Finding, funding and fostering the most promising cleantech startups on the planet

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The Need for Cleantech Acceleration

We fervently believe that the most critical challenges facing the world today, related to energy, environment and the economy, represent strategic opportunities for breakthrough innovation and job creation. We believe that entrepreneurs and small businesses will create the products, services and technologies that address today's most pressing energy and economic challenges. The Cleantech Open, a not-for-profit organization headquartered in Silicon Valley, is therefore focused on providing the platform to support the most promising of these entrepreneurs and to connect innovators with major corporate partners, investors and customers. A competition-based approach is used to identify the most promising entrepreneurs that are then eligible to take part in an intensive annual acceleration program. The participating entrepreneurs are supported, promoted, "de-risked" and connected to potential investors, customers and partners. As the best cleantech startups progress through the Cleantech Open they are continuously trained, mentored and assessed. Each November, the top performing startups in the accelerator from across the United States compete for the National Prize. At this same event, international companies also come together to compete for the global prize of the world's best cleantech start-up.

The Cleantech Open began in 2005 as an initiative founded by entrepreneurs in Silicon Valley and Boston to support emerging cleantech entrepreneurs in their respective regions. Over the subsequent years the Cleantech Open has grown across the United States and evolved into the world's largest cleantech accelerator, encompassing intensive training, mentoring, access to capital and showcasing. Today, the Cleantech Open Accelerator operates across eight regions in the United States covering 50 states through regional teams and a network of more than 2,000 volunteers, holding events and activities in more than 26 cities. Of the over 700 companies we have worked with in the United States alone, nearly half have gone on to raise external capital now totaling over $800 million.

In parallel with the geographical expansion of the Cleantech Open Accelerator, we have also broadened the cleantech sectors that we cover, leading to a much wider scope of entrepreneurs that we support. In 2013 we are focused on eight specific technology categories; Energy Generation, Energy Distribution & Storage, Energy Efficiency, Chemicals and Advanced Materials, ICT, Green Building, Transportation and Agriculture,

Water and Waste. The Energy Generation category includes innovations that use, enable and accelerate the usage of renewable energy resources as well as energy generation from alternative sources like waste heat, sewage and materials. This category comprises of technology that includes low-emission power sources, such as solar, geothermal, biofuels, wind, wave and tidal energy and hydropower. Examples of Cleantech Open Alumni in this sector include **Rentricity** (www.rentricity.com), a New York based startup that generates electricity from untapped pressure in drinking water pipes. Rentricity works with municipal and industrial water facilities, helping them to generate clean, renewable electricity from an otherwise wasted resource. Another alumni company in the energy generation sector is **FloDesign Wind Turbine** (www.fdwt.com), a North East regional winner and national finalist in the 2008 Cleantech Open Accelerator. The company is a spin-off from aerospace company FloDesign and is focused on a novel compact jet-engine inspired wind turbine that is three to four times more efficient and significantly cheaper to produce than existing turbines. FloDesign is based in Waltham, Massachusetts and has raised $143m in investment.

Energy Distribution & Storage includes technologies that enable electricity delivery and give industrial, commercial and residential consumers greater control over when and how their energy is delivered and used. Examples include intelligent sensors, batteries, fuel cells, fly-wheels, and advanced materials or systems for energy transmission, such as hardware and software controls. Energy storage also includes cell applications capable of converting various stored gases to electricity. An example of an alumni company in this category is **FINsix** (www.finsix.com), previously known as OnChip Power, from Boston. This MIT technology start-up is commercializing a next generation power supply architecture that enables miniaturized electronic products. They create value by providing power supplies with 10x smaller size, 3x greater reliability, and 50% fewer components.

The Energy Efficiency category includes technologies that enable energy to be saved in industrial processes and in homes. Examples include advanced light sources and controls, smart energy management systems, energy-efficient water heaters and other appliances, high-efficiency industrial process systems, energy efficient technologies for construction, motors, pumps, and advanced space heating and cooling systems. **Alphabet Energy** (www.alphabetenergy.com) was an energy efficiency finalist in the 2009 Cleantech Open Accelerator and are commercializing breakthrough, inexpensive waste-heat recovery products. Alphabet Energy aims to offer the most modular and scalable heat-recovery technology available, and to tap into the potential $100 billion market for the conversion of medium and high-grade waste heat into electricity, offsetting as many as 500 million metric tons of carbon per year. Alphabet Energy is based in Hayward, California and has raised $29 million in funding to date.

