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A customer magazine
of the ABB Group
New Zealand

insider



Renewable energy

Environmentally sustainable – 06

ABB's technology provides further growth to Europe's largest wind farm

Grid compliant – 08

ABB and Vestas working together to enable Fakken wind farm to be grid compliant

Limitless power protection – 10

32 PCS100 AVCs protecting semiconductor processes in Korea

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Reducing pollution at a shipyard in Bahrain

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ABB provide a solution to DONG energy

Power and productivity
for a better world™



Renewable energy comes from natural resources. 16 percent of global final energy consumption comes from renewables with wind power increasing at an annual rate of 20 percent. ABB have the technologies to support the growth of renewable energy that will dramatically reduce the emissions of greenhouse gases that harm the environment.



5|12

Insider



John Penny

General Manager

LV Power Converter Products (DMPE)

We have another exciting issue of Insider magazine with lots of informative stories about applications of ABB's low and medium voltage power electronics technology. I am particularly pleased to have an article from Newave in this edition. Many of you will already know Newave but for those that don't, Newave is a highly innovative Swiss based uninterruptible supply (UPS) manufacturer that was acquired by ABB in February this year. Newave are pioneers in modular UPS technology utilizing transformerless distributed parallel designs and are well positioned in the traditional commercial UPS market sectors. This complements very nicely the industrial UPS's and voltage conditioning products designed and manufactured by ABB's Napier New Zealand based team.

ABB can now rightfully claim to be a major player in the "Power Protection" market space with a

wide range of solutions to keep business and industry running smoothly during potentially disruptive power quality events. Considerable effort is now going into expanding the offering even further; expect to be reading about UPS and other solutions at even higher kVA and voltage levels for complete datacenter and industrial plant protection in the near future. Computer rooms and datacenters are big consumers of electrical power so there is great focus on energy efficiency. Newave have delivered UPS protection for one of Denmark's greenest and most energy-efficient server rooms at DONG Energy, which we feature this month.

Semiconductor manufacturing is another large user of electrical power and, like datacenters, this industry relies on a clean and continuous electrical supply. A Korean company that is one of the world's largest manufacturers of memory chips, has widely applied the highly efficient PCS100 Active Voltage Conditioners (AVCs) over many years. We feature the extent of these huge applications and the benefits they have provided to this company in helping to ensure high yield of memory chips from their wafer production facilities.

The integration of renewables and in particular wind, continues to be a major focus for ABB's regionally located local engineering centers. Grid codes are becoming stricter and are driving the installation of our STATCOM and Battery Energy Storage solutions. Wind farms are expected to ride through power system fault events and deliver a stable supply of electrical power. ABB have been working

closely with the Vestas R&D team on the qualification of the low voltage PCS100 STATCOM system. This has culminated in the installation of three PCS100 systems rated at 2 MVar housed in containers for a 54-megawatt onshore wind farm at Fakken in the far north of Norway. This project involved collaboration between the Australian local engineering center based in Melbourne, the Lodz Poland based European PCS100 center of excellence and the ABB Denmark DM team, all supported by the New Zealand based PCS100 design center as required.

Shore to ship power supplies continue to be installed globally as port companies and shipyards move to reduce pollution and save energy. Most of these applications face the challenges caused by a demanding port environment with salt-laden air. An interesting article features the installation of three low voltage PCS100 frequency converters installed at the ASRY ship yard in Bahrain, where extreme temperatures provided another challenge that was met by the ABB team.

I am sure you will enjoy reading the various articles featured in this issue.



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- Energy storage systems : www.abb.com/energystorageandgridstabilization
- PCS 6000 solutions : www.abb.com/powerelectronics
- UPS and Power Conditioning: www.abb.com/UPS



Three liquid cooled PCS 6000 STATCOM units of ± 15 MVar each at 33 kV installed at Whitelee wind farm, located in Great Britain

Environmentally sustainable

ABB's PCS 6000 STATCOM enables further growth of Europe's largest wind farm.



