

Clean Energy

Factsheet 2011

At a Glance

As the world moves towards addressing the issues of climate change, fossil fuel depletion and rapid urbanization, the need for more eco-friendly products and solutions is set to accelerate, especially in Asia which has more than half the world's population. Singapore has thus identified the Cleantech industry as a key economic growth area.

In 2007, Singapore allocated nearly S\$700 million to develop five key pillars: R&D, developing manpower, grooming Singapore-based enterprises, branding our industry internationally and growing a vibrant industry ecosystem. The city also welcomes Cleantech companies to use Singapore as a 'Living Lab' to testbed and demonstrate innovative solutions before scaling up for the rest of the world.

Clean Energy is an important sector in the Cleantech industry. There is a strong focus on solar energy in Singapore, given our strategic location in the tropical sunbelt and semiconductor capabilities. There is also emphasis on wind energy, biomass, tidal energy, smart grids, green buildings, energy efficiency and carbon services.

By 2015, the Cleantech sector is expected to contribute S\$3.4 billion to Singapore's gross domestic product (GDP) and employ 18,000 people, with Clean Energy contributing S\$1.7 billion to GDP and 7,000 jobs. The other sector which we are focusing on is Environment and Water.

Energy Innovation Programme Office

The Energy Innovation Programme Office (EIPO), formerly known as Clean Energy Programme Office (CEPO), is Singapore's key inter-agency workgroup responsible for planning and executing strategies to develop the energy sector in Singapore. Since its inception in 2007, EIPO has launched several key initiatives, including the establishment of public sector R&D centres, competitive funding and talent development programmes.

Dedicated with S\$195 million from the National Research Foundation, EIPO is led by the Singapore Economic Development Board (EDB) and the Energy Market Authority (EMA). EIPO reports to an executive committee co-chaired by Chairman EDB and Permanent Secretary, Ministry of Trade and Industry

Key Strategies of EIPO:

Cluster Development

- Attract & anchor major international companies
- Groom local-based companies to be world class players
- Proliferate startup companies

Technology Development

- Initiate Clean Energy Research Programme
- Build R&D competence centers & global linkages
- Making Singapore a global testbed and site of early adoption
- Grooming talent & manpower

Internationalisation

- Exporting Clean Energy products and solutions by Singapore-based companies
- Marketing & Branding of Singapore's Clean Energy industry

Our Competitive Advantages

Existing Strengths in Electronics, Precision Engineering and Chemicals Industries

The manufacturing of solar wafers, cells and modules is similar to the semiconductor and other high-end electronics manufacturing processes. Today, Singapore is already a major semiconductor hub and also has all-round capabilities from the precision engineering and chemicals industries which can all be applied to the solar and wider clean energy industry.

Strategic Location in the Asian Sunbelt

Singapore is located on the sunbelt which gets about 50% more radiation than the temperate regions such as Germany and Japan which are major hubs for solar technology today. When the price of solar drops to parity with conventional electricity, the sunbelt region is expected to become a key solar market with strong growth. Our excellent supply chain capabilities and extensive linkages to the region make us an efficient base for companies to serve the Asian sunbelt. In addition, there are about 1 billion people in the region without access to grid electricity. Singapore-based companies can develop off-grid clean energy solutions tailored to this huge under-served market.

Positioning for the Future

The global clean energy industry will continue to experience robust growth due to rising energy demand, climate change concerns and rapid technological advances. Singapore has distinct competitive advantages to play a strong role in this industry to capitalize and contribute to its continued growth.

Companies come to us because they trust us; they trust that Singapore delivers on its promises. Our strong capabilities in electronics, precision engineering and chemicals, our mass manufacturing know-how (which in turn increases economies of scale and reduces manufacturing costs), and extensive supplier base, put us in good stead to provide value to clean energy companies. Singapore's trusted intellectual property protection regime is also a key consideration for clean energy companies which rely on innovation as a growth driver.

Singapore also has the right infrastructure, logistics capability and connectivity to serve the markets in Asia, which makes up more than half of the world's population including some one billion people without access to electricity. Our connectivity to the region will help Singapore-based companies meet the huge demand for clean energy products.

Leading Industry Players

Atlantis Resources Corporation

Atlantis Resources Corporation, one of the world's leading tidal energy companies, has established its Global Headquarters in Singapore to take advantage of Singapore's pro-business environment, excellent logistics connectivity, respect for intellectual property and innovation capability.

Bosch

Together with the recent opening of its new HQ building in Singapore, Bosch announced that it is investing €15 million for a photovoltaic and energy management R&D centre. The S\$92 million Singapore headquarters building is also the greenest building for Bosch globally, with advanced environmentally friendly features. In addition, Bosch is collaborating with local partners such as SingTel and Greenlots to design, deploy and maintain the Electric Vehicle (EV) charging infrastructure as part of Singapore's EV test-bedding programme.

