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A Barometer of the Changing Face of Global Cleantech Innovation

GlobalCleantech '13
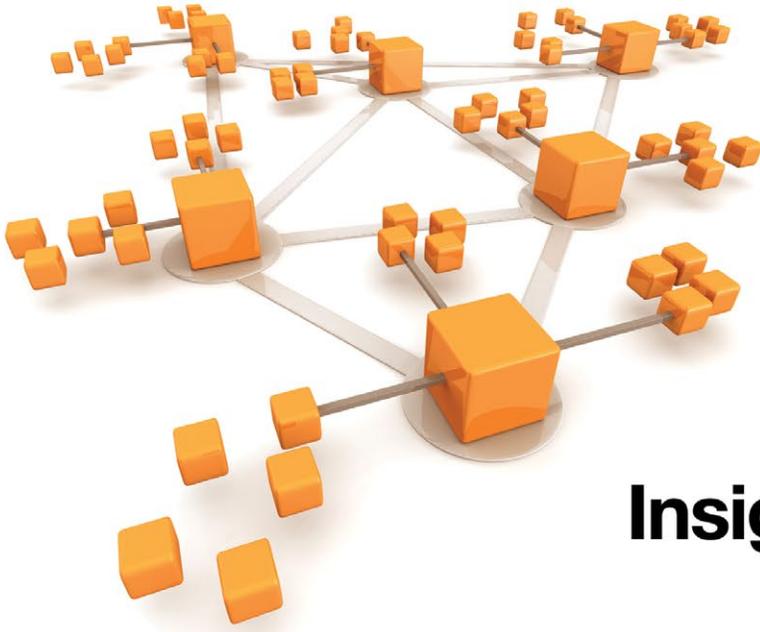# 100

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There is a lot of work involved and support given for the annual Global Cleantech 100 to come together. We would like to acknowledge and give thanks accordingly.

Firstly, the list and this report would not have been possible without our sponsoring partners, Autodesk and Chubb, organizations that have been highly supportive of our work, and who continue to help the development and nurturing of young and upcoming clean technology companies, the subject of this report.

Secondly, the list would not have been possible but for the willingness of our 90-strong expert panel (see Appendix 2), who gave up their time during the summer months to provide their input and opinions. This is, in addition, to the many hundreds who made company nominations during phase 1 of the process we go through, from May to August. Thank you all.

Thirdly, many people at Cleantech Group made small contributions, but particular thanks are due to Heather Matheson, Millen Paschich, and Emma Zolbrod (in helping with this report, the website, the awards, and the communications with all the companies) and to all our associates and analysts, with particularly noteworthy contributions from Troy Ault, Matthew Doe, Amanda Faulkner, Petra Janney, Joshua Seidenfeld, Will van Eaton, and Leo Zhang.

Disclaimer

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Foreword from Cleantech Group's CEO

For the fifth year running, Cleantech Group is proud to present the annual Global Cleantech 100 list, our method of taking a reading on the global innovation community's shifting views on which companies—and which types of companies—are most likely to have big commercial impact in a 5-10 year timeframe.

This research fits neatly and squarely within our mission to help corporations, investors, financiers, professional service firms, and governmental agencies connect with global cleantech innovation. It leverages our online i3 research platform, and the multitude of contacts and conversations we experience within our custom advisory practice and our global events.

Congratulations to those who made the 2013 list. We look forward to following the progress of your company—and hundreds of others—in the coming 12 months.

Sheeraz Haji
CEO, Cleantech Group

Sheeraz Haji

Foreword from the Authors

Our annual Global Cleantech 100 is a significant research exercise, pulling together thousands of data-points—objective and subjective; quantitative and qualitative—from all over the world, with the end goal of identifying where the consensus of sentiment and opinion seems to lie amongst the international cleantech community. The methodology and process is described in detail on pages 8-9.

The final 100 would not be one person's 100; there is much disagreement and conflicting opinion on what and who is working, and which companies are most likely to make significant market impact within a 5-10 year timeframe. The final 100 is therefore, by its very nature, a compromise—the median of all those opinions—delivered to us directly as part of the annual June-August research exercise and delivered indirectly through the market transactions (investments, contracts, etc.) which continue to be consummated.

Richard Youngman

We do not definitively state any year's 100 to be the best or top companies in the world, as that would need a common measure or metric. They do, however, stand for where "consensus sentiment" lies both in terms of which companies are in favor and are more commonly admired, and, particularly, for what kind of sub-sectoral areas and themes are in vogue.

What is most exciting to us, as analysts of the market, is the privilege of seeing and reading these viewpoints and interpreting them as part of our annual barometric read of the shifting sands within global cleantech innovation. Yes, there are 101st companies, unlucky not be on the list, and individual disappointments that go with that. However, this report is more focused on what this year's list tells us, relative to previous years, about the cleantech innovation and investment theme, and where it is all going. We hope you find our report thought-provoking and our read of the state of the market useful to you in planning the coming months.

Michele Parad

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MD, Europe & Asia, Cleantech Group

Michele Parad
Research Analyst, Cleantech Group

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The Global Cleantech 100 – Alphabetically

4Energy	Genomatica	Nujira
Agilyx	GlassPoint Solar	On-Ramp Wireless
Airbnb	glo	Opower
Alphabet Energy	Green Energy Group	OPXBIO
Amantys	Gridco Systems	Organica Water
Ambri	Gridium	OsComp Systems
Anesco	GridON	OSIsoft
Aquion Energy	Harvest Power	Ostara Nutrient Recovery Technologies
Attero Recycling	Heliex Power	Phoebus Energy
AutoGrid Systems	Hydrexia	Phononic Devices
Avantium	i2O Water	Project Frog
AZZURRO Semiconductors	INRIX	Proterra
Beta Renewables	Ioxus	Pure Biofuels de Peru
Beyond Meat	Isentropic	Recyclebank
BlablaCar	Kaiima	RelayRides
Chargepoint	Kebony	Scinor Technology
Ciris Energy	LanzaTech	SDC Materials
Clean Power Finance	Leosphere	Sefaira
Cooltech Applications	Liquid Robotics	Siluria Technologies
DeepFlex	LP Amina	Skyonic
Desalitech	Lucibel	SolarEdge
Digital Lumens	Marrone Bio Innovations	SorTech
ECO Plastics	MetGen	Space-Time Insight
Ecoult	Microvast	Streetline
Elevance Renewable Sciences	Mosaic	Sungevity
Emefcy	NanoH2O	Sunrun
ENBALA Power Networks	Nest	Tendril
Enerkem	newterra	Tianren
Enlighted	Nexant	Transphorm
Envia Systems	NexSteppe	Trilliant
Epuramat	Next Step Living	va-Q-tec
FibeRio Technology	NovaLED	Vestaron
FilterBoxx	Novomer	
FriedolaTECH	Nualight	

Click on any company name to be taken to their i3 profile.

What is the question we are seeking to answer in publishing the Global Cleantech 100?

According to the world's cleantech community, which 100 of today's private cleantech companies are the most likely to make the most significant market impact over the next 5-10 years?

Who can qualify for the annual list?

Any independent, for-profit, cleantech company that is not listed on any major stock exchange, or is not a majority-owned subsidiary of another company, can qualify.

What is considered cleantech?

How some use or interpret the cleantech term definitely varies among stakeholders—by type and by geography. However, despite occasional third party commentary to the contrary, Cleantech Group has actually never changed its guiding view on what *we* mean by the cleantech term we are synonymous with. From 2002 until today, our website has carried the same words, written by our founders, of which these are some of the most critical:

> *The concept of cleantech embraces a diverse range of products, services, and processes across industry verticals that are inherently designed to (a) Provide superior performance at lower costs, (b) Greatly reduce or eliminate negative ecological impact, and (c) Improve the productive and responsible use of natural resources*

The term might be out of favor today, especially in the US and in financial circles. Use energy and natural resources, resource efficiency, sustainability, closed loop or whatever you choose to label our innovation theme, but it still comes back to the same idea—doing more with less. It's a productivity challenge, a financial one, but also a productivity challenge from the viewpoint of using fewer (and less) resources from the earth's finite supply.

What we *have* evolved, and will continue to do so, is our taxonomy and the 700+ tags we use today to classify companies in this important area of innovation, organized under 18 top-level categories, as shown on the right. To see how these 18 break-down into sub-categories and how our commercial data platform, i3 (insight into innovation) is structured, please visit http://research.cleantech.com/tags/.
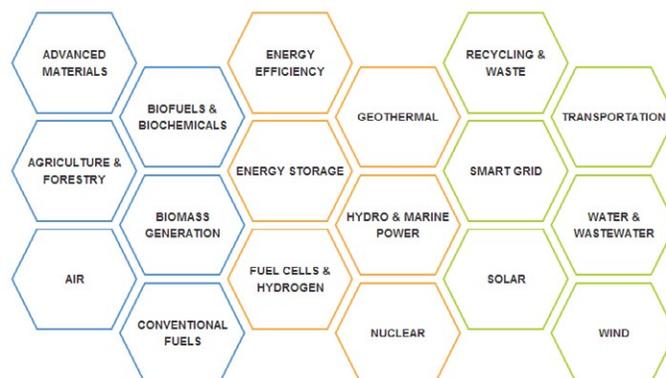
Source: Cleantech Group's i3 platform

How did this year's list come together?

In **Phase 1,** a long list of **5,864 companies** was built from both active nominations made by hundreds of experts in Cleantech Group's worldwide network of market "insiders", and passive nominations derived from analyzing a wealth of market data including **319 third party awards**, and **3,081 data points** from our own i3 platform. Based on a proprietary scoring system, used to identify those with the broadest base of support, Cleantech Group narrowed down the results to **a shortlist of 300 companies.**

In **Phase 2**, members of our expert panel, made up of 90 investors and corporations from across the globe, were each given a defined number of positive and negative 'votes' to place against the shortlisted companies, and were encouraged to provide commentary on a company's ability to achieve high growth and high market impact, to either strengthen or

weaken the company's case to make the final 100. They were asked to consider the following three angles:

- Innovation (the problem it solves; uniqueness; sustainability of advantage, etc.)
- Market (accessibility, size, growth dynamics, barriers to entry, etc.)
- Ability to Execute (finances; team competences; connections and networks, etc.)

### Who were the active participants (nominators and expert panelists)?

The expert panel was active in phase 1 (where they nominated blind, like everyone else), and also in phase 2, where they commented on the shortlist. See Appendix 2 on page 35 for a list of the 90 members of the 2013 expert panel.

In phase 1, we had hundreds of entrepreneurial companies, investors, advisors, economic development agencies, cleantech clusters, and other industry stakeholders give us their opinions—through the nomination process, in which, in accordance with the 'Lust List' principle, people can only nominate their own company or an investee company if they nominate two others where they have no associations. An illustrative list of names active in our industry, and known to us, is represented below:

Stefan Den Doelder, 3P Capital; Matthew Scullin, Alphabet Energy; Michael Mcneley, Ambri; Genese Castonguay, Aquatic Informatics; Noa Gershon, Aqwise; Ron Mahabir, Asia Cleantech; Jasjit Maggu, BDC; Ally Latourelle, Bio Amber; Matt Bonass, Bird & Bird; Vivek Soni, Boston Cleantech; Shaun Fitzgerald, Breathing Buildings; Emily Rothman, Bright Farms; Martin Garratt, Cambridge Cleantech; David Brown, Canatu; Claude Stoufs, Capricorn Venture Partners; Amy Ingram, Chubb; Nat Kreamer, Clean Power Finance; Peter Sweatman, Climate Strategy; Brad Poorman, Cocona; Danny Yu, Daintree; Mark Perutz, DBL Investors; Jason Bloking, Draper Nexus Ventures; Ted Fagenson, Ecofactor; Stefano Poli, Electro Power Systems; Eytan Levy, Emefcy; Marie-Helene Labrie , Enerkem; Bret Adams, Enervault; Alexander Hardtmuth, Entrepreneurs Fund; Kris Brettingen, Ernst and Young; Fred Chang, Everest Cleantech; Philippe Thellen, Finances et Economie Quebec; Carine Vanhove, Flanders Cleantech Association; Brandon Moffatt, Green Mantra; Kim Gilmer, Gridsentry; Paul Sellew, Harvest Power; Oren Gadot, Helio Focus; Alicia Moghtader, Highview Power Storage; David Waserstein, I2BF; Adam Kingdon, i2O Water; Nityen Lal, Icos Caipital; Alex Portilla, Innovation Center Denmark; Claire Servini, Italtrade; Thijs Verburg, Kempen; Mona Samuel, LanzaTech; Murray Mccaig, MaRs Cleantech Fund; Jennifer Stoneburgh, Marsdd; Richard Mccombs, MBA Polymers; Henry Wang, Nafasi Systems; Robert Thyssen, Netherlands Office for Science & Technology (NOST); Adi Naor-Pomerantz, New Co2 Fuels; Bruce Burke, Nexant; Anna Rath, NexSteppe; Raymond Mcallister, Nexterra; Cosima Schreiber, On-Ramp Wireless; Anders Lindgren, Optistring; David Ferris, Osborne Clarke; Jon Rabinowitz, Panoramic Power; Alex Stephany, Parkatmyhouse; Colin Calder, Passiv Systems; Arnold Lee, Pastech Group; Ronen Botzer, Phoebus Energy; Patty Solberg, Powerit Solutions; Susan Stevens, Practically Green; Mark Owen, Puralytics; Peter Bell, Renewable Fuel Products; Mike Kaplan, Retroficiency; Sandra Sassow, Seab Energy; Mads Jensen, Sefaira; Robert Simons, Sempra Utilities; Erik Olsson, Sol Voltaics; Yoav Banin, Solergy ; Laura Rooseboom, Start Green; Tad Glauthier, Stem; Bruno Rudnik, Sustech Consult; Andreas Stubelius, Swedish Energy Agency; Amir Peleg, TaKadu; Parag Mehta, Terra Green Biologics; Zvika Klier, TIGI; Evan Sarkisian, Tigo Energy; Tian Jin, Universtar; Robert Fenwick-Smith, Venable LLP; Ty Jagerson, Village Power Finance; David Hitchcock, Virent; Dirk Fransaer, Vito; Steven Ashby, Wattz On; Man Yang, WeTech; Ian Bowles, Wind Sail Capital; Holger Hoffmann-Riem, WWF; Edward Lovelace, XL Hybrids; Laura Draxler, ZERE Energy and Biofuels

What kind of third-party awards did we look at?