The scope of delivery also included transformers and external water/air heat exchangers



Whitelee will be able to generate 539 MW of electricity, enough to power the equivalent of over 304,000 homes

The exponential growth of the world's population and our growing reliance on electricity has led to a dramatically increasing energy demand worldwide. According to IEC, International Energy Agency, over the last decade the average energy consumption per person rose by 10 percent while the world's population rose by 27 percent. In order to meet this growing demand, energy supplies need to be adjusted in a way that is safe, reliable, cost-effective and, most importantly, environmentally sustainable. Taking these factors into consideration, it is no wonder that wind energy production has so rapidly gained in popularity.

Background

The global growth of installed wind power has forced transmission system operators to tighten their grid connection rules in order to maintain the security and quality of the power system. Grid codes have been introduced, defining the technical parameters electricity generating plants have to fulfil to ensure proper functioning of the network. As a consequence, some commonly used turbine designs have difficulty achieving grid code compliance.

One such example is Europe's largest wind park, Whitelee Windfarm, developed by Scottish Power Renewables. A recent extension project launched there, involving 75 new turbines, will add another 217 MW of capacity to the existing 322 MW.

One of the biggest challenges faced by this impressive investment was that strict national grid code requirements made it necessary for the turbines to compensate for the specified reactive power. Because

the wind turbines in general have more inductive than capacitive output capability, the reactive power contribution of the wind farm was not sufficient, thus calling for additional compensation equipment.

Solution

In response to this problem, ABB offered a holistic solution based on PCS 6000 STATCOM. As a robust and reliable reactive power compensation product, the STATCOM was the ideal option. This unique line-up of state-of-the-art technology adds the missing functionality to the wind farm, making it compliant with the national grid code.

As a pure static device with no switched passive elements, PCS 6000 provides outstanding performance for both steady state and dynamic operation. In addition, the fast dynamic voltage control which operates during balanced as well as unbalanced grid faults (fault ride through) allows the system to meet the demanding requirements specified by the transmission operator.

ABB supplied three liquid cooled PCS 6000 units of ± 15 MVar each at 33 kV, installed within shipping containers. The scope of delivery also included transformers as well as an external water/air heat exchanger. In addition, ABB was responsible for project management and commissioning.

Result

The successful commissioning of ABB's STATCOM units took place in September 2012. Thanks to ABB's applied solution, Whitelee Windfarm is now in the final phase of their ambitious plan. Gaining additional capacity, Whitelee will be

able to generate 539 MW of electricity, enough to power the equivalent of over 304,000 homes.

ABB's technology

ABB's Power Converter Systems provide a new dimension in developing smart grids, thus allowing for a significant increase in renewable energy generation. The main features of PCS 6000 are its efficiency (from 97 to 98.5 percent) and high reliability. Modular construction utilizing leading-edge technology makes STATCOM's design highly configurable and versatile, thereby enabling both indoor and outdoor placement. The solution is particularly competitive in terms of installation time and space requirements. Furthermore, high efficiency and low maintenance (MTTR < 30min) lead to low operational costs. Owing to maximum flexibility, the solution may be applied to a wide range of applications. These include wind farms, utilities with weak grids or fluctuating reactive loads, as well as industrial applications.

To see further technology information please visit:

www.abb.com/energystorageandgrid-stabilization





Three 2 MVar PCS100 STATCOM containers for a 54-megawatt onshore wind farm located in Fakken, in the far north of Norway

Grid compliant

ABB supplies a solution to one of the world's largest wind turbine companies, Vestas.

ABB's Power Electronics team in Australia and Poland have installed three 2 MVar PCS100 STATCOM containers plus two 2.5 MVar ABB ABACUS Mechanical Switched Cap Banks (MSC) for Vestas. Vestas had received an order for 18 turbines (3 MW each) for a 54 MW onshore wind farm located in Fakken in the far north of Norway. One of the main objectives of the Norwegian investment is the diversification of power generation, since more than 98 percent of Norway's electricity is supplied by hydro-power. This solution will enable the wind farm to comply with the local Norwegian grid code and also keep the voltage of the wind farm grid stable.



Fakken wind farm in Norway

Since innovative technology opened up great possibilities for renewable energy production, wind power has experienced a spectacular growth, with the number of new installations increasing every day. In fact, large-scale wind farms are now becoming common place. Simultaneously, the dimensions of the turbines are getting more impressive, with their capacity reaching 10 MW.

