

Smartcool Systems: Providing Smart Solutions for Energy Efficiency

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ABSTRACT

The world is facing an energy crisis as supply is outpaced by demand and prices continue to rise. Combined with the looming threat of climate change, the need to act has never been stronger. Smartcool provides unique, proven technology through its product line of retrofit devices to save energy on air conditioning and refrigeration systems. These products have helped Smartcool achieve a high degree of success and have helped clients take a bite out of their energy bills. Strong distribution networks, third party testing, a large customer base, quantifiable results and continued innovation prove the effectiveness of Smartcool's business model and the reveal strength of the clean tech sector.

Keywords: energy, efficiency, retrofit, cleantech, cooling

THE PROMISE & PROBLEM OF ELECTRICITY

Electricity is perhaps the single most important technology in achieving the standard of living we enjoy in the developed world. Electricity is the difference between access to the internet and all the information therein, and being literally and figuratively kept in the dark. Electricity is the difference between keeping a variety of food fresh and struggling every day to achieve adequate nutrition. Electricity is the difference between widespread, easy access to medicines and having to make an arduous trip to the hospital to get simple vaccines and antibiotics out of the refrigerators there. Electricity has allowed us to build the complex, interdependent society that we live in today.

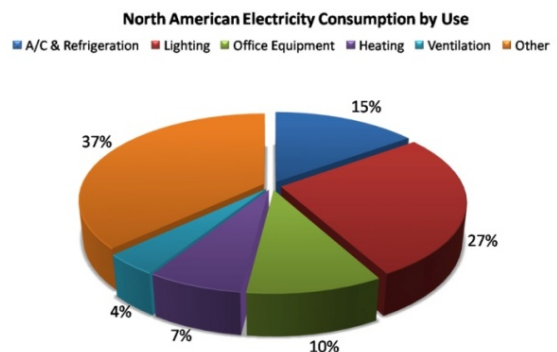
However, electricity has not been without its costs, most of which are now on the rise. To supply larger cities with power, more and more electricity generation plants have been built, burning more and more non-renewable resources. This burning of resources has caused a massive burden on the environment as air pollution has increased and greenhouse gas emissions have gone through the roof. The increasing demand for electricity to power our factories, data centers, hospitals, hotels, supermarkets, offices and homes, has strained our existing electricity grid to the point of collapse. As demand increases and supply remains static or declines, prices continue to rise. The convergence of pressures from the environmental, infrastructural and financial realms are pushing us to search for solutions.

There are two ways to reduce the environmental impact and strain on the existing electricity grid caused by the high energy requirements of buildings. One is through smart generation and one is through smart consumption. Using renewable resources such as wind and solar power to generate electricity, is one way to increase the amount of energy available for use without causing further environmental harm

through greenhouse gas emissions. The other main strategy is to reduce the amount of electricity we are consuming around the world. Energy efficiency, or the 'fifth fuel', offers a cost effective means of reducing our consumption while maintaining our current standards of living. All it requires is technological innovation to achieve more with less.

THE SMARTCOOL SOLUTION

According to the US Department of Energy, the largest single use for electricity in North America is lighting at 27%, followed by cooling at 15% [1]. In tropical regions and other areas with higher ambient temperatures than North America, the amount of energy consumed by cooling systems is higher, coming closer to the 27% used by lighting.



There has been a great deal of excellent innovation in the lighting field. However, in the area of air conditioning and refrigeration (cooling systems), most of the development has resulted in expensive and complex systems requiring large capital investments, significant system downtime, highly skilled installers and ongoing system management. The overall cost of these systems has been prohibitive to most small to medium energy consumers and even many larger businesses have been challenged to meet the expense.

Smartcool has chosen to focus on working towards greater energy efficiency in these cooling systems through unique retrofit products. Within these types of systems the compressor consumes the greatest amount of electricity, in most cases accounting for 70% of the total energy used by the system. Smartcool improves the efficiency of the compressors by optimizing their performance. This compressor optimization will reduce the energy consumption (kWh) by an average of 15% and the maximum demand (KW) by an average of 10%, resulting in significant benefits to customers and utilities.