We derived passive nominations from over 300 different third-party awards, as represented by the graphic. These ranged from revenue-based rankings like Deloitte's annual Fast 500 or GP Bullhound's European Cleantech Connect; to technology awards such as WEF's Technology Pioneer, or Red Herring's 100; to sub-sectoral rankings, such as the Artemis 50 (in Water) or Biofuels Digest's 50 Hottest Companies in Bioenergy; to corporation innovation competitions (including ones by GE, IBM, Saint-Gobain, and Shell); through to geographical ones (e.g. Sweden's Cleantech Company of the Year Nominees 2012).
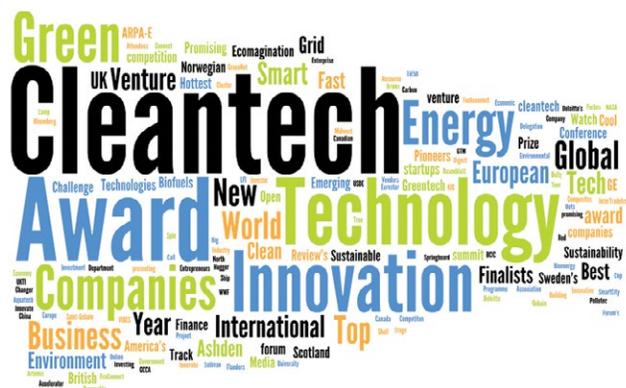
A 'wordle' of the 319 third-party awards used to derive nominations.

What data does Cleantech Group use each year?

Cleantech Group collects (and sells in the form of an i3 subscription) information on innovation companies. That information includes data on companies that have received investment via venture backing, grants, project financing, etc. as well as those who have established key commercial partnerships–channel partnerships, technology development partnerships, or pure customer/supply relationships. Thousands of validation points of commercial progress (that we use as passive nominations, alongside the active nominations) are derived from such data.

What is Cleantech Group's scoring system?

The scoring system rewards companies who have multiple validations across multiple sources, to align with our objective to synthesize and represent collective opinion. That is to say, a company that has consummated numerous market transactions, has been nominated by multiple people in the market generally—and within our expert panel—and might have additionally appeared in a third-party ranking, will score better under our methodology than a little-known, well-kept secret gem.

Why do we go to all this trouble each year?

We do this for two reasons. Firstly, we do it to help give profile and publicity to the enterprising companies who are working hard to grow businesses with positive impacts, financially and environmentally—who, as Tsing Capital might say, are putting "doing well by doing good", into action. Secondly, we do it to provide us (so we can provide you) with an annual read of the changing state of global cleantech innovation—who and what is in and out of favor, and why.

First-time entrants to the Global Cleantech 100 are shown in green.

Advanced Materials
DeepFlex
FibeRio Technology
Kebony
Novomer
SDC Materials

Agriculture & Forestry
Beyond Meat
Kaiima
Marrone Bio Innovations
Tianren
Vestaron

Air
Leosphere
LP Amina
Skyonic

Biofuels & Biochemicals
Avantium
Beta Renewables
Elevance Renewable Sciences
Enerkem
Genomatica
LanzaTech
MetGen
NexSteppe
OPXBIO
Pure Biofuels de Peru

Conventional Fuels
Ciris Energy
OsComp Systems
Siluria Technologies

Solar
Clean Power Finance
GlassPoint Solar
Mosaic
SolarEdge
Sungevity
Sunrun

Energy Efficiency
4Energy
Alphabet Energy
Anesco
AZZURRO Semiconductors
Cooltech Applications
Digital Lumens
Enlighted
glo
Gridium
Heliex Power
Lucibel
Nest
Nexant
Next Step Living
Novaled
Nualight
Nujira
Opower
OSIsoft
Phoebus Energy
Phononic Devices
Project Frog
Sefaira
SorTech
Tendril
Transphorm
va-Q-tec

Energy Storage
Ambri
Aquion Energy
Ecoult
Envia Systems
Ioxus
Isentropic
Microvast

Fuel Cells & Hydrogen
Hydrexia

Geothermal
Green Energy Group

Other Cleantech
Airbnb

Recycling & Waste
Agilyx
Attero Recycling
ECO Plastics
FriedolaTECH
Harvest Power
Recyclebank

Smart Grid
Amantys
AutoGrid Systems
ENBALA Power Networks
Gridco Systems
GridON
On-Ramp Wireless
Space-Time Insight
Trilliant

Transportation
Blablacar
Chargepoint
INRIX
Liquid Robotics
Proterra
RelayRides
Streetline

Water & Wastewater
Desalitech
Emefcy
Epuramat
FilterBoxx
i2O Water
NanoH2O
newterra
Organica Water
Ostara Nutrient Recovery
Technologies
Scinor Technology

In this article, Richard Youngman, creator of, and project lead on, the Global Cleantech 100 program, provides his reflections on the state of innovation and an update on the ongoing shift from the second cleantech innovation wave to the third.

It is that time of year again. The annual Global Cleantech 100 report, subtitled as always, "A barometer of the changing face of global cleantech innovation", provides us all with the opportunity to see where the consensus viewpoints are today, to see who or what is in or out of favor, and to see how key market participants—especially corporates and investors—are thinking about start-up and growth companies that are active across the broad clean technology innovation theme.

I entitle this piece "personal reflections", as I do not dare to speak on behalf of all my Cleantech Group colleagues. That said, I am confident that much of what I have to say below on the key innovation trends would fit "house view".

Last year, in this piece, I argued that we were in transition from a second to a third wave of cleantech innovation and investment activity—the ending of one wave,

Report cover from 2011

the early beginnings of another. My guarded optimism towards this third wave, what we labeled the "Cleantech Going Inside" wave, has cautiously increased since then. At a macro level, 2013 has felt quite similar to 2012, but the transition has continued, and market conditions and sentiment are gradually evolving at a more micro and nuanced level. Such shifts are evident in the 2013 Global Cleantech 100, and particularly in how it differs from 2012 and the previous editions.

I will cover such shifts in this section below, as I outline four reasons for my cautious optimism. In the sections that follow, some of these points and themes are further illustrated and developed along with, especially through the Concluding Remarks, some counter-balancing pauses for thought.

Market growth and deployment levels continue to trend upwards.

Let us not lose sight of the fact that our collective innovation and company-building activities are grounded in a context in which the drivers of growth and opportunity are only strengthening, and market deployment and development is not only increasing, but, in many cases, is accelerating too. Consider some of the following, to put the ups and downs into some kind of perspective:

- Global sales of the whole clean technology products portfolio have been growing, as a whole portfolio, at north of 10 percent per annum for the last few years, and are set to be on par by 2015, measured by value of sales, with such established global industrial categories as consumer electronics and oil & gas equipment.[1]
- More money has been invested globally in renewable capacity (including hydro) than in fossil-fuelled generation capacity since 2010, led by China, the U.S., Germany, Italy, and India.[2]
- Two-thirds of all solar PV capacity in place worldwide has been installed since January 2011, a period in which global module prices have fallen by more than 60 percent. Capacity is expected to nearly double in the next 2-1/2 years.[3]
- The global smart grid market is expected to cumulatively surpass $400 billion worldwide by 2020, with an average compound annual growth rate of over 8 percent.[4]
- Advances in technology and falling prices have seen the global penetration rate of LED lighting rise from a mere 1.5 percent as recently as 2009 to nearly 12 percent in 2012. This is expected to reach 26 percent by 2014, with an output value of $42 billion[5], and to be 45 percent in 2016 and 70 percent in 2020[6].
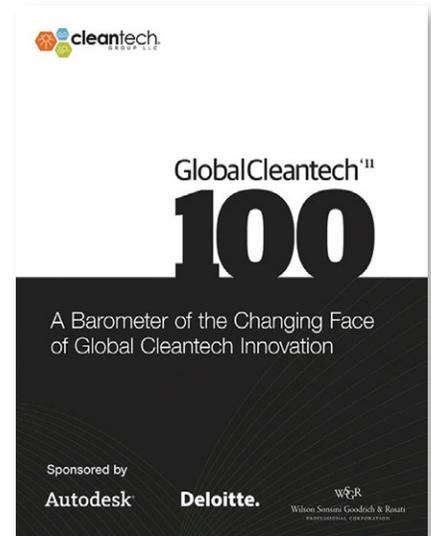
[1] The Race to the Top of Global Clean Energy Technology Manufacturing, Roland Berger/WWF, June 2012
[2] Global Trends in Renewable Energy Investment 2013, Frankfurt School-UNEP Centre/BNEF, 2013
[3] GTM Research - http://www.greentechmedia.com/articles/read/chart-2-3rds-of-global-solar-pv-has-been-connected-in-the-last-2.5-years
[4] Global Smart Grid Technologies and Growth Markets, 2013-2020, GTM Research
[5] Trends in the high- brightness LED lighting market, Digitimes.
[6] Lighting the Way: Perspectives on the global lighting market, 2nd edition 2012. McKinsey & Co.

- Approximately 10 percent of Inc. magazine's ranking of the 5,000 fastest-growing companies in America, we would recognize as cleantech companies[7].

The key takeaways for me are:

- These market deployment figures are in direct contrast to the falling volumes of private risk capital levels funding cleantech companies today, where, arguably, we are in a period of healthy correction after the "irrational exuberance of 2006-09". One is surely the more powerful indicator of the future health and potential of cleantech innovation. Money follows growing markets, eventually.

- Yes, there are areas in the clean technology world that have a long way to go to make significant market impact, but equally there are some which are reaching very exciting milestones. Cree's recent release of an LED light bulb for less than $10, taking shelf space from an incumbent like Philips, has rightly been cited as a significant milestone. Perhaps no surprise then that lighting should feature so strongly in the 2013 Global Cleantech 100.

- Whatever area we might talk about, the fundamentals driving future markets for cleaner, "doing more with less" products are undoubtedly trending positively even if it is impossible to predict the pace and path of each trajectory. Analysts typically over-state innovation market sizes too quickly; interestingly, recently, there have been cases where they have consistently under-estimated.
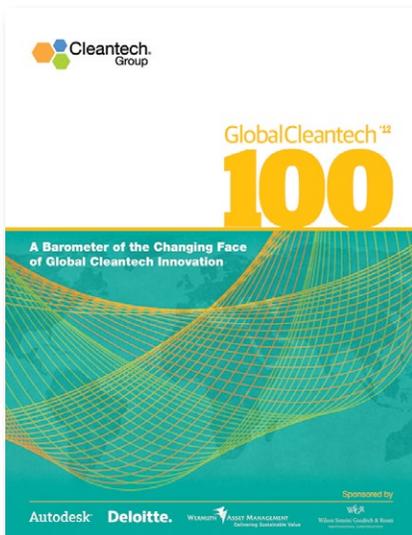
Report cover from 2012

Emerging market demand continues to show hunger for technology and innovation

In the same way that it is easy to be duped into thinking the portfolio of cleantech innovation is shrinking by being overly-focused on the capital flows into private companies, so it is also easy to forget (for those fortunate enough to benefit from the best that the world has to offer) that the better technology and innovation are not where you find the most acute environmental needs and the greatest economic growth prospects! Not only is it the case that the greatest population growths, the strongest gentrification and urbanisation trends, and the largest infrastructure upgrade programs are generally happening outside of North America and Europe, but it is also the case (in the main) that the better technology and the solutions to very real problems—such as air pollution and a scarcity of usable water—are not available locally.

That is to say, the opportunity-set I highlighted in last year's report—namely, the opportunity for young western technology companies to serve BRIC markets and beyond—remains as strong as ever and will continue to do so for many years to come. China is probably at the forefront of that group, given its scale, over-reliance on coal, increasingly affluent and energy-consumptive population, air pollution, and dwindling resources.

Companies in the 2013 Global Cleantech 100, living out this technology transfer theme include: **LanzaTech**, **LP Amina** and **Microvast** in China, **Nexant** in India, and **NexSteppe** in Brazil, to name but a few. Beyond this year's 100, **Azuri Technologies** was a shortlisted company; it is rolling out a "pay as you go" off-grid, solar solution to rural communities in Africa.

Many service-based and solution-driven businesses are flourishing

Does this mean all the opportunity is outside one's own markets? No, not at all. It is just a different opportunity set, in a portfolio of plentiful opportunity that, to my mind, makes a mockery of those claiming today "cleantech is dead". The drive to "do more with less" (cost and resources) is surely an endless journey for the innovative, and, by its very nature, can never die.

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[7] http://www.inc.com/inc5000/list/2013

Arguably, we are at the stage of a cycle where we are awash with technological advances (funded by the 2006-2010 goldrush of venture investment). Different from a few years back, the economic propositions of many ventures already stack up in certain market categories or are almost there—or will be soon—in the case of others. This, then, shifts the emphasis to deployment and installations, to finance and business models.

It is no surprise, therefore, to find many cases of service businesses flourishing at this time, and thus no surprise to find many such businesses in the 2013 Global Cleantech 100. Within the 100, I would point to such companies as **Anesco**, **Clean Power Finance, Next Step Living, Sungevity,** and **Sunrun,** as illustrative of this dynamic and as companies who all appear to be growing rapidly through today's low to negative GDP growth environment (in the West).

Indeed, when you look at the end customer of many of these service businesses, and then add to the list names such as **Nest** (2013 GCT100 North American Company of the Year), **SolarCity** (2013 GCT100 Graduate of the Year), and **Tesla** (GCT100 Alumnus 2009), there does seem to be something to the idea that, in this particular transition period, consumer-oriented businesses seem to have greater traction than B2B ones.

For me, this is indicative of the transition phase we are in right now. We are in a period when the economics are more or less there–perhaps not quite enough or perhaps not to the point where rational economics isn't the only factor in the procurement decisions being made. Consumers, even more than corporate customers, are not perfectly rational decision makers. Other factors come into play for them–and the smartest companies "get" this. Whether it is about design or branding, or service levels or other clever ways to remove the most common barriers to buying, the consumer, it seems, will buy if you play to all factors affecting him/her, not to one. Solutions, not technology. And think combinations. At the time of writing, **Nest** and **Sunrun** have just announced a marketing partnership to pair smart thermostats with solar. A case in point.

Thinking further ahead. If my consumer point, and the previous one about the importance of China (and many other fast-growth economies) in the cleantech theme resonate, then consider the importance and the game-changing opportunity set that is represented by the continued growth in spending power of the Chinese middle classes and the uber-wealthy.

New opportunity sets continue to appear

Within an ever more resource-scarce world, the opportunity set will surely continue to ebb and flow, evolve and, in some cases, explode, whereas in other cases die. The opportunity sets the majority were focused on within the cleantech theme a few years back (especially solar and biofuels) seem to have played out for now—admittedly, with not great results for the companies or their investors. But that does not necessitate that the next set of opportunities being tackled in the 2010's are also set to fail. Indeed, there are many reasons, based on the advancement of learning and market development/economics over that time, allied with less hype and fewer people forcing up expectations and valuations, why this third wave should be a strong period for entrepreneurs and their backers.

There are plenty of opportunity sets that could have been picked on (see pages 36-37 for more). I am picking out three from within my read of the 2013 Global Cleantech 100 and the wider environment.

