The Hidden Challenge

What Lies Beneath Cleantech’s Global Plans

Featuring findings from the 2015 Global Cleantech Risk Survey, conducted by the Chubb Insurance and Cleantech Group®
Risk and Reward: Finding A New Balance

For a growing cleantech company, every opportunity comes with a potential risk. Increasingly complex resource challenges are driving global need for new technology, but volatile foreign markets make it difficult to do business across borders. Working with suppliers makes production goals easier to achieve but may leave a company vulnerable to delays, quality issues, or intellectual property theft. Major corporations are hungry for innovation but can be frustratingly cautious when it comes to testing new ideas.

How can savvy cleantech executives pursue these opportunities while managing the risks that come with them?

Chubb Insurance and Cleantech Group sought to answer this question. We asked 300 cleantech executives to share their plans for the future, including how they plan to address anticipated risks. We discovered that many companies need to improve their risk management strategies to make it easier to seize opportunities.

Throughout this report you will find recommendations on how to make those improvements. These recommendations come from the combined experience of Chubb and Cleantech Group. Cleantech Group has spent more than a decade connecting innovative cleantech start-ups with corporations and investors. Chubb has insured a wide range of alternative energy and clean technology companies for the past three decades. We believe that the insights shared here will help executives better prepare for their growing risks and opportunities.

We would like to sincerely thank the cleantech executives who participated in our survey, as well as the 20 CEOs who spoke to us in one-on-one, in-depth interviews. The success of this report, and its ability to help cleantech companies improve their risk management strategies, would not be possible without their willingness to share their plans and challenges with us.

Learn more about the survey methodology and its respondents
Executive Summary

Over 300 cleantech CEOs shared with us their priorities for the future of their businesses and the challenges they need to overcome to succeed. Read on for specific takeaways on how to manage the risks they identified as most common.

From product development to market expansion in the next four years
Executives are focused primarily on product development-related goals in the next three years. Then, they plan to turn their focus to growing their market presence.

Going global to sell, but hitting barriers at borders
Executives say their companies are going global to enter new markets, particularly China, but indicated that they face significant barriers to market entry.

Despite their global presence, only 3% of companies have insurance to help protect them against the risks of global operations.

But are companies prepared to handle the risks inherent in these priorities?

Evolving involvement in China
China represents a promising sales market for cleantech companies:

- Currently sell into China: 11%
- Plan to sell into China in the future: 45%
- Currently source from Chinese companies: 28%
- Plan to source from Chinese companies: 25%

Cleantech executives also see China as a key part of their supply chain:

- Identify government regulations: 19%
- Identify increased IP risk: 30%
- Identify cultural practices: 30%
- Want to capitalize on favorable market conditions: 56%
- Want to be closer to customers: 20%
- Want to increase speed-to-pilot or speed-to-market: 13%

How can executives overcome these barriers?

- What can companies do to protect their financial well-being in foreign countries?
- How can a company improve its chances for success in China?

Learn more on pages 7-10.
Executive Summary (continued)

Cleantech supply chain disruptions: common and costly
Many cleantech companies are relying on global supply chains but indicated they are prone to disruptions.

- 61% of all cleantech companies have experienced a supply chain disruption in the past three years.
- 84% of executives indicated that the disruption had a material impact on their business.
- 70% of companies DO NOT have a written supply chain disruption response plan in place.

Pilots an often-unprotected priority
Many cleantech executives plan to pilot their product at another company’s location.

- 45% of executives identify pilots as a short-term priority. Yet the potential for financially devastating damages during a pilot are largely unconsidered:
  - only 10% are concerned about bodily harm
  - only 10% are concerned about damage to a third-party facility
  - only 8% are concerned about damage to the product

What can companies do to prevent or reduce the impact of a supply chain disruption? Read our supply chain best practices on pages 11-12.

What can a company do to stop potential piloting problems from impacting its bottom line? Find out more on pages 13-14.
Research Methodology and Respondent Profile

This report is based on an online survey of 300 cleantech executives conducted in June 2015, as well as input from 20 one-on-one interviews and two roundtable discussions with cleantech CEOs.

Survey respondents are based primarily in North America and Europe.

Respondents represent a variety of cleantech sectors:
- 30% energy efficiency, energy storage, or smart grid
- 13% water, wastewater
- 12% solar, wind, hydro, or marine power
- 7% transportation
- 6% biofuels, biochemical, or biomass generation
- 5% agriculture and food
- 5% advanced materials
- 5% recycling and waste
- 4% other
- 18% other

Respondents represent diverse growth stages:
- 29% respondents are developing their concept or product
- 35% have commercially available products
- 36% piloting their products
Great Ideas, Great Responsibility

Cleantech CEOs are focused on the future. Yet while landmark goals may be top of mind for executives, the smaller steps to those goals, and the potential pitfalls that come with them, are sometimes overlooked.

