

CleanTech Sector: A Global Overview

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The global cleantech sector has grown very quickly over the last few years and is forecast to continue its growth into the future. Whilst it initially was being driven by environmental concerns – and may have been called 'environmental technologies' as a sector – investors and companies quickly realised that there were many more benefits on offer.

Because cleantech drives efficiency in the use of energy, water and other resources, the adoption of these solutions by industry means that they become more efficient and productive. This creates more competitive industries that will outperform their global competitors. The industry owners, the state or shareholders, are keen to see this outcome as it creates a more profitable investment. Governments are keen to facilitate this outcome because it delivers economic development and creates jobs and employee wealth. Cleantech is therefore the way to create greater wealth from existing industries.

There is of course another benefit: cleantech also comprises the industries of the future. By building companies with products that harness renewable energy, provide recycling solutions or create carbon revenues, cleantech is creating a whole new class of industry that will outlive the traditional industries. The countries and regions that adopt these solutions first and drive the growth in their local industries have the potential to create new industries that will provide further economic development, jobs and wealth creation.

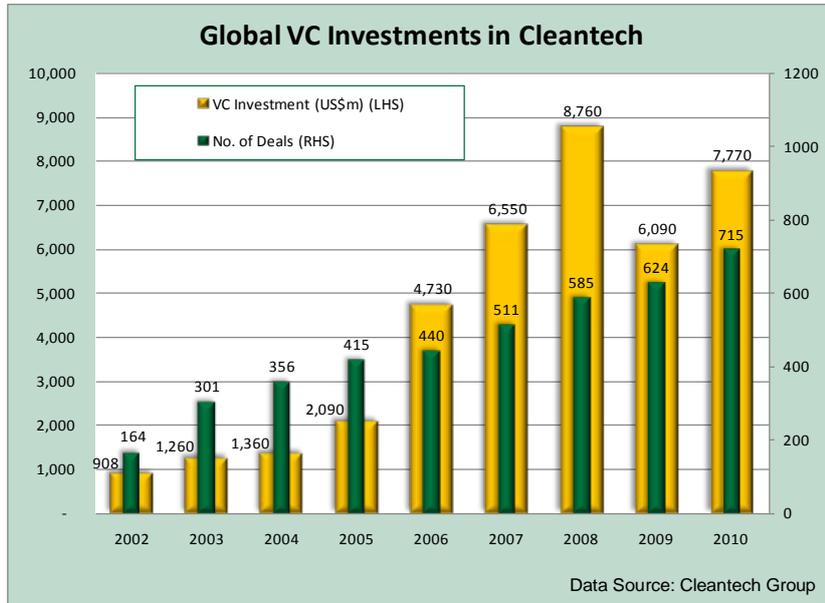
Countries that therefore both produce and adopt cleantech solutions will create two drivers for increased growth in their economies. Furthermore, the investors that back both the growth and adoption of cleantech solutions will secure superior returns in the long term. For these reasons, a number of governments around the world are putting in place strong regulatory measures that will help drive both industry development and solution utilisation.

To understand the dynamics that are currently underway in the cleantech market, this article provides two views of the global cleantech market. Firstly, a snapshot of the global activity in 2010 along with some high level forecasts of the level of growth over the next ten years. Secondly a review is presented of which countries are driving the growth in their own cleantech industries the hardest. This presents a picture of the countries that are looking towards the future and those that are holding onto a declining past.