Cleantech Innovation Meets Conventional Energy

In 2012, I ended these personal reflections with the words:

> *"Such practicalities as growing businesses to help clean up the dirtiest of industries from the inside will define the third wave. What greater symbolic moment of sustainable progress could there be than cleantech going inside the Oil and Gas industry?"*

A year on, I see this trend only getting stronger, deduced from our own interactions with Oil & Gas players and assisting many of them with their innovation sourcing activities, and represented by the presence of many companies in the 2013 Global Cleantech 100, where the Oil & Gas industry is one of their prime target markets. Examples include the carbon

capture and mineralization technology being developed by Skyonic, which can be bolted onto existing infrastructure at oil refineries. GlassPoint Solar's solar thermal technology is being used to generate steam for enhanced oil recovery (EOR) operations that otherwise burn natural gas to generate the same heat. And in the most notable cross-over, wastewater treatment companies including Filterboxx, Epuramat, and newterra are increasingly tweaking their offerings for application to produce water in remote Oil & Gas fields.

Efficiency has, at last, become sexy

In December 2008, Cleantech Group's annual predictions ("Nine for 2009") for the first time highlighted the coming boom in energy efficiency.[8] Obvious now—not so much then—the piece posited that "2009 will be the year IT turns its eyes to energy opportunities, not just in algorithms and software".

Since that time Energy Efficiency has emerged as our top category in investment figures. Information Technology has certainly played a critical role in that, as more intelligence is injected into previously dumb assets such as buildings, wind turbines, water pipes, power transistors, lighting fixtures, and more. "The Internet of Things" is how some like to describe this phenomenon.

Report cover from 2010

Energy Efficiency is now, by far, the most represented innovation category in the annual Global Cleantech 100. This certainly has a strong link to investors' distinct preferences today for business models that more closely resemble those of traditional capital-lighter and faster-to-market, tech and software start-ups—proven money-winners of the past.

More interesting is to observe the changes within the Energy Efficiency category, since this category is in itself a significant catch-all. The biggest change over recent years has been the rise of data-centric and so-called "cleanweb" companies which span categories such as Agriculture, Recycling and Transportation, as well as the more obvious energy areas such as lighting and buildings. Examples within the 2013 Global Cleantech 100 might include: Airbnb, OSIsoft and RecycleBank.

Beyond Energy

In the five years since we started the Global Cleantech 100, there has been a distinct change in the interest and activity levels around innovation, relevant to resources beyond energy—pertaining to, say, Air, Water, and Land, for example. Our Agriculture & Forestry category has mimicked energy efficiency's growth patterns (up 50 percent since 2009), admittedly from a lower start-point. And water, waste, and materials are all now well-established in the 100, representative of their place in the overall innovation opportunity-set.

Examples would include companies, new to the 100 this year, such as: Desalitech, ECO Plastics, FibeRIO, FriedolaTech, Leosphere, Organica Water (2013 GCT 100 Europe & Israel Company of the Year), Scinor Technology, SDC Materials, and Tianren.

So those are my four reasons for seeing cause for optimism as we navigate this tricky transition period, as the third wave of cleantech emerges from under the shadow the second. I come back to all of this in the concluding remarks.

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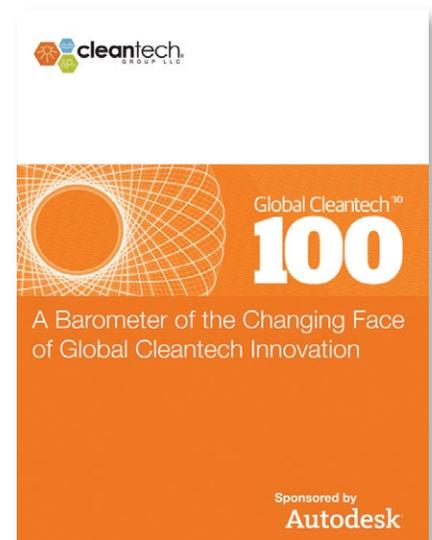
[8] Originally published December 4, 2008 (at a now discontinued web-page: http://cleantech.com/news/3945/nine-clean-technology-predictions-2009)

The Stand-Out Companies from the 2013 Global Cleantech 100

The 2013 Global Cleantech 100 is quite the mix of old and new, mature, and immature companies

This year's Global Cleantech 100 is a blend of old veterans and a cohort of new aspirant champions. One eye-catching figure this year is that 51 are new entrants. 49 companies are returning Global Cleantech 100 alumni, 26 of these have returned three years in a row, 12 for four years. The four companies shown below merit a shout-out, being the only ones to have made the Global Cleantech 100 all five years of its existence:

Company	Country	Sector	Description
Nano H₂O	USA	Water & Wastewater	Developer of thin-film nano-composite reverse osmosis membranes for the desalination market
OSTARA	Canada	Water & Wastewater	Provider of solutions transforming phosphorus and nitrogen from used water streams into environmentally responsible fertilizer
TENDRIL	USA	Energy Efficiency	Provider of a home energy management SaaS platform that facilitates interaction within the energy ecosystem to enable utility solutions
Trilliant	USA	Smart Grid	Provider of unified smart grid communications solutions that enable advanced metering, distribution automation, and demand response

Source: Cleantech Group's i3 platform

There was widespread consensus on many of the 2013 Global Cleantech 100

The table below shows the top 10 companies within each major region. Presented in alphabetical order, these companies attracted the broadest base of support from the world's cleantech community. The companies highlighted in bold won our three regional Company of the Year awards, being the most highly ranked by our scoring methodology.

North America	Europe & Israel	Asia Pacific
Ambri	4Energy	Attero Recycling
Aquion Energy	Amantys	Ecoult
Clean Power Finance	Avantium	**Hydrexia**
Harvest Power	FriedolaTECH	LP Amina
LanzaTech	i2O Water	Niutech Energy*
Marrone Bio Innovations	Kaiima	Pearl Hydrogen*
NanoH2O	Kebony	PerPETual Global*
Nest	Novaled	Scinor Technology
Opower	**Organica Water**	Tianren
Ostara Nutrient Recovery	va-Q-tec	WattCost*

*Note Niutech Energy, Pearl Hydrogen, PerPETual Global and Wattcost are taken from the shortlist, outside of the Global 100 to make up the Asia-Pacific regional top 10.
Source: Cleantech Group's i3 platform

Geographic Highlights

The US continues to dominate the 100 by number, but a total of 18 countries are represented this year (a record), with our first entrant from Latin America

Zooming into the 100 by geography, 61 percent came from the North America region (with 56 companies from the United States). 32 of the companies are from the Europe & Israel region, six from Asia Pacific and, for the first time, a company from South America. **Pure Biofuels de Perú** specialises in liquid fuels storage, distribution, marketing, and biodiesel production in Peru. *"The company has been smart and secured facilities at below market costs; margins are retained as it does not bear the brunt of commodity pricing impact",* commented one Expert Panel member.

The Global Cleantech 100 Locations Around the World

Top Countries							
US	56	Canada	5	Israel	5	China	3
UK	9	Germany	5	France	4		

Source: Cleantech Group's i3 platform

Country	Number of GCT100 Companies	GCT100 Companies per $Trillion GDP
Israel	5	20.00
Norway	2	7.14
UK	9	3.88
USA	56	3.58
Canada	5	3.45
Sweden	2	3.37
Australia	2	2.08
France	4	1.78
Germany	5	1.57
China	3	0.43

*Countries with 2 or more represented in the Global Cleantech 100

The UK had the second highest number of companies in the 100, though Israel continues to lead the way by company per GDP metric.

The United Kingdom (with nine companies represented) came in a distant second place after the US (with its 56 companies); tied in third place with five companies each were Canada, Germany, and Israel. Though absent last year, the Nordics have re-emerged as a core geography in the Global Cleantech 100 with companies from Sweden (**glo**), Finland (**Metgen**), and Norway (**Kebony, Green Energy Group**) making an appearance on the 2013 list.

Looking at the Global Cleantech 100 companies per $ Trillion of GDP[1], Israel emerges as the clear winner, Norway in second place, and the UK in third, just ahead of the US. Although Germany has one more company represented, France has a slightly better per GDP ratio.

Similar to last year, China retained three companies on the list (**Scinor Technology**, **LP Amina**, and **Tianren**) but remains way behind in terms of representation per GDP. This is indicative, in our opinion, that China still has far to travel on the innovation and start-up company-building journey.

[1] GDP Current Prices 2013, Report for Selected Countries and Subjects, World Economic Outlook Database, April 2013, International Monetary Fund.

Country Spotlight: Israel

Israel's entrepreneurial culture and technical expertise make it a natural hub for cleantech innovation

- Israel placed second on the 2012 Global Innovation Index (co-published by Cleantech Group and WWF) primarily due to the strong evidence of technical expertise and entrepreneurial culture[2].

- The country is particularly strong in Water and Agriculture innovation (2013 Global Cleantech 100 examples include **Desalitech**, **Emefcy**, and **Kaiima**); driven by significant water scarcity and local arid agricultural challenges that affect the region. In particular, drip irrigation, precision farming, agri-biotechnology, desalination, and turnkey water management solutions are innovation areas of strength in Israel.

- There is a local investor and incubator base, set up to assist young companies. Key names in this regard include: Israel Cleantech Ventures, Kinrot Ventures (recently purchased by Hutchison Water), Mekorot (and its Watec program), Mofet Venture Accelerator, and Terra Venture Partners.

- And there is momentum in government support, evidenced, for example, by the 10-year, $400 million Oil Free Initiative, specifically aimed to reduce the global consumption of oil in transportation, and by the government's NewTech initiative to help water and alternative energy companies which has been running since 2006.

Country Spotlight: United Kingdom

The UK has a number of advantages as a geographical area for startups

- There are numerous incentives and support services for startups from organizations like the Department of Energy and Climate Change (DECC), the Green Investment Bank, the Carbon Trust, the Technology Strategy Board, and the UK Trade & Investment (UKTI).

- Cleantech companies in the UK no doubt benefit from the fact that a number of Europe's leading pan-European cleantech investors are based in London (e.g., Climate Change Capital, Environmental Technologies Fund, Greencoat Capital, Ludgate Investments, and Zouk Capital), and from the fact that there have been a number of UK-only investors who have been active over recent years. These UK-only investors include Carbon Trust Investment Partners (recently re-branded to 350 Investment Partners) and IP Group. All of the names mentioned have participated in investment rounds for the nine 2013 Global Cleantech 100 UK companies.

- Cambridge is Europe's self-proclaimed leading technology cluster—based on the combination of some stand-out successes, a premier university, as well as a very strong seed/angel investor community—which undoubtedly benefits from the SEIS (Seed Enterprise Investment Scheme). Cambridge Angels, Cambridge Capital Group, and Cambridge Gateway Fund, for example, have provided early rounds of funding to **Nujira**, **i20 Water**, and **Amantys**, respectively.

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[2] http://info.cleantech.com/2012InnovationIndex.html

Sector Highlights

Capital-lighter, revenue-generating companies are most in tune with today's majority sentiment

Energy Efficiency's dominant presence on the 2013 Global Cleantech 100 marks a 42 percent increase in representation since the list's inception. Agriculture & Forestry has also mimicked energy efficiency's growth rate (up 50 percent since 2009), albeit from a lower base.

Water & Wastewater has held its ground as a top innovation category with 10 or more companies represented in the list since 2011. Other categories that have maintained a consistent number of companies (between six and eight) in the past few years include Recycling & Waste, Smart Grid, and Transportation.

Conventional Fuels and Geothermal emerged as new categories represented in this year's list—and we may expect more from these sectors in future years. Air is another category that gained new entrants with companies **Leosphere** and **LP Amina**.

Within the Smart Grid category, there were fewer grid communications companies represented in the 2013 Global Cleantech 100 compared to past years. Only **Trilliant** remained, and **Silver Spring Networks** graduated through its first quarter 2013 IPO. On the other hand, new, niche categories emerged, in areas of big data and analytics software for grid operators, utilities, and others (e.g. **AutoGrid Systems** and **Space-Time Insight**) as well as smart power electronics (**Gridco Systems**) and solutions for fault currents on distribution and transmission grids (**GridON**). This indicates that, while the previous wave of innovation in Smart Grid was around the end user (i.e. metering or smart home), the new generation of companies is focused on making the power distribution grid smarter.

The 2013 Global Cleantech 100 Sector Winners and Losers
2013 Company Count (total in parentheses) vs. Four Year Running Average 2009-2012
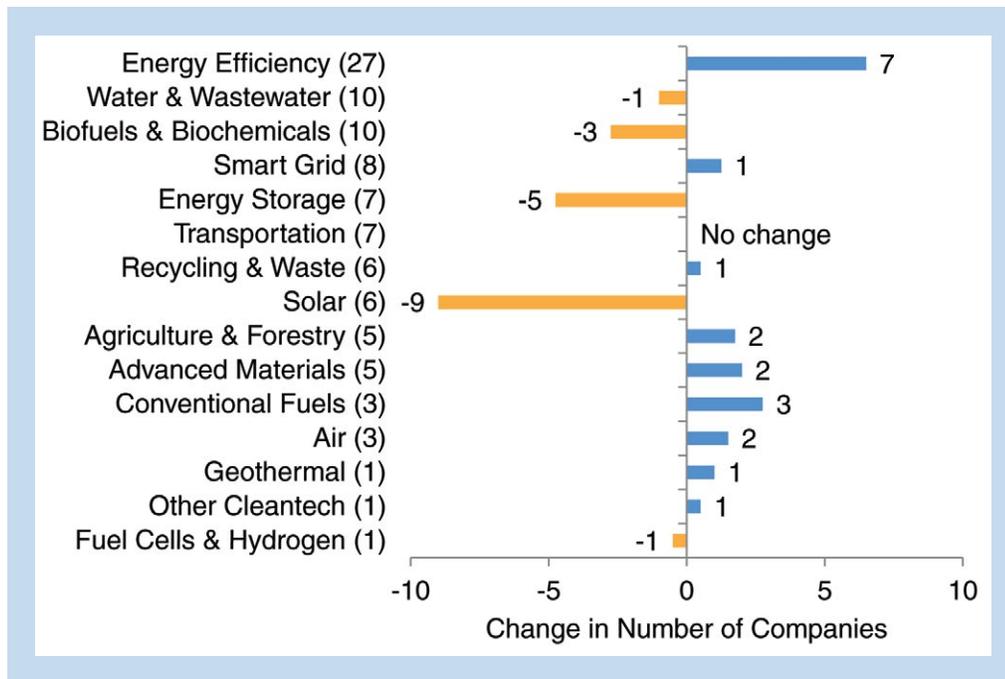
Source: Cleantech Group's i3 platform

The three categories in most obvious retreat today are Solar, Energy Storage, and Biofuels & Biochemicals, in terms of their representation in the Global Cleantech 100:

- In 2009, there were 20 solar companies that made up the first Global Cleantech 100, compared to only six solar

companies in 2013, which in turn is half of the 2012 representation. Of the solar companies that made it to this year's list, four out of the six were downstream services and financing companies—**Cleanpower Finance, Mosaic, Sungevity**, and **Sunrun**. This seems emblematic of the continued back-lash in sentiment against solar hardware companies, in the wake of the many failures and bankruptcies in the upstream part of the chain.

