

The case for clustering

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There has been an explosion of clean-tech clusters, promising to help accelerate the next generation of sustainable technologies. **Peter Adriaens, Shawn Lesser** and **Ben Taube** explain

Four years after public stimulus funds aimed at greening the economy were committed, a new pattern of economic development, green job creation, green procurement and high growth venturing is emerging. During the past decade, the development of the clean technology sector was driven by private or strategic corporate investments in venture-grade companies, or by investment in projects underpinned by renewable energy targets and carbon markets.

We argue that the low-carbon economy has now gone mainstream. Local, regional and countrywide economic development groups, business organisations, corporate partners, investors and centres of R&D are coalescing into clusters aimed at accelerating the path to market for clean-tech innovations. From Europe to the Asia Pacific, via North America, dozens of clusters have been launched, often in conjunction with major clean-tech investment events.



Clean-tech clusters – creating cleantech jobs

Whether as incubators of clean-tech growth companies, or business services and partnerships for later stage innovators, these clusters represent and attract a portfolio of companies characteristic of their mandate (whether job promotion, green procurement, economic development or achieving high-value exits for investors) and local business culture (see table). Clean-tech clusters are fast becoming the driving force behind the acceleration of innovations in energy, water, waste, clean fuels, green materials and green buildings.

In 2010, the Global CleanTech Cluster Association (GCCA) was formed to facilitate global connections, develop a platform of exchange for best practices and align emerging start-ups with corporate partners. By joining the GCCA, clean-tech clusters and their member companies increase their exposure for their region and companies worldwide, while also harnessing the knowledge, experience, and other benefits a worldwide association of clusters has to offer.

Until the advent of the GCCA, international collaboration was limited by a scarcity of resources and a lack of strategic alliances between clusters and cluster member companies. The GCCA is addressing this challenge by making communication and collaboration for local clusters and their companies faster, more efficient, affordable and, most importantly, global.

Why do these clusters matter?

Clusters help clean-tech investors. Like mutual funds, the portfolio of companies within each cluster represents a spectrum of deals that are currently investable, or that may be investable in the future, whether via seed and venture, debt, strategic, project or public finance. Growing interest in clean technology has drawn aggregate cluster company investments upwards of \$200 million.

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Indeed, the seven clusters that track investment in member companies estimate that close to \$800 million was invested in 2010/11 as the result of cluster efforts, a figure which, if replicated across the GCCA cluster universe, would suggest an aggregate exceeding \$3 billion.

During the past few years, the Cleantech Group has reported on the increasing trend of corporate strategic and venture investments in clean-tech companies. Clusters are capitalising on this trend, engaging companies such as Veolia Environnement, Siemens, IBM and Bosch to accelerate the integration of clean-tech innovators in new business practices. Particularly active in this space are swisscleantech, CleanTECH San Diego, the Finnish Cleantech Cluster, EcoTech Quebec, the Singapore Sustainability Alliance and An tSlí Ghlas – The Green Way (Ireland).

Clusters help portfolio companies. No two clusters are the same, but all aim to help accelerate access to markets and provide networking, business services, and links to the R&D pipeline, corporate partnerships or investors. Aside from visibility and access to the investment community, it is the strength of global supply chain collaboration that sets the clusters apart.

For example, in 2011, the Finnish Cleantech Cluster connected later-stage and corporate members with CleanTECH San Diego smart grid companies and investors, and is planning to repeat this with nascent clusters in China in 2012. The swisscleantech cluster was instrumental in setting up Cleantech Nord-Rhein WestPhalen in Leverkusen, Germany. Similar cross-border connections are being promoted by other clusters, exposing member companies to corporate partners, entrepreneurial start-ups and potential investors.

