survey shows that the execs recognize they cannot count on them as a sole energy source in the long term. Consequently, oil and gas companies are sending a clear signal to the government that intervention is needed."

While oil and gas executives are keen to see renewable energy sources becoming a mass produced resource, they say that will not be possible by 2010. Of those that believe it will, 18 percent say ethanol is the most viable option for production by then, 13 percent say biodiesel and only 3 percent say cellulosic ethanol.

Sixty percent of the executives believe that the trend of declining oil reserves is irreversible. And, when considering the impact of emerging markets, such as China, will have on declining oil reserves, almost 70 percent of the executives believe that it would lead the situation to worsen.

The executives also clearly see that there are steps that individuals can take to alleviate the issue of de

reserves.

"One-third of oil and gas executives questioned said that the next time they are purchasing a family car they will consider one that consumes less gasoline, such as a hybrid," said Kimble. "They clearly see demand-side solutions as a solution to declining oil reserves."

When executives were asked about their upstream capital spending in the 2006 survey, the majority indicated that investment will be a factor in helping them manage declining oil reserves. Sixty-nine percent said that it will increase by more than 10 percent, a jump of 49 percent over 2005. The 2007 survey suggests that increases in investment are flattening, with 35 percent saying they expect an increase of more than 10 percent, 19 percent saying they expect an increase of up to ten percent, and 38 percent say it will stay the same. Only seven percent expect to see a decrease.

Mergers and acquisitions continue to be a trend, with 24 percent of the executives saying that they expect to be involved in one in the next year -- a three percent increase over last year's survey. Sixty eight percent of respondents expect private equity to play a larger role over the next year than it has in previous years.

As financial executives, the respondents put a great deal of their focus on the risks facing their companies. Sixty percent say that the biggest risk facing their company at this time is financial; such as satisfying new regulatory requirements and shareholder demands. The next biggest risks cited, at nine percent each, were "political instability in certain countries in which your company has operations" and "insufficient access to drilling rigs".

Other Findings

Sixty-five percent of the respondents say that while they believe global warming is occurring, it is a natural phenomenon and 11 percent say that they do not believe it is occurring. Just under a quarter believe CO-2- induced global warming is occurring.

KPMG will be discussing these survey results during its Fifth Annual Global Energy Conference. Please visit the conference website for more information www.kpmgglobalenergyconference.com.

MORE PROFIT WITH LESS

CARBON

BY AMORY B. LOVINS (excerpts from a Sept 2005 Scientific American article)

Focusing on energy efficiency will do more than protect Earth's climate and make businesses and consumers richer

Using energy more efficiently offers an economic bonanza – not because the benefits of stopping global warming by saving fossil fuel is a lot cheaper than buying it. If properly done, climate protection actually reduces costs, not increases them.

The world abounds with proven ways to use energy more productively, and smart businesses are leaping to take advantage. In the past decade, chemical manufacturer DuPont has boosted production nearly 30 percent but cut energy consumption 20 percent and greenhouse gas emissions 72 percent (measured in terms of their carbon dioxide equivalent), saving more than \$1 billion. Five other major firms—IBM, British Telecom, Alcan, NorskeCanada and Bayer—have collectively saved more than \$2 billion since the early 1990s by reducing their carbon emissions more than 60 percent. In 2001 oil giant ExxonMobil set a goal of reducing carbon dioxide emissions 10 percent below the company's 1990 level, thereby cutting its energy costs \$100 million over 10 years. In May 2005, General Electric vowed to raise its energy efficiency 30 percent by 2010 to increase its company's shareholder value. These sharp-penciled firms, and dozens like them, know that energy efficiency is the bottom line.

Converting coal at the power plant into incandescent light is only 3 percent efficient. Most of the waste heat is lost to the atmosphere.

power stations—which amounts to 20 percent more energy than Japan uses for everything—could be used to power the U.S. About 5 percent of household electricity in the U.S. is lost to energizing computers, televisions and other electronics that are turned off. (The electricity wasted by poorly designed standby circuitry is equivalent to the output of more than 100 megawatt power stations running full-tilt.) In all, preventable energy waste costs Americans hundreds of billions of dollars and the global economy more than \$1 trillion a year, destabilizing the climate while producing no value.