•   Energy Storage is trending downwards, when you place the 2013 count of seven against its 5-year average of 12 over the previous four years. This seems to reflect the divide between "the next big thing" attitude some have towards energy storage and the reality that, up to this point, it is an area that has flattered to deceive and we still await a company that proves out sustained market performance. Until then, it is probably fair to say that the storage category may have a greater tendency to contain some hot, but sometimes over-hyped, start-ups and is prone to high turnover. New to the Global Cleantech 100 in 2013 are five companies: **Ambri, Ecoult, Hydrexia** (2013 GCT 100 Asia Pacific Company of the Year), **Isentropic**, and **Microvast**.

•   Biofuels & Biochemicals had peaked in 2010 (with 16 companies represented) but has since fallen back by nearly 40 percent to 10 companies. We should note, however, the 2011 graduations (in the form of IPOs) of **Amyris**, **Gevo,** and **Solazyme** (all GCT 100 alumni, 2009-2010), which reduced the qualifying pool to draw on.

Breaking down the Global Cleantech 100 companies by the amount of equity raised and revenues achieved helps illustrate why certain company types are gaining the most momentum.

In an environment where capital-efficiency and market traction have premium value, this graph contextualizes well the difference in company types in the 2013 Global Cleantech 100. The promise of 'jam tomorrow' is out of favor; even if that means backing companies with smaller addressable markets. So be it. That is where majority sentiment, for financial investors at least, is at right now.

Select Sector Representation in 2013 Global Cleantech 100 by Paid-in-Capital / Revenue
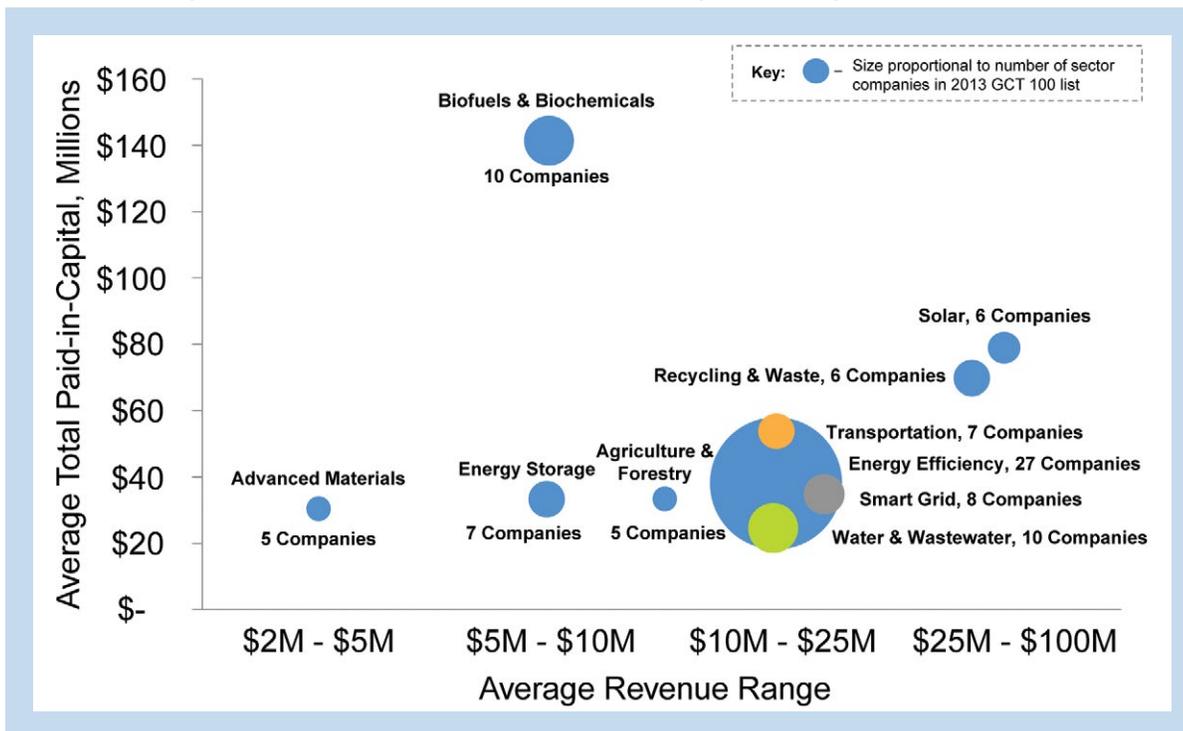
Excluded Sectors: Air, Conventional Fuels, Fuel Cells & Hydrogen, and Geothermal.
Source: Cleantech Group's i3 platform

Select Sectors in Focus

Lighting emerged as a top subcategory with five of seven companies based in Europe

The Energy Efficiency category encompasses a very diverse crowd, including companies from nine different subcategories. Lighting emerged as the top subcategory (with seven companies) followed by efficient heating and cooling and home energy management (with four companies). Other categories include Waste Heat Recovery (**Heliex Power, Alphabet Energy**), Building Envelope (**va-q-tec**, **Project Frog**), Green IT (**OSIsoft**), and Enterprise Energy Management (**Sefaira**). Below are the companies within the top energy efficiency subcategories:

Source: Cleantech Group's i3 platform

Notably, within the lighting category, five out of seven companies are headquartered in Europe. This is perhaps not surprising given the widespread legislation in the region to remove inefficient lamps from the market. The LED lighting market in Europe is expected to grow over 45 percent by 2016 and more than 70 percent by 2020[3], providing momentum for cutting edge innovation in replacement lighting.

[3] Lighting the Way – Perspectives on Global Lighting Market," McKinsey Report 2012.

The European companies in the 100 distinguish themselves from other lighting companies in their use of innovative materials to improve the performance and reduce costs of LEDs, i.e. **NovaLED** (organic LED and organic solar cells (OSC)), **glo** (nanowire LED), **AZZURRO Semiconductors** (gallium nitride wafers on silicon substrates), and **Lucibel** (recyclable LEDs). In addition, some of these companies have focused their product design on some very specific (yet potentially lucrative) market segments. While mainstream LEDs have been sold as retrofit light bulb replacements, technological advancements by the Global Cleantech 100 companies and others have allowed integration of LEDs into more demanding and specialized applications. For example, **Nualight** has been successfully targeting lighting for food displays; **NovaLED** is pursuing architectural design and medical appliances; and **AZZURRO** is targeting the electronics and semiconductors industry.

Meanwhile, the two US-based lighting companies **Digital Lumens** and **Enlighted** are specializing in control systems, and moving the lighting value proposition beyond its basic functional role and towards cross-purposes for building facilities such as cold storage controls or plug-load management.

Whereas last year, Enterprise Energy Management was the second hottest Energy Efficiency sub-category in the Global Cleantech 100 (with companies like **Amee**, **Hara**, and **Building IQ** making the 2012 list), this year, Efficient Heating & Cooling emerged as a new top sub-category. This change may be indicative of market appetite for companies innovating in HVAC, given that the maintenance of indoor climate conditions accounts for 75 per cent of the building sector's energy demand. Increasing the share of renewables like solar thermal (**Phoebus Energy**), thermoelectric storage (**Phononic Devices**), and cogeneration (**SorTech**), can help balance energy loads and render large cost savings. Furthermore, the replacement of inefficient compressing through the use of magnetics (**Cooltech Applications**) or adsorption technologies (**SorTech**) can help reduce consumption by refrigeration and air-conditioning in both manufacturing industries and commercial buildings.

Home energy management continues to play a part in the Global Cleantech 100, with pioneers in the space becoming particularly inventive in the way they engage residential consumers and provide incentives or behavioral tactics to stimulate action. **Opower**, **Tendril**, and **Nest** all use SaaS-based solutions (i.e online energy portals/analytics tools) and have leveraged the power of utility partnerships to make their products more accessible to end users. **Next Step Living** leads with in-home assessments (many of which are free or subsidized by utility-sponsored programs), and ends with retrofit programs to leave customers' homes more comfortable and with lower ongoing energy bills.

Nest emerged as the top rated North American 2013 Global Cleantech 100 company, for "demonstrating the value of design to industrial products and fostering consumer interest in a dull product like the thermostat," according to one expert panelist. Of note is the fact that Opower is also now getting involved in the smart thermostat space, through their recent partnership with Honeywell International (Nest's primary competitor).

The cross-section of smart grid and energy efficiency is another interesting theme in this year's list, with **Gridium** and Nexant providing intelligent software to decipher smart meter and power grid data. Such companies have a capital efficient model given that they get data from the web, rather than installing hardware. **Tendril**, **Opower**, **Sefaira**—among others—are then able to utilize this data for building analytics purposes.

Wastewater treatment across various niche markets is a feature of the 2013 Global Cleantech 100

Clean water is the new oil—it is in increasingly short supply around the world. As a result, water technologies are attracting a lot of interest from developing countries where water shortage is already an imminent issue. This is true even in the US, where water is relatively cheap (courtesy of government subsidies). As a result, the competitive marketplace for water and wastewater means that companies are becoming more innovative in the way that they conserve and treat water from various sources and target markets.

The majority of the water technology companies in the 2013 Global Cleantech 100 have technologies applicable to wastewater treatment, though **i2O water** is a notable outlier. **i2O water** is combining financial engineering with information and analytics by enabling both advanced water leakage technology and real-time network optimization for utilities.

Companies targeting very niche markets include **Ostara Nutrient Recovery Technologies**, that specializes in the recovery of nutrients from wastewater streams for use in Agriculture, and **Metgen**, a developer of enzymes for both wastewater, biofuels, and the pulp and paper industries.

Desalination companies (**Desalitech**, **NanoH2O**, and **Scinor**) are specialized in reverse osmosis for brackish water, with applications in industrial, municipal, or urban wastewater treatment. **Organica Water** (the top-rated European 2013 Global Cleantech100 company) is differentiated in its use of biological treatment, and newterra specializes in turnkey solutions like chemical treatment and filtration.

Companies specialized in resource recovery are enabling their clients to off-set operational and capital costs through the re-use of wastewater. (**Ostara** for agricultural feedstock, and **Emefcy** for biofuels, for example).

2013 Global Cleantech 100 Water companies by Type of Technology/Target Market
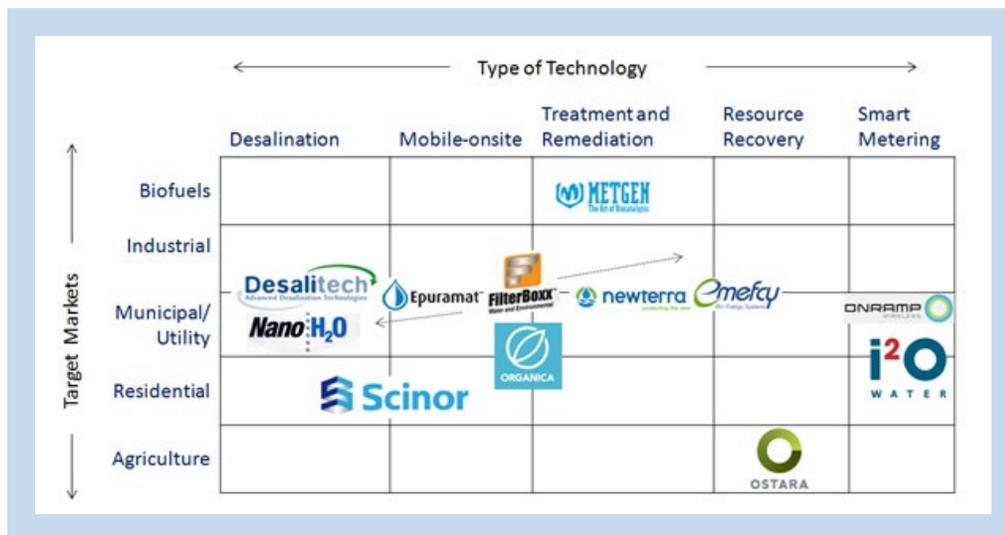
Source: Cleantech Group's i3 platform

Wastewater companies that are clustered around the center of the above chart are split between whether they treat human sewage (**Emefcy**, **Organica Water**) or process waste from manufacturing industries and municipal plants (newterra, **Epuramat**). **Filterboxx** has diversified its products to apply to various market segments.

Mobile-onsite companies **Epuramat**, **Organica Water**, and **Scinor** are providing their clients with patented liquid separation technologies packaged in a mobile wastewater treatment system.

Oil & Gas is a prime target market for many of the 2013 Global Cleantech 100

The three companies within the emerging conventional fuels category are **Ciris Energy**, **Siluria Technologies**, and **OsComp Systems**. These US-based companies are all creating process technologies that increase the efficiency of methane conversion and natural gas extraction or transportation.

Represented in the Global Cleantech 100 were an additional 11 companies whose business models and target markets are geared (or will be geared) towards the Oil & Gas industry. These are innovators with solar, smart grid, transportation, advanced materials, energy efficiency, and water technologies, as detailed below. Notably, five of the 11 were water and

wastewater companies. Many of these companies have key partnerships with corporations (General Electric being the favored one) as well as a fair number of large Oil & Gas players (e.g., Petronas, Chevron, Petroleum Development Oman, Shell, and Schlumberger).

2013 Global Cleantech 100 Companies Addressing the Oil & Gas Market

Company	Location	Primary Sector	Application	Key Partners/Investors
DeepFlex	United States	Advanced Materials	Pipe materials for transporting fluids or CCS	Petronas, Chevron
GlassPoint	United States	Solar	Solar steam generators for enhanced oil recovery	Petroleum Development Oman, Shell
liquid robotics	United States	Transportation	Marine vehicle used to discover oil reserves	Schlumberger
ONRAMP WIRELESS	United States	Smart Grid	Wireless communication systems for oil drilling sites	General Electric, SAIC, Enbridge, Energy Technology Ventures
SPACE-TIME INSIGHT	United States	Smart Grid	Geospatial and analytics software visualize the integrity of gas and water pipes	IBM, Microsoft, Google, Oracle, SAP
LanzaTech	United States	Biofuels & Biochemicals	Captured carbon to basic chemicals through microbes	Petronas, Indian Oil
Nexant	United States	Energy Efficiency	Intelligent grid software for chemical and petroleum majors	Qatar Petroleum, Intel Capital
HeLiEX POWER	United Kingdom	Energy Efficiency	Waste-heat recovery from low grade steam in the oil & gas processes	BP
alphabet energy	United States	Energy Efficiency	Waste-heat recovery with applications natural gas industry	Encana
OSIsoft.	United States	Energy Efficiency	Real-time data solutions for oil & gas infrastructure	Shell, ERG
Desalitech	Israel	Water & Wastewater	Desalination at oil & gas operations	General Electric
FilterBoxx	Canada	Water & Wastewater	Liquid separation for enhanced oil recovery	General Electric
Nano H2O	United States	Water & Wastewater	Desalination at oil & gas operations	BASF, Veolia
Epuramat	Luxembourg	Water & Wastewater	Oil sludge treatment solutions	Black Opal
newterra	Canada	Water & Wastewater	Site remediation for refineries and pipelines	N/A

Source: Cleantech Group's i3 platform

The "cleanweb" is crosscutting many sectors in the 2013 Global Cleantech 100

One fourth of the 2013 Global Cleantech 100 companies have "cleanweb" characteristics about them. By this, we mean companies with web-based resource sharing models that are reducing the need for new goods and/or enabling online person-to-person networking.