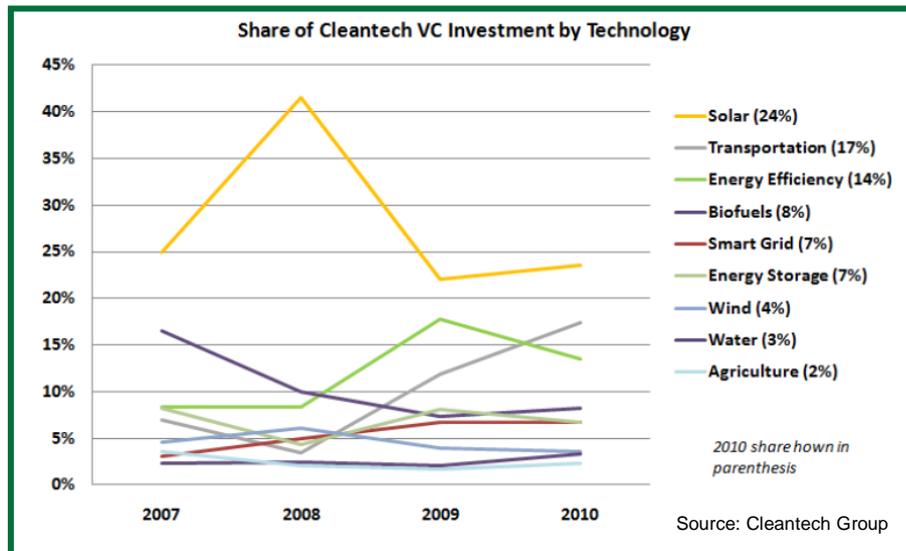
Global Cleantech Today

The international cleantech market place has been thriving over the last few years with 2010 showing a strong recovery from slowdown shown in 2009. There are many organisations that provide reports and forecasts on this global activity.

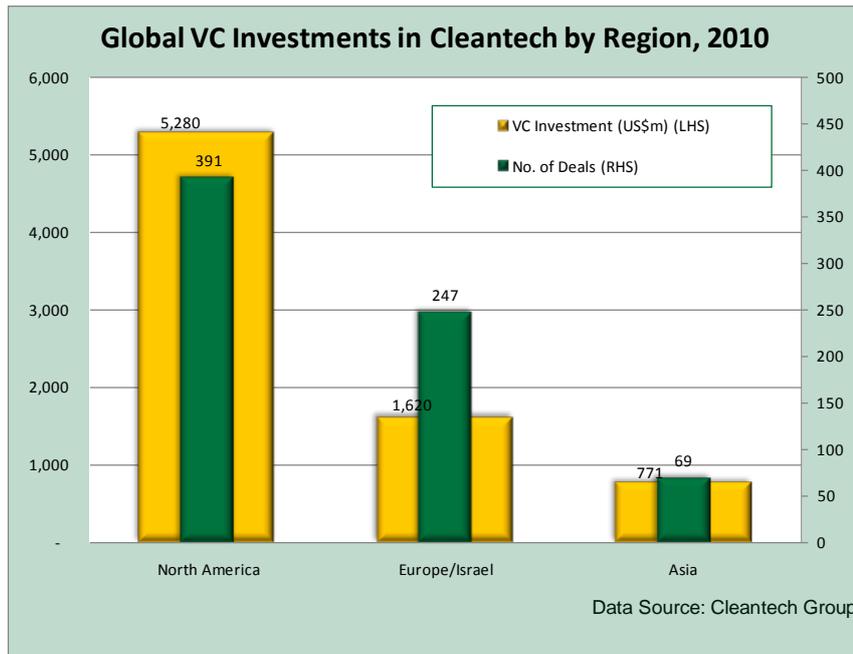
The Cleantech Group tracks global transactions and makes the details of this analysis available to its members. The data that has been published is represented in the chart below. It shows the recovery in total venture capital investments in 2010, although this did not match the high points achieved in 2008. The total number of deals has continued to increase each year, despite the variation in the headline investment figures, and this indicates growing global activity even if some of the very large deals seen in 2008 are not been replicated.



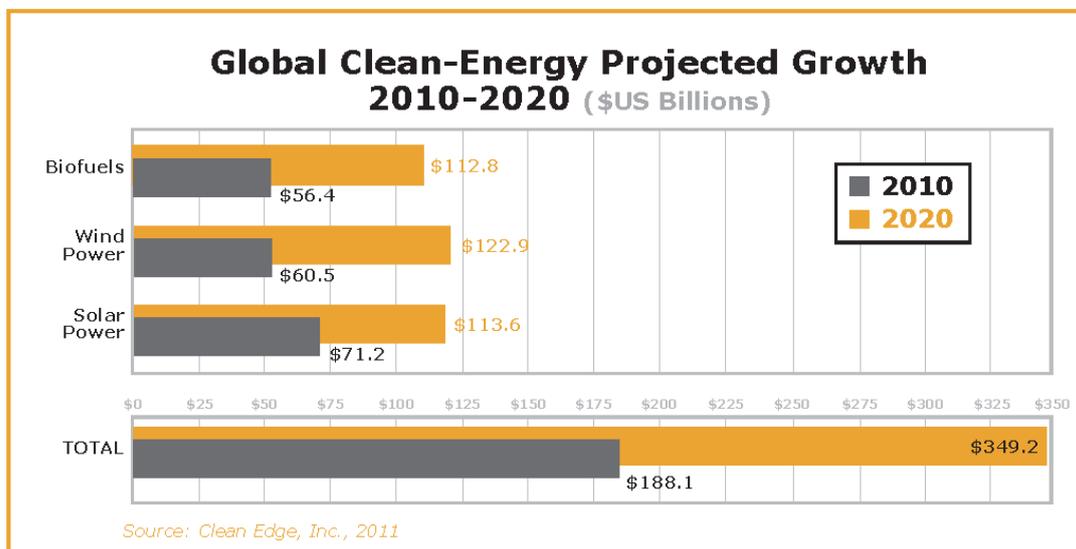
The allocation of these investments since 2007 in terms of sector is shown the chart below that was produced by the Cleantech Group. It shows that, globally, venture capital investment has consistently been focussed on the solar industry. The other two sectors that attracted significant venture investment in 2010 were Transportation and Energy Efficiency.



