

MEDIA COVERAGE

Low Carbon Technology Partnerships initiative

VERGE at 5: From a movement to a market

By Joel Makower

This morning we launch our fifth annual VERGE conference, in San Jose, California. If you're unable to attend the four-day event in person, I encourage you to watch the plenary sessions we'll be livestreaming; [click here for details](#). In case you'll miss it, here is the message I'll be delivering as we open the event.

Four years ago, when we [launched VERGE](#), it was, in retrospect, a bit audacious.

There is a great convergence of technologies taking place, we proclaimed. It will accelerate sustainability solutions in a climate-constrained world.

And, as we [put it at the time](#), perhaps a tad hyperbolically: "It will change everything."

We believed it to be true. Except that there was only minimal evidence to back it up.

That first VERGE event, in June 2011 — actually, three separate events on the same day, held in Shanghai, London and San Francisco, and streamed globally — was, as the saying goes, "early days." But it quickly became clear that we weren't the only ones witnessing a significant shift taking place. Even those who couldn't really articulate what this convergence looked like showed up, eyes and ears wide open.

The participants convened in those three cities were less than conversant about technological convergence as it related to energy, transportation, buildings, infrastructure and supply chains, and its implications for the economy, the environment and society. Indeed, it felt at times as if the assembled guests were learning to speak a new language.

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Most participants were well entrenched in their respective operational silos — buying energy, managing facilities or fleets, building infrastructure projects and other things. Few had yet envisioned what happens when the various silos and technologies came together — how



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electric-vehicle recharging stations, for example, could affect a building's design and energy use or connect to its rooftop solar panels to produce zero-carbon fueling. Never mind the potential of those EVs to serve as back-up energy storage for that building — or the implications of all this on the electricity grid and the auto industry. Or the capability of apps to allow multiple employees to share vehicles, electric and otherwise, thereby reducing fleet capital costs and more fully using these pricey assets, all while potentially reducing congestion and pollution in surrounding communities.

By the second VERGE conference, in San Francisco in 2012, hundreds of participants not only were speaking the same language, but beginning to have real conversations. Their understanding began to take shape of the potential for technologies to work together to align sustainability with productivity and profits.

By [last year's VERGE](#), those conversations were in full swing. Customers were flocking to exhibitors, partnerships were forming, deals were being made. And that was just during the four-day event. The conversations continued long after.

So, were we prescient or lucky? No doubt, a little of both. I began talking about technology convergence in speeches starting in 2008. (I used the term "mash-up" back then.) The original notion came from my work with the Silicon Valley venture capital community, where big corporations were joining forces with VCs to speed market adoption of smart and clean technologies for a range of business applications. Initially, the "convergence" I noticed was of big companies and the cleantech community, which up to then had been in separate orbits.

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Of course, there was much more to it: New technologies were creating new capabilities that increased efficiency, asset use and service offerings while using a fraction of the energy, materials and other resources. In short order, the sharing economy would emerge, along with the notions of a low-carbon and circular economy. So would the acceleration of markets for renewable energy, energy efficiency, connected vehicles, intelligent buildings, resilient and sustainable cities, smarter supply chains and technologies for more efficient food and water systems.

Growing sales

This wasn't just about sustainability. Far from it, as I noted in 2011:

VERGE technologies aren't being developed primarily for environmental or sustainability reasons; they are the result of natural technological evolutions. But their development is being accelerated by the demands of energy and natural resource constraints, crowded mega-



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cities, emerging economies and the need to ensure such things as healthy air, public safety and affordable housing to people around the world.

Fast-forward four years. In 2015, we are witnessing the rapid growth of what we once called "cleantech," but which is now mostly called just "tech." We're no longer measuring these technologies' growth by how much money is being invested in them, or the number of new patent filings or initial public offerings. Now, their growth is being tracked by the increasing sales of actual products and services.

At last, smart, low-carbon technologies have transformed from a movement into a market, and from the margins to the mainstream. Consider:

- During Climate Week this year, [200 business executives agreed](#) to take steps to transition to a low-carbon economy. Working through the World Business Council for Sustainable Development, they formed working groups to study low-carbon freight, renewable energy, carbon capture and storage, low-carbon transport fuels, climate-smart agriculture and energy efficiency in buildings, as well as in cement and chemical manufacturing.
- That same week, nine multinationals from nine industries pledged to transition operations to 100 percent renewable energy. Half a dozen other global businesses pledged to reach zero net emissions, and scores of individual facilities set 100-percent renewable energy goals. Just last week, Apple and its biggest supplier Foxconn said they plan to [build solar power plants](#) producing hundreds of gigawatts of electricity toward the goal of making Chinese factories that produce iPhones run entirely on clean energy.
- Energy storage, not that long ago a pipe dream among renewable energy and next-gen grid advocates, is rapidly becoming mainstream, as the price-performance curve follows that of so many other technologies. Solar City and its close cousin Tesla have made storage (almost) affordable for homeowners, more so for [commercial customers](#). A small industry of technology providers and business models has sprung up just in the past year.
- There's now a race to produce autonomous or semi-autonomous vehicles, including from both old-line car companies (BMW, GM, Toyota) and would-be disrupters ([Apple](#), [Google](#), [Tesla](#)). The barriers to self-driving vehicles are now far more policy and business questions than technological ones.
- Similarly, the notion of zero-net-energy — ZNE for short — buildings is no longer far-fetched. In September, several organizations associated with advocacy group The B Team [declared a "net zero by 2050" aspiration](#) pertaining to greenhouse gas emissions. Building codes in Europe and California are shifting to encourage ZNE buildings.
- The market for low-carbon cities is growing quickly, even despite the limited funding realities of most municipalities. According to a [report by New Climate Economy](#), low-emission transportation, building efficiency and waste management in cities could generate savings of \$17 trillion by 2050.

Eye-popping numbers



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While some of these things seem to have happened overnight, that's hardly the case. A variety of technologies and trends have come together over a period of years to enable these technologies to shift into high gear: the growth of the Internet of Things; the entry of big companies, often pushed by disruptive smaller ones, into these markets, as we're seeing in the auto industry; renewable-energy and greenhouse gas emissions reduction mandates by companies, cities, states and nations; the growing attention to, and concern about, climate change.

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And then there are the business opportunities, with market reserachers offering some eye-popping numbers. For example, according to Navigant Research, which provides the best forecasts on these technologies:

- The market for zero-energy buildings could reach \$1.4 trillion by 2025.
- Stationary energy storage technology revenue is forecast to reach \$21.5 billion annually by 2024.
- Global revenue for smart parking systems is expected to reach \$1.5 billion from 2015 to 2024.
- Revenue form the combination of solar PV plus energy storage nanogrids is expected to grow globally from about \$1 billion in 2015 to more than \$23 billion in 2024.
- Annual sales of autonomous-capable vehicles are expected to reach 85 million globally by 2035
- Global revenue from LED lamps and modules is expected to total \$216 billion from 2015 to 2024.
- Global carsharing services revenue is expected to grow from just over \$1 billion in 2015 to \$6.5 billion in 2024
- Revenue for V2X — that's "vehicle to external" communications systems — is expected to reach nearly \$180 billion from 2015 to 2025.
- Communications equipment and services associated with EV charging networks is expected to generate revenue of just over \$62 million in 2015 and grow to more than \$709 million in 2024.

There's more: wind turbines, lithium-ion batteries, drones, demand-response technologies, energy-efficient HVAC systems, building energy management systems, microgrids, virtual power plants, wireless energy systems, vertical agriculture, electric bikes and scooters and more — a seemingly endless parade of innovations, all designed to fit together in an increasingly complex technological ecosystem. And there's the data all these smart devices generate, itself a growing market with unlimited potential.

The image shows the acronym 'LCTP' in large, stylized letters. The 'L' is a vertical bar with a blue and purple fiber-optic pattern. The 'C' is a circle with a blue and purple circuit board pattern. The 'T' is a grid of blue and green squares. The 'P' is a white, wireframe-style letter. To the right of the letters is a white silhouette of the Eiffel Tower against a blue sky with white clouds. Below the letters, the text 'Low Carbon Technology Partnerships initiative' is written in a blue, sans-serif font.

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Patience and vigilance

All told, it's a massive opportunity. The aforementioned New Climate Economy report sees a \$5.5 trillion global market evolving for low-carbon technologies and products. Real money.

Realizing this opportunity takes time, far more than most people realize. And the technologies don't develop in a vacuum. Many require changes in policy or that institutional barriers be removed. They can require significant changes by customers, such as cutting or changing longstanding relationships with energy utilities, or rethinking the nature of buildings or supply chains. They require constant vigilance to ensure that the opportunities these technologies afford are available to all, not just a few elites.

We are both cheered and chastened by the [Law of Accelerating Returns](#), promulgated by Ray Kurzweil, an author, inventor, futurist and a director of engineering at Google. It states that people tend to overestimate what can be achieved in the short term (because we conveniently tend to leave out necessary details and simplify complexity), but underestimate what can be achieved in the long term (because the effects of exponential growth of technology and ideas are misunderstood or overlooked).

The bottom line: When success comes, as it clearly is for many of these technologies, change can be fast and furious, and the benefits profound.

That is to say, the party is just getting started.

GreenBiz - <https://www.greenbiz.com/article/verge-5-movement-market>