Background

The significant increase of installed wind power has forced transmission system operators to tighten their grid connection rules – also known as grid codes – in order to limit the effects of wind power farms on network quality and stability. For this reason, some commonly used turbine designs have difficulty in achieving grid code compliance in several countries. Many wind farm projects are realized either offshore or at sparsely inhabited, remote locations where the electricity grid is relatively weak. Such conditions are an on-going challenge for Vestas.

Joint efforts between ABB and Vestas R&D teams incorporated this project as a qualification of the PCS100 platform, in order for it to become a standard product in the supplier catalogue for Vestas in the future. In addition, the hybrid project combining dynamic and classical reactive power compensation will reduce the overall investment cost to Vestas. A further benefit is that the joint solution will allow a seamless integration of Vestas and ABB control systems to compensate for the reactive power range in the Wind Turbine Generators (WTGs). The result is a fast and dynamic response where the Statcom acts as a reactive power source controlled in parallel with the WTGs by the Vestas Power Plant Controller.

ABB had previously installed several systems to integrate renewable energy with Vestas, including a 400 kW Energy Storage System (ESS) which has been in operation since October 2010. This was the first PCS100 STATCOM solution delivered to Vestas. Additionally, several PCS 6000s have already been produced and installed by ABB in Switzerland. The success of the product's performance and reliability, and the need to fulfill the small power range group, lead to the three 2 MVar STATCOM order.

Solution

In order to meet grid connection requirements, the challenging location of Fakken increases the need to complement the wind farm with supplementary compensation equipment. The PCS100, a fully dynamic STATCOM, provides a perfect solution for the project. The three 2 MVar PCS100 STATCOM containers



A crane positioning one of the PCS100 STATCOM containers into place

plus two 2.5 MVar ABB ABACUS Mechanical Switched Capacitor Banks (MSC) provide the additional functionality to the Fakken Wind Park, making it grid code compliant. The STATCOM, as a pure static device with no switched passive elements, provides outstanding performance for dynamic operation, extending the performance and range of the wind turbines.

Result

The fast dynamic voltage control and the behavior during balanced as well as unbalanced grid faults (fault ride through) allow the system to meet the stringent grid code requirements faced by Fakken. The ABB ABACUS MSC, in conjunction with the STATCOM, will also enable Vestas to comply with local Norwegian static power factor grid code requirements. Freddie Andreassen, Vestas Technology R&D Director stated, "For the first time, the VestasOnline™ Power Plant Controller has an ABB STATCOM in the loop via an advanced and standardized communication scheme. We have experienced a very successful and professional cooperation with ABB on this controller integration project."

Features

The PCS100 STATCOM provides modularity and overload capability. The main feature of the PCS100 solution is the advanced redundancy, which reduces power output in a failure by only a small fraction of the total system power. In addition, the productized STATCOM system solution at Fakken with three 2 MVar containers enables system redundancy and hence increases further availability for such a remote and difficult to maintain plant.

The Fakken wind farm will generate 135 GWh per year. To make this possible ABB will supply Vestas with a full reactive power plant consisting of MV switchgear and all related services in addition to the STATCOM containers and MSC.

To see further technology information please visit:
www.abb.com/energystorageandgridstabilization





A semiconductor production line

Limitless power protection

ABB provides an integral power protection strategy consisting of 32 PCS100 AVCs to a world class semiconductor manufacturer in Korea.

ABB have provided a power electronic solution of 32 PCS100 AVCs (Active Voltage Conditioners) that have been installed in a first-class semiconductor production facility based in Korea. The order consists of 26 900 kVA units and six 1500 kVA AVCs, with a combined power rating of over 32 MVA. This solution is part of a strategy to provide power protection for semiconductor processes. The process protection includes production tools such as RF (radio frequency) generators and critical support infrastructure, such as chilled water pumps and chillers.

As the consumer electronics industry continues to grow, so too does the semiconductor industry in order to meet the demands of electronics manufacturers. To ensure that the supply of their products can keep up with demand, the semiconductor production process must be protected against disruption from external events such as voltage sags or swells. A protected process is a crucial step towards ensuring high levels of consistency and production efficiency. Factors such as the weather have a major impact on Korea's power supply and this is the main reason why the company implemented ABB's leading edge technology. The semiconductor production process utilizes sophisticated equipment that is very sensitive to voltage fluctuations and will shutdown if the voltage varies too much. When this occurs, losses can be high as the direct cost of resuming operations and scrapping damaged products can



The 32 PCS100 AVCs that are protecting the semiconductor processes

is specified in the design of all new fabrication (FAB), upgrades and the expansion of existing facilities.

