



Committee Meeting Agenda & Minutes

Market Trends Committee

Committee Meeting Objective:

The Committee provides a forum for market trends within the power generation industry to be discussed and analyzed.

Date and Time:

Monday, March 4, 2019

Location:

Austin, TX

Time

1:00-3:00 pm

Chairperson:

Justin McMahon

Preparation

This meeting will engage all participants allowing each to have a higher level of contribution to the subjects. Come to this session prepared to be a subject matter expert (SME) or to learn more about these issues. We will also be electing new committee officers.

Schedule

Item	Description
Welcome	<p>Call to order at 1:03 pm</p> <p>Market Trends Initiatives reviewed</p>
FlexEnergy	<p>Speaker: John Alday VP, Applications Engineering - FlexEnergy</p> <p>Primer on Micro Turbine Technology, Packages and Applications</p> <ul style="list-style-type: none"> • Overview of who FlexEnergy is • One of only a few major micro-turbine OEMs • Introduction of what the Flex Turbine Product is • Explanation of a Recuperated Turbine Cycle • Review of components of a Micro Turbine package • Integration of a typical micro turbine • Review of Target Markets <ul style="list-style-type: none"> ○ First focus for the industry was CHP; every site would have a micro turbine ○ That has shifted to more specialty applications; biogas, island power, remote oil & gas - this biggest market today (2/3 of Flex's sales) • Value Proposition of Micro Turbines <ul style="list-style-type: none"> ○ Very low maintenance, with long service intervals ○ High uptime; availability ○ Fuel flexibility ○ Very low emissions ○ Relatively quiet ○ Low vibration ○ Small footprint, low weight ○ Integrated co-gen heat exchangers ○ Long view, total lifecycle cost outweighs higher upfront, CAPEX • Oil & Gas Recovery Applications <ul style="list-style-type: none"> ○ Pumpjacks, large compressor control rooms, small pumps

	<ul style="list-style-type: none"> ○ Using onsite gas as fuel ○ Modularity in smaller units ● Q: "What load step can a turbine handle?" <ul style="list-style-type: none"> ○ 150 HP ○ 100 kW cycle every 6 seconds is typical in Pumpjack ● Typical Performance and Efficiency <ul style="list-style-type: none"> ○ High heat results in lower power output and lower efficiency ○ Efficiency comes with keeping the turbine loaded at greater than 42% ○ Once a turbine starts and gets up to speed, the engines prefer to run continuously, not start/restart ○ The heat rate, thermal efficiency, goes up as the ambient temperature increases, counter to the electrical performance ● Sound and Vibration <ul style="list-style-type: none"> ○ 82 to 77 dBA vs. Recip engine at 115 to 83 dBA ● Emissions <ul style="list-style-type: none"> ○ Typically no catalyst ○ A result of very lean combustion ○ Far less than diesel engines without catalyst ● Knocking <ul style="list-style-type: none"> ○ Turbines do not experience the knocking a piston engine does ○ Fuel does have to be delivered under pressure - 60-75 psi ● Increased uptime through lower annual maintenance <ul style="list-style-type: none"> ○ Overhaul is 40-56,000 hours ● Review of Case Studies
<p>SIEMENS</p>	<p>Speaker: Dalia El Tawy, Director Global Unconventional O&G Solutions Development</p> <p>How Microgrids Changed Over Time - Case Studies from Different Energy Markets</p> <ul style="list-style-type: none"> ● Overview of Microgrids ● Microgrid controller is key to success when the number of energy sources and storage add up - it's impossible to manage manually and optimize each source, type ● Microgrid Examples: Electrification of Hydraulic Fracturing in Oil & Gas <ul style="list-style-type: none"> ○ Replacing diesel power recip engines with gas turbines to drive pumps ○ Highly mobile application, requires high power density ○ The overall process of the power delivery is more fluid, provides more control than conventional engine driven solutions ○ Rig up in under 2 hours for 5.9 MW ○ Much quieter than the recip ○ Huge fuel savings and lower emissions ○ Higher CAPEX is repaid in about 3 years in this application ● Case Study: Microgrid in University Campuses <ul style="list-style-type: none"> ○ Alternative financing models: long-term power purchase agreements based on the project's realized savings ● Case Study: Microgrids in Remote Locations ● Q: "What frequency are you running the turbine generators at?" <ul style="list-style-type: none"> ● 50/60 Hz ● Achieved ● Q: "What percent of total powergen was possible from renewables?" <ul style="list-style-type: none"> ● Primary power is all renewable ● Fossil fuel engines as backup ● It depends on the project, but the trend is toward new projects being mostly renewable; retrofit or brownfield is more fossil focuses ● Q: "What sort of wireless monitoring is SIEMENS doing?"

	<ul style="list-style-type: none"> • Yes
Pulse Survey Question Database	<p>Speaker: Dane Olson DD committee proposed questions to be added to survey,</p> <p>Following a conversation with Phillips, Dane to supply the Committee with these recommendations.</p>
Market Pulse Survey Working Group	<p>Nic Phillips gave a brief introduction of the Pulse Survey as it stands today and made an open call for volunteers to form a Market Pulse Survey Working Group (WG). The WG will meet virtually between now and the Fall Conference to (1) develop recommendations for future Pulse Survey improvements and (2) explore paths and platforms to a market research survey tool for EGSA.</p> <p>WG Volunteers: Dave Champlin (Stewart & Stevenson), Houston, TX Paul Wareham (Dynagen), Dartmouth, Canada Marcello Lo Cicero (React Power Solutions), Houston, TX Marc Rost (Johnson Matthey), Audubon, PA</p> <p>Marcello Lo Cicero suggested there is a good model in air compression market research to investigate.</p> <p>Radiator sales is another ancillary to consider.</p>
<i>Actions from meeting:</i>	<p>DD committee proposed questions to be added to survey were not presented during the meeting. Follow up necessary.</p> <p>FUTURE TOPICS MENTIONED:</p> <ul style="list-style-type: none"> • Storage/Battery Technology • UPS and critical power systems • The Analysis and application of the analytics from predictive maintenance data • Radiators and cooling systems <p>It was recommended that the Committee bring in industry/end users to tell us where the market is and where EGSA Members need to be to serve their needs; Utility Customer speakers</p>
<i>Close of Meeting</i>	<p>Attendees were asked to please fill out the Meeting Evaluations. Participation was minimal; needs improvement</p> <p>The meeting was called to close at 2:25 pm.</p>
Complete MOM, attendee list, presentations for submittal to EGSA and membership	<p>Chris Nagle collected the sign-in sheet and evaluations. Nic Phillips created and submitted these minutes.</p> <p>52 people attended the meeting per the sign-in sheet including 3 non-members. This does not include the two guest speakers.</p>