What is more is that 57 of the 300 companies shortlisted this year were cleanweb compared to 25 companies only two years ago. This may well be a reflection of a wider trend of cleanweb permeating into many of our 18 categories, and their success marshaling clean technologies to improve the everyday life of people.

The top categories containing "cleanweb" companies are Energy Efficiency (nine companies), Smart Grid (five companies), Solar (four companies), and Transportation (four companies). It is not surprising that Energy Efficiency is the dominant cleanweb constituency, as we see a growth in mobile platforms, social networks, and big data analytics which create opportunities for improving commercial building energy management software, residential home automation systems, and data center infrastructure management.

Smart Grid came in second place (15.8 percent) in terms of representation within the cleanweb shortlisted companies, allowing for creative solutions to grid optimization and demand response. **ENBALA Power Networks**, **GridON**, **On-Ramp Wireless**, **Trilliant**, and **Viridity Energy** are the Global Cleantech 100 frontrunners with smart grid/cleanweb applications. While there were fewer Solar and Water & Wastewater companies that were part of the cleanweb shortlist (8.8 percent and 5.3 percent, respectively), these companies obtained a higher number of positive votes from our expert panel than those in other categories. In our view, this is an indication that these applications are "hot right now," judging by their relatively capital-light business model (compared to peers in their sector), something that is particularly appealing to investors. The innovative cleanweb solar companies in the Global Cleantech 100 include **Clean Power Finance**, **Mosaic**, and **Sungevity**.

Whereas Transportation's representation in past Global Cleantech 100 lists used to be dominated by hardware companies and manufacturers, such as **Fisker** (GCT 100 alumnus, 2009-11) and **Tesla**, it is very noticeable that four of the seven 2013 Transportation companies now illustrate the cleanweb theme. The four companies in question are: France's **BlablaCar** and the U.S.'s **RelayRides** (both car ride-sharing solutions), **INRIX** with its transportation software for traffic monitoring, and **Streetline**, the start-up whose networked sensors and software platforms connect drivers to parking spaces.

Cleanweb companies in other categories include **Airbnb** (the developer of an online marketplace for private accommodations, thus improving resource utilization), and **Propel Fuels** (an operator of renewable fuel stations and developer of a carbon emission reduction tracking platform for drivers).

Investors in the Global Cleantech 100

There are 414 disclosed investors in the Global Cleantech 100, of which 56 percent were financial investors, 20 percent were corporations or corporate venture units, three percent were public sector entities, three percent were investment banks, and the remaining 16 percent were a mixture of family offices, private individuals, and asset managers.

Of the 228 financial investors, 52 percent were located in the US, and the remainder spread across 25 countries with 35 percent from the Europe & Israel region, seven percent from the Asia Pacific region, and one investor from Brazil (South America).

Kleiner Perkins Caufield & Byers (KPCB) retained its position as the investor with the most companies on the list. However, VantagePoint Capital Partners won our 2013 Global Cleantech 100 Investor of the Year award for having the highest proportion of companies from its total 'qualifying' cleantech portfolio on the 2013 list.[4]

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[4] Minimum portfolio size rules apply – there need to be 10 eligible companies in the portfolio to qualify

Investor	Portfolio Companies 2013	Portfolio Companies 2012	Change	2013 GCT100 Companies
KPCB KLEINER PERKINS CAUFIELD BYERS	19	19	0	Agilyx, Aquion Energy, Beyond Meat, ChargePoint, Clean Power Finance, Enlighted, FriedolaTECH, Harvest Power, INRIX, Kaiima, Nest, Opower, OSIsoft, Proterra, Recyclebank, Scinor Technology, Siluria Technologies, Tianren, Transphorm
VANTAGEPOINT CAPITAL PARTNERS	7	9	-2	Genomatica, glo, Liquid Robotics, Next Step Living, Ostara Nutrient Recovery Technologies, Tendril, Trilliant
BRAEMAR ENERGY VENTURES	7	7	0	ChargePoint, Ciris Energy, Enerkem, Ioxus, NexSteppe, OPX-BIO, Sefaira
BRIGHT CAPITAL	5	6	-1	Aquion Energy, Epuramat, Genomatica, Siluria Technologies, Transphorm
ROCKPORT CAPITAL	5	3	+2	Enlighted, GlassPoint Solar, Gridco Systems, Project Frog, Streetline
DFJ	4	9	-5	Attero Recycling, Enlighted, Genomatica, Kaiima
khosla ventures	4	7	-3	Ambri, Ciris Energy, LanzaTech, NanoH2O
Foundation CAPITAL	4	4	0	Aquion Energy, AutoGrid Systems, Sunrun, Transphorm
IFC	4	3	+1	Attero Recycling, Microvast, Organica Water, Tianren
aster capital	4	3	+1	Avantium, FibeRio Technology, Ioxus, Lucibel
TPG	4	2	+2	Alphabet Energy, Beta Renewables, Elevance Renewable Sciences, Genomatica
ROBECOSAM Sustainability Investing	4	2	+2	DeepFlex, ECO Plastics, Harvest Power, Nujira

Note: As an aggregated global network, Chrysalix Global Network (CGN) also has four companies in the 2013 Global Cleantech 100
Source: Cleantech Group's i3 platform

Corporate Engagement with the 2013 Global Cleantech 100

GE retained its position as the corporation with the most working relationships with companies on the 2013 Global Cleantech 100. However, it is GM Ventures that won our 2013 Global Cleantech 100 Corporate Investor of the Year award for having the highest proportion of companies from its total 'qualifying' cleantech portfolio on the list.[10]

Company	Headquarter	2013 GCT Companies in Portfolio	2013 GCT Disclosed Partner Companies	Total Known Number of Engagement
GE	United States	Ciris Energy*, Emefcy*, Ioxus*, On-Ramp Wireless*, Project Frog, Skyonic*, SolarEdge, Sungevity, Tendril, Trilliant	Desalitech, Emefcy, FilterBoxx, GridON, On-Ramp Wireless, Opower, Project Frog, Sungevity, Sunrun, Tendril, Trilliant	29
WM	United States	Agilyx, Enerkem, Genomatica, Harvest Power, Recyclebank	Enerkem, Genomatica, Harvest Power, Recyclebank	9
SIEMENS	Germany	ChargePoint, Tendril	Cooltech Applications, LanzaTech, Scinor Technology, Streetline, Tendril	7
Google	United States	Clean Power Finance, Nest, RelayRides, Transphorm	Clean Power Finance, Space-Time Insight	6
IBM	United States		ChargePoint, OSIsoft, Space-Time Insight, Streetline, Tendril, Trilliant	6
GM	United States	Envia Systems, Proterra, RelayRides	ChargePoint, RelayRides	6
bp	United Kingdom	Heliex Power, Skyonic	Avantium, SolarEdge, Sungevity	5
Energy Technology Ventures	United States	Ciris Energy, Emefcy, Ioxus, On-Ramp Wireless, Skyonic		5
Mitsui	Japan	Kaiima, Marrone Bio Innovations, Proterra	Lanzatech	4
BASF	Germany	NanoH2O, SDC Materials	Genomatica, NovaLED	4
Total	France	Agilyx, Ambri, Elevance Renewable Sciences, NanoH2O		4
SAP	Germany		AutoGrid Systems, OSIsoft, Space-Time Insight, Streetline	4
BMW	Germany	ChargePoint	ChargePoint, INRIX, Tendril	4

(*) denotes joint venture investments with Energy Technology Ventures (the joint fund between GE, Conoco Philips, NRG Energy)
Source: Cleantech Group's i3 platform

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[10] Minimum portfolio size rules apply – there need to be 8 eligible companies in the portfolio to qualify

Some of the most highly rated companies in the 2013 Global Cleantech 100 have an impressive portfolio of corporate partnerships

The importance of younger companies partnering with incumbents in the established and politicized world of industries such as power, energy, water, and transportation cannot be overstated.

As an illustration of this, the companies below have relationships with three or more of the top corporate partners (from the above chart).

By utilizing products and applications that communicate directly with a utility's existing infrastructure, **Tendril** has been able to move into all facets of home energy management. They have partnered with some of the largest manufacturers of smart appliances (GE and Whirlpool) to enable communication between appliances, utility companies, and consumers. Furthermore, **Tendril** has developed key channel partnerships with some of the largest smart grid hardware providers—including Hitachi, Siemens, Lockheed Martin, and Landis+Gyr—to sell their software to consumers. **Tendril** is also in development to integrate their products into BMW's electric vehicles, as well as into AT&T's wireless communications to provide homeowners the ability to communicate both directly and indirectly with their homes.

ChargePoint, the world's largest electric vehicle charging station network, has expanded beyond only providing physical charging stations for EV drivers. The company has partnered with TomTom to allow drivers the ability to access charging station information while driving, allowing them detailed information including power and connector type, the capability to reserve it, and get there. Through their joint venture with ECOtality, called Collaboratev, they are able to provide charging station interoperability, as well as a way to exchange data among the network. **ChargePoint** has also partnered with BMW's electric car sharing program in San Francisco called DriveNow. The partnership aims to increase awareness and benefits of EVs.

Space-Time Insight's geospatial and visual analytics solutions are being integrated with some of the biggest software companies in the world (Google, Microsoft, Oracle, SAP, and IBM) to transform the copious amounts of data into natural visual displays. Their Situational Intelligence solutions for smart grid and energy initiatives have seen companies such as Accenture, OSIsoft, and ESRI seek collaboration to amalgamate their data into simple visuals.

Streetline's technology provides connected drivers with real-time data on parking spots. They have formed development partnerships with Siemens in Germany, Xerox in Los Angeles, and Orange in France for projects which deploy real-time sensors and hardware in city streets to give drivers the ability to easily find parking. Moreover they have strengthened their service by teaming up with companies, including Cisco Systems, IBM, and SAP, that provide the data analysis tools to crunch all the data from parking spaces, garage booking systems, and the thousands of mobile users of Streetline's Parker app.

The 2013 Expert Panel was comprised of representatives from 50 financial institutions and 40 corporations or corporate venture units from all over the world. Since they represent most of the leading players in cleantech innovation and investment, further insights into the state and the psychology of today's market can be gleaned from a closer look at what they told us about which companies they admire most, and why (and the reverse).

What factors were top of mind for the 2013 panel?

The companies that stood out in the eyes of our panel members as having the "greatest likelihood of having the most significant market impact over the next 5-10 years," demonstrated specific characteristics. The frequency with which the top four reason types were cited with a positive vote are shown to the right in blue and speak to the prevailing mindset and biases amongst today's deal-makers and innovation scouts.
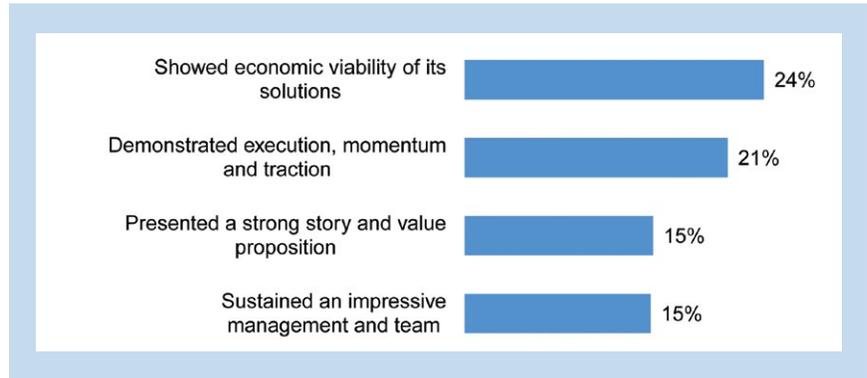
On the other hand, companies gained negative votes from panelists for a greater diversity of reasons. In contrast to the positive votes, the top seven reason types cited along with negative votes were far more evenly distributed. The patterns are shown to the right in orange.

What to read into this? From looking at both sides of the coin, we come to the following conclusion about the factors impacting viewpoints and so influencing which companies today they are admiring (and so impacting who made the 2013 Global Cleantech 100).

Showed economic viability of its solutions	24%
Demonstrated execution, momentum and traction	21%
Presented a strong story and value proposition	15%
Sustained an impressive management and team	15%

Lack of competitive advantage or crowded market	19%
Little chance of profit without huge subsidies	12%
Company that has been around for a long time with very little revenues	12%
Company's progress is dependent on successfully securing a huge project	11%
Rumors of severe struggles with financing	11%
Much too capital intensive to be a high return proposition	10%
Value proposition is opaque; Not sure there is a market need	10%

Companies with the clearest and economically-underpinned propositions, with market traction and momentum on their side, are heavily favored over companies that might be more mature but that might have suffered setbacks, or that perhaps have had management or strategic direction changes, or whose capital needs are so great that there is strong concern as to their future viability given the tough capital-raising environment.

One upshot of this can be that younger companies, that have not had as much time to yet blemish their reputation, are being regarded more favorably than more mature companies, deeper into the mire, battling through, in the language of Gartner's hype curve, the trough of disillusionment. This might help explain why more mature companies tend to be the ones who divide opinion most strongly (see the 'Marmite List' section below) and why the Global Cleantech 100 list still continues to bring in a large number of new entrants each year. This theme is picked up again in our closing remarks.

At the top of the 2013 Lust List, as measured by the companies with the most peer validations (from neutrals) in the expert panel assessments, where not one negative case was made, were the three companies below. We use, with the odd word changed or phrasing re-arranged, the actual, but anonymous, input of panelists to add color to what was admired about them. This is indicated by the italics.

Marrone Bio Innovations (MBI) (GCT100 alumnus, 2012-13), a provider of bio-based pest management and plant health products for the agricultural and water treatment markets, has developed a powerful IP position with more than three dozen patents pending for its natural weed, pest, and disease management products.

The panel was impressed by the growth opportunity that bio/natural pesticides represent, as gradual replacements for the traditional chemicals which are currently being used. And in MBI's case, in particular, the CEO was described by one as "*a star*" and the company's products to have "*good efficacy, market validation from distributors and end-users, strong product pipeline and established good market distribution channels internationally.*"
(By the time of publication, many public market investors have agreed and the company has listed on NASDAQ).

Clean Power Finance (CPF) (GCT100 alumnus, 2012-13) has developed an asset light solution to one of the most prohibitive issues associated with distributed solar generation: financing. The company connects solar professionals with institutional investors through its CPF Market, an online business-to-business marketplace for residential solar financing. Additionally, the company operates CPF Tools, a solar sales SaaS application that provides user-friendly solar sales quoting and design tools. High profile power players, including Google and Morgan Stanley, use CPF to invest in residential solar projects for reliable rates of return.

CPF's innovative business model as a solar aggregator lines up with global market needs, and the company has been growing revenue by double digits.

The panel commented on CPF's ability "*to find solutions that put systems on residential rooftops with little/no burden to the end user for up-front capital requirements or significant changes in power bills*". Others were impressed by its "*potential to scale quickly to different solar segments (e.g. to commercial) and to expand internationally*". In terms of international expansion, another commented that CPF "*lines up with market needs in Middle East and Asia, where financing of solar power will drive market penetration.*"

"*The Ferrari of the third party solar financing companies*" was how one summed up CPF.