Since 2004, the company has installed 338 ABB systems exceeding a total of 300 MVA.

amount to millions of dollars. In this competitive environment, there is also an intangible cost if a downstream company is unable to get the products they need in a timely manner.

Extreme weather conditions

Korea is subject to four distinct seasons. Winter brings subzero temperatures with the occasional snow and ice storm. Summer has a rainy season, which often brings typhoons, that lasts from July to August. The typhoons can cause major flooding and impact on Korea's power system, causing voltage sag events. Often multiple events are experienced within minutes during periods of lightning. These seasonal weather patterns are repeated every year, so there is an on-going need for preventative action and an investment in power protection systems. The features of the PCS100 AVCs, such as their small footprint, high efficiency, and low maintenance, are very appealing to the manufacturer.

Past relationship

The company has a history of utilizing ABB's PCS100 AVCs dating back to 2004. This solution has been used in all the company's other facilities in Korea and China with proven success. Since 2004, the company has installed 338 ABB systems exceeding a total of 300 MVA. The unique design of the AVC does not require storage elements such as batteries, capacitors or flywheels. This means long term reliability is exceptional and maintenance requirements are minimal. This, combined with the PCS100's high efficiency, provides a system with very low OPEX (ongoing operational expense) for the facility owners. All this, plus the on-going protection of the company's plants over the last eight years, has strengthened the trust in ABB's product and support. So much so that the PCS100

This high-tech manufacturing company is one of the world's largest manufacturers of memory semiconductors, and is the largest DRAM provider in emerging markets such as China. It employs around 21,000 people. With an ever-growing share of semiconductor memory markets, the demand for power protection will be a crucial step towards ensuring their competitive position is secured.

Technology driven

ABB's PCS100 LV power protection applications currently protect sensitive industrial and commercial loads from voltage disturbance, with fast and accurate sag and surge correction, for major industry players throughout Asia and around the globe. These high tech electronic solutions protect sophisticated factories from the repercussions of equipment failure, accidents and extreme weather conditions. The benefits offered by ABB's PCS100 power protection products are considerable. They include boosting productivity, the reduction of waste, improvement in up-time of high technology production lines, and reduced maintenance for the protected equipment. Ultimately the customer saves money and increases their profitability.

To see PCS100 AVC technology information please visit:

www.abb.com/powerquality





ASRY shipyard in Bahrain

Grid connection

ABB innovation saves costs and reduces pollution at a shipyard in Bahrain.

ABB have installed three PCS100 SFCs (Static Frequency Converters) at a shipyard in Bahrain to help the facility become more environmentally friendly and reduce maintenance costs. ABB's grid connection technology enables commercial ships calling at ports to turn off their diesel engines and tap into cleaner onshore energy sources and save fuel. Having successfully delivered the world's first shore-to-ship power connection to the port of Gothenburg, Sweden in 2000, ABB has the experience required to make the complete connection, onboard and onshore. Unique features, such as a high efficiency rate of 95 percent whilst having precise control of frequency and voltage, create a clean power supply to isolate an unstable grid from a critical load.



tion, reliability and availability of the equipment is an issue. But the efficiency of the PCS100 SFCs is much higher – up to 95 percent. ABB is the market leader for SFC technology and thanks to acknowledged technological leadership secured the order from ASRY.

Previous experience

Saad Shetiwi, Head of Yard Operations at ASRY, says, “With ABB’s pioneering technology coupled with local support capabilities, we will reap the benefits.”

Gaurang Desai, acting Sales Manager, Discrete Automation and Motion (DM), Bahrain, says, “We were thrilled when ASRY positioned us ahead of competition and gave us due credit for being a technology leader. The new converters will be installed by September 2012. The customer benefits include no noise pollution, lower operating and maintenance costs, reduced nitrogen dioxide pollution and improved efficiency at the shipyard.”

The electrical scope was sub-contracted to ACE Al Moayed. A technical presentation on the benefits of PCS100 SFCs compared to the rotary convertor was made by Alan Cooper, Engineering manager, DM at ABB in New Zealand.

