The Cleantech Growth Journey

Report from the second annual Cleantech CEO Retreat
The Cleantech Growth Journey

New realities, new opportunities
The business landscape we face these days can be described as a new reality, one that brings new business, financial, strategic and operational risks.

Key among them are the cost of energy, energy security concerns, constraints on natural resources, consumer demand for greener products and services, the consumption power of the middle class in emerging markets, environmental regulations, and the demand for integrated reporting as part of shareholder value.

At the same time, the new reality also presents exciting opportunities that can drive sustainable growth and development. No business can afford to ignore either the risks or the opportunities.

The need to transform our global economy to a more resource-efficient, low-carbon and sustainable one continues, with governments seeking innovative ways to revitalize their economies and corporations finding more attractive opportunities for deploying their capital.

Meanwhile, emerging cleantech companies are at a pivotal moment in which they are seeking to attain the next stage of development even as their traditional funding sources are retreating from the market, governments are reducing incentives and certain renewable energy sectors are undergoing consolidation.

To explore the most important issues and options for cleantech companies in the current environment, Ernst & Young LLP convened the second annual Cleantech Growth Journey CEO Retreat in Napa, California, in September 2012.

The event brought cleantech CEOs together with corporate executives, investors, policymakers and business advisors in a peer-to-peer roundtable discussion format.

Rather than focusing on a single industry vertical, such as solar or biofuels, the retreat addressed topics that are relevant across cleantech – capital raising, partnerships, transaction readiness, growing beyond borders and the government as customer.

Special thanks go to Bloomberg New Energy Finance, Goodwin Procter and Silicon Valley Bank for their sponsorship of the retreat and their many contributions to the event.

This report highlights the key participant perspectives and actionable insights shared during the dynamic discussion. We hope that our findings, focused on the cleantech growth journey, will help to spur creative market initiatives and further discussion on how to achieve the next stage of industry growth.

Foreword

Gil Forer
Global Cleantech Leader
Ernst & Young

We hope you’ll join us for Ernst & Young’s third annual Cleantech Growth Journey CEO Retreat
30 September to 1 October 2013
Carneros Inn
Napa, California

For more information, contact:
Scott Anderson
Tel: +1 201 872 1292
Email: scott.anderson@ey.com
Participants

3TIER, Inc.
Craig Husa, CEO

Borrego Solar
Michael Hall, CEO

Calysta Energy
Alan Shaw, Chairman & CEO

Cisco Systems
Dave Bhattacharjee, Director & Group CTO, Internet Business Solutions

Citi
Mike Eckhart, Managing Director and Global Head of Environmental Finance

Citizen Schools
Nitzan Pelman, Executive Director

Daintree Networks, Inc.
Danny Yu, CEO

DBL Investors
Seth Miller, Partner

Distributed Sun
Jeff Weiss, Managing Director

Ecological Brands
Julie Corbett, CEO & Founder

Edeniq, Inc.
Brian Thome, President & CEO

First Fuel
Swapnil Shah, President & CEO

Fisker Automotive
Henrik Fisker, Executive Chairman & Founder

Goldman Sachs
Stuart Bernstein, Global Head of Clean Technology and Renewables Group

Goodwin Procter LLP
J. Hovey Kemp, Partner
Bradley Weber, Partner

Greentech Capital Advisors
Kyle Jones-Baker, Principal

Honeywell International
Luca Mazzel, VP of Global Strategy and Marketing, Building Solutions

Hunt Alternative Energy Investments
John Balbach, Senior Advisor

IBM
Allan Schurr, VP Strategy & Development, Global Energy and Utilities
Peter Williams, CTO, Big Green Innovations

Ingersoll Rand
William Sekkel, President, Latin America, for Climate Solutions

Innovalight DuPont
Conrad Burke, President & CEO

International Finance Corporation
Nikunj Jinsi, Global Head, Clean Technology Investments

Life Science Partners
Geeta Fisker, Founder & Director

McKinsey & Co.
Stefan Heck, Cleantech Leader, Sustainability and Resource Productivity

Microsoft
Rob Bernard, Chief Environmental Strategist

Momentum Dynamics Corporation
Andrew Daga, CEO

Monitor Talent
Christopher Meyer, Founder

NREL/JISEA
Doug Arent, Executive Director

Paradigm Environmental Technologies, Inc.
Gordon Skene, President & CEO

Primus Power
Tom Stepien, CEO

REEL Solar Inc.
Edward Grady, Chairman & CEO

Resolute Marine Energy, Inc.
Bill Staby, CEO

Samba Energy
Jack Hidary, Chairman

Silicon Valley Bank
Quentin Falconer, National Cleantech Coordinator
Matthew Maloney, Head of Cleantech Practice

SoLexant
Brad Mattson, CEO

SolFocus
Mark Crowley, CEO

SunPower Corporation
Chuck Boynton, EVP & CFO

The Center for the Next Generation
Kate Gordon, Director, Advanced Energy and Sustainability Program

ThermaSource
Richard Chow, President & CEO

U.S. Department of the Navy
Tom Hicks, Deputy Assistant Secretary of the Navy for Energy

U.S. General Services Administration
Nancy Gillis, Director, Federal Supply Chain Emissions PMO
Day one

**Keynote**  
Tom Hicks, Deputy Assistant Secretary of the Navy for Energy

**State of the cleantech market**  
Presenter: Scott Sarazen, Global Cleantech Markets Leader, Ernst & Young

**CEO discussion: Capital**  
What are the lessons learned in raising, investing, preserving and optimizing capital?  
What are some new trends in cleantech finance?

**Discussion POVs**  
Matt Sapp, West Cleantech Leader, Ernst & Young

**Discussion leaders**  
Kyle Jones-Baker, Principal, Greentech Capital Advisors  
Brian Bolster, Managing Director, Cleantech Technology and Renewables Group, Goldman Sachs  
Mike Eckhart, Managing Director and Global Head of Environmental Finance, Citi  
Quentin Falconer, National Cleantech Coordinator, Silicon Valley Bank  
Henrik Fisker, Executive Chairman and Founder, Fisker Automotive

**CEO discussion: Partnerships and alliances**  
What are the corporate expectations of cleantech partnerships and alliances?  
How can partnerships be sustained beyond the first year?  
What are the lessons learned from partnerships in the cleantech marketplace?  
What are the key elements of partnership readiness?

**Discussion leaders**  
Luca Mazzei, VP of Global Strategy and Marketing, Building Solutions, Honeywell  
Alian Schurr, VP Strategy and Development, Global Energy and Utilities, IBM  
Chuck Boynton, CFO, SunPower  
Jack Hidary, Chairman, Samba Energy

**Keynote**  
Christopher Meyer, Founder, Monitor Talent
Agenda

Day two

CEO discussion: Transaction readiness
What does IPO/M&A readiness mean for my company?
What are the top 10 issues CEOs should focus on?
What are the hazards of going to IPO too early?

Discussion POV
Jay Spencer, Americas Cleantech Leader, Ernst & Young

Discussion leaders
Stuart Bernstein, Global Head of Cleantech Technology and Renewables Group, Goldman Sachs
Alan Shaw, Chairman & CEO, Calysta Energy
Conrad Burke, President and CEO, Innovalight DuPont
J. Hovey Kemp, Partner, Goodwin Procter
Seth Miller, Partner, DBL Investments

CEO discussion: Growing beyond — competing for growth in a global market
What are the success factors in working in emerging markets?
How should efficient multinational innovation be driven and accelerated?
What are the lessons learned in managing talent globally?

Discussion POV
Scott Sarazen, Global Cleantech Markets Leader, Ernst & Young

Discussion leaders
Peter Williams, CTO, Big Green Innovations, IBM
Nikunj Jinsi, Global Head, Clean Technology Investments, IFC
William Sekkel, President, Latin America, for Climate Solutions, Ingersoll Rand

CEO discussion: Government as customer
What are the key lessons learned in working with governments around the globe?
How do you access and win government contracts?

Discussion POV
Jeff Petrich, Executive Director, Washington Council Ernst & Young

Discussion leaders
Jeff Weiss, Managing Director, Distributed Sun
Doug Arent, Executive Director, Joint Institute for Strategic Energy Analysis, NREL
Kate Gordon, Director, Advanced Energy and Sustainability Program, Center for the Next Generation
Nancy Gillis, Director, GSA Federal Supply Chain Emissions PMO
Dave Bhattacharjee, Director and Group CTO, Internet Business Solutions Group, Cisco

Keynote
Rob Bernard, Chief Environmental Strategist, Microsoft
Executive summary

Cleantech Growth Journey: new realities, new opportunities

This report analyzes the themes and participant points of view that arose during the Cleantech CEO Retreat. It synthesizes the discussion, debate and views of the Retreat participants. Included are quotations from participating cleantech CEOs, who remain anonymous under the Chatham House Rule observed during the Retreat.

Cleantech is not a temporary phenomenon, driven solely by regulatory shifts or short-term incentives.

CEO Retreat participant

The second annual Cleantech Growth Journey convened start-up CEOs, corporate executives, financiers, government representatives and business advisors for a dynamic executive roundtable discussion of the critical issues facing cleantech businesses today.

Close to 40 participating executives traded opinions and advice on the challenges of raising capital, the potential of partnering, the ins and outs of preparing for a major transaction, finding and succeeding in new markets, and selling to the government.

The discussion took place against the backdrop of new realities in cleantech. Even as hundreds of cleantech companies in many different segments are poised to move to commercial-scale production, venture capital is harder to secure or unsuited to financing needs. In the US and Europe, government support for cleantech has been reduced — or perhaps even worse, rendered uncertain — as policymakers have sought to close budget gaps in the ongoing economic downturn.

