

2010 BIOMASS POWER TECHNICAL SEMINAR

AGENDA

Thursday, March 11, 2010 DAY ONE: FUEL SELECTION, FUEL TYPES, PROJECT DEVELOPMENT, ECONOMICS & MATERIAL HANDLING

1:00 pm - 1:15 pm Welcome & Introductions & Overview Kathy Morgan: Int'l Applied Engineering

1:15 pm - 1:45 pm Opening Remarks Roger Webb: Strategic Energy Institute
Overview of state of Research & Education for Renewable Energy

1:45 pm - 2:30 pm Project Development: Fact or Fiction David Tennant: Int'l Applied Engineering
Overview of tradeoffs & challenges of various approaches to project development.

2:30 pm - 3:15 pm Project Economics Overview Trotter Hunt: Hunt, Guillot, & Associates
An overview of capital cost ranges, business case scenarios, and overall economics of biomass projects.

3:15 pm - 3:30 pm Break/Snack

3:30 pm - 4:15 pm Cellulose Based Fuels & Logistics Charlie Churchman: Int'l Applied Engineering
Accurately assessing the current and future availability of woody biomass, dedicated energy crops, and other cellulosic biomass fuels. The very different business model for biomass logistics versus coal, gas, oil and nuclear power.

4:15 pm - 5:00 pm Fuels Selection, Strategy & Ash Impacts Gary Elliott: Int'l Applied Engineering
Overview of fuel selection implications for availability, storage, material handling, boiler performance and emissions; Biomass versus Coal; Plus a discussion of the opportunities & challenges with handling biomass ash.

5:00 pm - 5:45 pm Material Handling Systems Johnny Leggett: Hunt, Guillot, & Associates
Biomass material handling system basics: design considerations, challenges, and opportunities

5:45 pm - 6:00 pm Questions

Friday, March 12, 2010 DAY TWO: CROPS, CONVERSION, CONTROLS, EMISSIONS, & CASE STUDIES

7:30 am- 8:30 am Breakfast

8:30 am - 9:15 am Biomass Energy - The Low Cost Carbon Neutral Solution
Thomas McGowan: TMTS Associates, Inc.

This presentation covers the subject from the forest to the stack. Practical information is offered, including diagrams and photographs of actual equipment and installations, costs, and step-by-step guidance for converting these fuels into energy.

9:15 am - 10:00 am Emission Control Technologies Charlie Churchman: Int'l Applied Engineering
An overview of various emission control technologies and how the value they bring value to biomass projects plus CAIR impacts.

10:00 am - 10:15 am Break/Snack

10:15 am - 11:00 am Conversion Technologies Bill Markert: International Applied Engineering
An overview of the various boiler technologies including pros, cons, and best opportunities to utilize each technology.

11:00 am - 11:45 am Biomass Boiler Controls Carl Linderoth: International Applied Engineering
Typical control technologies and methods employed in biomass projects.

11:45 am - 12:00 pm Questions

12:00 pm - 1:00 pm Lunch

1:00 pm - 1:45 pm Case Study: Pulp & Paper Mill Conversion Bill Bulpitt: Sterling Energy Assets
How to do it & the driving economic force

1:45 pm – 2:30 pm Oxygen Enhanced Firing of Biomass & NOx Reduction in Boiler Conversions
Dave Thompson: Praxair, Inc.

An overview of the use of oxygen to mitigate problems associated with biomass combustion.

2:30 pm - 3:30 pm Break-Out Sessions by Technical Points of Interest – Break/Snack
Emissions, Material Handling, Fuel Supply, Economics/Financing, Boiler Equipment Design, etc.

3:30 pm - 4:15pm Case Study: Material Handling Johnny Leggett: Hunt, Guillot, & Associates
Lessons learned from construction and operation of a biomass-fired power plant.

4:15 pm - 5:00 pm Co-firing Emissions Implications Bill Markert: International Applied Engineering
A review of the potential reductions in NOX, SOX, & carbon including how to maximize the reductions.

5:00 pm - 5:45 pm Case Study: Boiler Conversion Gary Elliott: International Applied Engineering
One or two innovative boiler conversion projects will be discussed in detail.