DNV

DNV's Clean Technology Centre (CTC) in Singapore will grow to be a 100-man centre, developing new cleantech services in Technology Qualification and Certification, Risk Assessment, and Asset Management. The CTC will cover the following 6 cross-sectoral focus areas: (1) Clean Energy; (2) Green Shipping and Offshore Design; (3) Green Ports; (4) Climate Change Adaptation; (5) Carbon Market Services; (6) Sustainable Cities and Urban Solutions.

E.ON Climate & Renewables

E.ON Climate & Renewables, the renewable energy business unit of the German utility E.ON, has established a regional clean energy project development and carbon sourcing team in Singapore. This is a strong testament to Singapore's growing stature as Asia-Pacific's leading carbon hub.

Gamesa

Gamesa, a leading wind turbine manufacturer from Spain, has chosen Singapore as the base for its first R&D centre in Asia. The centre will employ more than 30 engineers by 2014. Despite the absence of wind market in Singapore, Gamesa is leveraging Singapore's strengths in foundational capabilities for the wind sector such as material sciences and control systems.

Greenwave Reality

GreenWave Reality, a building energy management systems company, has established its Global Headquarters and R&D Centre in Singapore. In particular, the R&D centre will further develop the energy management software and hardware for smart grid applications and LED lighting.

Phoenix Solar

Phoenix Solar, a leading photovoltaic solutions provider from Germany, established its Asia Pacific hub in Singapore in 2006. Since then, Phoenix Solar has become the market leader in PV system integration in Singapore and the region.

Renewable Energy Corporation

REC has established one of the world's largest integrated solar manufacturing complexes in Singapore. The company has invested some S\$2.5 billion in its first phase expansion, which would provide 800MW of wafers, cells and modules. The Singapore facility currently employs about 1,500 employees.

Siemens Centre of Competence for City Management

Siemens established its first Global Centre of Competence (CoC) for City Management in 2008 in Singapore. The Center is responsible for designing, developing and implementing innovative urban technological solutions that can help cities improve their environment and quality of life. The centre is also leveraging Singapore's strong capabilities in the area of urban management.

Vestas Wind Systems

Vestas, the world's largest supplier of wind power systems, has chosen Singapore as the base for its largest R&D centre outside Denmark. This centre will employ 200 research scientists and engineers. Singapore also hosts the Asia-Pacific headquarters for Vestas.

Yingli Green Energy

Yingli Green Energy, one of the world's largest vertically integrated photovoltaic manufacturers based in China, is establishing its Regional Headquarters and R&D Centre in Singapore. It is leveraging Singapore as an internationalisation base to expand to global markets.

Research Centres

SERIS, or the Solar Energy Research Institute of Singapore, was launched at the National University of Singapore in 2008. It is led by Professor Joachim Luther, the former Director of Fraunhofer Institute of Solar Energy Systems. With an investment of S\$130 million over five years, this institute conducts world-class industry-oriented R&D and trains specialist manpower for the solar energy sector. It has attracted globally leading talent in the solar industry and is now home to some 160 researchers. It is also collaborating with leading solar companies such as REC and Trina Solar.

The Energy Research Institute at the Nanyang Technological University (**ERI@N**) was launched in 2009 with an investment of S\$200 million. ERI@N will develop industry-oriented innovations and train specialists in clean energy, focusing on areas such as wind and marine renewables, green buildings, e-mobility, energy storage and fuel cells. It is also collaborating with leading wind energy companies such as Vestas and Gamesa on joint research projects.

Another key research centre in Singapore is Agency for Science, Technology and Research's (A*STAR) Experimental Power Grid Centre (**EPGC**). EPGC is an important enabling infrastructure that will collaborate with companies to develop innovative smart grid and distributed generation technologies. It features a 1MW grid which is the world's largest pilot smart grid facility.

About the Singapore Economic Development Board

The Singapore Economic Development Board (EDB) is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre. EDB dreams, designs and delivers solutions that create value for investors and companies in Singapore. Our mission is to create for Singapore, sustainable economic growth with vibrant business and good job opportunities. EDB's 'Host to Home' strategy articulates how we are positioning Singapore for the future. It is about extending Singapore's value proposition to businesses not just to help them improve their bottom line, but also to help them grow their top line through establishing and deepening strategic activities in Singapore to drive their business, innovation and talent objectives in Asia and globally.

For more information, please visit www.sedb.com

For more information, please contact

Ms Shin Ae Baek
Senior Officer, Marketing and Communications,
Singapore Economic Development Board
DID: (65) 6832 6245
FAX: (65) 6832 6498
Email: shin_ae_baek@edb.gov.sg