Smartcool's first product offering was the Energy Saving Module™ or ESM™. This retrofit technology for air conditioning and refrigeration systems has several key features which set it apart from other retrofit devices. The ESM™ is compatible with any air conditioning or refrigeration system, including the latest building automation systems and computer controlled refrigeration plants. The modular system interfaces directly with existing controls to achieve compressor optimization. Up to eight compressors can be controlled using the ESM™, giving excellent value to the customer. The "on and off" feature allows it to be switched out of the compressor circuit for easy savings verification and it will always fail to safe. Advanced monitoring options are also available, including networking through a modem for remote performance tracking. Significantly, Smartcool's ESM™ achieves energy usage and demand reductions while maintaining temperature requirements and without any impact on manufacturers' warranties.

CAPITALIZING ON THE OPPORTUNITY

Economic and environmental issues around energy consumption have leapt to the forefront of political and corporate agendas, particularly over the past year. Smartcool will meet the challenge of energy efficiency, ready with the necessary technology and skills to provide top quality service to its client. Smartcool's advantage in the burgeoning clean tech market lies in four main areas: a strong distribution network, proven technology, quantifiable results, and research and development.

Distribution Networks

Smartcool acquired its original technology and the Energy Saving Module™ in 2006 from an Australian company called Abbotly Technologies Pty Ltd. Although this technology had emerged in the Australian market in 1986, structure and resources to support its widespread application were lacking. As a result, the ability of the ESM™ to penetrate international markets was limited, despite the obvious potential for success.

Smartcool set out to create a pervasive and reliable distribution network for its technology that would be able to take advantage of the huge opportunities available in the clean tech sector. By working with the existing sales channels for the ESM™, Smartcool quickly established a presence in the US, Australia, and the UK. With the inclusion of two subsidiaries, Smartcool Systems US Inc. and Smartcool Systems EMEA, distribution and sales in target markets have been solidified.

Independent distributors have come to play a major role in the expansion of Smartcool's network. Some companies have been founded around distribution agreements with Smartcool, and others have incorporated the ESM™ into their existing product offerings. The screening and training processes are rigorous to ensure that distributors are headed for success and will contribute to the growth of a strong brand identity and sales record with Smartcool.

Proven Technology

With such a huge variety of technologies to choose from, how has Smartcool emerged as a leader in the field? First, extensive independent third party testing has shown that the technology can be trusted to perform. Second, thousands of installations worldwide and a long product history prove that Smartcool is offering a technology that works.

The first formal independent third party testing on the ESM™ took place in 1998 by the Los Angeles Department of Water and Power (LADWP). The ESM™ was installed on two compressors of the refrigeration system of Notrica's Market in Bellflower, California. The average daily kWh usage savings recorded during this test was between 20 and 24%, and temperature performance was maintained.

The US Department of Energy's Oak Ridge National Laboratory, and most recently, the University of Miami, on behalf of Florida Power & Light, have also conducted testing. The 2006 University of Miami test showed that the ESM™ reduced kWh usage of the entire air conditioning system by 8.9% – which provides a savings of 13.38% of the kWh usage by the compressors, an annual reduction of 43,660 kWh and a reduction in greenhouse gas emissions of 58,911 lbs.

International clients from a wide variety of businesses including telecommunications, data centers, food processing, cold storage, supermarkets, big box retail, hotels, hospitals, and schools, have all installed the ESM™ and achieved

impressive results in their facilities. Tesco, the leading supermarket in the UK and in top five in the worldwide, is a Smartcool client. Telstra, the Australian telecommunications company had the ESM™ installed in hundreds of its switching stations. Gate Gourmet, one of the largest airline catering companies in the world, relies on the ESM™ to reduce its energy bills at its Heathrow facility. In the US alone the client list is long: Hellmann Perishable Logistics (FL), the Navy Exchange (FL), Olympic Fruit & Vegetable (CA), Tapia Brothers (CA), Pharmacia (NJ), El Rancho Marketplace (CA), and Kamehameha Schools (HI). Clients have chosen Smartcool over other technology providers for three key reasons: we guarantee temperature performance, we have 26,000 installations worldwide, and our energy savings and associated financial benefits are significant and easily quantified.

Quantifiable Results

Governments around the world are establishing legislation around reducing greenhouse gas (GHG) emissions, and utilities are providing financial incentives to do so while becoming more energy efficient. The ability to prove a carbon footprint and energy consumption have been reduced, is becoming increasingly valuable. With sticks behind and carrot ahead, the impetus for businesses to shift practices towards greater energy efficiency and environmental sensitivity is stronger every day.