In the shipping industry, harbors have been identified as a prime area in which emissions can be significantly reduced. With this in mind, port authorities, ship-owners, industry suppliers and regulators are now focusing on the decade old technology known as shore-to-ship power, for which universal electrical standards are on the verge of being ratified by IEEE, ISO and the IEC.

ASRY was among the first shipyards in the world to receive ISO certifications for Quality, Management, Environment and Health & Safety Systems in addition to the ISPS code for Port Security. By adopting ABB’s PCS100 SFC, a large ship can cut fuel consumption by up to 20 metric tons and reduce CO₂ emissions by 60 metric tons during a 10-hour stay in port.

ASRY, a leading Middle Eastern ship building and repair company, had been using rotary frequency converters for two years. These rotary converters were not very environmentally friendly due to nitrogen dioxide gas emissions and low efficiency. Therefore,

to adopt a clean energy system, ABB’s grid connection technology was implemented. Internationally, many ships are designed to operate on a 60 Hz power supply, however in the Middle East, the standard power supply is only 50 Hz. Therefore, an SFC (Static Frequency Converter) is used to feed the power supply to ships at ASRY in order to make them compatible with the 50 Hz requirement. Also, to adhere to ASRY’s requirements, the three 1250 kVA SFCs were de-rated to 882 kVA to suit the high ambient temperature of Bahrain.

Promising outcome

Since installing the PCS100 SFCs, there is no longer any rotating equipment in the system and therefore no need for mechanical maintenance. As a result, efficiency is drastically improved and the operating and maintenance cost of the equipment over time is reduced. Due to less maintenance issues the solution provides high reliability and greater availability of the equipment.

For a rotary system, efficiency is generally around 75 percent and in addition, pollu-

A shore solution

ABB has developed scalable and flexible installation solutions that meet the needs of ship-owners and ports. As part of ABB’s shore-to-ship power solution, the company has engineered both shore-side and ship-side connections, and is one of the few companies worldwide that has developed a reference list in this technology. ABB continues to work closely with customers worldwide to ensure its portside offerings are meeting the needs of the market. To see further technology information please visit:

[www.abb.com/powerelectronics/ \(grid interconnection products\)](http://www.abb.com/powerelectronics/grid-interconnection-products)

[PCS100 SFC shore connection video](#)





ABB's business partner in Denmark, has delivered a new server room to DONG Energy

Critical IT infrastructure

Authentic modular UPS systems.

Working with its business partner in Denmark, ABB's new UPS product group (formally Newave), has delivered a new server room to DONG Energy. The facility is one of Denmark's greenest and most energy-efficient server rooms. A high degree of free cooling due to rear-door cooling and a modular UPS system from ABB contribute to an expected PUE (power usage effectiveness) value of approximately 1.3 and a COP (coefficient of performance) factor of over 7.5. ABB's UPS systems are reliable with an efficiency rate of up to 96 percent and are therefore a sound investment for modular technology.

Exacting IT system managers have quickly recognised the advantages of modular UPS-systems. You pay as you grow. Innovative companies grow, especially in the initial few years, but they may lack investment capital. Yet their power supply should grow simultaneously and continually.

The solution lies in modular technology. ABB is one of the first to recognize this and has developed the Conceptpower DPA™ (Decentralized Parallel Architecture) UPS-system, which allows for expansion as the firm grows. Up to five modules can be accommodated in a rack with a footprint of 0.6 m² each having an output of 40 kVA. In this way a power density of 200 kVA on 0.6 m² of floor space is reached – a peak value, possible because of the extremely high efficiency (up to 96 percent) of ABB's modules.

DONG Energy is one of the leading energy groups in Northern Europe and is headquartered in Denmark. Their business is based on procuring, producing, distributing and trading in energy and related products. Over 20 years experience of offshore wind farm development makes DONG Energy the current market leader in offshore wind power.

When they developed their new server room, they went for the most energy-efficient and environment-friendly solution they could find within the framework of a healthy budget. Atek supplied them with ABB technology. Charlotte Wederking is Senior Project Manager of Group IT

The solution lies in modular technology. ABB is one of the first to recognize this.

at DONG Energy. She explains, "It is an ultra-modern and green solution. I cannot say with certainty that this is Denmark's most energy-efficient server room, but it is certainly one of the best."