Executives consider **global expansion, establishing new business relationships, and research and development** top priorities throughout the life-cycle of their companies.

These priorities are signs of a thriving, fast-paced industry determined to seize the opportunity to solve global problems. But are executives taking the time to prepare for the challenges that come with these opportunities?

**Moving Targets**

**Top five priorities in the next three years:**
- 42% first commercial sale
- 47% global expansion
- 45% prototype or pilot project development
- 68% R&D
- 70% establishing new business relationships

**Top five priorities in the long term (4+ years):**
- 36% managing or growing supply chain
- 58% R&D
- 45% establishing new business relationships
- 60% acquisition or IPO
- 73% global expansion

**Research continues... until it doesn’t**

Whether cleantech companies are working on their first product, refining an existing solution, or planning to expand their offerings, research and development (R&D) is a critical part of their business, even as they mature.

Consider the following recommendations to keep research operations running smoothly:

**01 Analyze all possibilities.**
Consider all “what-if” scenarios that could occur during or as a result of your R&D operations. Create a plan that outlines what you and your employees can do to reduce the probability and/or impact of these scenarios.

**02 Regularly reassess risks.**
As you test new ideas, your company’s product development process may change. Regularly assess how new materials, jobs, and interim goals could alter your risks. Update your risk management strategy accordingly.

**03 Consider purchasing insurance.**
Specialized R&D business income and property insurance addresses the financial impact of unanticipated delays, lost milestones, and the cost to repair or replace prototypes in the event of a fire or other cause of loss.
New Markets, New Challenges

Operating on a global scale is a necessity for most cleantech companies: **80%** of surveyed executives indicated that their companies *already* have a global presence, sourcing from or selling into at least one country other than their home country.

Global expansion is a key priority for almost all cleantech companies regardless of whether they already have a strong international presence or currently operate in only one country. An overwhelming **90%** of executives are going beyond borders primarily to grow sales, as opposed to cutting costs or increasing efficiencies.

Executives target global growth

Of the **20%** of companies that operate in one country, **80%** plan to expand to more countries in the long term (four or more years from now).

Of those companies currently operating in two or more countries, **49%** plan to expand further in the next three years.

Setting sail to increase sales

- **20%** to be closer to customers
- **56%** to capitalize on favorable market conditions*
- **13%** to increase speed-to-pilot or speed-to-market

*Defined as rapid market growth and an advantageous policy environment.

Due Diligence, Done Well

Performing due diligence on prospective vendors, suppliers, and other business associates may save a company a lot of trouble later. As you build new business relationships, ask these questions:

- Are they financially stable?
- What relevant experience do they have?
- What insurance do they maintain? How will their level of insurance affect my company in the event of a product liability claim?
- Your insurance agent or legal advisor can help guide your due diligence process.

Key Takeaways
New Markets, New Challenges (continued)

Where in the world is cleantech?

More than half of the companies we surveyed are already selling their products in at least one foreign country. In Europe, many cleantech companies are doing more than just experimenting with global sales: **40%** are currently selling in **four or more countries**.

Although companies today are generally selling into more mature markets such as North America and Europe, many executives indicated that emerging markets will play a critical role in future sales.

![Graph showing sales percentages in different regions.](image)

The role of emerging markets

In 2014, developing countries invested a total of $131.3 billion in renewable energy. Cleantech companies are taking note of this trend and focusing on emerging markets in the years to come.

- **35%** sell or plan to sell into South Africa
  - $3.5 billion invested in 2014
- **44%** sell or plan to sell into Brazil
  - $7.5 billion invested in 2014
- **53%** sell or plan to sell into India
  - $7.6 billion invested in 2014

Although these markets are undeniable opportunities, they also present unique challenges, from greater-than-average intellectual property concerns in India* to cargo theft trends in Brazil and cancelled bilateral investment treaties in South Africa.

*According to US Chamber of Commerce’s Global Intellectual Property Center (GIPC), 2015
New Markets, New Challenges (continued)

Rising to the global challenge

Entering a new market presents a number of challenges. Business models typically need to be different in each country. Making informed changes to business models requires detailed knowledge of cultural and governmental differences.