Chemicals and Advanced Materials is a new technology category in 2013. It comprises technology that reduces or eliminates the use or generation of hazardous substances in materials or chemical products. These chemicals and advanced materials include novel

detergents, pharmaceuticals, cosmetics, household products, lubricants, surface and finishing materials, packaging materials and fabric. **EarthClean Corporation** (www.earthclean.com), a runner up for the 2010 National Grand Prize, has created a product that changes water into a biodegradable, non-toxic gel that is pumped using standard fire-fighting equipment. The company's first product, TetraKO, is a direct response to the growing concern over the toxicity of existing firefighting foams, super absorbent polymer-based fire suppressants, and phosphorus and ammonia dioxide–based retardants.

The Information & Communications Technologies (ICT) category includes companies whose primary business is built around computing hardware or software design improvements or the application of information technology, web, mobile or social applications (including emerging "clean web" applications) to reduce resource consumption and environmental impacts. An example of a Cleantech Open alumnus in this sector is **Power Assure** (www.powerassure.com), a former Category and Sustainability Prize winner that has raised $35m since graduating from the Cleantech Open Accelerator. Power Assure is a leading innovator of data center infrastructure and energy management software for large enterprises, government agencies, and managed service providers. Their solutions provide visibility, intelligence, analytics and automation to help CIOs, IT directors, and facilities managers balance load, capacity, service levels, and power consumption within and across data centers.

The Green Building category focuses on reducing the environmental impact of construction by producing innovative, energy and material efficient building materials. This category also encompasses improved design or construction practices. Examples include improved site planning, water management systems, reduction of hazardous materials in building construction or operation, use of new environmentally friendly or recycled materials, systems to improve indoor environmental quality and systems for improved waste reduction or disposal. A recent example of a Cleantech Open alumnus in this category is **GR Green**, winner of the Green Building category in 2012. GR Green produces eco-friendly roofing options from recycled plastic and limestone, beating traditional alternatives on cost, aesthetics and performance. Every GR Green Slate or Cedar roof uses 44,000 plastic bags, 4,000 milk bottles and waste limestone to make a roof that lasts over 50 years. .

The transportation category covers innovative technology that not only improves our means and ways of mobility, but also reduces the environmental impact of mobility markets. The winner of the 2012 Cleantech Open National Grand Prize was **HEVT** (www.hevt.com), a company that has developed disruptive alternatives to induction and permanent magnet motors. HEVT's patented switched reluctance motors (SRMs) provide high-performance alternatives to induction and permanent magnet motors and generators with increased reliability and disruptive cost benefits. **Mission Motors** (www.ridemission.com) was a 2007 transportation category finalist and 2010 Alumni Award winner. The San Francisco based company supplies advanced electric powertrain

technology. Mission Motors set out to build a high-performance electric motorcycle that could exceed 160 miles per hour with a range of 150 miles. The resulting electric superbike broke speed and lap records and demonstrated that electric motorcycles could match or outperform their conventional fossil fuelled counterparts. To achieve this Mission Motors developed a completely original powertrain, which has led to the company providing custom components and powertrain systems to OEMs for their electric and hybrid vehicle programs.

Applications in the Agriculture, Water & Waste category focus on improving food security, resource availability, conservation and pollution control. The *Agriculture* sub-category encompasses innovative farming technologies that reduce the need for resources needed to produce food, improves supply chain and ensures sustainable food security. The *Water* sub-category refers to innovative technological solutions which address drinking water distribution, usage or treatment. In the water category, **Puralytics** (www.puralytics.com) has pioneered an entirely new way to purify water using light activated nanotechnology, enabling pure water in places and applications where it was not possible before. Whilst there are many ways to treat water including chemical, thermal, filtration and separation technologies, Puralytics has pioneered photochemical purification technologies, which have compelling advantages in many applications. The *Waste* sub-category focuses on cradle-to-cradle approaches to reduction, reuse and recycling technologies, as well as innovative business models and approaches to materials usage. A recent category winner, **PK Clean** (www.pklean.com**)**, has developed technology to convert plastic waste to oil with a vision of ending landfill waste. Following the success of their pilot plant in India, PK Clean is now operating a commercial scale waste-processing facility in Salt Lake City, Utah.