At the same time, the fundamental drivers that are propelling cleantech in developed markets are even stronger in emerging ones. In the fast-growing economies of Africa, Asia and Latin America, the forces of demographic growth and economic expansion are increasing the need for resource-efficient and low-carbon technologies. In emerging markets, developing the capacity to meet domestic resource needs has become a critical priority for public and private sectors alike, creating opportunities for cleantech companies around the globe. Clean energy investment reached US$68 billion in China alone in 2012.

Capital raising: look beyond venture capital and across borders

CEO Retreat participant

For VC-backed companies, there’s a shift toward longer-term relationships, such as strategic partnerships and family offices.

Following is a summary of the key ideas and actionable insights for adapting to the new cleantech business realities and seizing new opportunities.

For VC-backed companies, where venture capitalists (VCs) were once a cleantech company’s first stop, innovators must now look to less familiar sources. Corporations are emerging as an important financing source. A successful strategic partnership can help a cleantech company accelerate commercial development. In addition to providing funding, a good strategic partner can stress-test new technologies, iron out manufacturing processes, and open the door to ready-made distribution and sales channels.

Across all classes of capital, it’s increasingly important for cleantech companies to globalize their hunt for funding, particularly from non-traditional players, such as sovereign wealth funds and family offices, many of which have longer investment horizons that align with cleantech development times.
Though once viewed chiefly as potential sales regions, emerging markets are becoming promising sources of growth capital too. In countries like Brazil and China, the demand for clean technologies is enormous, and government policy is catalyzing in-country investment. To help secure investment from these emerging sources, companies must often deploy a share of the capital in the source country: establishing an R&D lab, factory or a country office can secure the funding while opening legitimate market opportunities.

Too many partnerships failed because neither party saw them as critical to their success.

CEO Retreat participant

Transactions and alliances are emerging to fill the vacuum left by the contraction of conventional funding sources. A well-chosen pairing can deliver broad strategic benefits. These include rapid access to global distribution and sales networks, capital for expansion, technical validation and an immediate boost to legitimacy. For both sides of the arrangement, a partnership can work as a prelude to an acquisition.

In partnerships, it pays to diversify. Only rarely can a single deal yield the perfect solution to meet a start-up’s aspirations. To maximize global opportunities, for instance, it is worthwhile to court strong partners in different regions. Likewise, multiple partners can help cultivate sub-markets within a single geography.

To succeed, effective communication is paramount. Partnerships most often fail as a result of misaligned expectations, poor documentation of objectives and a breakdown in key personal relationships. Additionally, many clean technologies – from electricity to water – are heavily regulated, inherently political, and subject to media scrutiny that can strain a partnership. Good communication can help to prevent such strains from bringing the relationship to the breaking point.

Transaction readiness: prepare now to create future options and drive value

This is the best negotiating position: if you don't need to be acquired, then you can genuinely walk away from the table without trouble.

CEO Retreat participant

Whether aiming for IPO or acquisition, the earlier a management team can commit to a strategic path and shape the business's evolution accordingly, the better.

The dearth of other sources of large financings for cleantech companies can make IPOs an attractive option. Pressure to go public can also come from venture or private equity investors. Even so, cleantech CEOs must seek a clear understanding of market realities to manage stakeholder expectations, particularly if conditions suggest an IPO is premature.

That said, acquisition should not be considered a second-best alternative. A big corporate buyer can provide the resources needed to bring a cleantech company through commercialization while also offering an exit path for investors.

Regardless of the transaction type, fundamental business processes must be in order. Young companies can get a head start on transactions by documenting business practices and key performance indicators, as well as by appointing board members as frontline scouts for opportunities. These steps can simplify the process of executing – and maximizing returns – once a deal emerges.
Cleantech companies are increasingly turning to emerging markets, where economic growth continues to be vibrant. Seizing these opportunities requires a combination of skills, adapting best practices from home while developing new tactics customized to the new market. For a company launching its first international foray, a key to success is to focus on a single market and avoid overreaching by pushing into too many new frontiers at once.

Emerging markets are promising sources of innovation, where products and processes can be adapted at lower costs. A company’s first goal is typically to optimize offerings for local needs, but often the cost-lowering improvements developed overseas can be exported back home.

Realizing these on-the-ground innovations requires careful nurturing of local hires. While expatriate managers are a vital link back to home base, locals are often better at adapting imported technologies into new markets. Above all, succeeding in emerging markets demands patience and an understanding that each market will be different.

There is no single emerging market. And there is no single strategy for success. The one certainty is that you need people on the ground with the mileage to know local perspectives.

CEO Retreat participant

One of the most effective things that a government can do is set a rule that creates a market, which in turn attracts private capital.

CEO Retreat participant

While governments’ capacities for directly subsidizing cleantech are diminishing in the US and Europe, their demand for cleantech goods and services remains resilient.

In the US, for instance, the federal government is required to buy sustainably produced goods and services, and is mandated to retrofit its huge property portfolio for greater efficiency. Numerous cities and states have set similar goals.

To turn these requirements into sales, cleantech companies must become proficient in the language and process of government procurement. Because government purchasing usually involves many more decision-makers than in the private sector, business development executives must take the time to understand which officials oversee requests, which handle bidding, and who issues payments. As is the case in entering other new markets, partnering with a larger entity that has proven access to government sales channels can ease market entry.

Bidding processes can be complex, with strict timelines and exacting documentation requirements; responding to such requests puts significant demands on the time of management and support staff.

Companies can also indirectly spur purchasing of cleantech products and services by backing standards – such as building efficiency codes, renewable portfolio targets or lighting efficiency standards – that can create demand across entire markets.
Participant perspectives: Capital

Funding cleantech: look beyond venture capital, local investors

**Discussion POV**

Matt Sapp  
West Cleantech Leader, Ernst & Young

Discussion Leaders

Kyle Jones-Baker  
Principal, Greentech Capital Advisors

Brian Bolster  
Managing Director, Cleantech Technology and Renewables Group, Goldman Sachs

Mike Eckhart  
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Quentin Falconer  
National Cleantech Coordinator, Silicon Valley Bank

Henrik Fisker  
Executive Chairman and Founder, Fisker Automotive

Capital scarcity is perhaps the greatest challenge facing emerging cleantech companies seeking to evolve and grow. Venture capital (VC), long a sustaining source of both seed and growth funding, has become harder to obtain even as government incentives in developed markets are being reduced or eliminated. To navigate this new landscape successfully, cleantech companies must look beyond familiar domestic capital sources and across borders.

While the funding situation has grown more difficult for cleantech entrepreneurs, there is a silver lining. Cleantech is maturing and becoming more resilient as it moves from a past period of capital push to a future of capital pull. At an earlier stage, policymakers pushed capital toward unproven, but promising, cleantech strategies. These days, profitable business models are working to pull in funding.

**Understand venture capital’s constraints**  

Financiers’ romance with cleantech is rooted in the sector’s long-term promise as deep, multi-generational shifts remake the global economy and environment. Rising consumption as a result of growing middle classes in high-growth markets – think Brazil, China and India – promises huge demand growth. And as these nations grow richer, consumers will demand more energy technologies and a cleaner environment – all of which point toward cleantech solutions.
However enamored they are of the sector, venture capitalists have found that nurturing cleantech ventures differs in fundamental ways from classic investing in IT, for example. Many cleantech companies are tackling research and development (R&D)-intensive technology opportunities that are technically complex. Many opportunities must clear significant regulatory hurdles: energy generation plays, for instance, often face federal, state, regional and local regulatory oversight. In many respects, investing in cleantech is more akin to investing in biotech, with its long commercialization timelines, capital-intensive clinical trials and regulated end-markets.

When combined, the factors of high technical complexity and regulatory compliance translate into projects that can require billions of dollars to commercialize, with timelines that can stretch to a decade or longer.

For VCs accustomed to investing tens or even hundreds of millions of dollars with anticipated paybacks in a few years, large-scale cleantech projects with decade-plus timelines are simply a poor fit.

In an era of declining public funding for cleantech, where do we look for capital and how do we structure it?

CEO Retreat participant

Look past VCs and beyond borders

Other classes of capital offer alternatives to venture capital for nurturing later-stage cleantech ventures. For example, management offices of high-net-worth families and sovereign wealth funds have long-term
For VC-backed companies, there’s a shift toward longer-term relationships, such as strategic partnerships and family offices.

CEO Retreat participant

investment horizons and a higher tolerance of risk than conventional debt sources do.

Likewise, strategic partners, while wary of high-risk early-stage technologies, can offer unique opportunities to smaller cleantech companies with both funding and business support. The right strategic partners can help such companies leapfrog over many stages of development by stress testing their technology and offering manufacturing scale and ready-made sales and distribution representation.

Across all classes of capital, it’s increasingly important for cleantech companies to globalize their hunt for funding. Despite the downturn, Europe remains ripe for technologies that boost efficiency or offer cost-competitive alternatives. Unlike the US, where a glut of natural gas is depressing power prices and neutralizing investor interest in some renewable projects, Europe remains a high-cost energy environment. Pro-renewable policies in Europe continue to scale the installation of renewable systems, albeit at a slower pace than in previous years.

China is also emerging as a key candidate for cleantech funding. Long regarded warily as a low-cost threat to Western technologies, China’s role in this dynamic is maturing.

China has tremendous energy needs and is relatively flush with capital. Increasing energy supply and improving the environment are top priorities among China’s public and private sectors and policymakers, so demand for clean technologies from the US and EU is surging.

Caveats apply, to be sure. Like their peers in the US and EU, China’s solar manufacturers are so battered by falling prices – partly due to Beijing’s heavy subsidy of manufacturing capacity – that the door has all but closed for foreign engagement in the solar sector. Operations in China, whether to serve the domestic market or the foreign one, continue to be complex to negotiate.

