



the credit crunch's implications for energy

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The recent, intertwined collapse of the capital markets and sudden global economic slowdown has drastically altered the energy landscape. Just as the entire energy industry was gearing up to address long-term infrastructure, supply and alternative opportunities, virtually every component of the business decision collapsed, including economic merit, demand, cost of capital, and availability and cost of debt. While temporary, today's commodity bust puts a halt to vital investment across the energy infrastructure, and the implications for traditional and alternative energy sources are serious. Both fossil fuel and clean energy fundamentals are intertwined, more so than advocates of either might like. As global economies recover and energy demand increases, this lack of investment could mean insufficient energy supply and soaring prices. Absent steady and growing investments, hydrocarbon supplies could flatten or decline, and both near- and longer-term clean energy investment policies and opportunities are likely to suffer.

Over the past few years, we have witnessed the usual energy boom and bust, albeit at warp speed. This compression, following several years of bull-market hyperactivity, has already initiated a period of under-investment, especially in the US and other non-OPEC markets. Some large but poorly managed national oil companies (Venezuela, Iran, Mexico, Nigeria and Ecuador) will likely be unable to invest in their resources or satisfy their national budget needs at current prices. In China, collapsing equity markets (down over 75% since last October) have choked off access to capital, slowing both upgrades and new energy infrastructure. Russia's mature oil resources, in need of constant and expensive maintenance, will suffer due to an onerous fiscal program, which taxes oil revenues, leaving producers to deal with painful cost inflation. The result is that much of Russia's oil resource may not justify reinvestment under the existing tax regime. The probable fallout will be drops in Russian oil output this year and next. Several producers have already signaled reduced reinvestment in Canada and the North Sea.

A similar boom-bust is underway in North American natural gas markets. As operators exploited new technology and higher gas prices to commercialize new shale resources, they tapped equity and debt markets to bid up prospective acreage, while "drilling their brains out" to meet demand for \$10 - \$14 natural gas as recently as last summer. Then the *Lehman Brothers* failure sparked a massive lending contraction. Suddenly without funding for aggressive 2009 budgets, the same companies have slashed spending plans (the US rig count could fall as much as a third) and are scrambling to refinance maturing debt. Some aggressive gas producers owe more on recently acquired acreage than the land is now worth. Undisciplined lending/spending and weakening markets have contributed to ruining North American gas fundamentals for the near future.

Absent steady re-investment, oil and gas production growth will slow, with first signs likely by the end of 2009. However, rather than tightening the market, demand fundamentals are also likely to remain weak, as annual global oil consumption has fallen for the first time since 1982. While large OPEC investments will continue for the foreseeable future, this will only increase US reliance on the cartel as a key oil supplier. Some analysts think oil prices will average as high as \$90 a barrel in 2009. We believe oil prices are likely to remain below average required reinvestment levels until a weakening dollar and successful OPEC supply management come online and global economies show real signs of recovery.

The "clean energy slowdown" has turned sold-out wind and solar markets into sudden excess, with lower prices likely on new projects, due to both newfound overcapacity and lower component (steel, labor) prices. Importantly, the clean energy promise has dimmed under a triple whammy—lack of shuttered capital markets, tight consumer spending, and weaker economics against cheaper oil and gas prices. Six months ago, the forecast for 2009 solar module demand around the globe was 7-9 gigawatts. Now, consensus is around 6-7 gigawatts. This is important because capacity expansion, geared to up to 10 gigawatts of 2010 demand, is underway, leaving significant oversupply and risk to price/profits.



Equity markets have punished renewable/alternative energy equities, despite their potential promise long term and abundant signals that US and many foreign governments will act to encourage continued growth and innovation. However, it is important to measure the progress of clean energy over the past few years, in both economic and consumer sentiment terms. Solar panel costs continue to fall. Spot prices are 25% below their June 2008 highs, and we believe they will slip another 15-25% during 2009. Newer solar-based technologies, including both thin film and concentrated solar processes, have been making rapid progress and could be cost competitive with retail electricity in many high demand markets as early as 2010. And wind power, after two decades of dramatic improvement, is already grid competitive and, due to modest oversupply, likely to remain so in the next couple years. Key countries (US, Germany, Spain, and smaller European markets) appear committed to continued incentive programs for these and other non-fossil fuel options. Meanwhile, customer sentiment, stoked by the memory of near \$150 oil, remains. Whether aided by carbon mitigation (global warming) actions or not, this populism seems sustainable.

Our view, therefore, is that, while the very near term is murky, and “clean energy economics” are more challenged than usual, recent history and political commitment are unwavering.

It is important to understand that, even with great political and public will, clean energy development cannot replace hydrocarbons anytime soon. It will not even come close to replacing hydrocarbon projects (which may not come to market, due to the current events.) Up to 30 million barrels/day of current capacity will deplete by 2015—35% of global supply. The need for consistent and growing investment to replace mature fields is paramount. However, the new solar installations required to replace just 1% of shuttered fossil fuel-based US electricity would consume 100% of current global module manufacturing capacity. Thus, while some argue for a windfall profits tax to fund clean energy development, economic incentives for ongoing fossil fuel investment are necessary to effect a smooth transition to any new energy paradigm. In this fashion, higher oil and gas prices encourage both sustaining investment for existing supplies, and commitment to alternate energy sources and consumption patterns. It is for this reason that we believe both select conventional and new energy equities can be attractive investments in the current environment, although a longer time frame may be necessary.

Perhaps in some future cycle, clean energy will be significant enough to offset falling oil production, but not this time. Thus, while we believe a barrel of oil may remain in the \$40s during 2009, we are convinced that, absent significant changes in consumption patterns and new sources, prices will recover to more normal levels (\$60-\$80/barrel) by 2011, and blast through the recent \$147 peak sometime during the next recovery (possibly 2011-2015). Ongoing oil, gas, and new paradigm investments are vital through this downturn. Today's busts in China, North American natural gas, and national oil companies—even clean-energy speed bumps—can give way to more cycles on the way to a more diversified energy infrastructure over time. Will a recovery bring new behavior, including conservation, efficiencies, climate legislation and perhaps, just plain old slower growth? We need a stable and growing commitment, to both conventional and new energy infrastructures—and, most importantly, new, sustainable consumption patterns.

Sources: Department of Energy, ExxonMobil

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