Founded in 2005 as a spinout from the University of British Columbia, **Ostara Nutrient Recovery Technologies** (GCT100 alumnus, 2009-13) has developed a unique way to create value from the environmentally harmful wastes left over from municipal and industrial water treatment. The company's proprietary nutrient recovery technology transforms the phosphate and nitrogen wastewater byproducts into a high-value, eco-friendly fertilizer marketed as Crystal Green. Ostara currently operates four facilities in North America, and its first European facility is scheduled to launch in Slough, UK later in 2013.

Panelists were struck by a healthy cocktail of the following: "*Massive market need, great technology, few competitors, an attractive business model; and strong financial support*". Added to which, plenty of credit was given to the company for "*solving an actual problem*" given the "*large quantities of nitrogen and phosphorus in sludge dewatering streams.*"

The "Marmite List": Which companies most strongly divided the 2013 panel?

Our annual, somewhat tongue in cheek, "Marmite List" is inspired by a Unilever food product, Marmite, that has famously divided tastes since being introduced to the market 100 years ago. So much so that 'You either love it or you hate it' has become part of the marketing![11]

The more serious point behind the analysis is to identify those companies which attracted the strongest split of opinions across the expert panel, a mix of positive and negative votes, in significant volumes.

It is, we believe, the points on which they disagree and how polar opposite those viewpoints can be, which provides instructive, even actionable, intelligence not only on how these particular companies are currently viewed, but more importantly, on the psychology today of market players in general.

Within the 2013 Global Cleantech 100 itself, the following three companies qualify for our 2013 Marmite List. (Remember these companies did have sufficient strength of 'love' to make the 100; the positive votes did sufficiently outweigh the negatives, if you like.)

The 'lovers' of **Agilyx** (GCT100 alumnus, 2011-13) believe it *"solves a major problem by keeping plastics out of the environment"* and see its strengths as *"its significant share of the US waste plastic feedstock along with its offtake contract with US Oil."* The 'haters' are concerned whether *"the window has been missed, and financing problems will occur."* One sees challenges from technical and economic standpoints, *"and it looks like other options for getting value from waste plastic may be better."* Another doesn't see the rationale for making waste into a liquid. *"Wouldn't it be better to generate power and use locally?"* was a rhetorical question posed.

The divide on **Emefcy** (GCT100 alumnus, 2010-13) seems to be about progress and speed of trajectory. First, the general flavor of the 'lover' side is well-represented by this point of view: *"Emefcy has two radically different wastewater treatment technologies, one for municipal wastewater and one for industrial wastewater, that are modular, scalable, low cost, no odor, noiseless, and have significantly improved economics vs. incumbent options. Strong team with recent additions as well as scar tissue from past missteps. Still pre-revenue but seems to be on a good path."* The doubts (the first time we have seen them in this Global Cleantech 100 process) center on what kind of pilot scale has actually been achieved and *"whether they truly have the ability to significantly commercialise in the 5-10 year timeframe."*

The divide on **Enerkem** (GCT100 alumnus, 2010 & 2012-13) has both technology and financing aspects. No doubt its withdrawn IPO didn't help the perceptions of the doubters; as a counter, one panelist gives it great credit for the *"completion of major financing in a challenging market."* On the technology side, we have the view that the technology isn't competitive or doubts on its reliability, pitted against this view: *"Robust solution, the technology risk has largely been addressed. Enough capital to demonstrate at commercial scale for a capex intensive technology. Strong partnerships in place. An example of good execution."*

[11]http://www.unilever.co.uk/brands/foodbrands/marmite.aspx

The "Marmite List": Which companies most strongly divided the 2013 panel?

2013 Report
100

Beyond the 2013 Global Cleantech 100, and in the context of the 2013 Marmite List, the following shortlisted companies are also noteworthy of how they divided opinions in the panel in 2013—in such a way that none of them made the 2013 final 100. They provide "Exhibit A" of the earlier point made on the strong swing of sentiment away from some of the "darlings" of the second wave, in favor of younger, new aspirant companies.

Bloom Energy (GCT100 alumnus, 2009-10) did not survive the final shortlisting process from 300 to 100, the phase when the expert panel's influence is heaviest. On the one hand, we have the customer announcements, the financing deals, and the international expansion achieved by the company over the last year. This explains this type of sentiment of which there was plenty: *"You have to give them credit now. They have single-handedly created a real, viable commercial fuel cell market,"* comments one 'lover'. On the other hand, we have the 'hater' camp who are wrapped up in their view on the economics (*"$7/W = 7x is too expensive!"* and the company *"may not be sustainable without incentives and rebates"* are representative of this camp); an aversion to capital intensity and huge cash burn; and a viewpoint that their path to sustainable, unsubsidised growth is unclear.

Who is right? Truth in both? Or is one out of date and blinded by lagging perceptions? Who will have the "I told you so" moment? We await and see.

For the first time, in 2013, **BrightSource Energy** (GCT100 alumnus, 2009-12) did not make the final 100. Again, two very different camps are evident here; one that believes in the "go big or go home" approach, who believes that concentrated solar will play a part in Solar's future, and who believes that BrightSource's leadership in that field (derived from its significant backing, strong technology, and "*in the field experiences at scale*") will see it win out in the end. On the other, we have those who do not 'buy' the future addressable market, and struggle with the capital intensity and its finance-ability through this tough phase. Though not specifically cited, we suspect that the IPO withdrawal and the CEO change may have clouded sentiment too.

And, finally, worthy of comment in the context of the 'Marmite List' is **Takadu** (GCT100 alumnus, 2010-12). The divide on this water leak detection company reveals a fundamental difference of opinion on how much real market traction the company is gaining. Two polar opposite views on this exist, thereby underlining the importance of market traction and customer momentum to today's market deal-makers.

We are the first to recognize that there are many fine companies that do not make the 100 each year. This final section takes a look at some of these.

Alumni is a term we use to describe those companies that have been on the list in the past. For 2013, there were 10 alumni that were no longer eligible for the Global Cleantech 100 due to a change in their ownership status between August 2012 (the cut-off point of the 2012 list) and July 2013 (the cut-off point for the 2013 list). This contrasts to 11 in 2011, and six in 2012.

This year, we have split these alumni—so far as we can determine—between positive events that have taken the company on to the next leg of its journey (who we refer to as the graduates) and events occurring under more distressed circumstances.

The 2012-13 Global Cleantech 100 Graduates

The positive news story here is the return of the IPO market—in a small way, but, at least, in a way. In December 2012, **SolarCity** (GCT100 alumnus, 2009-12) was the first cleantech company to successfully make an IPO since eight months previous, when **Enphase Energy** (GCT100 alumnus, 2009-11) had gone public. It arguably helped break the run of bad news and paved the way that other Global Cleantech 100 alumni have since been able to follow—namely **BioAmber** (GCT100 alumnus, 2011-12), a developer of green chemicals

Company	Year in GCT100	Event	Amount	Date	Acquirer/ Exchange	VC/PE Backers
SolarCity	2009 2010 2011 2012	Public	$92M	Dec 2012	(NASDQ: SCTY)	DBL Investors, Private - Elon Musk, Private - Nicholas Pritzker, Shea Ventures, Silver Lake, Valor Equity Partners, Generation Investment Management, Mayfield Fund, Draper Fisher Jurvetson (DFJ), JP Morgan
ADURA	2009 2010 2011	Acquired	Not Disclosed	Jan 2013	Acuity Brands	Claremont Creek Ventures, NGEN Partners, VantagePoint Capital Partners
Silver Spring	2009 2010 2011 2012	Public	$81M	Mar 2013	(NYSE: SSNI)	Contra Costa Capital, Draper Fisher Jurvetson (DFJ), Foundation Capital, Google Ventures, Kleiner Perkins Caufield & Byers (KPCB), NCD Investors, WR Holdings, EMC, GSV Capital
BioAmber	2011 2012	Public	$80M	May 2013	(NYSE: BIOA)	Cliffton Group, LANXESS, Mitsui, Naxos Capital Partners, Sofinnova Partners
Joulex	2011	Acquired	$107M	May 2013	Cisco Systems	Flybridge Capital Partners, Intel Capital, Sigma Partners, Target Partners, TechOperators

Source: Cleantech Group's i3 platform

from agricultural feedstock, and **Silver Spring Networks** (GCT100 alumnus, 2009-12), the provider of networking communication technologies and solutions to facilities for advanced meter and home energy management applications.

Yes, all three raised amounts lower than $100 million of fresh capital in the IPO, but, at a minimum, the public markets in the US, at least, have proven that they are selectively open again to certain kinds of younger companies with "doing more with less" propositions, operating in the energy and resource efficiency worlds.

Their selectivity is apparent in as much as some companies have had to withdraw their plans (for the time being, at least). These include the following Global Cleantech 100 alumni, **BrightSource Energy**, **Elevance Renewable Sciences, Enerkem, Genomatica**, **Luca**, and **Mascoma**. Four of the six companies are biofuels companies, no doubt reflective of the very disappointing share price performance by the biofuels companies that have gone public.

On the M&A front, more of the activity in the last year has come under duress (see below), but two graduates appear to have been on the more positive end of a change of control transaction. In January 2013, **Adura Technologies** (GCT100 alumnus, 2009-11), a provider of wireless lighting controls, was acquired by Acuity Brands, as part of Acuity's push for market share into commercial and industrial markets. Little is known about the terms of the deal. Not the case for **JouleX** (GCT100 alumnus, 2011), an enterprise IT energy management company that provides organizations the ability to monitor, analyze, and control energy usage for all network-connected devices and systems across the enterprise,

including distributed offices and data centers. The company was acquired by Cisco in May 2013 for $107 million. *"A great little company with a very useful feature"* was how one panel member put it.

SolarCity won our 2013 Graduate of the Year award, with **JouleX** and **BioAmber** being the other two companies to attain commendation from the financial investors in our panel. (The panelists were asked to identify the Global Cleantech 100 graduate that has most impressively "both managed to realize good returns for its investors through the exit and has secured bright future prospects for the company, given the strategic progress it has made pre-exit and given its new ownership.")

SolarCity has benefited hugely from the massive drop in PV panel pricing and its share price has more than doubled since IPO, up 150 percent from $12 to $30. With a market value of about $2.5 billion today, it has recently set itself the goal of being the seller, installer and financier of one million solar rooftop customers within five years.

We are hoping for, and indeed anticipating more, graduates in 2013-14 period; two have already emerged. **Marrone Bio Innovations** (GCT100 alumnus, 2012-13) has, since the 2013 cut-off date, successfully listed on the NASDAQ, raising an additional $57 million of capital. And so it will become a 2013-14 graduate, along with **Novaled** (GCT100 alumnus, 2009-10 & 2012-13), who also graduated in August 2013. **Novaled**, the German provider of low-power consuming OLED technology, had filed for a NASDAQ IPO, but ended up being acquired by Samsung for €260 million, a 10x multiple on 2012 sales.

More such wins in 2013-14 will help unlock more capital from LPs and others, to accelerate the transition from the second wave to the third, to help the innovation ecosystem addressing issues around resource scarcity.

Distressed Exits 2012-2013

Proving out that consensus sentiment today on who are the most promising upcoming companies is no guarantee of future success, the following companies are testament to the ongoing shakeout of the second wave companies who were not able to navigate the Valley of Death. These five alumni—none of whom featured in 2012 (by which time market sentiment and conditions had already moved against them)—are no longer in business in the form they were at the time of making previous Global Cleantech 100 lists.

Better Place was twice on the Marmite List, in 2010 and 2011. I guess the 'haters' had an "I told you so" on that one! How the re-start newco fares will be interesting to watch.

Company	Year in GCT100	Event	Date	Acquirer	Comment
greenvolts	2009	Out of Business	Sept 2012		This CPV systems vendor was unable to continue operations after its strategic investor, ABB, withdrew its support.
MiaSolé Thin-film solar	2010, 2011	Acquired	Oct 2012	Hanergy	The company was unable to raise the additional capital it required to continue operations. Its assets were acquired as one of Hanergy's acquisitions in thin film, Global Solar and Solibro being the others.
Novacem	2010, 2011	Acquired	Oct 2012	Calix	Calix acquired Novacem's negative carbon cement technology and IP after the company became unable to continue its development due to a lack of capital.
ReVolt TECHNOLOGY	2010	Bankrupt	Nov 2012	-	Despite receiving $10 million in grants from federal, state and local governments, this rechargeable zinc-air battery developer was unable to raise the additional capital it required to continue operations.
better place	2009, 2010, 2011	Acquired	May-July 2013	Sunrise Group	Better Place's capital-intensive electric car battery swapping model proved too costly and the market too narrow to sustain the company. It filed for bankruptcy and was acquired by Sunrise, which is paying $5 million for the company's assets in Israel, and another $7 million for its intellectual property.

Source: Cleantech Group's i3 platform

Perspectives on the Pace of Disruptive Change

In this guest article, Stephan Dolezalek of VantagePoint Capital Partners, provides his reflections on the state of cleantech innovation and investment today, against the backdrop of having participated in all five years as a member of our Global Cleantech 100 expert panel.

Stephan Dolezalek

The Global Cleantech 100, particularly when viewed over its five year history, presents a unique and valuable insight into the maturation of a disruptive, but not yet mature, new innovation theme—that of renewable energy and resource efficiency. Because the Global Cleantech 100 list is not constrained by numerical or other indisputable objective factors, yet seeks to reflect the thoughtful views and consensus opinion of a 90-person multinational and multidisciplinary expert panel, each year's Global Cleantech 100, it seems to me, provides a snapshot of where the pace of change appears most rapid and most exciting. Inasmuch as the last five years' lists also represent a continuum of such snapshots, they reflect sectors and companies becoming hot, becoming cold; stars that once attracted us now seem to bore us; a few have graduated (by M&A or IPO), many more have exited by less exalted means; surprisingly, a few have not graduated yet but have kept our attention for four years or longer; others, while clearly maturing and becoming more successful (several with $50 or even $100M or more in real annual revenue) have lost their attractiveness and dropped from the list—perhaps we have simply grown bored of the fact that they might represent a decade-long (or longer) building process.

The case can be made that each year's Global Cleantech 100 list represents the top of the initial wave of the Gartner cycle—the very best candidates for long-term success, many of whom have yet to wander through the "valley-of-death;" but from amongst whom will come the real superstars and long-lived success stories of energy, water, and materials for the next 100 years. To an investor, this pattern poses the question: Am I better off putting my money into new young companies that can rapidly climb to the top of the first wave (assuming I am then able to liquidate them)? Or should I search among the past winners for those that have dropped from the list but are about to emerge on the other side of the valley-of-death? Or does the length of time it has taken for a larger list of long-term billion dollar exits to arrive, suggest that there are greener investment pastures elsewhere —as a number of venture players (and their limited partners) seemingly have decided over the last couple of years?