The allocation of this venture funding globally shows that the majority of deals and investment dollars occurred in North America, driven by its strong well funded venture capital industry. It can also be seen from this chart that the average deal sizes in Europe/Israel of US\$6.6m is much smaller than that in both North America (US\$13.5m) and Asia (US\$11.2m).

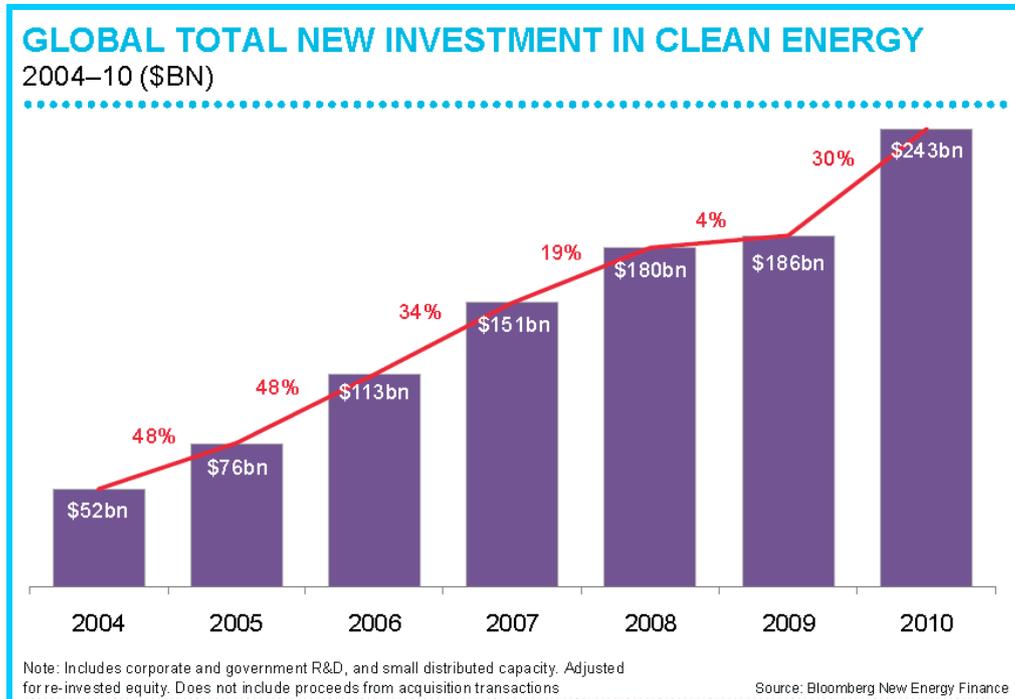


The US-based research group, Clean Edge, produces an annual report tracking global Clean Energy Trends, which includes the chart below showing a ten year projection on global revenue from the three largest clean energy sectors. Overall, this forecast shows that global revenues from biofuels, wind and solar will grow from their 2010 levels of US\$188 billion to US\$349 billion by 2020.



The world's leading provider of clean energy data is Bloomberg New Energy Finance (www.newenergyfinance.com), which provides its global investment report data for inclusion in Australian CleanTech's reports.

