

Cleantech Patents And Investment: What To Expect In 2012

Law360, New York (February 29, 2012, 2:03 PM ET) -- Despite the challenging market, recent years have been strong for clean technology and numerous innovation milestones were achieved with both an increase in investment and patent activity. Our analysis highlights trends for innovations and investment in the following 11 leading cleantech technology categories: solar, hybrid vehicles, wind, fuel cells for vehicles, hydro/wave/tidal, utility metering, geothermal, smart grid technologies, biomass/biogas/biofuel, carbon dioxide storage or sequestration, and nuclear power, and provides several related considerations for 2012.

The Big Picture

From an innovation standpoint, we studied 1,167 patents that were issued in 2010 across these cleantech categories, which is an increase from 823 patents issued in these categories in 2009. In 2010 the top three cleantech categories that produced the most patents and the most patent claims were (for the third year in a row) solar, wind and hybrid vehicles. In contrast, the cleantech categories with the lowest patent and patent claim productions for 2010, and which illustrate areas of possible opportunity, were smart grid technologies, geothermal, and carbon dioxide storage.

While solar, wind and hybrid vehicle technologies held their ground as the most dominant of the cleantech technologies for the third year in a row, all of the technology areas studied showed an increase in patent activity level from 2009, except for nuclear power and fuel cells for vehicles, which each posted a slight decrease from 2009 to 2010. We expect this general trend to continue in 2012, with solar, wind and hybrid vehicle technologies remaining in the top three with further increases expected in patent activity levels.

Although the venture capital industry faces certain headwinds, clean technology investment also remains strong as the venture capital community continues to display strong interest in the sector. According to The Price Waterhouse Coopers MoneyTree Report for the third quarter of 2011, venture capital investment in clean technology increased 40 percent from the third quarter of 2010.

Drilling Down to Find The Leading Technology Areas

The total number of claims granted among the patents in a particular technology subcategory may be one indicator of the level of interest and investment in that area. Representing areas of strong interest and investment, the top five technology subcategories in which the most patent claims were granted for new innovations are:

- photovoltaic solar cell construction and/or materials, with 2,843 claims; remains the first-place category from 2009 and 2008,
- control systems for hybrid vehicles, with 827 claims; remains the second-place category from 2009, and up from the third place category in 2008,
- wind turbine generator operational control, with 740 claims; up from the fifth-place category in 2009,
- mounting systems for solar panels, with 579 claims; was not in the top five categories in 2009 or 2008, and
- wave-driven hydropower generation, with 538 claims; was not in the top five categories in 2009 or 2008.

While we expect photovoltaic solar cell technologies to continue its domination of the cleantech landscape in the near term, the recent increases in activity levels for technologies such as solar concentrators, maintenance/repair of wind turbines, vertical axis wind turbines, landfill biogas collection, and heat extraction from geothermal reservoirs may represent up-and-coming areas to watch in 2012.

The number of patents also was consistent with the investment trends as the solar, wind and transportation sectors led the way in cleantech funding with large increases in the amount of investment going to these subsectors over 2010 levels. However, the investment market is changing. 2011 was a poor year for initial public offerings in the clean tech sector as all of the major offerings are trading below the initial public offering prices.

Notwithstanding the tepid public markets, merger and acquisition activity was relatively strong and is expected to increase in 2012. The friendly merger and acquisition market will have a positive impact on venture capital investment as investors see a path to exit.

Areas of Potentially Patentable White Space

First action allowances of subject matter claimed in recently granted patents (i.e., patent applications allowed upon the first substantive review by the U.S. Patent and Trademark Office with no rejection in view of prior art) may be one indicator of potential patentable white space in the cleantech landscape. Generally, the more first action allowances that are issued for a given type of claimed subject matter, the more reliable this indicator of potential white space may be.

More than 22 percent of the cleantech patents studied were granted by the USPTO in 2010 under a first action allowance (down from approximately 23 percent in 2009, but up from approximately 20 percent in 2008), indicating the possibility that a relatively broad scope of patentable white space in the cleantech landscape may still exist into 2012, despite the advances in patents granted over the recent years. The top five technology subcategories having the greatest white space according to this indicator are:

- photovoltaic solar cell construction and materials (ranked first in 2009 and second in 2008),
- control systems for hybrid vehicles (ranked second in 2009 and first in 2008),
- operational control of wind turbine generators (ranked third in 2009 and fourth in 2008),
- operating systems for a hybrid vehicle (not in top five in 2009 or 2008), and
- drive train or power transmission for a hybrid vehicle (ranked fourth in 2009 and fifth in 2008).

It is unclear whether venture capital funding will flow into these “white space” areas. Currently, many venture capitalists are looking for capital efficiency and are preferring areas that require less capital to develop the product and enter the market. The bankruptcy of Solyndra LLC, Evergreen Solar Inc. and SpectraWatt Inc. illustrate the investment risks of capital intensive companies in the cleantech sector. As a result, we expect more venture capital in 2012 to flow toward technologies that increase efficiency as opposed to those that represent major technology breakthroughs or disrupt industry sectors.