If energy efficiency has so much potential, why isn't everyone pursuing it? One obstacle is that many people fear that energy efficiency (doing more with less) with curtailment, discomfort or privation (doing less, worse or without). Another is that energy users do not recognize how much they can benefit from improving efficiency, because savings come in millions of invisibly small pieces, not in obvious big chunks. Most people lack the time and attention to learn about efficiency techniques, which evolve so quickly that even experts cannot keep up. Moreover, taxpayer-funded energy subsidies made energy seem cheap. Although the U.S. government has declared that bolstering efficiency is a priority, the message is mostly rhetorical. And scores of ingrained rules and habits block efficiency efforts or actually reward waste. Simple changes can turn all these obstacles into business opportunities.

Enhancing efficiency is the most vital step toward creating a climate-safe energy system, but switching to renewable energy and carbon capture will also play an important role. The world economy is already decarbonizing: over the past two centuries, fossil fuels such as coal have given way to fuels with less carbon (oil and natural gas) or with none (renewable sources like solar, wind and wind power). This decarbonization trend is reinforced by greater efficiencies in converting, distributing and using energy. For example, combining the production of heat and electricity can extract twice as much useful work from each unit of energy emitted into the atmosphere. Together these advances could dramatically reduce total carbon emissions by 2050 as the global economy expands. This article focuses on the biggest prize: wringing more work from each unit of energy used by businesses and consumers. Increasing end-use efficiency can yield huge savings in fuel, pollution and carbon emissions. Large amounts of energy are lost at every stage of the journey from production sites to delivered services. Small reductions in the power used at the downstream end of the chain can enormously lower the required input at the upstream end.

CROSSROADS FOR ENERGY

THE PROBLEM

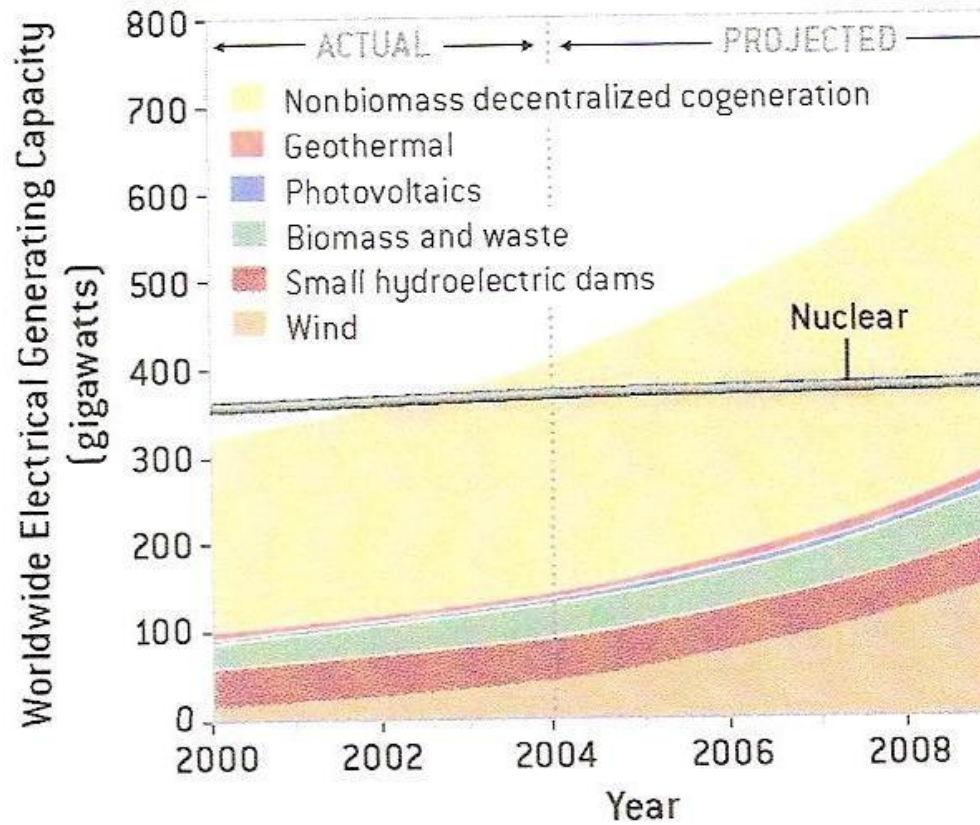
- The energy sector of the global economy is woefully inefficient. Power plants and buildings waste huge amounts of energy, and trucks dissipate most of their fuel energy, and consumer appliances waste much of their power (and often even when they are turned off).
- If nothing is done, the use of oil and coal will continue to climb, draining hundreds of billions of dollars a year from the global economy as well as worsening the climate, pollution and oil-security problems.