For more than a decade, pundits have bemoaned the absence of a shining star of success for cleantech; saying that without an Apple, a Microsoft, or a Google, it was hard for the public and investors generally to believe in an innovation theme that was supposed to be disruptive but that was certainly taking longer to reach its star potential than we had expected. Today, with Tesla worth roughly $20 billion in market cap, that is no longer a true statement. But Tesla is neither done nor is it the only success story. In an industry segment now largely shunned by the Global Cleantech 100 panelists, companies like First Solar and SunPower have very clearly succeeded at scale and have seemingly survived a ferocious onslaught by the Chinese solar industry. They were joined recently by SolarCity; which, while notionally in the same solar sector, is much more a financial play than an infrastructure one (I note that enthusiasm for the financial side of solar remains high on this year's 100). In solid-state lighting, Cree has established itself as a $7 billion industry disruptor. But it is also important not to overlook the difference between an Apple (or a Cisco, Sun, Oracle) that took far longer than a decade to really hit their stride and the more rapid and capital-light successes (Google, Facebook, et al) that were able to leverage that infrastructure and the underlying software platforms (like Microsoft) that enabled them.

Perhaps we have forgotten that the infrastructure side of the IT revolution took us thirty years to build (from the 1970's to the early 2000's) while the Internet phase that took advantage of that infrastructure was much shorter (and thus more lucrative for many venture investors). The industries we are now trying to disrupt are both more capital intensive and historically far slower-changing than was the IT industry. It also tends to be the case that in the infrastructure-building phase, there are relatively fewer ultimate survivors, perhaps because of the capital intensity (Apple is an enormous success story, but there were many dozens of venture-backed personal computer companies that generated losses not returns). But those few infrastructure survivors can both grow to magnificent scale and so build the competitive barriers

to enable them to live much longer lives than their software counterparts. Think about the disruption caused to the automotive industry when the Japanese carmakers first entered the U.S. market, and think about both the scale and longevity that a company like Toyota has gained from so doing. (It started in 1957.)

Today, Tesla may be the only new automotive entrant with a chance to emulate Toyota (as most major car manufacturers have now embraced the importance of electric vehicles and are spending more on EV R&D than a venture-backed competitor today could). This is reflected in the kind of companies we see represented in the Transportation category of the 2013 Global Cleantech 100, distinct from the first version of 2009 (in which Tesla indeed was an alumnus company). How likely is it that each of the wind, solar, solid state lighting, biofuel, biochemical, battery, Smart-Grid, and other cleantech infrastructure industries will end up enabling a Tesla-like success (as opposed to simply being swallowed up by incremental growth of legacy players)? Why would they not?

Who are those candidates within not just this year's Global Cleantech 100, but also within past years' lists (some of whom may today be seen as "old and cold")? And, have we, as members of the "expert panel," been too quick to rush toward the allure of the capital light, software phase of cleantech, not realizing that as was the case with Internet "eyeballs" in 1999, we must patiently await the build-out of the infrastructure before profiting from those software (Google, Facebook) and innovative business models (i.e. Amazon, eBay)?

If we all agreed, then the opportunity to profit hugely from the disruption of these industries would not exist. It is precisely because we might be able to see the future direction, but not so clearly read the timetable, that fortunes will continue to be both lost and won in cleantech investing.

History teaches us that the point when most others have given up is the time to start investing—on that basis the time is now!

Cleantech Group's i3 research analysts spend their days discovering new companies or new developments on companies already discovered to enhance i3's positioning as the leading platform on global cleantech innovation companies. This work provides them with a unique perspective to spot innovation trends. We asked them to provide a few thoughts for this report—our annual barometer on cleantech innovation—on who and what is catching their eye, and why.

Troy Ault

One of the newest and hottest innovation areas on my radar is solutions to improve the environmental footprint of the Oil & Gas industry. Not surprisingly, given the boom in unconventional gas production in North America, all three dedicated Conventional Fuels sector companies to have made this year's 100 list are developing technologies that enable increased use of natural gas in place of more-polluting petroleum fuels. **Ciris Energy** is activating microbes in spent coal mines to produce coal-bed methane, whereas **OsComp Systems** is developing less energy-intensive compression technology for the compression and transport of natural gas in downstream markets. **Siluria Technologies** is developing technology for the oxidation and coupling of methane (OCM) for conversion into fuels and chemicals.

Troy Ault

In the upstream exploration and production (E&P) segment of the Oil & Gas industry, I am seeing a wave of providers of software and services intent on improving the efficiency and safety of drilling and producing wells. This constitutes an innovation trend to keep an eye on moving forward. Beyond the 2013 Global Cleantech 100, **Acoustic Zoom**, **GroundMetrics**, **Wavetech Geophysical**, and **WirelessSeismic** are all examples of companies enabling Oil & Gas firms to be more efficient in the number and location of wells they drill, with very large efficiency gains at stake for the more successful solution providers.

Ciris Energy is also representative of another area of up-and-coming innovation in enhanced recovery techniques for oil & gas utilizing biological means. **Glori Energy** and **Taxon Biosciences** are developing parallel applications of biological technology in unconventional oil recovery and are companies to keep an eye on.

While we do see promising developments in renewable fuels and chemicals, as well as electric transport, our reliance on conventional energy sources is not going away anytime soon. I, for one, welcome the rise in innovation exclusively for, and with applicability to, the Oil & Gas industry.

Amanda Faulkner

I am excited by innovation in the Food and Agriculture space. As one of the largest and most resource-intensive sectors, Agriculture can become more efficient and higher yielding through innovation. Much of the historical innovation in Agriculture has focused on improving the efficiency and reducing pollution from inputs. Companies like **Marrone Bio Innovations, Tianren**, and **Vestaron** have developed biological pesticides, whereas **Kaiima** and **NexSteppe** use breeding technology to develop high-yield crops for food and biofuels.

However, there is a new wave of Food and Agriculture innovation focusing further downstream, connecting consumers to environmentally-friendly meat and local foods. **Beyond Meat**, **Modern Meadow**, and **Hampton Creek Foods** are examples of companies developing animal protein replacements that will allow people to consume protein with significantly less environmental impact. Likewise, **AgLocal, Farmigo, Provender,** and **RelayFoods** are connecting consumers and restaurants directly to local farmers.

Amanda Faulkner

This focus on downstream distribution is enriching the Food and Agriculture innovation space. Food and Agriculture startups are combining multiple technology areas to solve these complex problems. **Promethean Power Systems,** for example, uses batteries in cooling and refrigeration systems for milk and produce in off-grid areas. I am now seeing companies taking on everything from drought-resistant seeds to cloud-based farm management software to better shipping methods to climate risk insurance. Between population growth and climate change, innovation in Food and Agriculture will be sorely needed in the coming years. Watch this space!

Michele Parad

I am struck, and indeed encouraged, by the growing prevalence of companies putting into action closed-loop business models. This is in tune with the noticeable uptick in the use of "Circular Economy" terminology in both political and corporate circles.

A gradual, but decisive, move away from the "take, make, and dispose" attitude of the "Linear Economy" is certainly required if companies like Coca Cola, Hewlett Packard, Nike, Patagonia, P&G, Unilever, and Veolia are going to live up to their stated sustainability strategies and goals. Here are a few ways in which innovation companies and company types are fuelling the trend.

Michele Parad

Ostara Nutrient Recovery Systems, for example, can extract essential nutrients like phosphorous from used agriculture water streams, to ensure food security. Biofuels ventures can help extract value from so called "dead" matter and resurrect them into useful fuels, energy, soaps, clothes, and electronics.

Technologies such as waste-heat recovery and advanced motors companies can help optimize efficiency in industrial processes, and simultaneously help generate more jobs in the reuse markets across the EU and other economies. As an example, **FlexEnergy** helps landfills and coal mines to use a wide variety of existing waste gas sources for use in combined heat and power (CHP) natural gas systems.

Recycling and sustainable materials companies can help streamline corporations' manufacturing processes, green their supply chains, and offer much more to their bottom line. **ECO Plastics**, for instance, takes in used plastics, metals, and cardboard, and produces 'food grade' quality PET pellet, used in place of virgin plastics for household goods packaging.

Leo Zhang

Innovations in the biofuels sector—from both a technological and business model perspective—have made significant progress in an effort to build an entirely new industry. Unlike the Oil & Gas industry that has established operations across the entire value chain (e.g. upstream exploration, midstream refining, and downstream distribution), the biofuels sector has evolved into a multi-disciplinary sector that consists of multiple industry stakeholders. Consequently, multiple new technologies and business models have been focused on the cross-section of agriculture and biofuels to solve the first hurdle of biofuels commercialization.

To mitigate the food vs. fuel debate for corn ethanol production and pave a more sustainable advanced biofuel industry, the agriculture sector has developed key technologies to address potential challenges.

Leo Zhang

For example, **NexSteppe** and **Kaiima** are developing innovating genomic-based breeding technologies to specifically target bioenergy crops production.

Beyond technological development in biofuels feedstock, the sector has started to see business model innovations. Unlike crude oil that is easily transportable via pipelines, bulky biomass poses significant logistical and economic challenges for biomass producers and bio-refineries to establish a profitable vendor-supplier contract. Several new companies have set out to bridge that gap between biomass producers and bio-refineries by producing renewable sugar intermediates. **Sweetwater Energy** and **Renmatix**, for example, are focusing on the offtake of cellulosic biomass from feedstock producers to produce sugar intermediates for downstream refineries. If cost-competitive and logistic-feasible sugar intermediates can be delivered, this would be a critical missing link and an important accelerator on the long path towards large scale biofuel production.
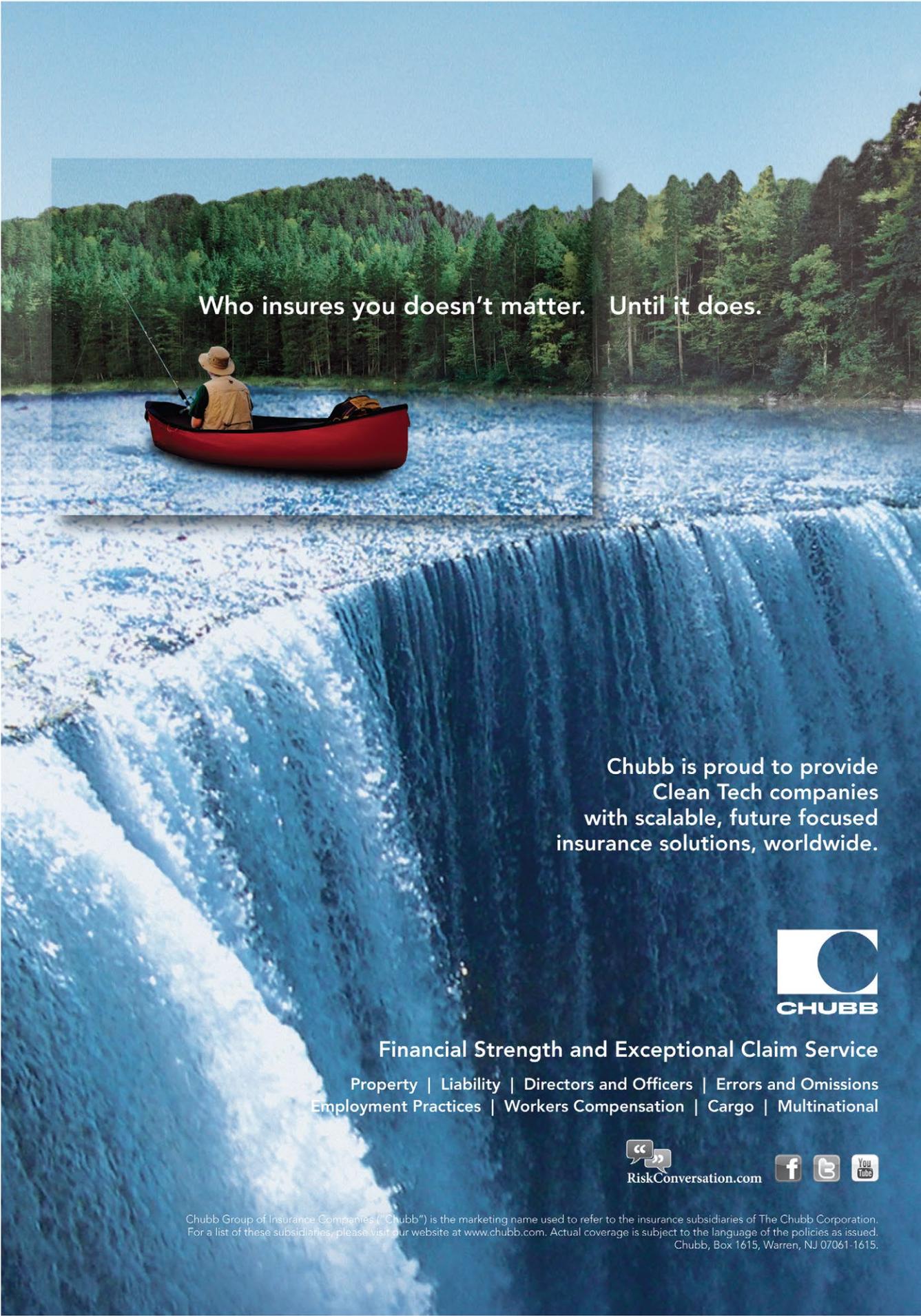
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When we began the Global Cleantech 100 program in 2009, we declared the program to be motivated to "draw more attention to the world of innovation and investment in cleantech, to strike an optimistic note in public consciousness that we can face up to the challenge of our generation, and to celebrate, and give the spotlight to, the people out there making significant advances, growing new businesses and new industries, and creating jobs."

We feel we are living up to that measure, and that the list is indeed highlighting many companies that are already doing well or are showing much promise, and there have been Global Cleantech 100 alumni companies that have gone on to graduate to the next level and phase of company development.

We see much cause for optimism and opportunity in our innovation theme, across the 18 categories we break 'cleantech' into, as the transition to a third wave of cleantech innovation continues. However, it is also worth highlighting a pause for thought that the 2013 process has given rise to.

As much as we believe in the potential of some of the opportunity sets and companies we have referenced in this report, we are equally alive to the idea that these things can be over-done, just as the abandonment of old opportunity sets and out of favor companies might be over-done. Issues and obstacles are plentiful, and we certainly do not wish to under-play the difficult challenges that exist today and the hard work that will need to be done. This is not a time or an innovation space for the boom-wranglers, or the "get rich quick" crowd.

51 companies are new to the Global Cleantech 100 in 2013, compared to 38 that were new in 2012 (a 34 percent increase). This is the first time in the list's history that we have had more entrants than retentions. Yes, I think this is partly explained by the dynamics of a transition phase (where the second wave is passing off the baton to the third wave, and where we have companies going out of business, being acquired, and drawing back from IPOs), but I think there is also an argument that the 2013 list also speaks to an impatience amongst the deal-makers in the market. Out with the old, and in with the new.