Likewise, the security of intellectual property – from process technologies to brand identities – remains a concern. Companies with significant existing global scale and strong presence in overseas markets face less likelihood of intellectual property infringement. But less established players face a higher risk.

Where foreign capital is available, don’t be surprised to encounter demands that a share of that money be invested in the source country. In other words, if you land funding from Finland to build electric vehicles, expect to build manufacturing, design operations or the like there too.

This need not be a constraint. Business plans that factor in global markets early on are likely to be better received and more successful since they reduce the exposure to US economic cycles.
Ernst & Young

Perspective on the capital agenda

How organizations manage their capital today will define their competitive position tomorrow.

A strong capital agenda needs to be at the heart of all strategic boardroom and management decisions. While strategies and approaches will vary by company, one point is compellingly clear – doing nothing will only provide your competitors with an advantage.

The agenda – based around the four key dimensions of preserving, optimizing, raising and investing capital – will help companies consider their issues and challenges, and more importantly, understand their options to make more informed strategic capital decisions.

**Preserving.** Every business needs to continuously assess the potential impact of evolving market conditions on the performance of its operations and its capital base. Even in a recovering market, companies believing themselves in a stable position may find their situation can change. The preservation of capital requires that companies continuously scour their strategies, markets and balance sheets to reassess strengths and weaknesses.

**Investing.** Investors in your organization want to know why: why this transaction, why at this price and why now? Complicating matters, different stakeholders increasingly bring different expectations of investments and returns.

**Optimizing.** Today’s economic climate is forcing businesses to candidly assess their financial fitness. More than a mere review of operations, companies today must conduct objective assessments of the alignment of their strategies.

**Raising.** A company’s ability to raise capital quickly and effectively is integral to its growth potential and financial well-being. This is true in good times and in bad. Whatever the motivation for raising capital, companies can access new funds more effectively if they have planned ahead. They should know how and where they could access capital if they need it.
China has changed. There are fewer barriers to getting money out. And there’s a big appetite for technology from the United States. The challenge is: we don’t necessarily know the sources or our way around business networks there.

CEO Retreat participant

As Brazil’s wind market shows, for example, overseas opportunities are no less competitive than those in mature economies. The Brazilian Government is expanding its commitment to wind, opening up bidding on 20-year power-purchase agreements (PPAs) for wind farms. As investment in wind farms in wealthier markets has petered out, there’s been a rush to tap Brazil’s potential. The result is a field crowded by global wind players aiming to develop a relatively small opportunity with huge long-term potential. It’s a situation that will reward patient investors with deep pockets.

PPAs represent a promising proven option, particularly for energy projects that can tap mature, reliable technologies like wind and solar. Indeed, because they are well understood in the financing community, PPAs can play a key role in the sorts of hybrid mixes of capital necessary to bring big cleantech projects to market.

In China or Japan, for example, an emerging cleantech developer can make a deal with an established company in exchange for corporate equity, followed by a commitment for project-level financing when key milestones are met.

Such transactions cannot typically be executed in short order — a year or more is common. But the benefits include a strategic partner and capital at a critical period of development.

Prepare by de-risking It is difficult to generalize about solving the funding challenge for industries as diverse as those encompassed by cleantech. Yet by being flexible and taking a broad view of potential funding sources, savvy CEOs are proving it is possible to overcome the financing gap and bring clean technologies to market.

Regardless of whether post-venture funding comes from a Middle Eastern sovereign wealth fund or a Brazilian strategic partner, cleantech companies can optimize their chances to land fresh funding by de-risking their business models in advance.

To do so, validating technology is at the top of the list. With technology risk minimized, would-be funders can make judgments based on more familiar variables. Indeed, the better potential investors can be taught to understand the nuances of cleantech sector risks, the more likely they are to accept those risks and put their money to work.
Keynote

Tom Hicks
The Navy adopts cleantech to save lives and money

As alternative energy comes of age, the US military is emerging as a disciplined defender of clean technologies. The military’s investment in the technologies is driven in part by the same cost- and resource-saving criteria that entice the private sector. Yet the Air Force, Army, Navy and Marines are also motivated by a more compelling agenda: saving the lives of personnel. Higher energy efficiency means fewer service men and women put at risk in refueling operations. In the long run, being able to do more with less than a foe translates into military advantage. In the past, says Tom Hicks, the U.S. Navy’s Deputy Assistant Secretary for Energy, countries have assumed energy was a given: “This is how [they] have lost wars.” Hicks’s way of thinking has matured rapidly during the Afghanistan war. In the remote terrain of Central Asia,
keeping far-flung outposts fueled has required that fuel convoys regularly traverse long distances on rugged, often unprotected roads, making them difficult to defend by the Marines that escort the trucks.

For every 50 tanker convoys, Hicks says, one Marine dies. “That’s one Marine not going back safely to [his or her] family. It’s one Marine not out there conducting operations. One Marine not there to help rebuild those communities.” He adds, “That’s simply too heavy a price to pay.”

In the past, the top brass may have tackled this problem solely by focusing on securing the fuel supply with more firepower. This time, Navy planners realized that cutting energy consumption at forward bases could deliver similar benefits. Reducing the volume of fuel needed reduced the frequency of deliveries. Fewer convoys meant fewer personnel at risk.

In 2010, top brass set up an experimental forward operating base at a site in the US and invited some 30 companies to demonstrate technologies to lower the base’s energy needs. After a few months of trial, fewer than 10 companies were promoted to take part in war exercises for more intense testing. Six months later, the best five or so were, in turn, deployed into active operations in Afghanistan.

No single technology made a revolutionary difference in this case. But the sum of the enhancements added up, compounding one another. Insulated tent liners, for instance, dramatically decreased air conditioning leakage. LED lights used less power and threw off less heat, further lowering the cooling load.

The results? Energy savings ranged from 25% up to 90% with a proportional reduction in fuel deliveries, depending on the role and location of the base. After being rolled out in one battalion, the original set of five technologies was incorporated into all five Marine battalions operating in Afghanistan. In dollar terms, the average payback is about six months, says Hicks.

Building on this success, the Navy has institutionalized this efficiency competition. These days, industry leaders are invited to demonstrate energy technologies twice a year. In May 2012, for instance, at Camp Lejeune, the focus was on personal power systems and personal water purifiers.
The scale and complexity of the Navy’s energy challenge is gargantuan. Service-wide, Hicks explains, the Navy spends US$4 billion to US$5 billion per year fueling a fleet of 286 ships and some 3,700 aircraft, and another US$1.2 billion or so to power Naval installations.

The Navy’s floating and flying armada consumes more than 30 million barrels of fuel annually, so every US$1 per barrel increase in the price of oil drains many tens of millions in costs away from the Navy’s budget.

While the private sector can adjust prices in response to energy shifts, the military has only two options: cut consumption or ask for more funding. “You can imagine going up to the Hill these days, in the restrained fiscal climate that we have, and asking for more money,” says Hicks. “It’s a very short conversation. The answer is no. So how do you pay for that?”

The answer, in part, has been a strategic emphasis on efficiency, renewables and alternative energy sources. This became a top priority starting in October 2009, when Secretary of the Navy Ray Mabus laid out a set of broad energy goals, including an effort to source half of all the Navy’s energy from alternate sources by 2020.

An important part of this initiative is an effort to improve deeply rooted, wasteful operations. Consider, for instance, long-standing wasteful practices in military housing. Hicks recalls a childhood growing up on Air Force bases: “If you live on a base, you don’t see an energy bill,” he says. “And if you don’t see it, you don’t care about it.” Hence, following the example of many utilities, the Navy is beginning to deliver energy statements – not bills, per se – with cues to encourage reduction. It’s a simple program that’s generating energy savings of 15%.

The Navy is following private sector precedents too. To develop renewables projects at its facilities, it’s turning to power purchase agreements, joint ventures and other innovative financing arrangements. Training and recognition are also playing a big role. The service is cultivating a generation of energy-focused officers with a new curriculum at its graduate college. “We’re working to bring energy into the criteria by which we promote officers,” says Hicks.

Of course, given its long history as a technology innovator, the Navy is also chasing some sky-high technology goals too. For air operations, a drop-in renewable replacement for aviation fuel has been tested on a large scale. On the oceans, the USS Makin Island is the Navy’s “Prius of the sea.” Its propellers are driven by electricity drawn from a combination of batteries, an efficient diesel generator, and/or a gas turbine when more speed is needed.

The Navy, Hicks emphasizes, is planning for the long term. Ships last 40 years and aircraft nearly as long, so developing next-generation energy solutions demands thoroughness and patience. Indeed, in the face of political headwinds from congressional questioning of the Navy’s efforts to develop fossil fuel alternatives, Hicks offers the reminder that over its more than 200 years of service, the Navy has navigated the transition from sail to coal and from coal to oil and nuclear. The first coal ships the Navy built, Hicks says, were built with sails because supplies of that new-generation fossil fuel weren’t certain in all ports.

Someday in the future, today’s mostly fossil-fueled Navy may seem a quaint memory too.
Prospecting for partners: back to the future?

Successful cleantech entrepreneurs rightly pride themselves on their fluency in the intricacies of cutting-edge venture capital practices and the ins and outs of negotiating late-stage funding rounds.

Now, however, the capital sources that cleantech entrepreneurs formerly relied upon are less accessible — VC funding has pulled back, the IPO market is constrained and public subsidies are drying up or uncertain.

In this new reality, partnerships with large corporations are generating renewed enthusiasm. As cleantech companies respond to the new market conditions, many are recognizing that partnerships with larger corporations can deliver benefits far beyond capital alone. Among others, they offer enhanced market credibility, along with the global reach necessary to help shepherd new technology through commercialization.