The server room's PUE (power usage effectiveness) value is as low as around 1.3 when all servers are installed. The PUE value is calculated by dividing the total electricity consumption in the server room by the total electricity consumption of the IT equipment. According to the Uptime Institute, the PUE value for server rooms is normally around 2.5. The efficiency is also excellent. The COP (coef-



Onsite at DONG Energy's highly energy-efficient data center

icient of performance) factor at full load is estimated to be over 7.5. This means that at least 7.5 kW cooling capacity is being produced for every 1 kW recorded by the cooling system.

Charlotte Wederking highlights several points that made DONG Energy's Group IT select the server room from Atek. "We put special emphasis on a high degree of free cooling," she explains. "Atek's solution has 100 percent free cooling at 11 degrees Celsius and partial free cooling at up to 17 degrees Celsius.

This is mainly due to the use of the innovative Rear-Door Heat Exchanger (RD-

Hx), where the cooling surface is located at the heat source at the back of the rack cabinet. This rear-door cooling ensures that the heat is removed before it spreads throughout the room. The flow temperature starts at a full 15 degrees Celsius, whereas traditional systems start at six degrees Celsius. In addition, the cooling system contains the natural coolant propane instead of a traditional synthetic coolant.

"Propane is virtually harmless to the environment and the surroundings," says Charlotte Wederking. In addition, only the infrastructure that offers the highest

energy efficiency such as the UPS system by ABB has been chosen to equip the data centre. "We went for the most energy-efficient and environment-friendly solution within the framework of a healthy budget," says Ms Wederking.

In the power range of 10-1500 kVA, ABB is the only manufacturer that is able to offer a third generation of UPS. Its market share with regard to modular systems is approximately 10 percent. The production of highly compacted modular UPS-systems has been made possible through modern semiconductors (IGBT) and a design without a transformer. ABB is the inventor of this technology. After a significant reduction of size and weight it was possible to reach a power density that is shared by few other producers.

To see further technology information please visit:

www.abb.com/UPS



PCS 6000 Wind medium voltage power converter

At home in harsh offshore environments

PCS 6000 Wind medium voltage power converter is designed to cover all the needs of 5+ MW wind turbines, especially those dedicated to off-shore application.

It offers a proven, highly efficient and easy-to-service solution that contributes to stability of the grid.

Application: wind turbines off-shore and on-shore

The PCS 6000 Wind is highly reliable thanks to the “less part count” concept. With only 26 power semiconductors, the converter enables grid compliant wind turbine operation up to 9 MVA.

An overall efficiency of around 98 percent is achieved thanks to the very effective IGCT semiconductors technology and optimized pulse pattern. The medium voltage and the compact design allow the converter to be installed on a single deck in the turbine tower foot. As a consequence, the reduced tower head mass saves foundation costs and service access becomes easy.

With PCS 6000 Wind, ABB delivers a complete frequency converter, highly flexible in configuration and line-up. It can include generator breaker, cooling system, filters, brake chopper for smooth fault ride-through, and soft-start unit. It supports single or multi generator operation.

www.abb.com/powerelectronics/generation



Advantages

- Highest availability and efficiency
- Lowest levelized cost of energy
- Smallest footprint and weight
- Reduced risk with proven MV building blocks
- Generator and grid interconnection support

PCS100 Product training 2012

Register your interest now for 6-8 November



Enhance your technical ability and knowledge in the PCS100 product range. Receive the benefit of interactive practical training with real devices for demonstration purposes and functional exercises.

Product training

Products, applications, markets and technical basics

- Power protection
- Frequency conversion
- Grid connect interfaces

Marketing

- PCS100 tools and support

Hardware

- Power modules, aux.module, interfaces

Control modes, interfaces, options

- Power protection
- Frequency conversion
- Grid connect interfaces

Order handling process

- PCS100 sizing and pricing

PCS100 outlook

- Ongoing and future developments

Who should attend?

ABB channel partner sales and service engineers.

Training locations

ABB's low voltage power converter product training is conducted in our well equipped manufacturing and R&D facility in Napier, New Zealand, by highly qualified engineers and instructors.

Enrolments

Register your interest for any one of our courses via email to: pq.supportline.nz@nz.abb.com

Confirmation

Confirmation of acceptance and course information will be sent approximately two weeks before the start of the course. We will inform you by email or phone if there are no vacant places.

