

PETER BALDWIN



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Professional Experience

Current



President

base_e is a Boston based independent consulting company focused on practical product positioning and commercialization strategies for Distributed Energy Technologies, Gas Turbines and various Air & Gas Compression interests.

2004 to 2014

**Ramgen Power Systems
President**

Ramgen Power Systems is a Seattle-based start-up company developing an advanced shock compression technology, utilizing supersonic flight inlet design methods and practice. Shock compression can achieve very high compression ratios and efficiency, simultaneously and has the potential to substantially reduce compressor cost while improving efficiency in conventional applications, as well as extending the range of applications through superior performance capability.

- Member of the Ramgen Executive Team and Board of Directors
- Responsible for Strategic Planning, Product Positioning and Business Development activities for Ramgen Shock Compression Technologies
- Created Shock Compression positioning in general and Ramgen in particular as a high-efficiency, low-cost approach for the Carbon Capture & Sequestration (CCS) compression application
- Developed a variety of formal Business Plans for Ramgen's Compressor, Gas Turbine and Combustor activities
- Developed and provided all equipment selection, application, performance and pricing information to prospective OEMs and users, worldwide
- Developed all collateral sales and promotional materials
- Developed product line Cost Models to support profitability analyses
- Maintained active and ongoing relationships with CO₂ capture system developers and electric utilities, as well as pipeline and underground technology elements within the industry, worldwide
- Maintained active and ongoing relationships within academia and government entities, worldwide
- Positioned Ramgen CO₂ Compressor as an important contender in the CCS community
- Effective public speaker and author of numerous technical articles on the topic
- Dresser-Rand completed the purchase of selected Ramgen assets in June of 2014 and will pursue full commercialization as part of their product portfolio

2000-2004

*base*_e

President

Since inception the company has completed approximately 60 different assignments with clients in the US, Europe, Japan and the Middle East. Pete has also provided due diligence support for a variety of energy tech venture capital investment firms.

- Audited major international turbo-compressor company's current business practices; Provided strategic and tactical direction to improve results.
- Developed Strategy and supporting Business Plan for a major international gas turbine manufacturer.
- Created and/or supported positioning strategies for various micro and mini-turbine developers.
- Identified and developed Strategic Partnership relationship for a new market entrant at 500kW and 1.6MW.
- Prepared a preliminary cost study for a novel 350kW gas turbine engine.
- Participated in a detailed risk assessment for a major U. S. gas turbine manufacturer.
- Developed product and commercialization strategies for various component manufacturers:
 - Compressor technologies
 - Recuperators
 - Web-based asset management and command & control software
 - Fuel gas boosters
 - High speed motor/generators
 - Power electronics
 - Investment castings
 - Wind turbines
- Performed investment due diligence work for venture capital firms J. P. Morgan Partners, Perseus, Thayer Capital and Metapoint Partners to evaluate opportunities:
 - Air & gas compressors
 - Micro and mini gas turbines
 - Natural gas fired reciprocating engine
 - Stirling engine
 - Steam turbine
 - Blowers/vacuum pumps
 - Hydrogen on-site generation
 - Zinc/Air fuel cell power system
- Consulting services for a small scale modular SOFC
- Advisor for an under-hood 5kW PTO generator
- Interim Program Manager for STM Power's Stirling engine development
- Developed both a detailed Corporate Business Plan and a Product Strategy for a novel Oil-free Turbo Compressor concept (Ramgen)
- Evaluated an Oil-Free Vane Compressor concept.
- Consultant to Cambridge Energy Research Associates (CERA)
- Contributing Editor Turbomachinery International
 - Over 40 Op-Ed columns published
- Board Observer STM Power
- Peer reviewer for DoE Advanced Microturbine and Recuperator Programs.
- Expert witness NY State Electric & Gas (NYSEG) and SoCal Gas
- Featured speaker
 - Gas Technology Institute, , EPRI DG, CERA Week, Gas Research Institute, DoE
 - Energy Venture Fair, Harvard Cyberposium, Energy Frontiers International
 - Ohio Department of Economic Development, American Society of Materials
 - CERA Rountables, Distributed Energy Advisory Service
- ASME – International Gas Turbine Institute
 - Member Electric Power Committee & Fuels Committee Chair 2013-2017

President, Northern Research & Engineering Corporation - (NREC)
Woburn, MA

3/96 to 5/00

NREC is a wholly owned subsidiary of Ingersoll-Rand Company, specializing in turbomachinery, combustor and heat exchanger design and development. Projects/products include:

NREC POWERWORKS Microturbine

Identified, defined and implemented NREC's microturbine efforts including:

- Defined program scope and secured internal and external funding support for this \$15 million program
- Negotiated intellectual property and commercial rights
- Identified and quantified market opportunity and defined product and positioning strategies
- Established distribution and pricing strategies
- Identified Critical Success Factors and secured necessary resources
- Managed the project and maintained sponsor commitment throughout
- Forecast annual sales \$500 million to \$1 billion by 2010
- Market capitalization benchmarks exceed \$1+ billion
- No negative cash flow impact on I-R to date
- The PowerWorks Family of products includes:
 - 70 & 250kW Cogen & Peaker versions for distributed power generation
 - Air conditioning, refrigeration and air compressor application packages
 - Microturbine for Siemens-Westinghouse world's first Solid Oxide Fuel Cell Hybrid
 - Opportunity fuels and biomass combustion systems

NRECUPERATOR Modular Components

Identified recuperator as the critical enabling technology for the microturbine success, and a substantial opportunity for external component sales.