Let a Thousand Flowers Bloom

We believe that in order to address the greatest economic, energy and environmental challenges that we face today, we need to look for innovative solutions globally, in as many countries as possible. In 2009, the Cleantech Open began to look for innovative cleantech startups from around the world through the launch of the Cleantech Open Global Ideas Competition held in conjunction with Global Entrepreneurship week, an annual celebration of entrepreneurship in more than 100 countries. The number of participating countries in the Global Ideas Competition has grown from 7 in 2009 to 33 in 2012, encompassing a huge range of innovative technologies, products and teams. In 2011, a startup from Santiago, Chile was named the overall Global Ideas winner. **Biofiltro** (www.biofiltro.cl) has developed and patented an innovative, environmentally friendly, sustainable and low-cost technology for domestic and industrial wastewater treatment. Through a unique wastewater treatment process, water suitable for irrigation and other uses can be obtained without using chemical products and saving up to eighty percent of the energy used by conventional solutions, all without generating any kind of polluting waste. In addition, organic fertilizer is produced as a valuable byproduct of the process. Since winning the Cleantech Open Global Ideas

Competition, BioFiltro has increased its number of installations to more than 100 worldwide, providing sewage treatment for communities from 6 to 15,000 people and liquid industrial waste treatment for large-scale industries.

In 2012, Global Ideas finalists from across the world came to Silicon Valley to compete for the Global Prize. Some of the many innovative companies competing for the top prize included **enLighten Australia** (www.enlighten.com.au) with novel LED lighting solutions delivering energy savings of up to 93% and **BRD Motorcycles** (www.faster-faster.com) with the first electric motocross bike that outperforms its gas predecessors. Finalists also included **SP3H** (www.sp3h.com), a French startup with an innovative technology to profile the molecular structure of fuel, allowing fuel consumption and pollution to be drastically reduced by dynamically adapting the parameters of the motor to match the fuel. From a large group of innovative finalists from around the world, the 2012 Global Ideas Competition was won by Danish startup, **Biosyntia** (www.biosyntia.com). The company has developed high-performance cell factories for fermentation of fine chemicals for manufacturing companies, enabling them to cut production costs by up to 80%, while gaining a greener profile.

Since launching the Cleantech Open Global Ideas Competition in 2009, we have seen each year a growing number of innovative cleantech entrepreneurs from China. Through the support of Global Entrepreneurship Week China, the Entrepreneurship Foundation for Graduates (EFG) in Shanghai and GESEP, the most promising cleantech entrepreneurs have been identified each year, with the overall winner travelling to Silicon Valley to compete in the Global Finals in Silicon Valley. Most recently this has included **AiControl** (www.aicontrol.com.cn), a Shanghai-based company that provides energy efficient solutions for cold storage of fruit and vegetables and **YYToilet**, also from Shanghai, with its unique water saving toilet that can save up to 80% of the water consumed by a traditional water-flushing toilet.

These and other innovative companies that we have met from across China have emboldened our efforts to launch a Cleantech Open Accelerator that could support high-impact cleantech startups in many areas of the country. Our vision is a platform that enables a cleantech entrepreneur in Shanghai, Tianjin or Guangzhou to receive mentoring from an expert in San Francisco or Frankfurt, license their technology to a strategic partner in Hyderabad or Sao Paulo and secure venture funding from Silicon Valley, Moscow or London. The Cleantech Open is building the platform for this kind of interaction and growth. To truly address the huge global challenges and opportunities we face economically and environmentally, we believe it is essential to support promising clean technologies being developed by many startups. We must truly let a thousand flowers bloom in China, the United States and around the world. We hope you will consider joining our efforts in China and across Asia.

About the Author

Kevin Braithwaite is the Global Programs Director for the Cleantech Open, a not-for-profit organization that runs the world's largest cleantech accelerator, where he is responsible for international expansion and for all operations outside of the United States. He works closely with international agencies, governments, investors, corporations and universities to launch new Cleantech Open Accelerators and programs around the world. As Chair of the Cleantech Open Global Ideas Competition, he is focused on finding the most innovative early stage cleantech ventures from over 30 countries. *E-mail: global@cleantechopen.org*