Some cleantech companies are taking steps to proactively manage the legal, political, and regulatory risks that come with entering a foreign market. However, many indicated they are not using common best practices to manage their global risks, and the majority have not purchased global insurance.

Without insurance, cleantech executives leave their companies at risk for multinational product liability lawsuits and large-scale losses. Global insurance can help cleantech companies minimize the financial impact of lawsuits that occur outside of their home country. Insurance can also help companies comply with country-specific regulations, protect traveling employees, and recover from catastrophic events ranging from natural disasters to civil unrest.

Barriers beyond borders

Cleantech executives see the following as barriers to global growth:

- 30% cultural practices
- 30% increased IP risk
- 19% government regulations

Managing a world of risk

Only 3% of cleantech companies obtain global insurance. Instead, companies employ the following risk mitigation strategies:

- 35% frequently travel to business locales
- 35% use a local salesforce
- 28% engage expert professional services
- 33% use innovative business models
- perform due diligence on prospective vendors, suppliers, and other business associates
Special Section: Chasing China

China draws the attention of cleantech entrepreneurs. In 2014, China led the world in renewable energy investment with a record $83.3 billion. Aggressive government mandates intended to address environmental problems and the potential to sell to one of the world’s largest economies make China even more attractive. In China’s economic environment, cleantech companies with the right offerings can increase their speed-to-market, take advantage of competitive costs, and find financial backing.

On the other hand, the country’s recent stock market volatility, currency devaluation, and even revised estimates of its CO2 emissions could leave an executive’s head spinning. Unfair competition is consistently a concern. Although China has enacted economic reforms, a 2014 survey reveals that U.S. executives see little improvement and regard the policy environment as “uncertain.”

Companies that simply source from China face challenges of their own. Three out of four respondents that do so have had at least one supply chain disruption in the past three years.

In August 2015, a worst-case supply chain scenario played out in Tianjin, China. Explosions at a chemical manufacturing plant devastated surrounding facilities, homes, and the port itself. Numerous companies that counted on Tianjin as part of their supply chain were impacted as well. The incident drew attention to Chinese suppliers’ continuing struggles with safety standards, labor issues, and compliance with environmental regulations.

Peer Insights

“As a cleantech firm committed to making an environmental difference, it is crucial to focus on China. A strategy that lacks China as a target market will not move the needle on global climate issues. While a Chinese partnership may take longer to get started, the size and velocity of the Chinese market opportunity is unparalleled.”

- Gregory Manuel, Managing Partner, MNL Partners

Key Takeaways

China is a strategic “must” for many cleantech companies.

Fortunately, cleantech companies can employ strategies to manage the risks of doing business in China. Consider the following:

- Be (or look like) a local. Learn and practice Chinese business customs. Develop a strong network with Chinese business insiders.

- Build the right relationships. Assess potential business relationships carefully. Make sure your Chinese associates have a strong local network and track record.

- Incentivize your China teams. Take the time to understand what motivates your Chinese colleagues. Make the most of your strategic alliances by crafting mutually beneficial agreements that align your company’s goals with those of your Chinese counterparts.
Supply Chain Reaction

Surveyed executives classified supply chain growth and management as a top priority for their company in the long term. **Sixty-eight percent** of surveyed companies rely on a global supply chain, sourcing from at least one foreign country. Global supply chains are intrinsically more complex and vulnerable to disruption. Disruptions in the flow of manufacturing, storing, and transporting products or components can have a big impact on business as reported by surveyed executives.

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**Weak links wreak havoc**

Cleantech companies source from suppliers outside of their home country.

- 61% of all cleantech companies have experienced a supply chain disruption in the past three years
- 84% of executives indicated it had a material impact on their business
- 70% of companies do not have a written supply chain disruption response plan

**Impact of supply chain disruptions**

Supply chain disruptions are disturbingly common—and come with a hefty price tag.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Delayed deliveries</td>
<td>69%</td>
</tr>
<tr>
<td>Impacted profit margin</td>
<td>28%</td>
</tr>
<tr>
<td>Resulted in brand or reputation damage</td>
<td>27%</td>
</tr>
<tr>
<td>Led to decreased revenue</td>
<td>26%</td>
</tr>
<tr>
<td>Lost customers</td>
<td>17%</td>
</tr>
</tbody>
</table>

**Start at the source**

Managing supply chain exposures starts with choosing the right suppliers. Many companies choose a supplier based on cost and convenience.