From the perspective of large corporations, whether energy companies or IT leaders, partnerships provide access to the external innovation needed to pursue new cleantech market opportunities. They offer a fast-track method to enrich the companies’ cleantech product pipelines.

For both sides in the deal, a partnership can serve as a prelude to an acquisition, allowing a corporation to survey the terrain of promising new technologies and providing an emerging company the opportunity to prove its value to a potential buyer with the resources to bring its business to commercial scale.
Address the need for complex, customized solutions. Compared with other sectors, however, cleantech is characterized by factors that can make it difficult to establish a partnership. Ironically, many of these factors make the benefits of partnerships all the more compelling. For cleantech companies, it is therefore wise to explore a series of alliances rather than bet that a single partner can deliver all the solutions.

A comparison with IT highlights the unique situation of the clean energy sector. By practically any measure—from software practices to equipment standards to regulations—the energy sector is less standardized than IT is. At the same time, energy accounts for a larger share of the global economy; it is more capital-intensive and spans larger geographies. This amplifies the challenges, even as the opportunities for consolidation and the creation of efficiencies of scale through innovation are proportionally large.

In this respect, regulations can make establishing partnerships more complicated for cleantech companies. Rules affecting the smart grid in the US, for example, emanate from scores of federal and state agencies and include thousands of building codes in different jurisdictions. Similarly, outside the US, rules and standards for the grid vary by country. In smart grid and other areas of energy infrastructure, the unique requirements of different markets all but eliminate the possibility of devising a one-size-fits-all product.

A partnership works best when you both have something to gain from it.

CEO Retreat participant
Likewise, a one-size-fits-all partnership is not likely to succeed. Multiple partnerships will likely need to be forged to address global market opportunities.

Prepare for politics

The inherently political nature of energy can cause turbulence in a cleantech partnership. Willingly or unwillingly, the leaders of emerging cleantech companies often find themselves actively engaged in political debates about energy policy. Corporations venturing into cleantech partnerships must therefore be prepared for potentially sharp political and media scrutiny.

If a partnership is not built on a solid foundation, unfavorable media and political attention can stress, and even damage, the relationship. The battery industry, in recent years, has yielded a handful of examples of the challenges facing partnerships. The industry is both capital-intensive and technologically advanced, and government policy in the US and overseas complicates the competitive marketplace. Newcomers to the field needed the help of incumbents for capital, market know-how and sales.

An emerging battery company filed for bankruptcy last summer, raising questions as to whether its supply deals with a large automotive original equipment manufacturer would be maintained.

Communication: Many of the risks facing cleantech alliances are rooted in the essential unpredictability of the emerging technologies being developed. While the smaller cleantech company may be built from the start to expect and respond to this uncertainty, such flexibility is harder for the larger partner.

Although there may be no magic fix for this kind of imbalance, constructive communication is the best antidote. It behooves both sides to adapt to the other’s modus operandi. The start-up must learn patience while the incumbent must cultivate the flexibility to test new products and alternative approaches to its established business practices.

As the start-up and the large corporation integrate their goals, documentation is critical. The exercise of clearly and simply setting out goals and expectations in writing is an essential – and yes, time-consuming – formality that can help expose important mismatches.

Strong documentation hedges against the risk of commitments being forgotten as staff come and go. Given that small companies grow and the staff in large companies rotates with regularity, having thorough documentation mapping out the partnership can be the difference between success and failure. Defining shared goals up front and constantly revisiting them help keep both sides of the relationship in synch.

Indeed, while cutting-edge technology may be the catalyst that draws many allies together, dysfunctional human dynamics are often the reason they split.
# Ernst & Young Perspective on partnerships and alliances

Joint ventures (JVs) and strategic alliances can provide an ideal vehicle for establishing strong local business partnerships and entering strategic markets and geographies. A JV or alliance can help companies to expand business, access technology or cut costs. At the same time, less capital is usually committed than in a full acquisition. A successful JV also may be a transitional step toward divestiture or may facilitate the streamlining of corporate portfolios. Be sure your JV is supported by quantifiable milestones and compatible goals between the partners in order to foster realistic expectations. In our experience, alliances that fail usually lack these vital ingredients.

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>Requires less capital than a full acquisition</td>
<td>Faces risk of incompatible corporate cultures</td>
</tr>
<tr>
<td>Maintains some control</td>
<td>Requires significant effort to keep expectations and business objectives in alignment</td>
</tr>
<tr>
<td>Shares risks and rewards</td>
<td>Requires consistent oversight of the other partner</td>
</tr>
<tr>
<td>Bridges to a sale or IPO</td>
<td>Increases potential risk – legal, financial and reputational – due to joint and several liability with partner</td>
</tr>
<tr>
<td>Integrates products and customers</td>
<td>Demands more sophistication from partners</td>
</tr>
<tr>
<td>Builds credibility and knowledge to expand into key markets, develop new products and improve productivity</td>
<td>Slows decision-making</td>
</tr>
<tr>
<td>Helps expand business, access new technology or cut costs</td>
<td>Requires special considerations related to licensing, distribution and supply, manufacturing, employee and other relationship agreements</td>
</tr>
<tr>
<td>Manages risk in entering strategic markets and geographies while establishing strong local partnerships and new sales channels</td>
<td></td>
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<tr>
<td>Provides greater transparency of operations</td>
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<tr>
<td>Offers transition toward divestiture or facilitates streamlining of corporate portfolios</td>
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Source: Ernst & Young’s Guide to Going Public, 2012
up. So while ramping up technology development and sales may seem the first order of business, strengthening and investing in the organizational bridge between the two parties early on is vitally important.

A common misstep is for either side to come to the table with a sense of superiority. For the small company, guarding against overconfidence from early success can help win respect from counterparts at the larger partner. For the latter, a common pitfall is arriving with a “bigger is better” attitude and letting it take root.
Cleantech entrepreneurs are increasingly considering the possibility of conducting an initial public offering (IPO) or merger and acquisition (M&A) transaction to propel their companies to the next stage of development, such as achieving commercial-scale production or expanding globally.

An IPO can be attractive because it offers an opportunity to raise a large amount of capital and gain access to future public market financings through secondary transactions. Some cleantech companies are feeling pressure to conduct an IPO from their venture investors, who are themselves under pressure from their limited partners to show returns on substantial amounts of capital invested in cleantech ventures.

However, IPOs by venture-backed companies have become scarcer due to changes in the structure of capital markets over the past decade and the ongoing economic downturn. Conducting an IPO is also a challenging, time-consuming process.

Those wary of the potential pitfalls of going public have a strong alternative — the possibility of a merger or acquisition. Like an IPO, the balance sheet of a large corporate partner can provide the resources needed to take a cleantech company to the next stage of development and provide an exit for investors.

Although an IPO can be alluring for the prestige and publicity it brings, it is not for every company. As the post-listing swoon of some recent high-profile IPO stocks has shown, there can be downsides to a share sale. Market expectations can soar unrealistically and become a draining distraction for senior leadership.
It can be hard. A lot of board members, particularly when they're VCs, do not want to hear M&A mentioned.

CEO Retreat participant

The run-up to an IPO can also be stressful for fast-growing companies, given the time required of senior executives and the organizational changes that must be implemented.

As expectations around IPOs have been reined in, the challenges facing cleantech CEOs are more complex than ever. Their VC backers' need for liquidity on a short timeline — say three to five years after making an investment — can force a premature listing, to the detriment of other stakeholders in the arrangement.

In this environment, CEOs must balance their passion for the venture's potential with market realities that may run counter to the expectations of investors. And for hyper-competitive cleantech executives, it can be difficult to keep in mind that raising money, per se, is not a measure of success.

Cleantech veterans agree that stepping out of the IPO race can deliver long-term benefits. For many, M&A offer a more balanced option with the potential to nurture more sustainable, enduring businesses.

The IPO process tends to focus management resources disproportionately on the near term. The offering is typically priced based on expectations of quarterly earnings.

Conversely, in an acquisition, the parent company may not care as much about near-term revenues. Motivated by a more strategic view, an acquirer is typically focused on fulfilling the value proposition of the technology over the
Ernst & Young  Perspective on transaction readiness

Through more than a decade of research on transaction readiness for our Measures That Matter reports, Ernst & Young has identified 10 key considerations in preparing for a strategic transaction.

Top 10 considerations to prepare for an IPO or acquisition

1. Preparing for the journey: develop a compelling strategic plan
2. Keeping your options open: evaluate transaction alternatives
3. Timing the market: start early and take time to prepare
4. Building the right management and advisory teams: recruit and retain an experienced team
5. Building your business and financial processes and infrastructure: construct a strong infrastructure for accurate financial forecasting
6. Establishing corporate structure and governance: create corporate governance policies that inspire shareholder confidence
7. Managing investor relations and communications: keep investors informed by regular communications
8. Delivering an effective road show: convey a compelling equity story
9. Attracting the right investors and analysts: cultivate long-term relationships
10. Delivering on your promises: create shareholder value

Venture-backed cleantech exits:
IPO and M&A transactions in the US, Israel and Europe
Source: Dow Jones VentureSource

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of transactions</th>
<th>IPO</th>
<th>M&amp;A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>49</td>
<td>37%</td>
<td>63%</td>
</tr>
<tr>
<td>2007</td>
<td>66</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>2008</td>
<td>30</td>
<td>3%</td>
<td>97%</td>
</tr>
<tr>
<td>2009</td>
<td>38</td>
<td>8%</td>
<td>92%</td>
</tr>
<tr>
<td>2010</td>
<td>75</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>2011</td>
<td>55</td>
<td>15%</td>
<td>85%</td>
</tr>
<tr>
<td>2012</td>
<td>55</td>
<td>15%</td>
<td>85%</td>
</tr>
</tbody>
</table>
Are you a company who’s really ready to make it on your own? If you are, then an IPO is truly the best way to finance that push.