5:45 pm – 6:00 pm Questions

Saturday, March 13, 2010 DAY THREE: SOLAR OPTIONS, FINANCING & SUPPORT OPTIONS

8:00 am – 9:00 am Breakfast

9:00 am – 9:45 am Solar Thermal Gary Elliott: International Applied Engineering
The role of solar thermal in energy efficiency applications.

9:45 am – 10:30 am Solar Photovoltaic Charles Humphrey: International Applied Engineering
The role of Solar PV in utilities

10:30 am – 10:45 am Break/Snack

10:45 am - 11:20 am Securing Outside Financing Gary Elliott: International Applied Engineering
A discussion of the key attributes of financially feasible projects, the fund-raising process, and the financial environment.

11:20 am - 12:00 pm Financial Assistance Programs Greg Sanderson: Taylor English & Duma LLP
A review of programs, requirements and methodologies – BCAP, DOE loan guarantee program and Treasury grants / Investment Tax Credits (ITC) / Production Tax Credits (PTC).

12:00 pm – 12:50 pm Lunch

12:50 pm - 1:30 pm Project Management & Economics David Tennant: Int'l Applied Engineering
A conference summary touching on project management, best practices, project economics, and schedule.

1:30 pm – 1:40 pm Questions

1:40 pm - 2:00 pm Closing Remarks Gary Elliott: International Applied Engineering

PRESENTER BIOS

William S. Bulpitt (Bill): Sterling Energy Assets – Project Director

Mr. Bulpitt joined Sterling Energy Assets, a division of Sterling Planet, Inc., in 2009. Previously he was a Senior Research Engineer for the Georgia Tech Strategic Energy Institute. He returned to Georgia Tech in 2004 after twenty-five years in the electric utility and environmental consulting fields. He has extensive experience in the areas of business development, energy-related research, power plant/energy plant construction and startup, environmental affairs related to energy plants and heavy industry. In particular, during his six years as Director of Environmental Affairs of Southern Energy (now Mirant Corporation) he was responsible for environmental due diligence related to power plant mergers and acquisitions in the U.S., South America, Asia, Africa and Europe. He was also responsible for overseeing environmental operations in those regions, and was also responsible for permitting of new facilities in those regions. As Director of Business Development for Mirant he was responsible for permitting, construction, and startup of several large combined cycle power plants. Bill received his Bachelor of Mechanical Engineering with honor and M.S. Mechanical Engineering from Georgia Tech.

Charles Churchman: International Applied Engineering – VP Engineering

Mr. Churchman has a background in chemical engineering and alternative energy systems including biomass-to-energy. He is responsible for all engineering activities at IAE including design, feasibility studies, cost estimating, and technology development. Specific areas of expertise include facilities/utilities engineering, process engineering for plant design, and simulation/modeling including Aspen™, ChemCAD™, and Barracuda™. This also includes development and implementation of plant projects including synthetic gas technology, MSW waste-to-energy, applications of Fischer-Tropsch technology and “green” unleaded aviation gasoline. Prior to IAE, his experience includes process design engineering for chemical and pharmaceutical plants; phosphoric acid plant and FCC catalyst plant production facilities, formaldehyde production plants, and combined cycle power plants. Mr. Churchman has been in a leadership role on projects worth hundreds of millions of dollars. He is a Fellow of AIChE and registered as a Professional Engineer in ten (10) states including Georgia.

Gary Elliott: International Applied Engineering – Principal Engineer

Mr. Elliott has twenty-seven years (27) experience in the energy generation field and a leading expert in the development of energy projects. He is experienced in applying energy conversion technologies utilizing renewable energy sources, especially biomass. Mr. Elliott has technical responsibility as Principal Engineer, specializing in consulting projects for utilities, developers, financial institutions, businesses, and governmental organizations. He has considerable expertise in biomass and other specialty fuel applications such as gasification evaluation and design, biomass drying applications and evaluations, EPC contract negotiations, and power plant design and operations.

Charles Humphrey: International Applied Engineering – Principal Engineer

Mr. Humphrey is a mechanical engineer with twenty years of experience in the engineering, design, manufacture, and project management of process equipment in the pulp and paper, steel, cement, and chemical industry. He has extensive experience in engineering and project management of supply only and complete turnkey installations of air pollution control equipment, heat exchangers, and materials handling systems.

His pre-contract experience includes design, marketing, cost estimation, and firm price proposals complete with guarantees and warranties for performance. His post-contract experience includes managing the design, manufacture, and installation of air pollution control equipment and developing operation and maintenance manuals. During his career, Mr. Humphrey has served in positions with Amerex Ind, Brandt Filtration, WAM Corp., and IAE.