The Bloomberg New Energy Finance research shows that the total new investment in clean energy smashed through previous levels to reach US\$243bn in 2010. This figure includes the clean energy components of the US\$7.8m of venture capital detailed by the Cleantech group above. This figure is up 30% from \$186.5bn in 2009, and makes 2010 easily the strongest year so far for investment in clean energy – double the figure recorded in 2006 and nearly five times that from 2004.



The authoritative Bloomberg New Energy Finance time series shows total investment growing from \$51.7bn in 2004, to \$76.3bn in 2005, \$112.9bn in 2006, \$150.8bn in 2007, \$180.1bn in 2008 and \$186.5bn in 2009. The main drivers of the rapid growth in investment in 2010 were China, European offshore wind, European rooftop solar and research & development.

The key components of this result were:

Distributed Solar Energy

Investment in small-scale, distributed generation projects surged by 91% last year to \$59.6bn, with the dominant element rooftop and other small-scale solar projects, notably in Germany but also in the US, the Czech Republic, Italy and elsewhere.

China

Investment in China was up 30% to \$51.1bn in 2010, by far the largest figure for any country. In 2009 Asia and Oceania overtook the Americas, and in 2010 it narrowed the gap further on Europe, Middle East and Africa as the leading region of the world for clean energy investment.

Offshore Wind

Offshore wind finance had another good year in 2010, led by a \$1.7bn package to fund the next, 295MW phases of the Thornton Bank offshore wind farm off the coast of Belgium, and a \$1bn deal to finance the Borkum West II project in German waters.

Research & Development

Research and development spending on clean energy technologies by companies and governments grew to a record level in 2010, according to the Bloomberg New

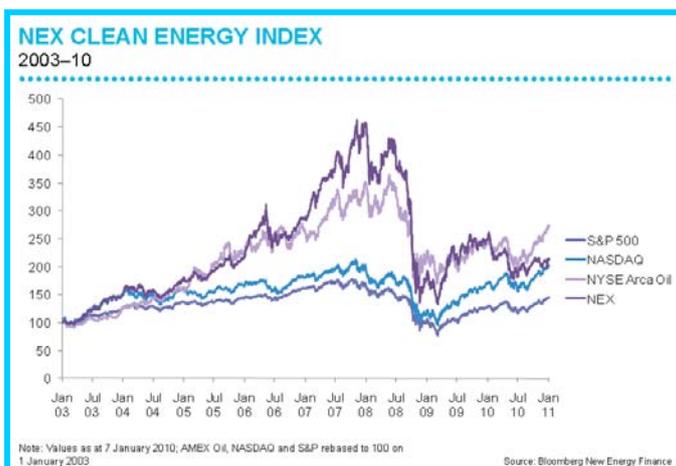
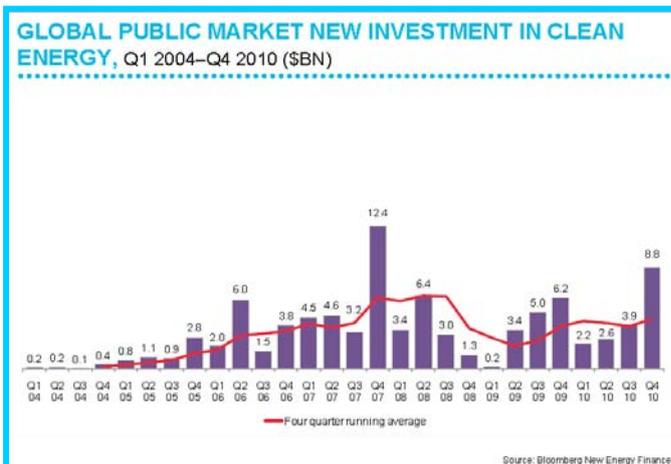
Energy Finance data. Within this, the main constituent was government R&D, which reached \$21bn, up from \$15.8bn in 2009, while corporate R&D recovered from 2009's recession-hit figure of \$12.8bn, to reach \$14.4bn, giving a total for global clean energy R&D of \$35.5bn.

Venture Capital and Private Equity

Venture capital and private equity investment had a strong year, up 28% from the 2009 total to reach \$8.8bn, though failing to match 2008's record figure of \$11.8bn. Among the private equity deals of 2010 were a \$400m financing for US wind project developer Pattern Energy Group, and \$350m for Better Place, the US-based electric vehicle charging network specialist.

