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Advances in the Ability to Find Clean Technology Funded by the U.S. Government: The EERE Innovation Portal

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LES Viewpoints

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Once upon a time finding technical gems that have been developed at national laboratories was challenging at best. Attending technical conferences and reading technical journals could help, but how does a person monitor the many technical venues and publications where a scientist with a new innovation in clean tech may present? If one monitors just the clean technology venues, one will only find those technologies that have been envisioned by the innovator or the marketer as clean technology.

Conversely, some clever searches of the U. S. Patent and Trademark Office's patent and patent application database have been conducted by using the number of the contract between the government sponsor and the national laboratory, which is normally listed in the patent application, even when assignments and other useful information are not up to date to obtain all of the holdings of a specific national laboratory. However, the database of all the patents and published patent applications owned by a lab is large and cumbersome to sort. In addition, navigating one's way through the various contacts at the national laboratories to find a person that can explain the kinds of agreements that are available and negotiate a binding deal has been notoriously difficult. The successful stories have often come from those who have found a warm contact to which they return over time as their ideas evolve. In fact, it is common for an inquiry into one technology to blossom into an area not expected but more satisfactory to the inquirer. But how does one begin? At Lawrence Livermore National Laboratory (LLNL) referrals are received through avenues such as the Public Affairs Office, scientists who have contacted someone at a meeting, friends of licensees, and then carom their way into the Industrial Partnerships Office (IPO), in addition to those who have found and perused the LLNL IPO website. This is common at national laboratories and universities, and to a certain extent such caroming is part of the business of business. However, it can be inefficient and frustrating.

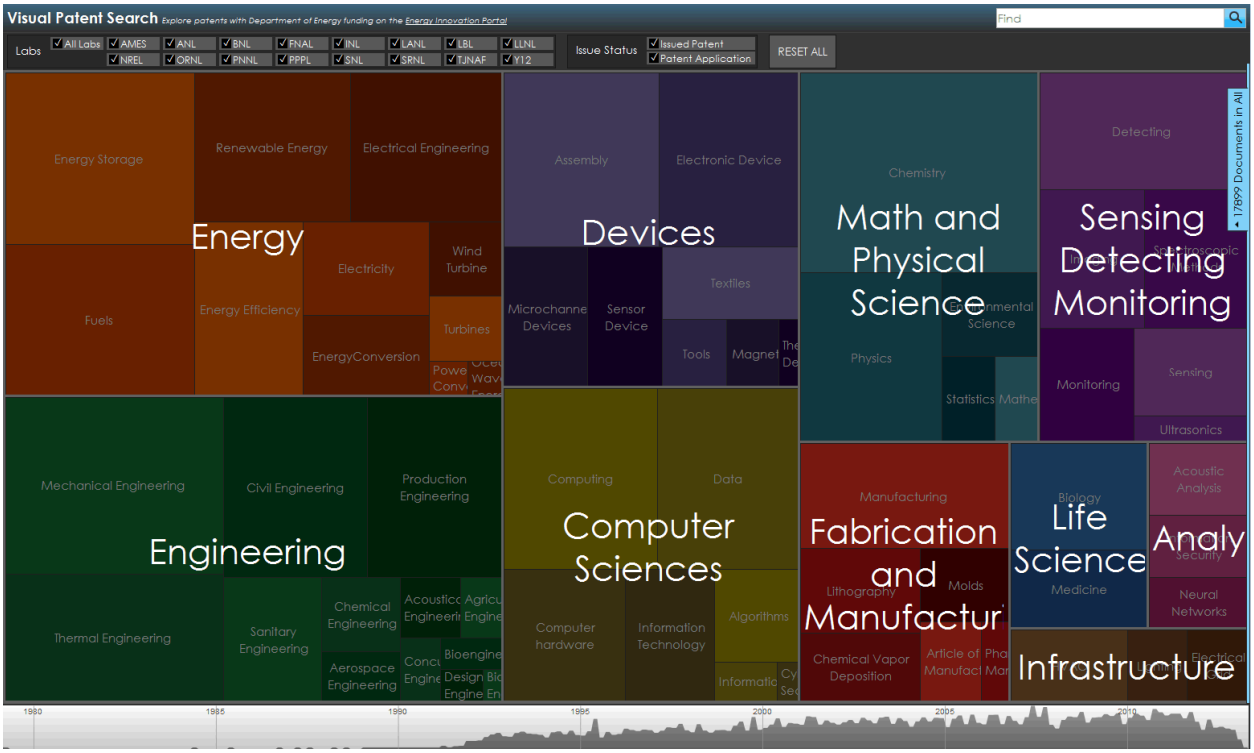
Over the past few years, significant strides have been made making technology innovations in the realm of clean technology available to the public. One useful tool to explore not only applications envisioned by the innovators and marketers, but also technologies that have not been dubbed as such is the U. S. Department of Energy, Energy Efficiency and Renewable Energy (EERE) Innovation portal (http://techportal.eere.energy.gov/). The EERE Innovation Portal boasts innovations from twenty seven national laboratories and universities. Technology summary categories range from advanced materials to building energy efficiency and energy analysis to energy generation, industrial technology, fuels and vehicles. Not all clean technology is listed in the summaries, but with over 950 technology summaries, and over 18,000 patents, the summary pages are certainly a good place to start.