- Principal sales responsibility for the gas turbine OEM's.
- Secured a contract for the WR21, a \$400 million, 20MW propulsion engine development program sponsored by the U.S. Navy in cooperation with their British and French counterparts
- Leading contender on the 1.5MW British Royal Navy sponsored Gas Turbine Alternator Program
- Actively pursuing AlliedSignal/GE LV100 tank engine upgrade
- Various gas turbine manufacturers worldwide
- Component sales opportunity could exceed \$250 million.

Design & Development Projects

- 500hp turboalternator engine for Chrysler's *Patriot racecar*
- Alden Labs/DoE "Fish Friendly" Hydro Turbine
- Technical support Air Products/DoE "Ion Transport Membranes" for advanced oxygen production concept
- PEM Fuel Cell pressurization systems
- Ammonia turbine for sea water to energy project in India

NREC Military Activities

- VAROC Air Dynamometers for the U.S. Navy and Army
- Engine Drive Compressor for the Japan Defense Association
- U.S. Navy CFC compressor re-rates

World-class Turbomachinery Design and 5-Axis Machining Software

Vice President Business Development

Northern Research and Engineering Corporation, Woburn, MA

1/94 to 3/96

Vice President Sales and Service
Air Compressor Group, Davidson, NC

1/86 to 12/93

Successfully implemented a major restructuring of the Sales and Service Organization to achieve greater customer focus, leverage expenses and improve morale.

- Increased sales volume from \$175 million to \$275 million in 7 years. Thirty-three percent improvement in expense ratio. Eliminated unplanned turnover.
- Dramatically improved the working relationship with, and the effectiveness of our company-owned and private Distributor Networks.
- Implemented a Quality Improvement Process for all field personnel, including the distribution and field service networks.
- Successfully implemented a field Sales and Service Automation Project.
- Provided on-going and significant input to the new product development process.
- Led successful Strategic Alliance negotiations with DuPont.

Vice President/General Manager
Single Stage Products, Charlotte, NC

6/83 to 12/85

Negotiated a major license agreement with Kawasaki Heavy Industries of Japan for X-Flo, a new line of single-stage centrifugal blowers with a \$200 million incremental market.

- Established a start-up division to promote I-R's entry into this new market.
- Developed complete software and promotional material.
- Established pricing and cost structures.
- Defined target markets and strategies.
- Detailed companion development projects and related product acquisitions to achieve sales of \$100 million in (5) years.

Vice President Marketing/Marketing Manager
Air Compressor Group, Charlotte, NC

8/79 to 5/83

Defined and developed a Marketing concept for the newly created Air Compressor Group. Accomplishments include:

- Strategic Plan coordination and development.
- Development of a Target Market concept.
- Initiated market and sales strategies for existing products, including the development of Telemarketing and National Account Programs.
- Initiated new product development programs for four major new products, as well as developments to upgrade much of the existing line.
- Initiated work on a computer based Marketing Management Information System
- Developed a Sales Time and Territory Management program
- Development and use of Economic Forecasting Models.
- Detail analysis of the Blower and Vacuum Pump Market.
- Detailed analysis and marketing support for the Compressed Natural Gas (CNG) Vehicle opportunity.
- Detailed analysis and marketing support for Generon, a membrane-based, on-site Nitrogen Generator
- Evaluated candidates and initiated efforts for a corporate joint venture in Korea.

Product Manager – US, Canada, Latin America and Asia
Rotary and Recip Compressor Division, Davidson, NC

1/79 to 7/79

Product Manager Europe, Mid-East & Africa
Centrifugal Compressor Division, Milan, Italy

10/76 to 12/78

Area Manager – UK and Scandinavia
Centrifugal Compressor Division, London, England

1/75 to 9/76

Sales Engineer
Air Power Division, Charlotte, NC

7/68 to 12/74

Application Engineer
Air Power Division, Chicago, IL

6/67 to 6/68

Education Purdue University Bachelor of Science in Mechanical Engineering - 1967

Related Experiences

- MAPI Marketing Council
- Developed a Harvard Case Study on Ingersoll-Rand's industrial distribution strategy
- Crosby QIPM, QES instructor level
- Mahler Advanced Management Development
- Ingersoll-Rand Management Development Course
- Leadership Development Course
- AMA Finance for Non-Financial Managers
- Philip Kotler Principles of Marketing
- Dan Neimer Pricing Fundamentals
- Kellogg School Advanced Sales Management
- The Hartford Graduate Center Computer System Fundamentals
- Association of Energy Engineers
- ASME
- American Society of Naval Engineers – National Program Committee
- ASME-IGTI Electric Power Committee and Fuels Subcommittee Chair