Trotter Hunt: Hunt, Guillot, & Associates – Marketing Manager

Mr. Hunt is responsible for marketing and business development in the biomass energy industry for Hunt, Guillot, & Associates. He has over ten (10) years of experience in engineering, project management, and marketing in a variety of industries. Mr. Hunt received his B.S. in Mechanical Engineering from Georgia Tech with honor and MBA from Vanderbilt University. He is a registered professional engineer in Louisiana.

PRESENTER BIOS (Continued)

Johnny Leggett: Hunt, Guillot, & Associates – Project Manager

Mr. Leggett is a Project Manager with extensive experience and management skills. He has been in the forest products business since 1964 having served as a maintenance superintendent and plant manager in both plywood plants and sawmills. He's been in the engineering field for 10 years. As a senior Project Manager at HGA, he is responsible for major projects. His duties include project conception, return on investment and supervision of all engineering, procurement, construction and start-up.

Carl Linderoth: International Applied Engineering – Principal Engineer

Primary responsibilities include providing technical expertise and judgment in alternative energy systems including equipment, I&C, plant cycles and start-up services. Supervised the installation, integration and commercial operation of biomass fuel drying systems in many different applications throughout North America including power generation for a 35 MW equivalent pulp and paper application. Managed the installation and start-up of turnkey systems and trained plant personnel in the operation and maintenance of power generation systems. Led the design of unique applications for biomass drying systems including co-firing with fossil fuels, sludge drying for fuel purposes and 100% suspension firing to replace oil. Supervised engineering, procurement and construction (EPC) personnel, provided manufacturing startup expertise; and, tuning of retrofit gasifier and combustion systems for energy clients.

Bill Markert: International Applied Engineering – Engineering Manager

Mr. Markert is currently responsible for managing the conceptual and detail design activities of power projects and systems at IAE. Also performs cost estimates and works directly with clients. At present, directing multiple alternative energy projects utilizing the conversion of woody biomass to gas or steam. Background includes machine design, manufacturing oversight and documentation. Bill holds a BS degree in Aerospace Engineering from the Georgia Institute of Technology.

Thomas F. McGowan (Tom): TMTS Associates, Inc. – President

Mr. McGowan is president and founder of TMTS Associates, Inc., a firm that specializes in thermal systems and air pollution control. He was previously employed by RMT/Four Nines, American Combustion, the Georgia Tech Research Institute and Particulate Solid Research, Inc. He has 35 years of experience in combustion, air pollution control, solids handling and industrial ventilation, including combustion and gasification of biomass fuels. Tom's credentials include a Masters degree in Industrial Management from Georgia Tech and Bachelors and Masters degrees in Chemical Engineering from Manhattan College. He is a registered engineer in Georgia and several other states and is OSHA 1910.120 HAZWOPER certified.

Katherine F. Morgan (Kathy): International Applied Engineering – Consultant

Ms. Morgan has over thirteen years experience in the power business. Her industry experience includes working as a Commercial Manager at GE Energy in commercial operations and contractual services. She worked for over nine years at Oglethorpe Power Corp. first as an Operations Engineer before moving into Generation Engineer, Project Engineer and Technical Standards Coordinator roles. She started her career as an Assistant Instrumentation & Controls Engineer at Ebasco Services. Most recently she's worked in a consultant capacity at IAE working in business development and marketing. She has founded and operated her own recruiting business, KFM Associates, Inc. for the past eleven years specializing in the power and energy field. Currently she is serving as a Director on the Executive Committee of the ASME Atlanta Section and she is a past Chair of the ASME Atlanta Section. Also, she is serving on the Steering Committee for the upcoming 125th anniversary of the Woodruff School of Mechanical Engineering at Georgia Tech. Kathy received her Bachelor of Mechanical Engineering degree from the Georgia Institute of Technology.