Why aren't all clean technologies from the national laboratories listed under the appropriate summary categories? The answer is that often clean technology is an application of an innovation that can also be used for other purposes. For example, LLNL has licensed Multi-Zone Combustion Model (MCM), a software tool to Convergent Science, Inc. (CSI), formerly Convergent Thinking, LLC. Convergent Science is

well known for Computational Fluid Dynamics (CFD) software that contacted LLNL through the Portal. CFD software simulates the three-dimensional flow of fuel, air, and combustion products within an internal combustion engine. MCM enables computationally efficient and accurate prediction of combustion processes in internal combustion engines. It works with computational fluid dynamics (CFD) and detailed chemical kinetics (DCK) software packages to simulate internal combustion engine processes. Chemical kinetics simulation is critical to accurately predicting ignition and emissions formation, but this type of simulation is also computationally intensive. MCM reduces the number of chemical reactors that must be calculated in an engine simulation from hundreds of thousands or millions to a few hundred calculations per time step. By reducing the computational cost of engine simulation, MCM has made it practical to do combustion simulations with reasonable run-times (hours to days instead of weeks to months) on smaller-scale computer systems without compromising accuracy.

Is MCM a "clean technology" code? Not always. Its distinction is the code's efficiency reducing computational costs and run times of simulations on a small scale (not the high performance computational systems that LLNL is known for). The code therefore can enable many computational inquiries that could otherwise not be addressed by those who do not have access to a high performance computer system. One could use the code to optimize things other than energy efficiency (the clean tech application), such as high performance.

One might frame the difficulty of finding technology at the national laboratories in another way -- that the most interesting technology for clean technology applications may not have been originally developed for a clean technology purpose. In 2006, understanding that in addition to the routine difficulties one might encounter negotiating a national laboratory's technologies, most may not even think of LLNL for clean technology innovations, the author assembled and began to market LLNL's first clean technology portfolio. Some of those technologies had a clear clean tech development pedigree, such as capacitive deionization, a desalination technology. Others, such as a solar thermal engine developed to power constant surveillance aircraft, were not. In fact, one might suggest that the more disruptive and innovative answers to clean technology applications may be precisely those developed for other purposes. Arguably clean technology applications can be found for computer algorithms, wireless sensors, RFID tags, coatings and materials and the list goes on.



With the modified framework in mind that clean technology is not always labelled as such, the most valuable tool for disruptive clean technologies may be the EERE Innovation Portal's visual patent search page (http://techportal.eere.energy.gov/VPS/). The page maps all of the patents and published patent applications owned by the twenty-seven entities contributing to the website and funded by U.S. Government sources. The holdings can be displayed visually and then by patent as an investigator drills into the information, either by category for the twenty seven entities combined, or by category from selected institutions. This allows the user freedom to use his or her own creativity and expertise to assess technologies for a potential clean energy application.

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