Public Speaking Events

- Energy Frontiers International – March 2004
- US-Norway Bilateral DOE Conference – May 2004
- Energy Solutions Center – October 2004
- Clean Coal – November 2005
- Electric Utility Environmental Conference – January 2006
- ASNE Advanced Naval Propulsion Conference – October 2006
- Energy Venture Fair VII – October 2006
- Piper-Jaffrey CleanTech – January 2007
- University of Michigan FutureTech – January 2007
- Carbon Capture Summit – December 2007
- Carbon Management Conference – December 2007
- Electric Utility Environmental Conference – January 2008
- 7th Annual Conference on Carbon Capture & Sequestration – May 2008
- Electric Utility Environmental Conference – February 2009
- EPRI CO₂ Workshop – March 2009
- DOE/EPRI/NIST CO₂ Compressor Workshop – March 2009
- AIChE 2009 Spring Meeting
- Pittsburg Coal Conference – September 2009
- France-Canada CCS Technology – November 2009
- Next Generation Utilities – October 2009
- European Gas Processors Technical Committee – February 2010
- Coal Utilization Research Council Technology Sub-Committee Meeting – October 2010
- ASME-International Gas Turbine Institute – CO₂ Panel June 2013
- ASME Power & Energy Conference – Fuels Report Panel Session June 2016
- ASME-International Gas Turbine Institute – Fuel Report Panel Session June 2017

Featured Articles

Contributing Editor Turbomachinery International. Articles published in 2000-2010 include:

- "A Technology Driven Recovery"
- "The Convenient Half-Truth"
- "It's The Fuel Stupid Part 2"
- "Thoughts from Three Conferences"
- "ASME TurboExpo 2008"
- "Black is the New Green"
- "The Energy Box"
- "Realizing a Carbon Economy"
- "Passing Gas"
- "Energy Policy 2007"
- "TurboExpo 2007"
- "The EPA and CO2 Emissions"
- "Texas Hold 'em"
- "Some Things Look Better on Paper"
- "Office of Electricity"
- "CO2 Shortage"
- "IGCC Pinch Points"
- "Would That I Were King..."
- "Sombodys Been Smokin the "Switchgrass"
- "Succeeding a Graying Turbo Faculty"
- "The Airline Cycle"
- "What's Driving the Electric Drives"
- "Coal...the Solution to the Energy Crisis"
- "Sources & Sinks"
- "Dear George"
- "FuelCell 2004"
- "Business is Back"
- "Turbo Expo 2004"
- "DG Business Models"
- "Small Turbines Need New Approaches"
- "FuelCell 2003"
- "It's Time to Adopt the Standard Market Design"
- "Size Matters!"
- "The Hydrogen What?"
- "SOFC/GT Fuel Cell Hybrids"
- "Truce!"
- "Identity Theft!"
- "Power-Gen International 2001"
- "Microturbines...Are they for real?"
- "What's up with the Electric Generating Capacity?"
- "The Role of Turbomachinery in the Emerging Distributed Generation Opportunity"
- "It's the Fuel Stupid!"
- "Managing the Value Chain"
- EPA New Source Performance Standard – 2014
- EPA Clean Power Plan - 2014

Contributing Author in various trade journals and publications. Articles include:

- Power June 2009 "Capturing CO2: Gas Compression vs. Liquefaction"
- Carbon Capture Journal Sept/Oct 2009 Special Section – CO2 Compressor Technology "Low-cost, High-efficiency CO2 Compressors"

Authored numerous Blogs related to CO2 emissions and their impactes on Climate Change

**Technical
Papers &
Publications**

- ASME TurboExpo 2005 GT2005-68349 “Conceptual Design of a Supersonic CO₂ Compressor”
- ASME TurboExpo 2005 GT2005-68203 “Insertion of Shock Wave Compression Technology into Microturbines for Increased Efficiency and Reduced Cost”
- 25th U.S. Army Science Conference November 2006 “Ramgen Power Systems-Supersonic Component Technology for Military Engine Applications”

Patents

- United States Patent 5,586,429 December 24, 1996 Brayton Cycle Industrial Air Compressor
- United States Patent 7,603,841 October 20, 2009 Vortex Combustor for Low NO_x Emissions when Burning Lean Premixed High Hydrogen Content Fuel
- United States Patent 8,312,725 November 20, 2012 Vortex Combustor for Low NO_x Emissions when Burning Lean Premixed High Hydrogen Content Fuel