



TECHNICAL ENGINEERING COURSES

Distributed Generation

Power Quality

System Restoration

Voltage Stability

Integrating Distributed Generation: *Theory, Experience and Best Practices*

Introduction

Integrating distributed generation (DG) implies a change in the way the distribution system is operated; and it must be done ensuring that the safety, reliability, and efficiency of the system or of the local customers are not adversely affected. DG represents an opportunity for the local distribution system operator and the DG owner to work together to improve the overall operation of the system. However, this hinges on the fact that both parties are open and have access to accurate, up-to-date information, in order to ensure that the process is productive and beneficial for both.

This course attempts to bridge the gap in knowledge by relating theory through the use of illustrative case studies, based the tenets of open collaboration as the best path to a positive experience with DG. The course material relies heavily on practical experience acquired through Natural Resources Canada's Grid Integration of Distributed Energy Resources and Renewable Energy Programme, and shares knowledge from existing installations. It also provides a preview of the role that DG could play in the future.

What you will learn

Although a thorough review of theory is performed, the main purpose of the course is to go beyond basic DG theory and to consider the pragmatic technical considerations associated with the study and approval of distributed generation installations. The intent is to provide participants with an understanding of how distributed generation may interact with the distribution systems and to provide solutions to ensure that DG is integrated in a safe and cost-effective manner, focusing on working towards solutions that meet the needs of both the proponent and the distributor. The participants should come away with a good understanding of the theoretical considerations and readily available solutions to common problems, reinforced using a set of real-world case studies.

Audience

The material of this course addresses not only distribution company engineers actively interconnecting distributed generation but all engineering practitioners dealing with the interconnection of distributed generation.

Date:

June 23, 2008

Course Language:

English

Fee:

US \$ 750.

Location:

Delta Montreal
475 President Kennedy Avenue
Montreal, Quebec
Canada H3A 1J7

Registration to Course:

www.cyme.com

(or fax attached form)

Hotel Reservations:

Delta Montreal
Reservation Desk: 1-877-286-1986

Further Information:

info@cyme.com

The course fee includes tuition, refreshments and lunches. Applicable taxes are extra.

Each participant will receive a set of course notes.

A number of rooms at a special rate is made available to the attendees, on a first-come, first-served basis. Call-in the Hotel Reservation Desk before May 6 for arrangements.

CYME Technical Engineering Courses
Program Director: **Dr. Atef S. Morched**

Course Outline

Monday, June 23

- **Revision of distributed generation technologies (modeling, control, and protection)**
 - Induction machine-based generators
 - Synchronous machine-based generators
 - Inverter-based generators
 - *Simulation Exercise: generation profile, dynamics and short-circuit behavior*
- **Utility interconnection: impact assessment and concerns**
 - Protection considerations
 - Anti-islanding detection
 - Short-circuit contribution
 - Protection coordination impacts
 - Overvoltages and grounding
 - Voltage regulation – tap-changers, capacitor banks, DG VAR support
 - Power quality – is DG a concern?
 - DG size and location
 - Feeder capacity
 - Reverse power flow
- **DG studies and solutions**
 - Collaborative interconnections – utilities and proponents working towards solutions
 - *Practical Case Study: Anti-islanding detection options for small DG – one size doesn't fit all*
 - *Practical Case Study: Voltage regulation with wind generation – tap-changer set-points and capacitor banks*
 - *Practical Case Study: Validating breaker and fuse selection and other protection concerns with DG*
 - *Practical Case Study: Power quality – does high penetration of photovoltaics impact power quality?*
- **Advanced issues**
 - Multiple distributed generators – what is different?
 - Advanced distribution automation – how can it help?
 - Planned islanding and microgrids – an innovative way forward.
- **General comments and summary**
 - Standards and application guides
 - Other sources of information
 - Conclusions

Instructor



Chad Abbey, M. Eng.

Chad Abbey received his degree in Bachelor's degree in electrical engineering from the University of Alberta in 2002. In 2004, he graduated with an M. Eng. degree from McGill University where he is currently pursuing his Ph.D. He is presently a Research Project Manager with the CANMET Energy Technology Centre, a federal laboratory of Natural Resources Canada. There he conducts research in and helps coordinate a joint research program on the modeling, testing, and integration of distributed generation and smart grids. He is an active member of the IEEE and CIGRÉ.



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Registration

Fill out and fax us the form below to sign up for the course.

A CYME representative will contact you to complete the registration process and provide you with the additional information you may need.

You can also sign up on-line on our web site: use the form at the bottom of the Technical Engineering Courses list.

REGISTRATION FORM
Integrating Distributed Generation
June 23rd, 2008
Montreal, Quebec, Canada

Name:	<input type="text"/>
Company:	<input type="text"/>
E-mail address (required):	<input type="text"/>
Street Address:	<input type="text"/>
City, State/Province:	<input type="text"/>
Zip/Postal Code, Country:	<input type="text"/>
Phone and extension:	<input type="text"/>
Fax:	<input type="text"/>
Name of Attendees:	<input type="text"/>

CYME Fax Numbers:

- **Canada and International: (450) 461-0966**
- **USA: (781) 229-2336**

CYME Registration and Cancellation Policy

Registration Information

Upon receiving your registration information, a CYME representative will contact you to complete the registration process. CYME will send you an e-mail acknowledging payment and status. For multiple-attendee registration on the same form, acknowledgement will be communicated to the person requesting the registration.

It is advisable to register at least one month prior to the start date of the course.

Registrations are transferable within your company at no additional cost.

The registration fee of the course, along with available discounts, appears on the course description page. Applicable taxes if any are not included in the fee. Travel and accommodation are at the expense of registrants. For your convenience, CYME will, in most cases, provide you with the name and phone number of a recommended hotel. When a special rate for hotel rooms is announced, attendees should note that this rate applies to a fixed number of rooms and that reservations should be made before the date specified on the CYME web page describing the course.

Cancellation Policy

Cancellation of registrations should be requested in writing, either by mail, e-mail, or fax. For a request received fifteen days or more prior to the course start date, CYME will refund the paid-up fees less US\$ 50.00 administration fee per canceling attendee. For a request received after that date, the fee is non-refundable.

While CYME makes every effort to meet the published courses schedule, please note that CYME reserves the right to cancel or change the date or location of its courses. CYME's responsibility will not exceed the amount of the fee collected. CYME is not responsible for the purchase of non-refundable travel arrangements or accommodations or for the cancellation/change fees associated with canceling them.

Please contact CYME to confirm that the course will proceed as scheduled before confirming travel arrangements and accommodations.



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