Many financial investors have headed to very different parts of the cleantech opportunity set to find companies that are capital-light, that are fundamentally software, data and/or communications companies albeit with energy and resource applications. Here they have placed a new set of bets for the 2010's, and a flavoring of some of these is very apparent in the 2013 edition.

This is entirely rational, especially given the importance to fundraising of showing some near-term successes. They are, if you like, looking for more **JouleX's**. Not a blockbuster at a $107 million acquisition price, but a very solid success for the company and its investors, given the shortness and capital-efficiency of the journey.

But there can only be so many of these plays in energy management, no? There can only be so many successes in the solar financing game, for example. There can only be so many 'operating systems' (so to speak) to run on top of the 'hardware' businesses.

So what of the old darlings in 'hardware'? Looking at solar illustrates the more general point. Solar was once the darling of the cleantech innovation theme. The 2013 Global Cleantech 100 representation by the solar category has fallen to its all-time low at six companies, and most of them are downstream. We have lost representation from companies promising new breakthroughs—such as **1366 Technologies** and **Alta Devices**—and pioneers such as **BrightSource** working on a scale unimaginable today to some of the companies in the 100. Such companies have, in my view, been caught by the negative sentiment surrounding solar more generally. Opportunity surely still abounds in solar's future; cost may have been dramatically squeezed out of panel manufacturing (to the pain of the over-populated market), but beyond the module there is still much to do, more efficiencies to be gained within the value chain, and higher-end products with higher-end and differentiated benefits to come on-line during the 2010's. That the deployment levels (whether measured in GW or rooftops) remains on an ever upward trajectory only adds to that opportunity set as the gains from efficiencies would multiply to bigger and bigger numbers.

The pause for thought, then, is simply this. Hardware and capital intensive may be out of vogue right now—but the contrarian call is to "watch out". Such company types are down, but not out. They may be mired in the deepest Valleys of Death, but out some will come. And when they do they will be set to dominate what by then might be markets another 20 to 50 percent larger than today, and the economics may be well and truly past the tipping point.

Enjoy the year.

Company	Country	Sector	Description
4Energy	United Kingdom	Energy Efficiency	Developer of cooling devices for thermally sensitive equipment such as radios, routers, batteries, and data centers
Agilyx	United States	Recycling & Waste	Developer of a technology that converts mixed waste plastics into synthetic crude oil and other petrochemical products
Airbnb	United States	Other Cleantech	Developer of an online marketplace that allows people to list and book private accommodations, improving resource utilization and decreasing idle capacity and urban sprawl
Alphabet Energy	United States	Energy Efficiency	Developer of low-cost thermoelectric technology for waste heat recovery
Amantys	United Kingdom	Smart Grid	Developer of power switching efficiency products via IGBT control and monitoring
Ambri	United States	Energy Storage	Developer of an all-liquid metal battery technology for grid-scale energy storage
Anesco	United Kingdom	Energy Efficiency	Provider of energy efficiency and carbon reduction solutions for homeowners, local authorities, and businesses
Aquion Energy	United States	Energy Storage	Developer of batteries based on ambient-temperature sodium-ion technology
Attero Recycling	India	Recycling & Waste	Provider of electronics waste management and recycling services
AutoGrid Systems	United States	Smart Grid	Developer of software and cloud-based data analytics services for utilities, grid operators and end users
Avantium	Netherlands	Biofuels & Biochemicals	Developer of a chemical, catalytic process to convert biomass into bio-based materials and fuels
AZZURRO Semiconductors	Germany	Energy Efficiency	Developer of technology for low-cost high-brightness LEDs, high-power electronics applications and GaN semiconductors
Beta Renewables	Italy	Biofuels & Biochemicals	Developer of cellulosic fluids from non-food crops or agricultural waste stream for the production of biofuels and biochemicals
Beyond Meat	United States	Agriculture & Forestry	Developer of a plant based protein meat substitute
BlablaCar	France	Transportation	Provider of a car-pooling online marketplace
Chargepoint	United States	Transportation	Provider of electric vehicle (EV) charging solutions
Ciris Energy	United States	Conventional Fuels	Developers of microbes in spent coal mines to produce coal-bed methane
Clean Power Finance	United States	Solar	Developer of financial services and software provider for the distributed solar industry
Cooltech Applications	France	Energy Efficiency	Developer of a magnetocaloric technology, including solutions for refrigerators, conditioners, and food processing equipment for industrial application.
DeepFlex	United States	Advanced Materials	Developer of a non-metallic, corrosion-free pipe which can enable new, lower cost solutions for transporting fluids or carbon capture and sequestration
Desalitech	Israel	Water & Wastewater	Developer of reverse osmosis water desalination projects
Digital Lumens	United States	Energy Efficiency	Developer of intelligent LED-based lighting systems for industrial facilities that provide fully integrated controls and reporting capabilities
ECO Plastics	United Kingdom	Recycling & Waste	Developer of plastics recycling and the production of recycled polyethylene terephthalate (PET) for use in food and beverage containers
Ecoult	Australia	Energy Storage	Developer of a hybrid battery technology containing both an ultra-capacitor and a lead-acid battery in a common electrolyte
Elevance Renewable Sciences	United States	Biofuels & Biochemicals	Producer of high-performance waxes, functional oils, anti-microbials, lubricants, additives and other chemicals using olefin metathesis technology

Company	Country	Sector	Description
Emefcy	Israel	Water & Wastewater	Developer of Electrogenic Bioreactors (EBR) that treat industrial wastewater and Spiral Aerobic Biofilm Reactors (SABRE) that treat municipal wastewater
ENBALA Power Networks	Canada	Smart Grid	Operator of a network enabling large electricity users to deliver demand-side regulation services to the grid
Enerkem	Canada	Biofuels & Biochemicals	Producer of biofuels and chemicals from waste with proprietary thermochemical technology
Enlighted	United States	Energy Efficiency	Provider of lighting control systems for energy management applications
Envia Systems	United States	Energy Storage	Developer of a cathode material for lithium-ion batteries used in electric vehicles
Epuramat	Luxembourg	Water & Wastewater	Provider of energy-efficient and chemicals-free water and wastewater treatment solutions for municipal and industrial clients
FibeRio Technology	United States	Advanced Materials	Producer of a proprietary nanofiber technology which it incorporates into equipment and manufacturing processes
FilterBoxx	Canada	Water & Wastewater	Supplier of containerized water treatment systems to industrial, municipal, resort and aboriginal clients
FriedolaTECH	Germany	Recycling & Waste	Processor and manufacturer of recycled plastics for automotive and packaging applications
Genomatica	United States	Biofuels & Biochemicals	Developer of green chemicals from renewable feedstocks such as sugar and garbage
GlassPoint Solar	United States	Solar	Manufacturer of solar steam generators for the oil and gas industry
glo	Sweden	Energy Efficiency	Developer of nanowire light-emitting diodes (nLED)
Green Energy Group	Norway	Geothermal	Provider of turnkey 3.2 MW to 6.4 MW flash type modular wellhead geothermal power plants
Gridco Systems	United States	Smart Grid	Provider of smarter power management technology for utilities and industrial power consumers
Gridium	United States	Energy Efficiency	Provider of energy efficiency services that uses a company's online utility bill to identify energy savings and maintenance needs
GridON	Israel	Smart Grid	Provider of smart fault current limiters, increasing capacity, inter-connectivity and reliability of power grids
Harvest Power	United States	Recycling & Waste	Developer of technology to maximize the value of organic materials through the production of renewable energy and soils, mulches and natural fertilizers
Heliex Power	United Kingdom	Energy Efficiency	Developer of a novel rotary screw expander which recovers low grade energy from steam and uses it to generate electricity
Hydrexia	Australia	Fuel Cells & Hydrogen	Developer of solid hydrogen storage systems based on magnesium alloys
i2O Water	United Kingdom	Water & Wastewater	Supplier of water technology addressing water leakage and advanced pressure management for utilities
INRIX	United States	Transportation	Developer of real-time crowd-sourced traffic information, driver directions assistance and tools and applications for traffic predictions and assessment
Ioxus	United States	Energy Storage	Developer of ultra-capacitors and hybrid-capacitors that can be made into individual cells, pre-packaged modules, or complete systems
Isentropic	United Kingdom	Energy Storage	Developer of a reversible, gas cycle machine that works as both an engine and a heat pump
Kaiima	Israel	Agriculture & Forestry	Developer of genomic-based breeding technology to develop high-yielding energy crops for bio-diesel, bio-ethanol, and biomass energy

Company	Country	Sector	Description
Kebony	Norway	Advanced Materials	Manufacturer of sustainable hard wood, made from sustainably sourced wood and chemicals from biowaste
LanzaTech	United States	Biofuels & Biochemicals	Developer of a process that increases industrial energy efficiency by capturing waste gases (CO, CO2) and converting them to fuels and chemicals
Leosphere	France	Air	Developer and manufacturer of light analysing radar (LIDAR) technology for the monitoring of atmospheric and wind conditions
Liquid Robotics	United States	Transportation	Developer of an autonomous unmanned marine vehicle propelled by waves for scientific, research, and defense applications
LP Amina	China	Air	Provider of efficiency improvement programs for every step of energy production in coal plants, including modelling and analytical tools, as well as coal to chemical technology
Lucibel	France	Energy Efficiency	Designer and manufacturer of low maintenance recyclable LED luminary products and systems suitable for homeowners, retailers, and the building sector
Marrone Bio Innovations	United States	Agriculture & Forestry	Developer of natural weed, pest, and disease management products
MetGen	Finland	Biofuels & Biochemicals	Developer and producer of multi-copper oxidases enzymes for the pulp and paper, biofuels, and wastewater treatment industries
Microvast	United States	Energy Storage	Provider of battery systems for electric vehicles and large-scale power grid applications
Mosaic	United States	Solar	Organizer of community solar financing projects, allowing building owners to lease the installation from a group of small local investors
NanoH2O	United States	Water & Wastewater	Developer of thin-film nano-composite reverse osmosis membranes for the desalination market
Nest	United States	Energy Efficiency	Designer of a networked "learning" thermostat for home use
newterra	Canada	Water & Wastewater	Developer and manufacturer of technology for treatment of wastewater, greywater and process water, as well as groundwater remediation, for industrial and municipal markets
Nexant	United States	Energy Efficiency	Provider of intelligent grid software including electric power grid and alternative energy technologies and services
NexSteppe	United States	Biofuels & Biochemicals	Developer of sustainable feedstock solutions for the biofuels, biopower and biobased products' industries
Next Step Living	United States	Energy Efficiency	Provider of home energy diagnostics and energy efficiency services
NovaLED	Germany	Energy Efficiency	Developer of high-efficiency organic light-emitting diodes (OLED) and organic solar cells (OSC) for architectural design, medical applications, home lighting and electronic devices
Novomer	United States	Advanced Materials	Producer of polymers and plastics made from CO2 and other renewable materials
Nualight	Ireland	Energy Efficiency	Producer of LED lighting for food displays and chilled cabinets in food retail
Nujira	United Kingdom	Energy Efficiency	Provider of high efficiency radio frequency and power amplifiers for the wireless communications industry
On-Ramp Wireless	United States	Smart Grid	Developer of wireless communication systems for the water, smart grid and other industries that allow device communication in hard to reach environments
Opower	United States	Energy Efficiency	Developer of a software-as-a-service that utilizes customer engagement and billing analytics for utilities

Company	Country	Sector	Description
OPXBIO	United States	Biofuels & Biochemicals	Manufacturer of renewable bio-based chemicals and fuels including BioAcrylic from sugar feedstocks
Organica Water	Hungary	Water & Wastewater	Provider of Fixed-Bed Biofilm Activated Sludge (FBAS) wastewater treatment plants in urban and residential population centers
OsComp Systems	United States	Conventional Fuels	Developer of compression technology that decreases the energy required to compress and transport natural gas
OSIsoft	United States	Energy Efficiency	Provider of real-time data infrastructure solutions for management of resource consumption and process performance
Ostara Nutrient Recovery Technologies	Canada	Water & Wastewater	Provider of solutions recovering phosphorus and nitrogen from used water streams and transforming them into environmentally responsible, slow-release fertilizer
Phoebus Energy	Israel	Energy Efficiency	Developer of hybrid water heating systems that use solar thermal energy and electricity to maximize efficiency for large facilities
Phononic Devices	United States	Energy Efficiency	Developer of advanced thermoelectric devices that efficiently manage and monetize heat
Project Frog	United States	Energy Efficiency	Designer and manufacturer of resource efficient and zero net energy modular buildings
Proterra	United States	Transportation	Developer of battery-powered buses and other clean commercial transit solutions
Pure Biofuels de Peru	Peru	Biofuels & Biochemicals	Manufacturer and distributor of ultra-low sulfur diesel and biodiesel products
Recyclebank	United States	Recycling & Waste	Developer of a financial rewards system for households that recycle
RelayRides	United States	Transportation	Developer of a peer-to-peer car sharing platform that connects car owners with drivers who need short-term vehicle access
Scinor Technology	China	Water & Wastewater	Manufacturer of a membrane water treatment process via a Thermally Induced Phase Separation (TIPS) technology
SDC Materials	United States	Advanced Materials	Developer of nano catalysts, additives, and composites through a process that eliminates the usage of hazardous solvents
Sefaira	United Kingdom	Energy Efficiency	Provider of web-based energy efficiency software to help the building industry
Siluria Technologies	United States	Conventional Fuels	Developer of methane conversion technology for creating fuels and chemicals from natural gas
Skyonic	United States	Air	Developer of a CO2 mineralizing technology for industrial use
SolarEdge	United States	Solar	Provider of distributed DC systems that maximize power generation of residential and large-scale photovoltaic solar sites
SorTech	Germany	Energy Efficiency	Manufacturer of energy-saving, environment-friendly adsorption refrigeration units that cover small and medium cooling demands
Space-Time Insight	United States	Smart Grid	Provider of situation intelligence software to utilities, oil & gas, telecom and transportation companies
Streetline	United States	Transportation	Provider of smart parking solutions through wireless sensors located in parking spots and managed through a wireless mesh network
Sungevity	United States	Solar	Developer of financing-focused solar systems targeting the residential rooftop market
Sunrun	United States	Solar	Developer of solar systems that engage customers through PPAs to eliminate the cost barrier to residential solar adoption

Company	Country	Sector	Description
Tendril	United States	Energy Efficiency	Provider of a home energy management SaaS platform that facilitates interaction within the energy ecosystem and provides utility solutions
Tianren	China	Agriculture & Forestry	Developer of natural organic fungicides and insecticides for pest management control
Transphorm	United States	Energy Efficiency	Developer of technology to eliminate the electric conversion losses when converting power from one form to another, AC/DC, AC/AC, DC/AC and DC/DC
Trilliant	United States	Smart Grid	Provider of unified smart grid communications solutions that enable advanced metering, distribution automation, and demand response
va-Q-tec	Germany	Energy Efficiency	Provider of customised vacuum insulation panels (VIPs) and heat & cool storage elements containing phase change materials (PCMs)
Vestaron	United States	Agriculture & Forestry	Designer of the next generation of bio-pesticides from naturally occurring peptides

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