CEO Retreat participant

From day one, I’m accepting that my new company lends itself to being acquired. So we’re gearing its development to make it easy to integrate into a large oil and gas company.

CEO Retreat participant

long term. This is why developing and maintaining a partnership strategy is so important to help cultivate acquisition opportunities.

The earlier a management team can commit to a strategic path and shape the company’s evolution accordingly, the better. Management is a limited resource, so it pays to be focused. Leaders who recognize this reality can fine-tune their companies to handle emerging opportunities.

Get the basics right

Many of the practices that optimize a firm’s transaction readiness are common-sense, all-around good business practices. Yet a surprising number of young companies rush forward without financial projections or regularly updated business plans.

It’s a mistake to neglect basic documentation practices and operational discipline. Indeed, getting the basics right – updating strategic plans, documenting operations work flows and having a crystal clear understanding of financial data – can deliver compounded benefits regardless of whether the goal is an IPO or an M&A. And once the decision to pursue either path has been made, well-organized business data can accelerate and smooth the process.

M&A opportunities typically come more frequently than IPOs. They often originate from a current strategic partner, such as a supplier, a sales partner or an advisor. In fact, management must guard against becoming distracted every time a potential suitor comes knocking on the door.

Developing a system to manage the M&A process ahead of time can reduce the resources drained from senior management when queries do arrive. While setting the right role for board involvement is more art than science, in this case, experienced board members can be valuable resources. As a front line of expert allies, they can vet potential M&A deals before involving the broader management.

As transaction opportunities come and go, don’t lose sight of employees. Early-stage staff members are willing to work around the clock, in part for the promise of a big payday. But as news of an M&A circulates, it follows that morale may become strained. Open communication is vital to help shepherd staff through these ups and downs. Sharing the results of board discussions in regular, staffwide meetings can help keep expectations realistic.

Whether tuning up for a public offering or customizing strategy to ensure a company is merger-ready, cleantech companies have to prepare in advance. Being ready when opportunities arise is the surest way to realize maximum return for all the effort spent building a new business.
In nature, organisms face challenging stresses, from disease to predators to changing climate. To survive, they must adapt. In business, organizations and individuals face similar challenges. As it’s often put: adapt or die.

For a classic case of evolutionary response, think of finches. Charles Darwin was among the first to observe that the small birds evolved highly differentiated beaks in different regions, depending on the types of seeds available to eat.

Yet nature shows us that evolution isn’t always purely virtuous. Consider the peacock’s tail. Peahens tend to mate with the male whose display is showier. A vibrant tail, after all, suggests a healthy mate. As a result, the tail, though purely ornamental, has grown larger over many generations.

The problem? That tail eventually becomes a liability. When grown too big, it leaches away nutrients necessary for the bird to grow and maintain health. It’s cumbersome as well, imperiling a peacock’s ability to evade predators. A vibrant tail may be good for the individual, but it’s bad for the species. Biologists call this evolutionary trap “biological suicide.”

In the race to compete in business, there’s a risk that some corporations are evolving strategies that deliver short-term gain at the cost of long-term survival – think of investors as peahens, conferring their favors on showy results that might not support value for the society. Corporations have an incentive to externalize costs to increase earnings, too often causing long-term damage to the environment or the society that is difficult to quantify.

In the business jungle, this practice may prove analogous to biological suicide. Echoing this concern, Klaus Schwab, founder and Executive Chairman of the World Economic Forum, has expressed the view that capitalism, in its current form, is not sustainable.

But how can things change? As the epicenter of global growth shifts in coming decades toward emerging

Christopher Meyer
Founder, Monitor Talent

Chris’s mission is to anticipate and shape the future of business. He has pursued this goal as an entrepreneur, executive, consultant, author, and the leader of a think tank. Based on the ideas in his 2002 book, Future Wealth, Chris developed a plan for a business based on a network of thought leaders. He joined The Monitor Group in 2006 to develop this idea as Monitor Networks, where he was Chief Executive from 2004 to 2009. In 2006, he co-founded Monitor Talent, to take these ideas forward operationally. Chris’s fourth book, Standing on the Sun, published by Harvard Business School Press, is listed by the Financial Times as a Best Business Book of the Year for 2012.
markets, corporate planners face a related challenge—namely, adapting technologies invented in the US, but that will mature elsewhere.

There’s precedent for this kind of transition. In the 1800s, the University of Edinburgh in Scotland was the Silicon Valley of the industrial era, birthplace to key inventions involving electricity, chemistry and steam power.

Yet, in time, those technologies prospered most fully not there, but in the US. In the UK, they had to displace existing technologies. But in the US, the economy was nascent, and thus could leapfrog to the latest technologies then available.

As corporate planners prospect the globe for future growth opportunities, this historical precedent is instructive. While information technology first took shape in the West, the sheer scale of economic mobilization now taking place in Brazil, China, India and other emerging markets means the bulk of spending—and innovation—on these technologies will occur outside of mature markets. The share of global GDP produced by the G7, which has hovered near 75% for decades, fell below 50% in 2012 for the first time and will continue to decline as emerging markets surge.

Indeed, emerging markets may prove to be optimal markets for reconciling the concurrent challenges of improving sustainability and evolving growth strategies. Precisely because of their supercharged growth potential, emerging markets offer fertile ground on which to test strategies that rebalance unsustainable practices. These societies are coming of economic age in an era of increased awareness that businesses are accountable to all stakeholders, not stockholders alone.

One of the world’s largest consumer products companies, for instance, is working toward the goal of minimizing packaging waste through recycling and shrinking packaging materials. In the Philippines, the consumer products giant is working with partners to develop recycling markets for these materials.

A global beverage company is focusing on India as a laboratory to develop water-saving strategies. Rather than concentrating exclusively on its own operations, Coke multiplied its efforts by extending them to suppliers and partners, sharing technology to minimize their water use too.

A leading energy company is supporting programs to bring cleaner cooking stoves to Bangladesh. The stoves are more efficient and also improve household health by reducing indoor pollution. All three are examples of companies internalizing externalities.

The pursuit of such nonfinancial objectives is evidence that, as capitalism spreads to new corners of the world, it must evolve in its goals. Profits are a powerful motivator in the capitalist ecosystem, and companies that fail to proactively manage social, environmental and other nontraditional externalities will not be popular with customers in the long run. They’ll be finches with the wrong-shaped beaks.
As cleantech markets experience ups and downs, it’s worth remembering that deep tectonic market shifts are driving the demand for resource-efficient low-carbon technologies.

With the global population headed toward 10 billion by the middle of the century, humanity faces ever-growing needs for energy, fresh water, arable land and sustainable manufacturing methods. These imperatives will drive cleantech developments across a host of industries in the coming century.

In markets from China to Chile, economic growth is compounding resource scarcity. More consumers with more income are demanding more energy, more reliable water supplies, better transportation and higher quality food. The governments of emerging markets have responded by initiating national cleantech strategies aimed at improving resource efficiency, promoting innovation and creating new jobs. These governments are playing an active role in supporting cleantech by providing incentives to develop cleantech capacity and by setting rules and standards to improve efficiency and reduce pollution.

This trend is increasingly evident in investment flows. Over the past five years, three of the top five hotspots for overall growth in clean energy investment have been Indonesia, China and India. Likewise, in the electricity sector, four of the five fastest-growing markets in the same period have been emerging economies.

Cleantech companies based in North America and Europe, where market growth is currently slow, are increasingly looking beyond the borders of their home markets for new opportunities in emerging economies.
There is no single emerging market. And there is no single strategy for success. The one certainty is that you need people on the ground with the mileage to know local perspectives.

Necessity begets innovation

As cleantech pioneers push further afield, many are discovering that emerging markets are more than a source of new demand. They are also proving to be hotbeds of adaptive innovation, in which existing technologies are customized to meet local market needs.

This kind of adaptation requires capabilities that aren’t, strictly speaking, academically teachable. Local hires are typically better at tailoring imported technologies to domestic market needs. From finding local alternatives for costly imported raw materials to discovering markets for the by-products of a manufacturing process, the constraints of local markets — aided by local market insights — can often be the spark for invention.

By building R&D operations in targeted overseas markets, smart companies are beginning to tap into these local insights. The companies’ main goal may be to optimize offerings for local needs, but often they also aim to import the resulting innovations back to their home markets.

Products that succeed in emerging markets are, by necessity, almost always less expensive than their counterparts designed for developed markets. As a result, these lower-cost innovations are flowing back to developed markets to boost margins at home. The same is true for technical advances made in design and manufacturing processes.
Adapt and customize

Hopping on the opportunities in emerging markets demands a combination of adapting best practices that worked in home markets while also customizing different tactics to the particular realities of the new economy.

At the outset, it’s helpful to abandon any assumption about emerging markets. Successful investors agree: there is no single emerging market. Rather, anticipate that not all lessons learned in China will apply in Brazil, Russia or South Africa.

For a company preparing its first push into overseas opportunities, the lesson is to focus on a single market and avoid over-reaching into too many new frontiers at once.

Setting the right balance of human resources — a combination of local hires and overseas staff — is a related challenge. In the pursuit of cost savings, it is all too common for companies to err on the side of understaffing early on. Yet this contradicts the logic that typically motivates overseas investment in the first place. If the appeal of an emerging market is rapid growth, staffing with just a handful of professionals can hobble a venture’s potential from the outset.

Hire locally, partner smartly

Hiring local talent can mitigate many of the difficulties inherent in establishing a toehold in a new market. Cultivating local leaders is a required step to extend the reach of a sparsely resourced country office. Equally important is integrating local perspectives into the effort to introduce foreign technology and services into the new market.