Clean-tech clusters												
Country	Cluster	Cluster type	No. of firms	Investment (general)	Company investment (\$/€/m) (m)							Clean-tech focus
					G	A	VC	PE	D	SI	PF	
USA	Washington Clean Technology Alliance (Seattle, WA)	B	90									General
	Environmental Business Cluster (San Jose, CA)	R, Inc, ED	28									General
	Waterford Capital Group (Atlanta, GA)	I	30									General
	CleanTECH San Diego (CA)	R, R, I	800									Solar, fuels, efficiency, transport, grid, storage
	Portland Development Commission (OR)	ED	na									Solar, wind, efficiency, transport, green buildings
	Cleantech Alliance Mid-Atlantic (Philadelphia, PA)	ED	450	Pub/priv								Energy, transport, advanced materials
	Akron Global Systems Accelerator (OH)	R, Inc	52									Waste-to-energy
	Clean Technology & Sustainable Industries (Austin, TX)	R, Inc, R, I	200									General
	New England Clean Energy Council (Boston, MA)	ED	400									Renewable energy, storage
	NYC Area (New York, NY)	R, Inc, R	na	Pub/priv								Clean-tech, renewables
	CleanTech Los Angeles (CA)	R, Inc, R, I	na	Pub/priv								Vehicles, renewables, water infrastructure
	Colorado Cleantech Industry Association (Denver, CO)	R, R, I	200									Energy efficiency, renewables
	Chicago Clean Energy Alliance (IL)	B	na	Pub/priv								General
	Clean Tech Center Syracuse (NY)	R, Inc, R	na									Energy, fuels, grid, building, transport
	EcoTech Quebec (Montreal, QC)	R, R, I	130									General
Canada	GreenTech Exchange (Vancouver, BC)	B	na									Eco-cities
	M&RS Discovery District (Toronto, ON)	Inc	na									General
France	CDTE (Loos-en-Gohelle)	R, Inc, R, I	550	FD, state								General
France	French CleanTech (Lyon)	R, I	300									General
Italy	Progetto Manifattura (Trento)	Inc	30									Green buildings
Netherlands	Incubator Amsterdam	ED	na	Pub/priv								Eco-cities
	Cleantech Business Club (Rotterdam)	R, I	46									General
Denmark	Copenhagen Cleantech Cluster	ED	27									Smart cities
UK	Environnet CIC (London)	R, I	12									General
	UK CEDD (Preston)	ED	380	Pub/priv								Energy, water, green buildings
Germany	CleanTech NRW (Düsseldorf)	ED	94	Pub/priv								Energy, resource efficiency
Ireland	The Green Way (Dublin)	ED	200									Energy
Austria	EcoWorld Sprin (Graz)	R, Inc, R, I	175									General
Belgium	Flanders Cleantech (Gent)	B	500	Pub/priv								General
Switzerland	swisscleantech (Zürich)	ED	280	Pub/priv								General
Finland	Finnish Cleantech Cluster (Lahti)	R, Inc, R	400									Green materials, waste-to-energy, water
Australia	Australian CleanTech (Adelaide)	B	9									Solar
New Zealand	Green Wellington	ED	15									General
Singapore	Singapore Sustainability Alliance	ED	na	Pub/priv								Sustainability, green IT, management
S Korea	Clean Tech Korea (Seoul)	B	na									Solar, green chemistry

As of 1 January 2012. For details see www.globalecleantech.org
 Types: B = business, Inc = incubator, ED = economic development (publicly financed entity), I = investor, R = research
 na = not available or not disclosed
 Pub/priv = no specific funding type indicated
 G = grants, A = angel funding, VC = venture capital, PE = private equity, D = debt financing,
 SI = (corporate) strategic investing, PF = project finance
 General = no specific focus indicated or all clean-tech domains supported.
 Source: GCCA

The GCCA further amplifies this exposure and global collaboration and scalability. For example, EcoTech Quebec, focused on green procurement for eco-cities, brought together 17 clusters and their member companies in Montreal in conjunction with the EcoCities World Summit with meetings hosted by the Quebec pension fund. An tSlí Ghlas in Dublin, a collaborative cluster

established by industry, academic institutions and public authorities, hosted the GCCA Later Stage Awards event in 2011.

Clusters spur economic development. While most clean-tech clusters are primarily business-, investor- or research-driven, around one-third are funded by economic development organisations. Clearly, the objectives here are green jobs and strategic investment. An analysis by the Brookings Institution suggested that the clean economy employs some 2.7 million workers in the US.

The contributions to job creation vary widely, as do some of the underlying assumptions to quantify them. Regardless, credible sources indicate the economic impact of clusters. For example, the Washington Clean Technology Alliance is estimated to have spawned 83,000 jobs according to the Brookings report. The Colorado cluster generated about 3,000 jobs from 200 companies. Similar stories abound in Europe. For example, the EcoWorld Styria cluster in Austria has facilitated the growth of 150 clean-technology companies, providing 5,500 jobs in the renewable energy and environmental technology sectors.

One of the key issues that the GCCA seeks to tease out is, what makes clusters successful? What are the practices that make clusters grow or founder? What are the lessons for the design of public policy instruments that drive the success of clusters?

The role of the cluster is to bring together the research enterprise, corporate partners and investment capital, engage with public authorities to help develop legal frameworks (green procurement, subsidies and market incentives) and organise trade missions to 'make local global'.

Since the composition of clusters reflects the local business environment, and since different clusters may have different mandates, best practices are difficult to identify. The emergence of a variety of networking, incubation, business development and investment-dominated clusters, all of which are helping their members attract investment and create jobs, is indicative of a wide range of potentially successful but perhaps not widely replicable models. Think of the largely unsuccessful replication elsewhere of Silicon Valley's approach to innovation enterprise – the whole is greater than the sum of the parts.

However, the public policy lessons to date include the need to promote richness in diversity, allowing local strengths to be leveraged, and to enable 'coopetition' instead of competition between clusters. By setting up policies that enable public-private partnerships, mobilise financing through loans and private (including risk) capital, incentivise green procurement targets through market-based strategies, and are conducive to promoting foreign investment and technology sharing, clean-tech clusters will continue to develop and grow, allowing their member companies to capture value in the market. EF

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