Greg Sanderson: Taylor English Duma LLP – Attorney

Mr. Sanderson provides legal services in the areas of taxation and businesses transactions. His practice focuses in the on alternative energy development, where he helps clients qualify for tax credits and incentives. These include incentives for alcohol fuels, biodiesel, coal fuels, wind energy, landfill methane and biomass energy from wood and crop residues. He has structured more than 100 such alternative energy projects to qualify for credits and incentives. Mr. Sanderson also represents clients before the IRS National Office to obtain tax rulings, and defends clients before the IRS in tax controversies. Prior to joining Taylor English, he practiced with the Atlanta tax law firms of Sanderson & Rotroff, LLP and Gomel & Davis, LLP. He also previously worked as an accountant for the national CPA firms of Ernst & Whinney and Coopers & Lybrand. In addition, he has served as a co-owner and financial officer of two private energy companies, Power Management Inc. and W-T-E Development LLC, which developed and financed over 30 biomass energy projects in 14 states from 1995 to 2004. He has Bar & Court Admissions in Georgia, Tennessee and U.S. Tax Court. He is a Certified Public Accountant in Georgia. His education consists of an LLM, Taxation, University of Denver, 1988; J.D., University of Tennessee, 1986 and BBA, Lambuth University, 1983.

PRESENTER BIOS (Continued)

David V. Tennant, PE, PMP, MBA: International Applied Engineering – Executive Consultant, Development and Applications

Mr. Tennant has twenty-five years in the energy generation field as an experienced Executive with a successful track record in engineering, operations, marketing, management, planning, process improvement and consulting. He has directed projects worth over \$3.5 billion in engineering, manufacturing and power generation. His responsibilities have included: 1) Rescued, in 15 months, a \$1 billion program (25 related projects) that was \$100 million over budget. 2) Saved an offshore utility company over \$50 million annually in operational costs. 3) Served in leadership role in development of three biomass projects in Honduras, C.A. Projects have all been successfully completed within budget, schedule and performance targets. International experience includes projects in Canada, New Zealand, the Caribbean basin, Germany and Finland. Managed staff up to 130 with full P/L responsibility.

Affiliations: Project Management Institute (Mentor); American Society of Mechanical Engineers (Vice-Chairman of Energy & Economics Committee 2005-2006); Instrument Society of America (Chairman, Man-Machine Interface Committee (1998-2002), and ISA Atlanta Section Chair (1999-2000).

David R. Thompson: Praxair – Senior Business Development Manager

Mr. Thompson is a Senior Business Development manager with Praxair. Mr. Thompson has been with Praxair for over 30 years; he is responsible for identifying, analyzing and targeting new markets, and commercializing new products for Praxair. He has played a key role in the commercialization of a number of new technologies including: Oxygen Enhanced NOx Control for coal fired utility boilers, a process for the on-site production of activated carbon from pulverized coal for mercury capture at power plants and advanced oxygen and nitrogen production processes. Mr. Thompson has served in managerial and supervisory positions related to membrane separations and systems development, electronic gases, customer service and research and development. He has a Bachelor of Arts degree, an MBA and a Master of Engineering degree all from Dartmouth College and associated professional schools.

Dr. Roger P. Webb: Georgia Institute of Technology – Special Assistant, Office of the Provost Interim Director, Strategic Energy Institute

Dr. Webb has been on the School of Electrical and Computer Engineering faculty since 1964, where he has been actively teaching, research, and program development. He held the Georgia Power Company Distinguished Professorship from 1972 to 2000. In this capacity he coordinated efforts in instructional and research program development in electric power engineering. His research interests include electric power systems, instrumentation, and control systems.

Dr. Webb served as ECE's associate director from 1978 to 1989 and as school chair from 1990 until his retirement in 2004. He has worked in industry with Sperry Phoenix Co. and Douglas Aircraft Co. as well as a consultant to industry and government.

Since his retirement, Dr. Webb has been serving as the special assistant to the Provost at Georgia Tech. In this position, his work has been focused on energy research and technology transfer. Dr. Webb currently serves as the interim director of the Strategic Energy Institute.

Honors and Awards: He was the recipient of the 1983 Edison Electric Institute Power Engineering Educator Award, is a Fellow of the IEEE, and a registered professional engineer. He was a 2000 recipient of the IEEE Millennium Medal. Dr. Webb is past president of the National Electrical Engineering Department Heads Association (NEEDHA) and a member of the Board of Directors for the International Engineering Consortium. In 2003, he was honored with the Georgia Tech Vice Provost for Research Special Recognition Award and the Georgia Research Alliance Catalyst Award. In November 2004, Dr. Webb was inducted into the Georgia Tech College of Engineering Hall of Fame.