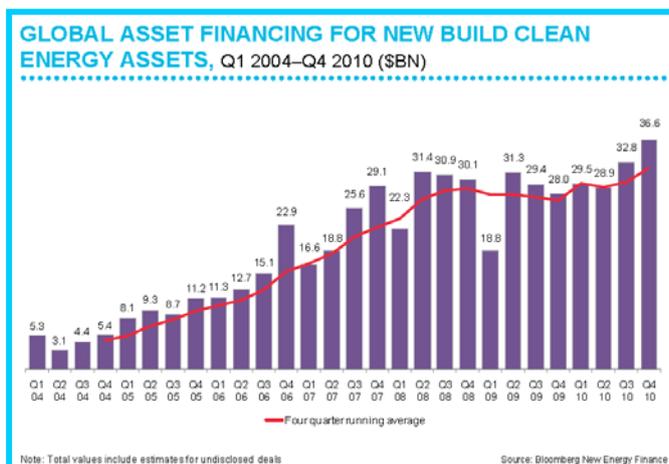
Capital Markets

Public market investment bounced back from its recession-driven lows in 2008 and 2009, up 18% to \$17.4bn in 2010. This was not a record figure - it fell short of the \$24.6bn clean energy companies raised on stock markets in 2007. Among the biggest deals in this category in 2010 were the \$3.5bn initial public offering in November by Enel Green Power of Italy, and the \$1.1bn flotation by Chinese wind turbine maker Xinjiang Goldwind Science & Technology in Hong Kong in October.

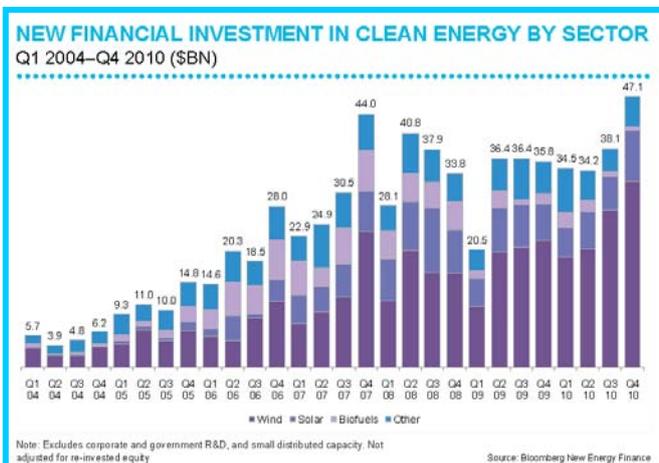


It is notable that this transaction level took place despite the lacklustre performance of clean energy shares during 2010, with the NEX index dropping 14.6% and underperforming the S&P 500 by more than 20% over the year.

The largest investment asset class in 2010 was, as usual, asset finance of utility-scale projects such as wind farms, solar parks and biofuel plants. This rose 19% to \$127.8bn last year.



In terms of sector, the most notable feature of 2010 was the 49% growth in investment in solar power to \$89.3bn, driven largely by distributed generation projects in Europe, where investment grew 91% last year to \$59.6bn. Bloomberg New Energy Finance estimates that 86% of investment in small-scale solar took place in markets where feed-in tariffs have been introduced. It is noted that the chart below excludes all of the small distributed rooftop solar that was the largest component of the solar sector.

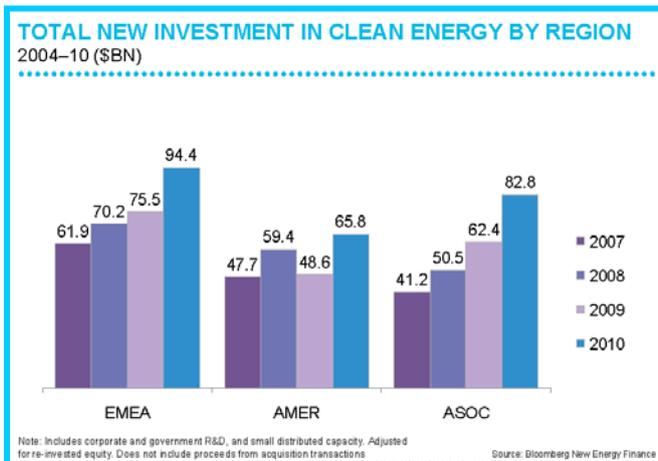


Overall investment in wind gained 31% to reach \$96bn. It is notable that 38% of this total was accounted for either by China or by large European offshore wind farms.