THE PLAN

- Improving end-use efficiency is the fastest and most lucrative way to save energy. Many energy-efficient products are more than twice as cheap as inefficient ones. Homes and factories that use less power can be cheaper to build than conventional ones. Reducing the weight of vehicles can double their fuel economy without compromising safety or raising sticker prices.
- With the help of efficiency improvements and competitive renewable energy sources, the U.S. can phase out fossil fuels. Profit-seeking businesses can lead the way.

We can retrofit buildings with decentralized cogeneration at no capital cost to the building owner and an immediate cost saving energy discount to the building tenants. Just [email us](#) and we will provide a no charge or obligation energy audit to provide you with your buildings potential savings potential.

ELECTRICITY ALTERNATIVES



DECENTRALIZED SOURCES of electricity—cogeneration (the co-production of electricity and heat, typically from natural gas) and renewables (such as solar and wind power)—surpassed nuclear as the largest source of global generating capacity in 2002. The annual output of these no-carbon sources will exceed that of nuclear power this year.

SCIENTIFIC AMERICAN

Nickle's "Market View"

Canadian Gas Reserves Fell in 2006

After two years in which frenzied drilling for natural gas and coalbed methane yielded more reserve additions, Canada's gas industry booked lower reserve additions in 2006.

A Daily Oil Bulletin compilation of reserve reconciliations from over 200 public company producers operating in Alberta shows proved gas reserves added from drilling last year of 4.53 trillion cubic feet (tcf) almost fully replaced 4.55 tcf. That represents a more normal year after a 123% reserve replacement in 2005 and a 124% replacement in 2006.

A year end total proved net (after royalty interest) reserves for all the producers in the survey amounted to 39.9 tcf, slightly down from 39.9 tcf in 2005.

In addition to the 38.7 tcf of proved gas reserves, producers reported 6.49 tcf of probable reserves in the province at the start of 2006.

Similar results were released by Alberta's Energy and Utilities Board which regulates Canada's largest gas-producing province.

High levels of drilling for gas in recent years have prevented a sharp decline in Alberta's production and prices since the spring of 2006, followed by a drop in drilling, have prompted the EUB to forecast a 2.2% decline in production this year.

Gas production in Alberta peaked in 2001 and has been drifting lower despite an intense drilling effort and many completions in recent years.

Industry and government had hoped that increased coalbed methane would help shore up declining production. However, low prices are low producers and the decline in 2006 gas prices, along with much higher supplier costs, have made CBM production unattractive, resulting in a drilling decline in 2007.

At the end of 2006, the EUB assigned 877 bcf of remaining established CBM reserves in the province, mainly in the Horseshoe Canyon formation as the larger (and deeper) CBM Mannville formation has proved to be more costly than only two commercial projects.

Total remaining Alberta gas reserves were estimated by the EUB at 40.5 tcf, down about 226 bcf from the end of 2005. Remaining reserves in the province have held fairly constant since 2003 but are down about 40% from 1982.

Drilling efforts in 2006 added 3.23 tcf to reserves and replaced 68% of production during the year, up from 60% replacement ratio in 2005.

Production in Alberta last year amounted to 4.9 tcf of which only 42 bcf came from coalbed methane.

In its supply outlook to 2016, the EUB expects Alberta's gas production will decline by an average of 2.5% per year, though CBM production is expected to rise to some 593 bcf a year by 2016. New pools being found are smaller with lower initial production rates and steeper decline curves.

A recent Ziff Energy Group study predicts that total Canadian gas production will fall by just over 20% in the next five years to 2015 to 13.1 bcf per day from about 16.6 bcf a day in 2006.

