Lodi, August 10, 2012

Lodi Energy Center - Pioneering Flex-Plant™ Combined Cycle Technology for Seamless Renewable Integration

Northern California Power Agency’s Lodi Energy Center
The Nation’s First Fast Start Combined Cycle

Northern California Power Agency’s Lodi Energy Center will be the First Fast Start Combined Cycle Power Plant in the U.S.A. in commercial operation. Based on the Siemens Flex-Plant™ 30 concept Lodi Energy Center is designed to meet the needs of the end user, including efficiency, flexibility and a small environmental footprint. The new plant with an installed capacity of 300 megawatts (MW) will serve the energy needs of 13 different project participants, including Modesto Irrigation District, Power and Water Resources Pooling Authority, Plumas-Sierra Rural Electric, State of California Department of Water Resources, Bay Area Rapid Transit, City of Ukiah, City of Lodi,
City of Biggs, City of Azusa, City of Lompoc, City of Santa Clara, City of Healdsburg and the City of Gridley.

The main components of the Siemens Flex-Plant™ 30 at Lodi Energy Center are:

- Gas Turbine: SGT6-5000F
- Gas Turbine Generator: SGEN6-1000A
- Steam Turbine: SST-900
- Steam Turbine Generator: SGEN6-100A-2P
- Control System: SPPA-T3000

Major facts and figures:
- Installed Capacity: 300 MW
- Efficiency: >57%

Renewable power is becoming a larger and larger part of the energy mix worldwide. California is a leader in this trend, adding significant amounts of wind and solar capacity to the grid. These renewable, green resources are environmentally friendly, but are intermittent due to their dependence on immediate local environmental conditions. Power today is primarily provided by power plants designed for base load, and lacking the ability to quickly start up or quickly change load. Fast Moving Flex-Plants are
designed to provide clean, efficient power on demand. Flex-Plants bridge the gap to enable a stable reliable power generation grid while renewables ramp in and out.

In addition to providing grid stability, the fast start of the gas turbine enabled by the Siemens Flex-Plant 30 results in a significant reduction in overall plant startup emissions.

Flexible, Efficient and Clean Solutions for California

Siemens Energy Solution Portfolio is designed to enable diverse resources to operate in concert and is being dispatched here in California. From the fast start simple cycle at Marsh Landing, to the Flex-Plant 10 at El Segundo to the Flex-Plant 30 at Lodi, Siemens solutions fit the needs of California with high efficiency for low cost generation, flexibility for fast dispatch, and low emissions for a clean environment. Siemens has implemented nine large scale gas turbine projects in California since 1997.
Lodi Energy Center is a Siemens SCC6-5000F 1x1 Flex-Plant - a fast responding, clean, efficient combined cycle power plant to partner with California’s large non-dispatchable renewable generation. It is a highly efficient combined cycle plant with an operating efficiency of over 57 percent designed for intermediate to continuous duty and capable of daily cycling. Plant start-up times are reduced by up to 50 percent due to the integration of fast-start features, including the three-pressure reheat heat recovery steam generator (HRSG) with Benson® once-through technology, high capacity steam attemperation, full capacity steam bypass systems, innovative piping warm-up strategies, and Siemens’ steam turbine stress controller (TSC). Using the Siemens SGT6-5000F gas turbine as the prime mover, the plant will provide high power density while requiring a relatively small plant footprint. The Siemens SPPA-T3000 control system provides an easy-to-use control platform for the entire combined cycle power plant. Its fast start capability with 200 MW in 30 Minutes or less can result in a carbon monoxide reduction of over 200 tons per year when compared to traditional F-class combined cycle plants.
Siemens Solutions Proven Capabilities & Experience

partnered with NCPA for a successful project

Core Execution Competencies
• Plant Engineering
• Procurement
• Transportation / Logistics
• Construction Management / TFA
• Commissioning

Highlights
• Over 330 Projects Completed World Wide.
• Over 70 HRSG’s procured globally since 2000
• Over 105 Turnkey Projects completed in the Americas
• Over 20,000 plant operators trained by our Siemens training department since 1990.