Energy-smart technologies such as smart grid, energy management, electric vehicles and power storage also had a strong year, with financing of companies in this sector reaching a record \$23.9bn, up 27% on 2009.

In the other sectors, biofuels had almost a flat year, with overall investment down

slightly to \$7.9bn from \$8.1bn in 2009 and far below the record of \$20.9bn set in 2006 during the US's corn-based ethanol bubble. Biomass and waste-to-energy was also flat, at \$11.6bn, compared with \$12bn in 2009.



In terms of regional distribution of the investment, the greatest investment occurred in the Europe, Middle East and Africa (EMEA) regions with \$94.4bn followed by the Asia and Oceania region with \$82.8bn

Commenting on the results, Bloomberg New Energy Finance, stated:

This is a spectacular result, beating previous record investment levels by a clear margin of more than \$50bn. It flies in the face of scepticism about the clean energy sector among public market investors, who have been concerned about the sustainability of subsidy programmes in Europe, the failure of the Obama administration to deliver a climate or an energy deal, and the crescendo of ill-informed doubts about climate change.

We have been saying for some time that the world needs to reach a figure of \$500bn per annum investment in clean energy if we are to see carbon emissions peak by 2020. What we are seeing in these figures for the first time is that we are half-way there, and it is very good news.

The figures do contain an important caveat. More than in most years, growth has been in fairly direct response to government intervention, whether in the form of cheap debt in China, sweet off-take deals for European offshore wind, feed-in tariffs for solar or a regulatory push for smart grids. The industry needs to continue to drive down its costs and reduce its reliance on this sort of support.

2011 will have to be a very strong year to beat 2010. At this stage, the signs are encouraging, with further cost improvements likely in both solar panels and wind turbines, and the supply of private sector debt and equity finance improving from its low point during and after the banking crisis. We are watching what happens to distributed generation particularly keenly – the extraordinary growth surprised us last year, and we will have to wait and see what happens as Germany reduces its solar tariffs.

Global Cleantech Industry Development

A report released in May 2011 and prepared by Roland Berger Strategy Consultants, a global firm based in Germany on behalf of the World Wide Fund for Nature (WWF) reviewed and compared the industry activity in 38 countries. The report gathered information from sources such as energy associations, bank and brokerage reports, investor presentations and the International Energy Agency. It measured the revenues created from a number of the key cleantech activities. This included producing renewable energy equipment and production facilities such as biofuels, solar and wind turbines, and energy efficiency technology equipment such as lighting solutions and insulation products.

The report compared the total revenue with the country's Gross Domestic Product (GDP) to provide an indication of the relative focus that each country has on cleantech.

It found that Denmark generates by far the largest share of its GDP at 3.1% from renewable energy technology and energy efficiency, or about US\$9.4 billion. This is driven by the large scale production of wind turbines and insulation products.

The second highest proportion of GDP is China at 1.4%. The report notes that China has rapidly moved up from its previous fourth place with a growth of 77% in cleantech revenues since 2008. In 2010, China generated the most revenue in money terms with US\$64 billion.

"The Chinese have made, on the political level, a conscious decision to capture this market and to develop this market aggressively," said Donald Pols, an economist with the WWF.