In order to prove compliance with legislation and to meet the standards necessary for rebates, an energy consumer must be able to prove that a change has occurred. Savings achieved by Smartcool's technology can be quantified, making this process quite simple. Smartcool performs basic monitoring and verification at the time of installation to ensure the technology is operating correctly. Since the ESM™ can be switched in and out of the circuit, collecting comparative data with the ESM™ saving energy and with it sitting idle is straightforward. By showing how much energy a cooling system consumed without the ESM™, and how much energy the ESM™ is able to save, Smartcool has helped clients around the US to secure rebates from their local utilities.

Smartcool clients see a rapid return on investment purely based on the reliable energy savings the technology can achieve. With the added perk of receiving a rebate, Smartcool's technology becomes even more attractive to businesses watching their bottom lines.

Evolution

The Energy Saving Module™ has helped give Smartcool a firm foothold in the clean tech industry and established a solid distribution network with prominent clients around the world. However, due to its complexity the ESM™ is not appropriate for every client wishing to reduce the energy bill from their cooling systems. Smartcool responded to the need for another product offering with extensive research and the development of a new technology.

In February 2009, Smartcool launched its newest product to continue pursuing opportunities in the market. The ECO³™ is a highly economical, small scale application of Smartcool's technology. It is compatible with any air conditioning and refrigeration system with one or two compressors, and like the ESM™ it interfaces directly with the existing controls. The ECO³™ has two key features that give it an enormous advantage over other technologies for certain applications.

First, the ECO³™ has been developed with the most simple installation process possible for such an effective device. For a qualified technician, installation can be completed in as little as one hour; this minimizes any disruption to business or the cooling system, and significantly reduces costs. The casing of the ECO³™ is rated to IP64, meaning it can be installed anywhere, even outdoors, without any additional (and expensive) protective enclosure.

Second, the ECO³™ has a completely unique ability to optimize the cooling *and* heating cycles of compressor driven heat pumps. These types of heat pumps are prevalent in areas of North America and Europe where lower ambient temperatures mean that cooling systems only operate for part of the year with heating systems taking over through the winter. The ECO³™ has exclusive access to this large market, as it provides the most effective energy efficiency device for customers with these types of units.

REVOLUTION

The ECO³™ has become a game-changing innovation for Smartcool. The ESM™ requires a high degree of technical expertise to install, and is most suitable for cooling systems with a higher load and level of consumption. As a result, Smartcool's approach in the past has been to grant exclusive distribution in certain regions to companies with the wherewithal to retain experienced HVAC-R technicians. These distributors have traditionally targeted vertical markets where a heavy load on the cooling systems is to be expected: data centers, telecommunications, cold storage, food processing, and supermarkets. They focused on regions with high ambient temperatures and high electrical rates, where the ESM™ could offer the most energy and related monetary savings.



With the launch of the ECO³™, these constraints for distributors have disappeared, opening up massive opportunities around the world. Non-exclusive distributors for the ECO³™ are signing on with Smartcool, bringing existing clients from a wider range of industries and regions with them.

Initial US installations have already taken place, including at a test facility in Jacksonville, TX. At this equipment sales facility, the ECO³™ was installed on the air conditioning system and achieved significant energy savings. Over the next year, the customer is expected to save approximately 7,774 kWh with a return on investment of just 14 months. Similarly impressive results are coming in from over 100 installations in Canada, Hong Kong, Laos, the Philippines, Australia, the UK and Barbados.

Despite the current recession, Smartcool continues to expand its sales and distribution network and achieve success with its product line. As the cornerstone of the business, the ESM™ continues to build on its previous success with a number of roll-outs in progress, and new clients and new distributors buying into the technology. The ECO³™ has made Smartcool's energy savings accessible to a wider range of businesses with a satisfying return on investment.

In the past, Smartcool has received recognition as a TSX Venture 50 company, and a recipient of the prestigious Deloitte Technology Green 15 Award. In 2009 Smartcool has already been added to IDC's list of the top ten green Canadian IT companies to watch. Corporate growth and product development will continue as Smartcool remains competitive in its sector. Energy efficiency offers one path out of the global energy crisis, and Smartcool is prepared to lead the way.