Today’s power generation companies find themselves in a highly competitive marketplace and ever-changing business environment. Driven by deregulation, the entire industry is transforming. Ways of doing business are changing.

With deregulation upon us, generation companies are preparing for changes occurring in the electrical energy marketplace. Those who are going to stay competitive are challenged to maximize profits, optimize resources, and respond quickly to change.

As the leading provider of power applications based on the experience from more than 30 years in the field of generation management, Siemens understands the dynamics of this new business environment. Our goal is to provide the solutions and services that help our customers turn inevitable challenges into new business opportunities. To help meet this goal, Siemens introduces the innovative Spectrum PowerCC® Generation Management system.

Turning challenges into opportunities
Retain and grow your customer base
Your customers will be concerned with two significant factors: the price of electricity and the reliability of supply. Spectrum PowerCC helps you monitor and control these factors to help you keep your existing customers and acquire new ones.

Profit maximization
Spectrum PowerCC helps you enhance revenue by providing tools for tighter control of reserves, energy trading, and the optimization of production cost.

Spectrum PowerCC helps generation companies prosper in the deregulated energy market environment by ensuring savings in all areas of operation. It creates one environment for office, trading floor, and control center activities. And, it offers the reliability and stability that customers have come to expect from Siemens – the number one power applications provider in the marketplace.

A multi-functional software system
Spectrum PowerCC is a fully integrated suite of generation management applications, helping to provide a powerful solution for day-to-day operational needs. Its functions help keep response times fast and profit high.

Its field-proven technology delivers solutions quickly and easily. From the front office over operations to back to middle office, Spectrum PowerCC allows you to handle a vast array of tasks in one working environment. This saves your business valuable time and money.

Resource utilization
The future success of generation companies depends on long-term forecasting and planning of generation resources. Proper scheduling of energy production and ancillary services, monitoring, controlling, and accounting for generation resources are also decisive factors in a deregulated environment. Spectrum PowerCC enables you to do all of this and more.
Spectrum PowerCC can be used in numerous applications, giving you control over multiple aspects of your day-to-day operations. Easily upgradeable, Spectrum PowerCC has add-on functionality.

### A Closer Look at Spectrum PowerCC

**Application and features**

<table>
<thead>
<tr>
<th>Long Term Operational Planning</th>
<th>Load Forecast</th>
<th>Price Forecast</th>
</tr>
</thead>
</table>
| • Annual native load forecasting  
• Maintenance scheduling  
• Resource optimization  
• Probabilistic production costing  
• Generation reliability model  
• Cost minimization or profit maximization mode | • Short, medium and long-term load forecast  
• Native load forecast  
• Modeling of sensitivity of customer loads to market price | • Short, medium and long term  
• Market clearing price, forward price curve |

<table>
<thead>
<tr>
<th>Hydrothermal Coordination</th>
<th>Thermal Unit Commitment</th>
<th>Hydro Scheduling</th>
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</thead>
</table>
| • Hydro and thermal unit coordination to minimize cost while serving the load, and planned transactions  
• Potential profit maximization when run in trade optimizing scheduler mode | • Optimal commitment and scheduling of generators to meet the load: forecasted native load and planned transactions  
• Potential profit maximization when run in trade optimizing scheduler mode | • Optimal scheduling of hydro resources to meet load and satisfy various hydraulic constraints  
• Potential profit maximization when run in trade optimizing scheduler mode |

<table>
<thead>
<tr>
<th>Transaction Management</th>
<th>Market Profiles</th>
<th>Energy Trading, Risk &amp; Portfolio Management</th>
</tr>
</thead>
</table>
| • Power scheduling  
• Different types of products (energy, ancillary services)  
• On-line contract reference and verification  
• Audit trails  
• OASIS interface to schedule transmission access (in U.S. electricity markets)  
• Electronic tagging (in U.S. electricity markets) | • Preparation of a nomograph with quick references to prices and buy/sell decisions  
• Sensitivity analysis with respect to changes in load and prices | • Risk assessment  
• Basis and volatility management  
• Portfolio management  
• Reports (e.g. Position, Mark-to-Market, Value-at-risk, credit/trader limits, portfolio stress)  

Functional Package provided by SunGard Data Systems Inc.