There's no quick-fix solution to the many challenges facing western Canada's natural gas producers and the economic conditions plaguing the sector are likely to worsen before financial metrics improve, Ziff Energy Group President of gas services Bill Gwozd said recently.

"Operating costs have spiraled up. It's tough to get people to do the actual projects. The big challenge the producers face is the new drilling, new product coming onstream. They're looking at \$9 (per mcf) in rolled-in costs," Gwozd said while addressing a forum at the Calgary Petroleum Club.

"Competitiveness in western Canada has been declining for a couple of quarters. It's going to get worse before it gets better."

The financially hostile environment that natural gas producers are facing revolves around a myriad of factors including finding and development costs and “startling” operating costs among them, Gwozd said.

“When you hear about producers making record earnings, let me just clarify -- record earnings are what they are based on yesterday’s investments. They invested under a (royalty) regime and they made those earnings,” he said.

“It’s the today costs, the costs for new drilling, the operating costs of today -- I’m telling you it’s \$9, this is the cost structure in western Canada on a go-forth basis is simply not economic.”

As a result, Gwozd said a number of Canadian producers have “shifted gears” and continue to divert capital away from gas exploration and production in the Western Canadian Sedimentary Basin.

“They were in the natural gas sector and they’ve routed some of their investment into oil, or they’ve peddled their investment. We will have more of that later this year, as well,” he said.

Ziff estimates that Canadian producers replaced 95% of their annual production in 2006 while Lower 48 U.S. producers replaced 138% of their annual production.

According to the Daily Oil Bulletin survey, EnCana Corporation remained Canada’s top producer and the owner of the largest reserves of proved gas in the country. The gas giant held 7.03 tcf of proved reserves at the end of 2006 and added 353 bcf during the year, for a reserves life index of 8.8 years, slightly ahead of the industry average of 8.5 years.

EnCana’s Canadian proved reserves rose by 7.84% last year and it reported the most drilling success by far, adding 301 bcf from drilling efforts plus 301 bcf from reserve revisions.

The second largest owner of Canadian gas reserves is Canadian Natural Resources Limited which ended 2006 with 3.31 tcf, 35% more than at the start of the year, mainly due to 1.11 tcf in acquisitions supplemented by 321 bcf of discoveries.

Jumping into third place thanks to its purchase of Burlington, ConocoPhillips Canada held 3.31 tcf of Canadian proved reserves at the end of 2006. It booked additions from drilling totalling 353 bcf but revised down its older reserves by 123 bcf. It also ranked third in production at 356 bcf.

In descending order, the next four largest owners of proved gas reserves were: Apache Canada Ltd. (2.37 tcf), Energy Inc. (2.15 tcf), Devon Canada Corporation (1.89 tcf) and Husky Energy Inc. (1.8 tcf).

In addition to EnCana and ConocoPhillips, Talisman had the third largest booking of reserves added from discoveries of 344 bcf last year. Talisman produced 240.8 bcf in Canada in 2006.

Proposed Canadian coal bed methane exploration worries U.S. officials

KALISPELL, Mont. (AP) _ A new proposal to drill for coal-bed methane north of Glacier National Park has Montana officials looking for a permanent solution to energy development issues in southeastern British Columbia.

“We’re tired of fighting this project after project after project,” said Rich Moy, water management chief for the Department of Natural Resources and Conservation. “What we need to develop is a long-term solution that protects the integrity of the Flathead River system.”

Over the past three decades, Moy has worked with five different governors to buffer the Flathead River from Canadian energy development just north of the border.

The international dispute first surfaced in the 1970s when coal interests sought to expand open-pit mining in the Canadian Flathead. The river flowing south from that valley crosses the border to form the western boundary of Glacier National Park before spilling into Flathead Lake.

Downstream interests have long argued that development north of the border will impact water and wildlife.

international line. Several coal and coal-bed methane proposals have been shot down amid repeated controversies.

Now federal officials from both countries are discussing the possible fate of a large coal mine proposed on the upper reaches of Canada's Flathead River.

More recently, the BP Canada Energy Co. wrote to Gov. Brian Schweitzer announcing the company's interest in the potential development of coal-bed natural gas resources in the Crowsnest coal field."