- 60% cost advantages
- 52% availability
- 41% geographic proximity

Although these are important factors, they are not the most reliable indicators of long-term supply chain stability. Executives who said they are confident in their supply chain employ more robust assessment practices, such as:
- Auditing a supplier’s quality management program
- Conducting recurring audits
- Checking references from other customers

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**Put suppliers to the test**

To build a resilient network of suppliers, consider using the following evaluation methods:

- **Ask to see your supplier’s business interruption plan.** Assess your supplier’s plan to get manufacturing, assembly, and shipping back on track after an incident, and see what controls it has in place to prevent interruptions.

- **Evaluate your supplier’s suppliers.** Make sure you consider all links in your supplier’s chain. A good supplier should have multiple sources for supplies, assembly, and transport to keep your project on track.

- **Take a geography lesson.** Know the locations of your suppliers and their suppliers, warehouses, and shipping locations. Ideally, your supply chain will be composed of geographically diverse companies so that a location-specific catastrophe, like the tsunami in Japan in 2011, does not threaten your entire network.

- **Evaluate a supplier’s labor practices track record.** Labor violations can result in strikes, quality problems, or accidents. Make sure you are working with a team that complies with labor standards and cares for its employees.

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**Key Takeaways**

- 68% of surveyed companies rely on a global supply chain, sourcing from at least one foreign country.
- Global supply chains are more complex and vulnerable to disruption.
- Disruptions can have a big impact on business.
- Executives assess suppliers based on cost and availability, but these are not the most reliable indicators of long-term supply chain stability.
Supply Chain Reaction (continued)

Routing around risk

A successful supply chain depends on more than a top-notch supplier relationship. Supply chain resilience requires thoughtful production and route planning, secure storage, and smart, up-to-the-minute management of inventory and quality. We asked cleantech companies how they holistically manage the risks of their supply chain.

Strengthening supply chains

Cleantech companies are using a range of techniques to manage their risks, as shown below; however, several best practices that could help a company mitigate supply chain risks are the least frequently used.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have multiple sources or suppliers</td>
<td>56%</td>
</tr>
<tr>
<td>Conduct sample tests with suppliers</td>
<td>40%</td>
</tr>
<tr>
<td>Require order fulfillment</td>
<td>38%</td>
</tr>
<tr>
<td>Conduct periodic performance reviews of their suppliers</td>
<td>38%</td>
</tr>
<tr>
<td>Use proximate sourcing</td>
<td>33%</td>
</tr>
<tr>
<td>Conduct periodic supplier capacity reviews</td>
<td>25%</td>
</tr>
<tr>
<td>Use local sourcing teams</td>
<td>24%</td>
</tr>
<tr>
<td>Use product tracking</td>
<td>23%</td>
</tr>
<tr>
<td>Conduct periodic financial reviews</td>
<td>15%</td>
</tr>
<tr>
<td>Ensure suppliers have business interruption plans</td>
<td>11%</td>
</tr>
<tr>
<td>Obtain insurance</td>
<td>11%</td>
</tr>
</tbody>
</table>

Sources: Creating More Resilient Supply Chains, MIT Sloan Management Review

Build a resilient supply chain

Consider using the following techniques to fortify your supply chain:

- **Map it out.** Creating a resilient supply chain starts with knowing your entire network. Remember to include not only suppliers, but sub-suppliers, storage facilities, and transportation routes.
- **Look at every link in the chain.** Assess every point on your map. Understand the location-specific vulnerabilities in your supply chain.
- **Draft alternates at every point in the process.** Ask your product development team to specify other components that could be used if others are unavailable. Create a back-up transit plan for your product or components, including different modes of transportation and routing.
- **Measure results.** Work with suppliers to define objective and comparable metrics that will help you track the resiliency of your supply chain, hold suppliers accountable, and identify supplier issues early.
- **Watch for warning signs.** Use your supply chain map to identify cities, countries, or regions that are particularly critical to your supply chain. Keep track of news in that region to identify and evaluate the severity of a potential disruption so that you can switch to your back-up plan before the damage is done.
- **Make sure IP protections are in place.** Find out if the companies in your chain are based in jurisdictions that will uphold the contracts you enter into with them. Know how companies in your supply chain protect against data breaches. Consider completing final assembly in-house.
- **Consider purchasing global business income insurance.** Global business insurance that includes contingent business income protection can minimize the financial impact of a supply chain disruption to your company.
Peer Insights

“Our customers are inherently risk averse. The greatest challenge we face is getting our customers out of their comfort zone, challenging them to think in new ways, and ultimately deploying our product.”

- Henrik Dahl, CEO, Eniram

Proof Is In The Pilot

At the other end of the cleantech chain are the customers. Many companies will be making the transition from product development to their first commercial sale within the next three years.