Individual Inventors and Potentially Available Technologies

More than 17 percent of the patents listed no assignee and were presumed granted to the individual inventors (down from approximately 18 percent in 2009 and approximately 22 percent in 2008, but still notably more than the 7.5 percent representation of individual inventors among all U.S. patents granted in 2010).

The continued relatively higher rate of patents to individual inventors in the cleantech landscape continues to represent an area where new technologies may be available for licensing by corporate entities or others looking for an entry point in the cleantech field, or companies looking to expand an existing cleantech presence. While the trend of cleantech patents to individual inventors has been decreasing in recent years, we expect it to continue to remain above the overall average of about 7.5 percent for all technologies as a whole.

Consistent with the results from 2009 and 2008, the ratio of individual inventors to corporate, governmental and educational entities was particularly high in the hydro/wave/tidal, geothermal, and wind categories.

Not surprisingly, again in 2010, corporate entities hold higher shares of patents in the categories of nuclear power and hybrid vehicles, where market barriers to entry are relatively high.

The Countries That Are Obtaining Cleantech Patents in The U.S.

During 2010, U.S. entities obtained the majority of U.S. patents (with slightly less than 58 percent) across the categories of the cleantech landscape studied, with entities from Japan coming in second (with about 12 percent), and entities from Germany coming in third (with 10 percent), which is a repeat of 2009 (U.S. about 58 percent, Japan about 14 percent, and Germany about 10 percent), and 2008 (U.S. about 54 percent, Japan about 18 percent, and Germany about 10 percent). We expect this trend to continue in 2012, as no other country has obtained more than 5 percent in recent years.

Among the U.S. entities, in 2010 the majority of patents studied across the categories of the cleantech landscape went to California (with about 23 percent), followed by New York (with about 15 percent) and then Michigan (with about 12 percent). The ranking of the top three states obtaining patents in the cleantech landscape is a repeat of 2009, with California obtaining the majority (about 20 percent), followed by New York (about 12 percent), and Michigan (about 10 percent), and is also a repeat of 2008, except that the majority went to New York (slightly more than 18 percent), followed by California (slightly less than 18 percent) and Michigan (15 percent). We expect this trend to continue in 2012, but note that the trend of cleantech patents granted to entities from Texas is trending upward and may soon approach top-three status.

The venture capital investment results are consistent with the technology trend in this regard. In the third quarter of 2011, California, Texas, the Northwest and Midwest received the most venture capital for clean technology investments. In fact, Silicon Valley and Southern California received over half of the venture capital invested in this sector. We expect this trend to continue in 2012.

How Long It Took to Obtain Those Patents

The total number of days from filing of an application until grant of the patent for the U.S. patents studied in the cleantech landscape ranged from a low of approximately 935 days for hydro patents to a high of approximately 1,378 for fuel cells for vehicle patents, with a total average pendency of approximately 1,154 days or 38.5 months (assuming 30 days per month). This result is slightly shorter than the 40-month average for cleantech patents previously announced by the USPTO.

In view of the long pendency, and relatively high first action allowance rate, it may be worthwhile for patent applicants to seek accelerated examination of their patent applications under the USPTO's Green Technology Pilot Program (while the program is still available), or other accelerated examination options for particularly important innovations. With patents filed under the Green Technology Pilot Program now granting, we expect the average pendency of cleantech patents to decrease in 2012, however such a decrease may be short-lived with the anticipated closure of this pilot program in the near future.

Conclusion

Over the recent past, the cleantech fields of solar, wind and hybrid vehicles have consistently dominated the cleantech patent landscape, far outpacing the other fields that were studied and we expect this trend to continue. We expect these areas to receive the most attention from investors. However, in 2012, we also expect to see investment in energy efficiency and smart grid increase as well. In addition, notwithstanding the tepid public markets for cleantech companies, the merger and acquisition activity remains strong and there will be exit opportunities for investors.

The availability of exit opportunities, the large technical and business problems remaining to be solved in this sector and the existence of a high volume of customers waiting to pay for solutions to these problems will continue to drive the levels of cleantech investment higher in 2012. We note that despite the advances in technology and the increasing number of patents granted, it appears that patentable white space still remains in the cleantech landscape, particularly in the areas related to photovoltaic cells and hybrid vehicle controls.

We also expect certain geographic areas to dominate the clean technology patent and investment landscapes, particularly California. We also note that individual inventors continue to be particularly active in the cleantech landscape, at a rate that is more than double that of individual inventor representation across all technology areas as a whole. Finally, we note that the time to obtain a patent in the cleantech landscape is still longer than most would like (i.e., about 36 months on average), and expedited examination options should be considered for particularly important innovations.

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