<table>
<thead>
<tr>
<th>Deal Entry</th>
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</thead>
</table>
| • Common deal entry for financial and physical aspects  
• Deal entry audit |
### Automatic Generation Control
- Regulation of the real power output of the generating units and maintenance of the desired net delivery of the generation company
- Consideration of current delivery schedules (from Transaction Management)

### Economic Dispatch
- Optimal generation allocation among the committed units to minimize production cost
- Proper consideration of reserve requirements

### Ancillary Services Monitor
- Periodical calculation and monitoring of reserves, alarming of insufficiencies
- Support for reliable energy delivery

### Production Cost Monitor
- Periodical calculation of unit, plant and system production costs and fuel consumption values
- Calculation of period and daily average costs and fuel consumption

### SCADA
- Signaling, measuring, controlling and monitoring
- Direct interaction with the field devices
- Calculations, limit monitoring and alarm processing

### Archive
- Storage of planned schedules, actual schedules, quotations, applications save cases, SCADA data, etc.
- Long term archives
- RDBMS based
- Ad hoc SQL queries

### Energy Accounting
- Data averaging and minimum/maximum determination
- Support of hourly, daily, weekly, monthly reporting
- Contract-based calculations
- Accounting of ancillary services fees charged
- Accounting of transmission fees paid

### Basic Components

<table>
<thead>
<tr>
<th>Engineering system</th>
<th>Interfaces (SQL-Access, ODBC)</th>
<th>Software Development Kit (SDK)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Input and update of engineering data</td>
<td>• Easy integration with ODBC/OLE DB-based tools (such as Microsoft Excel)</td>
<td>• Capability for functionality extensions in cost-effective manner and with minimum impact on the rest of the system</td>
</tr>
<tr>
<td>• Single source for all engineering data</td>
<td>• SQL interface to historical information</td>
<td>• Use of well-defined, versioned interfaces (APIs)</td>
</tr>
<tr>
<td>• Retention of engineering data through software upgrade</td>
<td>• Common Information Model (CIM) object model with extensions to support full GenCo functionality</td>
<td></td>
</tr>
<tr>
<td>• Object-oriented editor for field data model creation/maintenance</td>
<td>• Possibility to import engineering data from external source (e.g. another database or an ASCII import file)</td>
<td></td>
</tr>
<tr>
<td>• Fully web-enabled user interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Common Information Model (CIM) object model with extensions to support full GenCo functionality</td>
<td>* for cases of special project needs</td>
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</tr>
</tbody>
</table>

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Spectrum PowerCC Technologies

The innovative and state-of-the-art technologies of the Spectrum PowerCC software make it easy for you to stay up to date with current and evolving industry standards. With the Spectrum PowerCC, you can upgrade new technologies and leading-edge products that keep you competitive while minimizing costs for system administration and software maintenance. State-of-the-art technologies used within Spectrum PowerCC include:

- Running on Microsoft Windows NT and standard PC hardware
- Open interfaces based on Microsoft component technologies including:
  - COM/DCOM
  - ActiveX Controls
  - XML
- Archiving system on commercial RDBMS
- Industry standard interfaces SQL, ODBC

- Web-based UI
- IEC 60870-5 and other proprietary protocols
- IEC 60870-6 TASE.2 (ICCP)
- Object-oriented design of the system, user interface and user data model
- First full CIM compliant implementation of power system data model in the marketplace
- Use of industry standard SCADA system WinCC (based upon Windows NT).

Spectrum PowerCC deploys as many off-the-shelf products as possible. This enables Siemens to concentrate future development on domain-specific issues while complying with as many standards as technically possible, further enhancing your revenue.
Your business partner of the future

We are committed to providing solutions for the deregulated energy market that help you save money, optimize resources and take advantage of profitable business opportunities. As your business partner, we want you to succeed. Let us provide the fieldproven technology your company needs to prosper in a deregulated energy market. We are the established leader in power applications solutions. Let us be a part of your future.

Benefits

Spectrum PowerCC helps generation companies to prosper in the deregulated energy market environment by ensuring:

- complete solutions including energy production management and energy trading
- one environment for office, trading floor, and control center
- the safety and the stability of Siemens – the number-one power applications provider in the marketplace
- easy integration of Spectrum PowerCC into the IT environment of the company
- savings in all areas from installation to maintenance, upgrading, and training