The energy systems of power generators, power transmission and distribution, as well as power consumers and power prosumers are complex, multidimensional and dynamic. The changing market conditions due to political decisions, and changing business conditions with increasing feed-in from renewable energy sources puts some challenges to the “classical” energy generation. Under these increasingly challenging conditions power supply must remain safe, profitable and environmentally sustainable. Generation fleets are made up of more smaller generating units of wind, bio-mass mixed with the
traditional large fossil generators. The challenge for power generators is to manage their fleet of generation assets smarter by combining their assets with an increased operational flexibility for thermal plants as volatile renewable assets are prioritized higher. An information overflow due to significantly increased complexity can result from the number of generation assets which need to be managed. Under these conditions the goal that has to be achieved by a new fleet control system is trifold:

- Contribute to security of grid supply
- Ensure and improve profitability of the owners assets
- Maintain environmental performance

The main task for an I&C system is to manage the ever growing complexity in real time. The Siemens’ approach for a new solution is the interconnection of distributed power plants to a central command and control facility which also assures that the increased stress to the generation assets is monitored in the right way, to avoid unplanned production losses as early as possible.

Origin is the leading Australian integrated energy company. Being integrated, Origin has diverse operations spanning across the energy supply chain; from gas exploration and production to power generation and energy retailing. In Australia, Origin has 4.4 million customers and is the largest energy retailer. Origin also has significant power generation capacity and is responsible for around 13 plants in Australia’s and New Zealand’s electricity generation. These plants mostly operate as a peaker power plant the market.

Through a 37.5 per cent interest in Australia Pacific LNG, Origin is seeking to develop one of Australia’s largest coal seam gas (CSG) to liquefied natural gas (LNG) projects. Located in Queensland and based on Australia’s largest CSG reserves and resources, Australia Pacific LNG is expected to play an important role in delivering cleaner sources of energy to Asia.

Origin is also a significant investor in renewable energy technologies including geothermal, wind, hydro and solar.

Against this background of their heterogeneous fleet Origin’s target was the optimization of their fleet control to gain a competitive edge for maximum success. This could be done by improving the production output and reliability across the entire fleet by

- Implementing standardized dispatching
- Managing diverse types of power plants

- Improving analysis and reporting.

The challenges were to integrate 8 different power plants with different generation systems in the first phase, like wind farms, open cycle and combined cycle gas power plants, with different ownership structures, different feed-in conditions, different operational regimes (from base load to peak) different DCS systems and huge distances.

Thus there are inconsistencies in dispatch methods, lots of different IT-tools, numerous interface and data storage places and last but not least with the new business a more and more increasing asset diversity.

To increase business performance, 29 different functionalities have been identified to be implemented in a central Monitoring and Support Center to support the business strategy.

After an individual requirement oriented approach, Origin decided to team up with Siemens to get all these problems solved. As a partner to Origin Siemens can offer:

- Almost all IT-functionalities available in in-house products

- Minimization of interface risks due to usage of a standardized embedded components model and master database

- Built-in power generation know-how

- Ability to integrate vertically (across assets) and horizontally (from Headquarters to local DCS)

- Integrated solution approach

The technical challenge is that the “classical” approach limits the capabilities to handle complexity as the main IT-Functionalities in the headquarters are not yet connected in the appropriated manner with the local plant DCS. On the company’s intranet side IT-tools like MIS (Manufacturing Intelligent System) and EAM (Enterprise Asset Management) provide decision making data. On the plant automation DCS takes control of highly dynamic processes in real-time take place.
The new Siemens Fleet Control System (FCS) combines the strengths of the two worlds in one integrated solution. Basis is the SPPA-T3000 DCS and the IT-application SPPA-M3000 Energy Management Suite.

The SPPA–T3000 enables the customer to control remotely with a SCADA like functionality the remote assets. This enables the central Monitoring and Support Center (MSC) to start process chains from this central control room, control the feedback of the process steps, react on problems and give set points to the local sites directly (without remote terminal connections) to the local DCS (which remains in full operations). The SPPA-M3000 allows the customer to manage all alarms of the fleet centrally, use a central operations log for all assets to notify and analyze production problems which will be linked to a central problem management tool for a detailed and effective analysis of production losses or startup problems. Data from all cities are stored in a central process archive, to allow a long term analysis and visualize plant/unit overview screens in a harmonized way. With the context manager all portal integrated applications are forced to show the same asset related content. This enables the MSC Operator to see the related information from different systems in a standardized, central view enabling him to make faster and more reliable decisions, which will be the basis for a continuous improvement process for Origin’s core generation processes. The Set Pont management calculates efficiency curves day ahead based on weather conditions for the OCGT’s, CCPP etc. and assures that a plant will be operated with the right generation set points to meet start up reliability and efficiency requirements. It is planned that the SPPA-P3000 Efficiency calculation modul and the SPPA – D3000 Plant Monitor will further support Origin to identify or analyze problems in the most efficient way in the next phase.

The new Siemens Fleet Control System (FCS) gives the answer to mastering the complexity on the generation side, and is the next level of DCS and fleet management system. It enables the generation company to be ready for the new energy mix by increasing flexibility of the “classical” generation assets, integrating the renewables and managing the fluctuation of energy production. It enables companies to do generate smarter with maximum profit.