

Excerpt from Senate Energy and Natural Resources Committee Hearing, at Trading Charts, March 18, 2011
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Senate Energy and Natural Resources Committee Hearing

Despite major disruptions to the global economy, new investment in clean energy has continued to surge in recent years. However, the pattern of that investment has shifted dramatically. China, a virtual non-player on the international stage as recently as four years ago, is now the undisputed leader in attracting and disbursing new capital. The US and all others trail behind by comparison. However, much remains to be played for as generating from truly clean sources generally is more costly than from fossil fuels on an unsubsidized basis. The true eventual 'winners' in any clean energy technology race will be those that can generate power or produce transport fuel at lower cost. In this regard, with its outstanding intellectual, entrepreneurial and other resources, the US is hardly out of the game. Still, with governments elsewhere recognizing the potential economic opportunity of clean energy and throwing major support behind the sector, the US runs the risk of being left further behind.

. Clean energy investment has proven surprisingly resilient, despite the economic downturn. Total new investment in the sector totalled \$243bn in 2010, up from \$186bn in 2009 and \$52bn in 2004.

. Investment is shifting rapidly from West to East. The Europe, Middle East and Africa (EMEA) region was still tops in attracting new clean energy funding with \$94.4bn in 2010. Looking at third-party private capital alone including funding for small projects, China is the undisputed single national leader with \$54.4bn. Germany (\$41.2bn) and the US (\$34bn) lag far behind.

. China is the world's leading exporter of solar modules and top producer of wind turbines though it has exported very few of the latter to date. The US-China clean energy relationship is hardly a zero-sum game, however. Integrated supply chains allow the US to supply capital equipment and key high-value components to Chinese manufacturers. Both countries could benefit as equipment costs drop and deployment increases, creating more local installation jobs.

. Major progress has been made in recent years to cut costs of clean energy equipment, particularly photovoltaic (PV) modules. PV is now cost-competitive with fossil sources in some markets where local [electricity](#) prices are high and/or solar resources are exceptional.

. Still, much progress remains to be made on PV and technologies such as advanced batteries and next generation biofuels. A consistent problem: the so-called 'Valley of Death', which hinders projects employing new technologies from being built at scale. Venture investors are willing to take the risk on such large-scale projects but generally lack necessary funds. Banks have the needed capital but lack the appetite for risk.

. The US Department of Energy seeks to address this quandary through its loan guarantee programs. While the agency has made major progress in making such guarantees available, it has faced major challenges due to its conflicting roles.

1. INVESTMENT UPDATE

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Global clean energy investment surged 30% in 2010 to a new record of \$243bn. This represents a major milestone for a sector that enjoyed an average compound annual growth rate of 37% between 2004 and 2008, but then saw growth stall in 2009 in the face of the worst recession in half a century (Figure 1). While overall growth has remained strong, however, the patterns behind the capital flows have changed dramatically. Investment is up substantially in Asia, China in particular. Installations and financings for small-scale solar have soared while wind installations and financings have slipped. Interest continues to grow in energy efficiency technologies, batteries and electric vehicles.

Figure 1: Global new clean energy investment, 2004-10 (USbn)

Source: Bloomberg New Energy Finance

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Public market investment (funds raised via initial public offerings and others on the stock exchanges) bounced back from its recession-driven lows in 2008 and 2009, up 18% to \$17.4bn in 2010, though well short of the record

of \$24.6bn in 2007. This rebound came despite weakening sentiment among public market traders regarding the sector. The WilderHill New Energy Global Innovation Index (NEX), which tracks the prices of 100 clean energy stocks traded globally, lost 14.6% of its value in 2010 and under-performed the S&P 500 by more than 20% (Figure 2).

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Figure 2: Performance of the Wilderhill New Energy Global Innovation Index (NEX)

Source: Bloomberg

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1.2. Clean energy investment in the US

As recently as three years ago, the US was the top country in attracting new clean energy investment, thanks to a surge of investment in new wind and [corn](#) ethanol projects (Figure 4). However, funding fell dramatically in the first half of 2009 in the wake of the global financial crisis as credit for new wind, solar, geothermal and biofuels projects became difficult to secure. Investment bounced back in the second half of 2009 and into 2010 thanks to significant support from the American Recovery and Reinvestment Act (ARRA), which allocated \$63bn to clean energy companies and projects. Today, the sector faces uncertain prospects. State renewable energy mandates (renewable portfolio standards) are not driving investment as they did several years ago; low [natural gas](#) prices are making it difficult for wind in particular to compete; and uncertainty remains around key federal policies.

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2. THE 'VALLEY OF DEATH' CONUNDRUM

Thanks to a massive investment surge, clean energy technologies have made exceptional progress down their respective learning curves in recent years. Still, much work remains; the cost of generating a clean kilowatt-hour is still generally above that of generating one from coal or [natural gas](#) on an unsubsidized basis, assuming no associated costs are assessed for carbon pollution. One of the biggest impediments to further progress is a persistent

dearth of capital for potentially lower-cost breakthrough technologies that have advanced out of the laboratory but still require extensive and expensive field testing and trial installations before being deployed at scale. Financing has existed in the past for early stage, potentially high-risk/high-return technologies in the form of venture capital. It is also available for late stage, potentially low-risk/low-return technologies in the form of project financing. But what about those technologies that fall somewhere in between?

As the old adage among entrepreneurs goes, 'banks will always be the first in line to finance your second project'. This so-called commercialization 'Valley of Death' - located somewhere between Silicon Valley VCs and Wall Street banks - poses a long-standing challenge to the clean energy sector, just as it has to other capital-intensive industries in the past. Bridging this gap is critically important; existing technologies have an important role to play but costs must come down further.

Figure 9: 'The Valley of Death' financing challenges

Source: Bloomberg New Energy Finance

Today, there are in effect two valleys for clean energy technologies. The first comes at the very earliest stage when the potential commercial applicability of a technology remains unclear. The later, better-known valley takes place as a new technology looks to scale up. This tends to occur somewhere toward the end rounds of venture capital investment.

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