However, it can be difficult to recruit top performers with the right combination of skills and experience in emerging markets. Cleantech players that enter such markets and develop their staff in-house therefore face a real risk of seeing key personnel hired away. Successful ventures are careful to cultivate star performers by keeping on top of salary trends and competitors’ activities. Defections are inevitable, though, so keeping the pipeline filled with talent is key to long-term success.

Partners, along with local hires, are crucial to navigate the challenges of adapting to local business cultures. Yet finding the right match is potentially even harder than it is back home. Often, there are just one or two large players in the market suited to handle foreign technology. And just as often, other foreign players seeking to enter the market are also chasing them.

Trust can be a wild card in any efforts to strengthen local links. Typically, the trust networks that entrepreneurs are accustomed to in the US — from professional relationships, to contracts, to legal recourse — operate differently or are less robust in emerging markets.

We’re seeing a reversal of the flow of innovation. More ideas are being born in emerging markets and migrating to developed regions.

CEO Retreat participant

We’ve made some missteps. The lesson is to focus, get a lot more embedded into the local culture and see what works before moving on to the next market.

CEO Retreat participant
It is also harder to detect the opportunists in overseas environments, where cultural barriers and a newcomer’s lack of experience can make it harder to recognize red flags. Accordingly, it becomes all the more important to invest in personal relationships and to establish trust in the right local team to help avoid potential hazards.

Now, more than ever, it is important for cleantech companies to go where the growth is. Increasingly, the biggest growth opportunities are likely to be found in emerging markets, such as China and India, but also in less obvious regions, such as South America and the Middle East. Pursuing growth beyond borders might push some cleantech leaders outside their comfort zone of Western business practices. But with patience, the right team and reliable partners, the rewards of growing beyond borders can be profound.

Asia has emerged as the leading driver in new clean energy financing

Source: Bloomberg New Energy Finance; new financings only
Ever since the onset of the global economic crisis, Ernst & Young has surveyed C-suite, board directors and senior managers in large organizations to find out how they run their businesses. Our objective is to find out what it is that high performers are doing differently and set out the lessons that other businesses must learn if they are to emulate them.

Ernst & Young has identified four factors that drive competitive success in today’s global economy: customer reach, operational agility, cost competitiveness and stakeholder confidence.

For cleantech companies seeking new growth markets, our survey findings related to customer reach offer valuable insights.

High performers are more outward-looking and focused on the market.

They seek deep understanding of their customers’ demands and expectations and are increasing marketing spend to attain this.

They focus on finding new markets for existing products and services. High performers are nearly three times more likely than low performers to generate sales in new markets.

They plan more carefully when entering new markets. They identify a clear demand for a current product or service and assess the scale and growth projections of that market.

They prioritize innovation. Nearly twice as many high performers as low performers generate more than 10% of their sales from products or services developed in the past three years, focusing on incremental innovation of new products for current customers and current products for new markets.
CEO perspective

California-based Calysta Energy is developing biological process technologies to transform natural gas into liquid fuels and industrial chemicals. Before joining Calysta, Alan Shaw served for 10 years as president, CEO and a director of Codexis, a developer of cost-advantaged processes for production of biofuels, bio-based chemicals and pharmaceuticals. Under Shaw’s tenure, Codexis conducted an IPO, growing from a start-up to a global player.

From Codexis to Calysta: How a serial cleantech CEO is refining his strategy

What lessons can we learn from the past decade of cleantech development?

There was too much reliance on government. We were encouraged by policies and a lot of stimulus money. That pulled the focus away from what the market really needed. In particular, it was a mistake for the government to move in the direction of building plants. It’s not the government’s role to do project finance. Leave that to the markets.

Government does have an important role, though: research, to stimulate innovation. In this respect, I think the stand-out success is the Advanced Research Projects Agency-Energy (ARPA-E), a program of the U.S. Department of Energy. It was managed like a business, complete with due diligence, to identify and cultivate potentially game-changing technologies.

How has the industry fared in reading the direction of the market?

There have been some surprises. Consumer resistance is real. When you’re trying to change how people use energy or travel, it takes longer than you expect, especially compared to IT, where the iPad can flourish in months. For energy, transformations occur over decades.

Another mistake that some made was betting that consumers would pay a premium for renewables. We now know that’s not real. The only thing people care about is turning a profit – or saving money. No one’s going to buy a product simply because it’s green.

Looking back, it seems that many of our expectations in cleantech were naive. We underestimated the adoption rate, underestimated the challenge of technology deployment, and we absolutely underestimated the cost of capital required to get these products to market.

Getting buy-in from industry early on is critical because industry knows where it’s going. Oil companies have plans that go out 40 years. They have armies of planners. By comparison, building a small cleantech start-up, it can feel like we’re just flies buzzing around an elephant.

When I see General Electric making big statements about how natural gas will play a key role in their growth over the next 20 years, I believe them. Getting industry involved early on is critical.

Alan Shaw, PhD, is Chairman of the Board, President and Chief Executive Officer of Calysta Energy. He joined in 2012. Dr. Shaw is a veteran biotechnology entrepreneur and chemical industry executive, with more than 25 years’ experience building and leading technology companies. In 2010, Dr. Shaw received the Ernst & Young Entrepreneur Of The Year Award in the life sciences category for Northern California.
So if the past era of cleantech was pushed by policy, is it time to focus more on the pull of real demand?

Yes. The most important lesson is to focus on what the market is really doing. Don't focus on the subsidies.

Ask yourself: do people fundamentally want this product? This is a very important lesson that I learned at Codexis and that I'm applying at Calysta Energy. I'm putting my own money where my mouth is, investing in my own company, which is going to be delivering liquid fuels and industrial chemicals that have real demand, and using an alternative feedstock that happens to be incredibly cheap relative to the one used currently.

What advice would you give to cleantech companies seeking to make and maintain partnerships with big corporations?

Always, always do deals with big companies. Industry money is good money. You'll never get the levels of cash from a VC that you can get from a corporate partner. Generally the funding is less dilutive. They don't tend to be as aggressive, either, in terms of board participation or input on strategic direction.

They bring more than money, of course. You've got an industrial partner that can help align your technology with real market needs. They'll bring expertise and depth that no small companies could possibly have. They also bring shelter in terms of intellectual property, with patents, legal experts and experience that can help small companies navigate tricky situations.

However, using the old fisherman's analogy: you need to have many lines in the water. The future of your company can't hinge on one partnership.

In terms of keeping a relationship, it comes down to keeping regular contact, working for transparency, hitting milestones, delivering on your commitments and really truly working at it as a partnership. In a meeting, ask yourself: what does the person sitting opposite me need to walk away satisfied?

What is your perspective on today's challenging financing environment?

It is a concern. The VC community has walked away. They're exhausted. And meanwhile, some of the more professional project finance money is sidelined.

We will go through a period of consolidation in this sector. Winning technologies will be acquired, maybe for 10 cents on the dollar. But cleantech companies with relatively strong balance sheets should be in a good position. The market will decide who the winners are now.

Will the VCs come back? Yes, for the right story. They've learned a lot as well. And they will be more cautious. We're entering a time of de-risking. Ten years ago, if you did a Series A, you might get US$10 million. Now, it'll be: "Here's a couple of million. Hit one or two milestones and then we'll come back with more to really flesh it out."

Operating companies, entrepreneurs, people like me, will be challenged to focus on one or two critically commercially relevant milestones, technical milestones that are commercially relevant, and it'll be our job to deliver on those with the minimum amount of investment.

We've gone through a cycle here, and the same cycle could be starting in a different part of the world. Just because the US and developed markets are moving on to a different phase, that doesn't mean that you can't go tap into growth in other parts of the world. The most obvious place to look is Southeast Asia. For example, Malaysia has a very strong government initiative encouraging cleantech investment.

What fuels your optimism about cleantech?

The industry is facing some headwinds, there's no question. But, you know, there's been a lot of learning from this period. I'm finding that the pace of growth for this company is much faster than the last one. I believe that a lot of good will come from the past decade and that the next five years will bring real innovation. We've just got to stay the course.
Participant perspectives: Government as customer

Government: from funding source to client

Whether they are fans or foes of cleantech, national leaders in Europe and the US face enormous pressure to reduce the flow of loans, tax credits and grants that have lifted the global cleantech economy in recent years. With fiscal balances greatly overdrawn and economic growth still weak, leaders are increasingly limited in their ability to steer direct subsidies toward emerging clean technologies.

Against this backdrop, two realities are becoming clearer. First, direct public subsidies for cleantech are unlikely to return to their recent heights anytime soon. What’s more, cleantech leaders agree that, where public funding is still available, the sooner a start-up can cut off support, the better.

Second, doing so need not mean cutting ties with government customers. If anything, the case for public procurement of clean technologies is stronger than ever. So, while these openings can be difficult to navigate, cleantech purchasing opportunities are multiplying.

In the wake of the politicization of high-profile government-backed cleantech ventures, some cleantech leaders are rethinking the role of government in developing cleantech. Agreement persists that R&D and green procurement rules will help seed new markets and deepen commercial demand, but some cleantech entrepreneurs and investors object to using public monies to fund the manufacturing scale-up of particular companies and thereby altering the competitive landscape.

Opinion on the lessons to be drawn from the failure of a handful of US Government-backed cleantech start-ups is varied. Defenders of the Government’s role point out that, in the aftermath of past economic crises, Washington has stepped in to help other key sectors, such as finance, to reanimate frozen markets. Cleantech funding had all but stalled in the wake
of the 2007 financial crisis, when many cleantech loan guarantees were mapped out as part of the 2009 stimulus.

Regardless of the reasons to take action, some critics contend that the public loan guarantees ultimately may have backfired. Given the difficulty of predicting if and how the Government might intervene in the market with additional funding for certain companies, the public loans may have chilled further private financing in some areas, such as EVs, solar and energy storage.