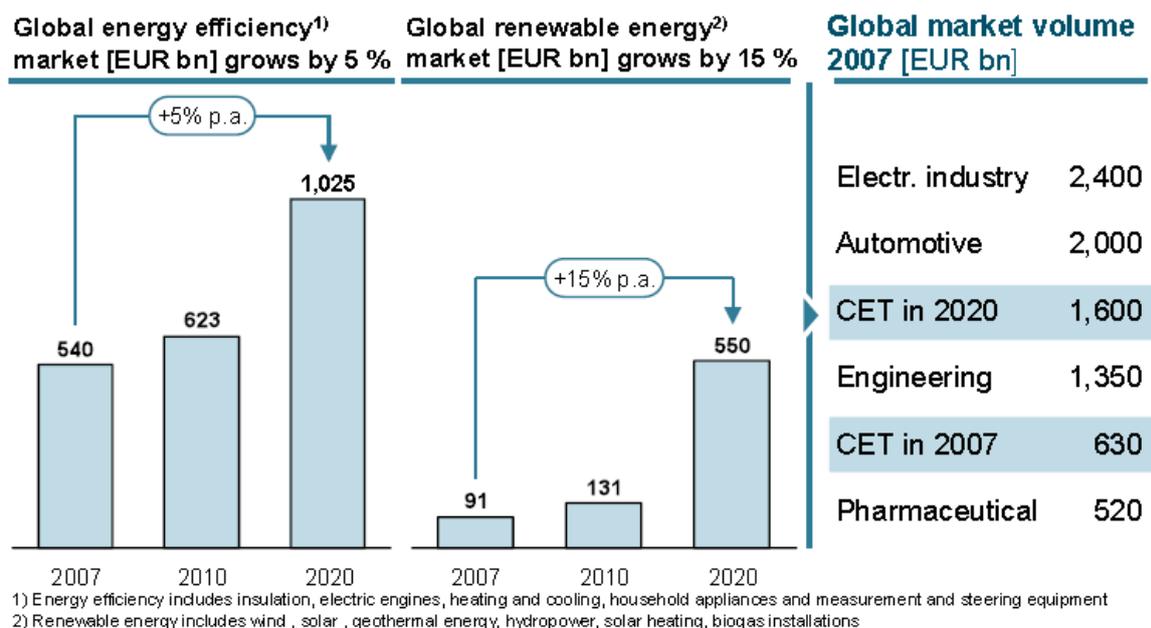
The United States was the second highest revenue generator in terms of dollars at US\$45 billion but only ranked seventeenth in terms of its contribution to GDP at 0.3%. The US revenues have however grown significantly under the Obama administration with the report stating a 28% increase since 2008.

The growth in the Chinese market is exceptional and is being driven by central government. Whilst the environmental benefits are welcome, the industry growth and the opportunity to dominate the global markets for cleantech solutions is also a big incentive for government.

Interestingly China is now not just producing cleantech products for export, but is also looking to rapidly adopt these solutions throughout all industries and all areas of society. This potentially then assists its existing industries to improve their operational performance and continue to compete on the global stage. The Chinese government more than anywhere else has recognised the potential double benefits from both producing and adopting cleantech solutions.

The other countries in the top five, as a proportion of GDP, are Germany, driven by its large scale production and adoption of solar energy, Brazil, driven by its ethanol production industry and Lithuania, driven by wind, biomass and solar cell production.

In an earlier version of the report published in November 2009, forecasts for industry growth were provided to 2020. The figure below shows that the forecast industry growth to €1,600 billion in 2020 will place cleantech (or CET as used in the figure) as the third largest global industry behind only electronics and automotive.



Source: GreenTech made in Germany 2.0, Roland Berger Strategy Consultants

This report also considers the lessons learnt from the countries that have been most successful. The three key components that have consistently led to the successful growth of a national cleantech sector were found to be:

- *“Early and consistent government support over the innovation cycle;*
- *High investment in sectors with a strong domestic fit; and*
- *Strong home markets for Clean Energy Technology applications.”*

The factor that is often overlooked when governments try to build industry that will have strong global demand is the last of these three. By ensuring that there is a strong local market for cleantech products, companies can start by simply supplying the local demand and, from this base, then grow into exporting companies. This allows companies to grow more slowly, to make any early mistakes within a local market and to evolve into being ready for the step up to exporting. It is very hard for a company to start on the basis of needing exports from the first day of production. A local market also allows companies to have demonstration projects that they can show to international buyers to reduce the perceived risks of buying a new product from overseas.

The figures presented in this report only present one side of the cleantech story as they are only a measure of the investment in the supply side of cleantech. There is another large benefit for countries adopting cleantech efficiency products through the increased productivity of other industries. The GDP percentages presented above might then be further increased if

this was also considered. This wider consideration also expands the net for cleantech investors as they can select to invest either into the providers of the cleantech solutions that are seeing significant growth or into the buyers of cleantech solutions that are increasing their efficiencies and productivity.

The cleantech sector offers benefits for suppliers, customers, investors, governments, communities and also the environment. It is a sector that is set to continue to grow and will become one of the largest three industry sectors in the world. Those companies, investors and governments that move to be part of this growth will be the ones that reap the most benefits in the longer term.

John O'Brien is Managing Director of Australian CleanTech, a research and broking firm that provides advice to cleantech companies, investors and governments seeking economic development. Australian CleanTech works across Australia, China, Korea and Malaysia and publishes the Australian Cleantech Review and the Australian Cleantech Index.