Proven, real-world solutions – backed by the power of Siemens

Siemens Solutions Proven Capabilities & Experience

Siemens partnered with NCPA for a successful project by delivering proven solutions and project execution know-how including core execution competencies in plant engineering, procurement, transportation / logistics, construction management / TFA, and commissioning. Siemens has successfully completed over 330 projects worldwide, and procured over 70 HRSG’s globally since 2000. In the Americas over 105 turnkey projects were completed.
Proven, Real World Solutions

Reducing risk by focusing on Safety
Integration
Delivery
Training

Implementing the Right Technology
To Partner with Renewable Generation

Proven, Real World Solutions

Choosing Siemens for extended power plant scope enables a reduction in overall project risk. With extended scope, throughout the project Siemens personnel access expertise in the design offices, in the factories and on the site to minimize technical, personnel, and financial risks. With an extended scope project, Siemens is a power plant partner, leveraging the power and expertise of Siemens around the globe. For the Lodi Energy Center project, the Siemens scope was to deliver the power island. From NTP (notice to proceed) to PAC (provisional acceptance certificate) and beyond, Siemens uses the best available tools and processes to manage risk and assure success.
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At Siemens, safety is considered the most important aspect of every project. In partnership with NCPA, Siemens followed a detailed safety program for the site. Siemens Project Manager and Project Engineer independently conducted and documented a formal site Safety Walk at every site visit. There were also regular site audits to assure adherence to Siemens and site procedures and prompt action and resolution for any quality incident reports. This focus on safety resulted in an impressive Zero Lost Time Accidents (LTA) for OEM or its subcontractor personnel with over 16,000 man-hours on site.
Having the OEM as an integral part of the Lodi construction management team enhanced the integration of equipment into the site execution. System integration is a big part of every Siemens project from first concept through construction. Siemens experts integrate Siemens expertise with local expertise to get the best from both. At Lodi Siemens provided field engineers to join the construction management team working directly for the customer. The Siemens experience and expertise contributed to improving installation by directly working with the craft sharing Siemens experiences to avoid installation re-work. Siemens integrated the Power Island and BOP controls including grid connection, water treatment, etc. into an overall integrated Plant Controls System.

Siemens also provided in house expertise to assist Customer in interfacing and obtaining design approval of specialty engineering designs including CBO, Fire Marshal, and authorized ASME Inspector approvals. This team participated in customer, A/E, constructor partnering workshops to develop open relationships and communication and to identify potential project risks and mitigations.
All OEM equipment for Lodi Energy Center was delivered ahead of schedule.

Siemens assigns a factory load planner to monitor the manufacturing of the gas turbine and steam turbine for all projects to resolve any schedule issues. For Lodi, a project expediter was dispatched by the Siemens Orlando-Team to Finspong in Sweden multiple times during the project to monitor and expedite the critical path steam turbine manufacturing progress.

Siemens also assigned a project specific site services procurement specialist to support unplanned or emergency needs for parts or services. For Lodi, they developed a logistics plan for special rail car usage and transit clearance and routing to ensure the gas turbine and the generator delivery to site without schedule delays.

- Steam turbine 74 days early
- Gas turbine 13 days early
- HRSG 38 days early
- Condenser 51 days early
Training

Training: NCPA personnel were given classroom, hands on operating and maintenance training on site and on the simulator in Orlando. Over 20,000 plant operators have been trained by Siemens since 1990.

Conclusion

Lodi Energy Center innovative fast ramping gas fired plant was specifically designed by Siemens as a solution to balance fluctuations on diverse power grids managing both renewable and traditional energy sources. Its clean footprint and versatility makes it an ideal solution to the growing need for stable and environmentally friendly power sources in the U.S.A. and around the globe.