In the wake of the financial crisis, a punishing election cycle and a continuing bleak fiscal outlook, the shift away from direct subsidies is likely to be permanent. Speaking after re-election, in the midst of rising anxiety over climate change stirred up by Hurricane Sandy, President Obama concisely articulated the prevailing sentiment in Washington: "... if the message is somehow we're going to ignore jobs and growth simply to address climate change ... I won't go for that."

The news is not all bad, though. While many national governments have little choice but to rein in subsidies for cleantech projects, the financial pressures driving austerity, along with energy security concerns, actually reinforce the case for governments to purchase cleantech products and services. These technologies can improve the long-term financial outlook of the US.

It's very important to wean yourself from government financing as quickly as possible. We're anxious to stand on our own, selling commercialized technology.

CEO Retreat participant
The loan guarantees in large part shut off VC investment in some areas of cleantech. Private funders aren’t going to compete with the Government if the Government can also influence who wins and who loses.

CEO Retreat participant

One of the most effective things that a government can do is set a rule that creates a market, which in turn attracts private capital.

CEO Retreat participant

for public authorities by lowering operating costs, increasing the security of energy and improving economic resiliency.

Among federal agencies, and in state and city capitals in the US and overseas, the demand for cleantech services remains substantial. The aggregate of this demand is enormous and highlights the Government’s ongoing purchasing powers as an important cleantech market driver.

Besides purchasing, government can also spur cleantech innovation by tailoring standards and rules – for everything from building performance to appliance efficiency. For example, the alliance between Detroit and Washington to ratchet up average automobile mileage standards to 54.5 miles per gallon by 2025 would have been unimaginable just a decade ago. Yet it will likely provide a greater innovation boost to transportation technology, and save more energy, than any other federal policy to date.

Federal rules are raising demand for renewable energy, too. The U.S. Department of Defense (DoD), for example, is required to purchase a quarter of its energy from renewable sources by 2025. The DoD’s ability to prime demand for green energy technologies is formidable. With more than 300,000 buildings – totaling over 2.2 billion square feet of space – the DoD is among the world’s largest property managers and spends some US$4 billion per year for electricity, according to DoD data.

Meanwhile, the U.S. General Services Administration (GSA), which owns and operates the largest portfolio of buildings on earth, has likewise been directed to invest in energy-saving retrofits to its facilities. And as the principal buyer for government contracts, the GSA oversees US$66 billion in purchasing annually. Current rules mandate the agency ensure 95% of its purchases are sustainable.

Local and state governments have enacted similar renewable energy quotas, building efficiency codes and green purchasing standards. At the municipal level, major cities are implementing policies that drive change, such as green building codes, waste reduction policies and green transportation rules.

Crack the procurement code

While opportunities to sell cleantech goods and services to the public sector are growing, doing so is easier said than done. For cleantech companies new to the intricacies of public bidding, patience is vital because the path to a final contract is typically longer and more twisting than selling to the private sector.

For the following reasons, smaller cleantech players might want to consider the benefits of partnering to tap government sales. As is the case in entering other new market segments and geographies, partnering with a larger entity with proven access to government sales channels can ease market entry.

Unlike the private sector, simply identifying the ultimate customer in a government contract can be difficult. This compounds the complexity of
selling to the public sector. The request for a new procurement may originate in one department, while the approval is granted in another, but the bidding process is overseen by a third. Simply mapping out this process can be difficult; identifying and connecting with the key influencers is harder yet.

As in other business engagements, disciplined maintenance of corporate records can help make bidding easier. Bids are complex, typically with serial deadlines, each accompanied by requirements for detailed documentation. Missing one of those hoops, no matter how minor, can derail an otherwise strong bid.

The era of generous government support for cleantech has likely drawn to a close in developed markets, and indeed, many cleantech company leaders advocate moving away from government support as early as possible.

Still, the government as customer offers vital revenue opportunities. As large consumers of energy and resources, government agencies face multiple constraints – rising costs, resource scarcity, energy security and sustainability mandates – that cleantech solutions are uniquely poised to address.

By being patient – and diligently cultivating the know-how to succeed at complex government procurement processes – cleantech companies can open a new realm of revenue opportunities.

Simply put, working with the government requires being there. That’s why big companies have specialized government sales teams.

CEO Retreat participant

We were disqualified from a public project because we failed to submit one inconsequential financial document in our proposal.

CEO Retreat participant
Few people would think of their Outlook calendar as a potential source of energy savings. After all, how can the times, dates and details of a series of trips and meetings translate into much besides an overly packed schedule?

To Microsoft, there’s gold in those appointments. Your calendar entries are an example of a new frontier of data that, when blended with a smart mix of analysis, security and collaboration, can yield savings by altering behavior.

Consider, for instance, 50 or so executives attending the same conference. Naturally, at the meeting’s conclusion, many attendees will depart for the airport at the same time, in a parade of taxis all going to the same place.

However, Microsoft engineers imagine a future when intelligent agents could securely assess the calendars of those attendees, with their permission, of course, to create efficiencies. To help line up shared car trips, software might draw on information from Linkedin to pair
up trusted contacts. The result: dozens of car trips are reduced to a fraction of that number as peers willingly match up. The move saves energy and money while the passengers network comfortably.

Mining calendars for savings opportunities has promise in more everyday circumstances too. In time, building automation systems could keep an eye on the smartphones and calendars of tenants. If smartphone geolocation apps show that an entire department is at a meeting, a quick cross-check with calendar data might confirm that there’s a daylong off-site meeting. In this case, an intelligent agent could power down that department’s office area only.

As these kinds of analytics mature and grow more reliable, the broader grid stands to benefit too. Utilities are already close observers of how power use fluctuates from hour to hour. Household demand, for example, peaks in the early evening as families return from work and school. Improving their ability to predict the peaks and valleys of energy consumption means utilities can run a little leaner, allowing them to generate less excess power, confident there won’t be an unexpected demand spike.

Further out, utilities are seeking solutions for preventing blackouts. As digital sensors and controllers multiply across the grid – from smart meters to transformers back to generating plants – utility engineers are looking to advanced software tools to help translate the deluge of data the devices emit to identify when trouble is starting and fix it before it spreads.

Likewise, as renewables proliferate, more agile grid-control systems can do a better job balancing the ups and downs of power produced by solar panels and windmills with that from conventional power plants.

As these scenarios evolve from vision to reality, they point to the potential of tapping data to save energy. They’re at the forefront of Microsoft’s efforts to develop methods in-house that will cut its energy footprint and lead to helpful solutions for its partners.

The heart of this effort is Microsoft’s corporate headquarters in Redmond, Washington – 115 buildings, with 15 million square feet of facilities, where 30,000 pieces of mechanical gear generate a stream of 500 million data points every day. The information flow makes the campus a living laboratory for Microsoft’s efforts to run real-life experiments on software and hardware.

The pressure on Microsoft to rein in its energy use got higher in 2012, when the software giant announced it would be carbon-neutral. To track the effort, Microsoft turned to a relative newcomer, Carbon Systems.

The Sydney, Australia-based company’s Environmental Sustainability Platform will help Microsoft track and manage carbon emissions at some 600 facilities in 110 countries.

Microsoft is tackling this ambitious challenge on a variety of fronts, from cutting-edge data center designs to an internal carbon tax on its operations.

It’s a truism that necessity begets invention. Accordingly, one of Microsoft’s lowest-energy data centers was built to serve a United Nations office in Nairobi, Kenya, a region where energy is in limited supply. By cooling itself using ambient air, rather than a conventional air conditioning unit, the center uses only one-fifth or so of the energy of a conventional design. In a drought-stricken region, the unit consumes just one liter of water per day.

Microsoft first experimented with ambient air cooling on its campus. In a surprisingly simple trial, developers set up a bank of servers outside, sheltered by a tent. The trial proved that data centers were more resilient than many expected. From Redmond to Africa and back again, the approach is now making its way into designs for Microsoft’s next-generation data centers.

As its cloud grows, Microsoft is taking on a growing share of the processing needs of many corporate clients. Thus, the higher-efficiency designs are also benefitting customers who typically switch from less-efficient, smaller-scale in-house data centers.

Ironically, scaling up new facilities to accommodate these cloud services makes Microsoft’s carbon-neutral goal that much harder to hit. Still, it’s a challenge the software giant is confident it can meet through innovations in both cutting-edge hardware design and innovative behavioral analytics.
# Contacts

**Ernst & Young Global**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gil Forer</td>
<td>Global Cleantech Leader</td>
<td>+1 212 773 0335</td>
<td><a href="mailto:gil.forer@ey.com">gil.forer@ey.com</a></td>
</tr>
<tr>
<td>Scott Sarazen</td>
<td>Global Markets Leader</td>
<td>+1 617 585 3524</td>
<td></td>
</tr>
<tr>
<td>Ben Warren</td>
<td>Global Cleantech Transactions Leader</td>
<td>+44 20 7951 6024</td>
<td><a href="mailto:bwarren@uk.ey.com">bwarren@uk.ey.com</a></td>
</tr>
<tr>
<td>Ben Warren</td>
<td>Global Cleantech Leader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paul Naumoff</td>
<td>Global Cleantech and CCaSS Tax Leader</td>
<td>+1 614 232 7142</td>
<td><a href="mailto:paul.naumoff@ey.com">paul.naumoff@ey.com</a></td>
</tr>
<tr>
<td>Heather Sibley</td>
<td>Global Cleantech Assurance Leader</td>
<td>+1 415 894 8032</td>
<td><a href="mailto:heather.sibley@ey.com">heather.sibley@ey.com</a></td>
</tr>
<tr>
<td>Nicola Marshall</td>
<td>Global Cleantech Transaction Advisory Services Resident Manager</td>
<td>+1 212 773 5156</td>
<td><a href="mailto:nicola.marshall@ey.com">nicola.marshall@ey.com</a></td>
</tr>
<tr>
<td>John de Yonge</td>
<td>Director, Account Enablement</td>
<td>+1 201 872 1632</td>
<td><a href="mailto:john.de_yonge@ey.com">john.de_yonge@ey.com</a></td>
</tr>
<tr>
<td>Scott E. Anderson</td>
<td>Global Marketing Director, CleanTech</td>
<td>+1 201 872 1292</td>
<td><a href="mailto:scott.anderson@ey.com">scott.anderson@ey.com</a></td>
</tr>
<tr>
<td>Lily Donge</td>
<td>Global Knowledge Leader</td>
<td>+1 202 327 6796</td>
<td><a href="mailto:lily.donge@ey.com">lily.donge@ey.com</a></td>
</tr>
</tbody>
</table>