To whom are these companies selling? Nearly two in three (65%) cleantech companies, regardless of their development stage, size, or location, sell to the utilities, oil and gas, or water and wastewater industries. Companies in these industries are hungry for innovation and want cleantech companies to bring new ideas to their businesses. However, they are traditionally more cautious when it comes to taking risks.

To help overcome this hesitation, many cleantech CEOs are counting on successful pilot projects to prove the viability of their new technology. Nearly half of executives surveyed indicated that prototype or pilot project development is a priority for their business in the next three years—and more than half are already negotiating or conducting a pilot.

Planning pilots

- 45% of executives say prototype or pilot project development is a short-term priority for their business.
- 20% of companies are negotiating a pilot.
- 36% of companies are running a pilot right now.

Clear skies for cleantech pilots

Cleantech Group has worked with many cleantech companies that have conducted pilots. From that experience, they offer the following best practices:

1. Charge your customer for the cost of conducting a pilot.
2. Commit to a firm piloting timeline upfront and outline why and how the timeline may be adjusted at a later date.
3. Establish clear business outcomes of the pilot at the outset. (Example: If the pilot is successful, the customer will purchase a confirmed number of units.)
4. Form relationships with academic experts, engineering firms and labs that provide third-party technology validation.
Proof Is In The Pilot (continued)

What could go wrong?

Almost all planned or completed pilots were or will be conducted at a facility the cleantech company does not own. Yet, the potential impact of any accidental damage to the host’s location, the cleantech company’s prototype or, in the worst-case scenario, someone getting injured as a result of the pilot are not top-of-mind issues to CEOs. Although these risks may be perceived as unlikely, an incident that results in any damage or injury can be devastating to a company’s finances and reputation.

Side effects may include

Cleantech executives seem unconcerned about potential unintended consequences of piloting projects:

- only 10% are concerned about bodily harm
- only 10% are concerned about damage to a third-party facility
- only 8% are concerned about damage to the product

Protecting pilot projects

Before starting a pilot, cleantech companies should have all standard contracts, licenses, and service agreements associated with the project reviewed by a legal advisor. Legal advisors can help the company limit its liability in the contract language.

Companies can also manage certain risks during a pilot—such as the cost to repair a damaged prototype, or addressing legal fees resulting from property damage or employee injuries—by purchasing insurance, which can provide a broad range of protection.
The Future’s So Bright

While these challenges may sound daunting, cleantech companies fearlessly tackle these risks every day. Despite operating with limited resources, they have achieved widespread commercial sales and are successfully targeting large and long-established industries. More sophisticated risk management strategies can only strengthen these companies and help them take advantage of new opportunities.

Although executives may sometimes feel otherwise, no cleantech company is an island. Legal advisors, insurance agents, and other trusted advisors can help cleantech executives understand their risks and develop programs to address them. As cleantech executives tackle their day-to-day priorities, a trusted team well-versed in risk management can help identify, manage, and implement a strategy to reduce risks and clear the path to success.

Join the conversation

The risks outlined in this report are just a few of the business challenges cleantech companies face and successfully overcome. Cleantech Group and Chubb are here to help.

Learn more about cleantech business risks and insurance solutions through Chubb’s Risk Conversation blog at www.riskconversation.com.

Connect with investors and discover opportunities to grow cleantech businesses through Cleantech Group’s innovation network, i3, at www.i3connect.com.
About Chubb

The Chubb is a global property and casualty insurer that specializes in complex industries. For the past three decades, Chubb has provided a wide range of renewable energy, technology, and manufacturing companies with tailored insurance solutions designed to protect cleantech companies as they grow. We are dedicated to understanding the evolving challenges these companies face, and we previously conducted a survey of North American cleantech executives in 2012 called Redefining Clean Tech’s Global Risks. Chubb’s global expertise, thoughtful risk engineering, and outstanding claims services help Clean Tech companies better understand and manage their changing risks.

Learn more at: www.chubb.com/cleantech.

About Cleantech Group®

Cleantech Group’s mission is to build the innovation network that drives sustainability. Cleantech Group connects corporates and investors with innovation, and connects startups with opportunity. Core to this mission is i3, an online platform that enables corporates to find, vet, and connect with start-ups. Cleantech Group also hosts global events which convene corporates, investors and startups. With more than a decade of experience covering 18 sectors, Cleantech Group is uniquely positioned to guide clients along their innovation journey.

Learn more at: www.cleantech.com.