Course program

The course program and all related information about the course times and venue are sent to the participants with the confirmation. The course normally runs from 9.00 a.m. - 4.00 p.m. over a three day period.

Reservations

We reserve the right to change any course schedules, programs and their contents. A course could be cancelled due to minimal enrolment. The maximum number of students varies between 10 - 12 persons.

Cancellation

In the case of cancellation, inform us as soon as possible. This will allow another applicant to attend the course. Your place on a course can be transferred to another person in your company or department.

Training schedule 2012

Course	Day one	Day two	Day three
Four	6 November	7 November	8 November
Agenda a.m.	PCS100 product platform overview	PCS100 frequency conversion	PCS100 sizing and pricing tools
Agenda p.m.	PCS100 power protection	PCS100 grid connection	Outlook / future developments

Service and commissioning training 2012

Register your interest now for November 2012

Your knowledge. Your power.

ABB is a leading supplier of power electronic systems. This extensive experience and history of innovation helps customers around the world to improve plant performance and production.

Our customer awareness means that we are committed to supporting customers globally in their plans for growth. ABB offers a wide range of professional training courses adapted to meet the needs of customers and partner channels.

Benefits of the training

Service and commissioning training courses give valuable support to increase return on investment, reduce costs in down time and improve skills and motivation of personnel.

Training participants profit from our extensive experience and modern training infrastructures which enable them to:

- efficiently operate and maintain ABB's PCS100 low voltage power converter systems
- extend the lifetime of the product

Training locations

ABB's low voltage power converter product training is conducted in our well equipped manufacturing and R&D facility in Napier, New Zealand, by highly qualified engineers and instructors.

Course profile

Our service and commissioning training courses are aimed at qualifying maintenance engineers to undergo unsupervised first level support of ABB's PCS100 applications. The main goal of the course is to learn how to operate, troubleshoot and maintain the system.

Upon completion of the course, maintenance engineers will be able to locate and identify hardware components, download fault loggers and important information for first analyses by support personnel, replace parts and perform preventative maintenance. Trainees will gain practical experience using available tools and techniques through organised practical exercises.

Who should attend?

ABB partner channel and customer service engineers.

Confirmation

Confirmation, reservation details, and all related course information including schedule and venue details will be sent approximately four weeks before the start of the course.



Enrolments

Register your interest for upcoming courses via email to: pq.supportline.nz@nz.abb.com

Training schedule 2012

Course	Day one	Day two	Day three
Four	20 November	21 November	22 November
Agenda a.m.	PCS100 platform service introduction	PCS100 service power protection	PCS100 service grid interconnection
Agenda p.m.	PCS100 platform service detailed	PCS100 service frequency conversion	Outlook / future developments

Powering the future



Project feature

- 6. Environmentally friendly**
ABB's shore-to-ship power solution helps Stena Line to reduce environmental impact

Industry watch

- 10. Wind power**
PCS100 and PCS 6000 powering the industry
- 12. Steel industry**
ABB supplies a power protection solution to Gülermak in Turkey

Project completion

- 14. Flawless cabling**
Making an impact in leading edge manufacturing
- 16. Protecting the motor**
Increasing the rate of production for the largest cellulose plant in China

Power from within



Project feature

- 6. Energy saving solution**
ABB provides a battery solution to one of Switzerland's largest energy distributors

Industry watch

- 10. Shipping Industry**
Successful grid interconnection for a better world
- 12. Semiconductor demand increasing**
PCS100 AVCs making their mark in the semiconductor world

Project completion

- 14. Medical intelligence**
Samsung Medical hospital in Korea leading the way for the future
- 16. Going green**
The Swedish port of Ystad embraces PCS 6000 technology



Connect emission-free power to the grid?

Naturally.



Renewable energy plays a vital role when it comes to balancing the need for more power with minimum environmental impact. By choosing from ABB's PCS100 STATCOM and Energy Storage System range, you are selecting from a unique line up of advanced technology that addresses the challenges of intermittent supply and connection in remote locations. This comprehensive line up of low voltage power converter solutions offers superior value in improved energy efficiency, grid stabilization and reduction in peak generation costs. For more information please visit us at www.abb.com/powerelectronics