**Americas**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jay Spencer</td>
<td>Americas</td>
<td>+1 617 585 1882</td>
<td><a href="mailto:jay.spencer@ey.com">jay.spencer@ey.com</a></td>
</tr>
<tr>
<td>Cynthia Orr</td>
<td>Canada</td>
<td>+1 604 643 5430</td>
<td><a href="mailto:cynthia.lorr@ca.ey.com">cynthia.lorr@ca.ey.com</a></td>
</tr>
<tr>
<td>Jeff Relyea</td>
<td>East Central</td>
<td>+1 703 747 0984</td>
<td><a href="mailto:jeff.relyea@il.ey.com">jeff.relyea@il.ey.com</a></td>
</tr>
<tr>
<td>Paul Chevalier</td>
<td>Midwest</td>
<td>+1 313 628 8220</td>
<td><a href="mailto:paul.chevalier@ey.com">paul.chevalier@ey.com</a></td>
</tr>
<tr>
<td>Sean Rieger</td>
<td>Northeast</td>
<td>+1 860 725 3820</td>
<td><a href="mailto:sean.rieger@ey.com">sean.rieger@ey.com</a></td>
</tr>
<tr>
<td>Matthew Sapp</td>
<td>West</td>
<td>+1 408 947 5758</td>
<td><a href="mailto:matthew.sapp@ey.com">matthew.sapp@ey.com</a></td>
</tr>
<tr>
<td>Steven McCabe</td>
<td>Southeast</td>
<td>+1 404 817 5573</td>
<td><a href="mailto:steve.mccabe@ey.com">steve.mccabe@ey.com</a></td>
</tr>
<tr>
<td>Lisa Shepard</td>
<td>Southwest</td>
<td>+1 713 750 8466</td>
<td><a href="mailto:lisa.shepard@ey.com">lisa.shepard@ey.com</a></td>
</tr>
<tr>
<td>Daniel Maranhão</td>
<td>South America/Brazil</td>
<td>+55 11 3054 0000</td>
<td><a href="mailto:dmaranhao@br.ey.com">dmaranhao@br.ey.com</a></td>
</tr>
</tbody>
</table>

**EMEIA**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Seiter</td>
<td>EMEA/Germany</td>
<td>+49 30 2547 121415</td>
<td><a href="mailto:robert.seiter@de.ey.com">robert.seiter@de.ey.com</a></td>
</tr>
<tr>
<td>Mikko Rytilahti</td>
<td>Finland</td>
<td>+358 207 280 190</td>
<td><a href="mailto:mikko.rytilahti@ey.com">mikko.rytilahti@ey.com</a></td>
</tr>
<tr>
<td>Philippe Grand</td>
<td>France</td>
<td>+33 4 7817 5732</td>
<td><a href="mailto:philippe.grand@fr.ey.com">philippe.grand@fr.ey.com</a></td>
</tr>
<tr>
<td>Alexis Gazzio</td>
<td>France</td>
<td>+31 4 693 6398</td>
<td><a href="mailto:alexis.gazzio@fr.ey.com">alexis.gazzio@fr.ey.com</a></td>
</tr>
<tr>
<td>Marcel Schwab</td>
<td>Germany: Central/Frankfurt</td>
<td>+49 6196 996 27531</td>
<td><a href="mailto:marcel.schwab@de.ey.com">marcel.schwab@de.ey.com</a></td>
</tr>
<tr>
<td>Stefania Mandler</td>
<td>Germany: Northeast</td>
<td>+49 341 2526 23583</td>
<td><a href="mailto:stefania.mandler@de.ey.com">stefania.mandler@de.ey.com</a></td>
</tr>
<tr>
<td>Jan-Menko Grummer</td>
<td>Germany: Northeast</td>
<td>+49 30 36132 11478</td>
<td><a href="mailto:janmenko.grummer@de.ey.com">janmenko.grummer@de.ey.com</a></td>
</tr>
<tr>
<td>Peter Lennartz</td>
<td>Germany: Northeast</td>
<td>+49 30 2547 12031</td>
<td><a href="mailto:peter.lennartz@de.ey.com">peter.lennartz@de.ey.com</a></td>
</tr>
<tr>
<td>Dirk Gallowsky</td>
<td>Germany: South</td>
<td>+49 89 14331 1139</td>
<td><a href="mailto:dirk.gallowsky@de.ey.com">dirk.gallowsky@de.ey.com</a></td>
</tr>
<tr>
<td>Dr. Eckart Wetzl</td>
<td>Germany: Southwest</td>
<td>+49 761 1508 23131</td>
<td><a href="mailto:eckart.wetzl@de.ey.com">eckart.wetzl@de.ey.com</a></td>
</tr>
<tr>
<td>Markus Senghaas</td>
<td>Germany: West</td>
<td>+49 221 2779 25652</td>
<td><a href="mailto:marcus.senghaas@de.ey.com">marcus.senghaas@de.ey.com</a></td>
</tr>
</tbody>
</table>

**Asia Pacific**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paul Go</td>
<td>Asia Pacific/Greater China</td>
<td>+86 10 5815 3688</td>
<td><a href="mailto:paul.go@cn.ey.com">paul.go@cn.ey.com</a></td>
</tr>
<tr>
<td>Mathew Nelson</td>
<td>Australia</td>
<td>+61 3 9288 8121</td>
<td><a href="mailto:mathew.nelson@au.ey.com">mathew.nelson@au.ey.com</a></td>
</tr>
<tr>
<td>Kenji Sawami</td>
<td>Japan</td>
<td>+81 1 3 3503 1028</td>
<td><a href="mailto:sawami-ken@shinnihon.or.jp">sawami-ken@shinnihon.or.jp</a></td>
</tr>
<tr>
<td>Moon-ho Choi</td>
<td>Korea</td>
<td>+82 2 3787 6703</td>
<td><a href="mailto:moon-ho.choi@kr.ey.com">moon-ho.choi@kr.ey.com</a></td>
</tr>
<tr>
<td>Krishna Sadashiv</td>
<td>Singapore</td>
<td>+65 6309 8813</td>
<td><a href="mailto:k.sadashiv@sq.ey.com">k.sadashiv@sq.ey.com</a></td>
</tr>
<tr>
<td>Wolfgang Paardekooper</td>
<td>Netherlands</td>
<td>+31 10 406 8159</td>
<td><a href="mailto:wolfgang.paardekooper@nl.ey.com">wolfgang.paardekooper@nl.ey.com</a></td>
</tr>
<tr>
<td>Karsten Boegel</td>
<td>Nordics/Denmark</td>
<td>+45 35 87 29 44</td>
<td><a href="mailto:karsten.boegel@dk.ey.com">karsten.boegel@dk.ey.com</a></td>
</tr>
<tr>
<td>Norman Ndaba</td>
<td>South Africa</td>
<td>+27 11 772 3294</td>
<td><a href="mailto:norman.ndaba@za.ey.com">norman.ndaba@za.ey.com</a></td>
</tr>
<tr>
<td>Rico Fehr</td>
<td>Switzerland</td>
<td>+41 58 286 4065</td>
<td><a href="mailto:rico.fehr@ch.ey.com">rico.fehr@ch.ey.com</a></td>
</tr>
<tr>
<td>Ben Warren</td>
<td>UK and Ireland</td>
<td>+44 20 7951 6024</td>
<td><a href="mailto:bwarren@uk.ey.com">bwarren@uk.ey.com</a></td>
</tr>
<tr>
<td>Thomas Christians</td>
<td>EMEIA Operations Manager</td>
<td>+49 711 9881 14464</td>
<td><a href="mailto:thomas.christiansen@de.ey.com">thomas.christiansen@de.ey.com</a></td>
</tr>
</tbody>
</table>

---

**Ludger Weigel**

Germany: Advisory
+49 40 36132 12456
ludger.weigel@de.ey.com

**Sanjay Chakrabarti**

India
+91 22 4035 6650
sanjay.chakrabarti@in.ey.com

**Andrea Palani**

Italy
+39 02 8066 9761
andrea.palani@it.ey.com

**Michael Hasbani**

Middle East
+97 1 43129141
michael.hasbani@ae.ey.com

**Nimer AbuAli**

Middle East
+97 1 24174566
nimer.abuAli@ae.ey.com

**Wolfgang Paardekooper**

Netherlands
+31 10 406 8159
wolfgang.paardekooper@nl.ey.com

**Karsten Boegel**

Nordics/Denmark
+45 35 87 29 44
karsten.boegel@dk.ey.com

**Norman Ndaba**

South Africa
+27 11 772 3294
norman.ndaba@za.ey.com

**Rico Fehr**

Switzerland
+41 58 286 4065
rico.fehr@ch.ey.com

**Ben Warren**

UK and Ireland
+44 20 7951 6024
bwarren@uk.ey.com

**Thomas Christiansen**

EMEIA Operations Manager
+49 711 9881 14464
thomas.christiansen@de.ey.com
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