The letter calls the 57,000-hectare Crowsnest a "tremendous opportunity," and promises to minimize the environmental impacts associated with coal-bed methane drilling. The field is thought to contain some 2 billion tons of coal and 12 trillion cubic feet of coal-bed methane gas.

BP Canada's plans include the upper reaches of the Flathead drainage, said company spokeswoman A

The company's initial \$100-million investment plan includes drilling up to two dozen coal-bed methane wells in the next five years. If the wells produce enough gas, Perry said, the company would pursue full development of the field.

She said the letter was sent to Schweitzer's office on May 15 as a courtesy to alert Montana that the environmental review is beginning.

"It's a place of considerable interest to a lot of people," Perry said. "We want to open the talks now, early, because we know there's a lot to talk about."

On June 8 and 9, at a meeting of regional governors in South Dakota, Moy said Schweitzer hopes to meet with Premier Gordon Campbell to discuss a long-term strategy for managing the Canadian Flathead in a way that both countries can accept.

Montana might ask that future energy development be banned, or might ask for a 50-year moratorium on coal-bed methane drilling, or could ask that the Flathead be made a "primitive area" with a focus on recreational use.

In turn, Moy said, Montana and the U.S. government might offer technical assistance in developing British Columbia's emergent recreational and tourism economy, or might offer financial assistance in developing the infrastructure of the U.S. economy.

"There are many, many options for how to get there," Moy said.

Already, municipal leaders in Canadian towns adjacent to the proposed developments have expressed concern about the impact of mining and drilling there.

"It's time to settle this once and for all," said Will Hammerquist, Glacier program manager for the National Conservation Association. "We need some stability for future negotiations."

Reuters

Business Books: Strain on U.S. grid to make blackouts

Saturday June 16, 10:38 am ET

By Timothy Gardner

NEW YORK (Reuters) - Most people in the United States only think about where electricity comes from when it goes out suddenly.

But unless the antiquated transmission grid is fixed, expensive blackouts that bring modern life to a grinding halt are ever more common, according to "Lights Out" (Wiley, \$27.95), a new book by Jason Makansi.

Before the 1980s, power generating companies were responsible for the entire chain of supply, from securing fuel to transmitting power to homes. Deregulation, meant to increase competition, has busted that chain apart and left substations that deliver electricity as a "neglected stepchild," Makansi writes.

As demand for electricity rises, especially in the hot summer months when air conditioners are humming, the

overstretched grid, exploding transformers, brownouts and blackouts.

Transmission only accounts for about 10 percent of the industry's assets, and for decades utilities and regulators have spent more on more expensive parts of the system. Now, even electricity generated in ultramodern plants is dependent on the transmission grid. "Imagine driving a Maserati over a road littered with potholes," Makansi writes.

Other parts of the U.S. power system make transmission rough.

Financial engineering has displaced systems engineering, Makansi writes, the worst effect of which was the crisis in 2000 and 2001, when power trading deals led to inefficient transmission, rolling blackouts, and spinning reserves.

Dwindling resources such as supplies of domestic natural gas and the exhaustion of local coal mines are likely to exacerbate the problems in coming years.

The U.S. government plans to import large quantities of liquid natural gas, but supplies will be vulnerable to price fluctuations in producer countries, much as OPEC has influenced oil prices.

Increasingly, power plants as far away as the Midwest and even the East are relying on Wyoming for coal. A coal shortage, for example, could slow generation, putting stress on other parts of the grid to make up the difference.

Makansi offers solutions, not all of which will be popular. He favors boosting nuclear supplies from about 20 percent to 50 percent because they emit virtually no greenhouse gases. But he devotes little ink to the possibility and cost of upgrading an older plant.

Power production from coal should be placed much closer to the mine mouth, he says, a move that could prompt the coal industry to relocate to the U.S. West.

Wind power won't take off unless there's more investment in how to store the energy, according to Makansi.

An innovation that is likely to be popular is for homes and businesses to add smart meters and other devices that let them see how much power costs at particular times and adjust their use accordingly. If they are willing to handle occasional interruptions when the grid is stressed, or have usage hours like cell phone plans, they could pay much lower rates, he writes.

"It should be the consumer who decides how competition should unfold and not the regulator."

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