

IAC Graduate to Industrial Energy Efficiency Consultant

By Marcus H. Wilcox



Cascade**Energy**

E N G I N E E R I N G

My Road...

- 82-86: B.A. in Physics
 - Enjoyed math
 - Closest I could come to engineering at a liberal arts college
 - Accepted to graduate school in physics, changed to M.E. at the last minute
 - These turns often happen in the strangest way!
- 86-89: M.S. in Mechanical Engineering
 - Approached for EADC (IAC) during new student orientation meeting
 - 1st student into and out of the program
 - Only focused on energy at that point
 - Fought over one 8 MHz 80286 computer!
- 89-93: BRACO Energy Services
- 1993: Started Cascade Energy Engineering

Cascade Energy Engineering

- Started in 1993 by 3 founders
- Now have 17 engineers & 4 support staff
- 3 offices – WA, OR, & UT
- Industrial energy efficiency consulting
 - Electric utilities
 - Non-profit agencies
 - Customer-direct
- Largest industrial energy efficiency consulting firm in North America...?

Our Focus

- Only industrial (little or no commercial)
- All industrial technologies
 - Refrigeration, compressed air, pumps, fans, lighting, etc.
 - Mostly electrical
- All industrial sectors
 - Food processing, petrochemical, high-tech, wood products, pulp & paper, primary metals, etc.
- Capital projects, commissioning, M&V, program design, training.
- Energy management programs
 - We are the corporate energy management firm for SYSCO Food Services (\$35 billion/yr in sales)

Overview

- What is the status of industrial energy efficiency?
- What are the likely opportunities for IAC students?
- How can you best prepare for these opportunities?
- What paradigm shift will you need to succeed?

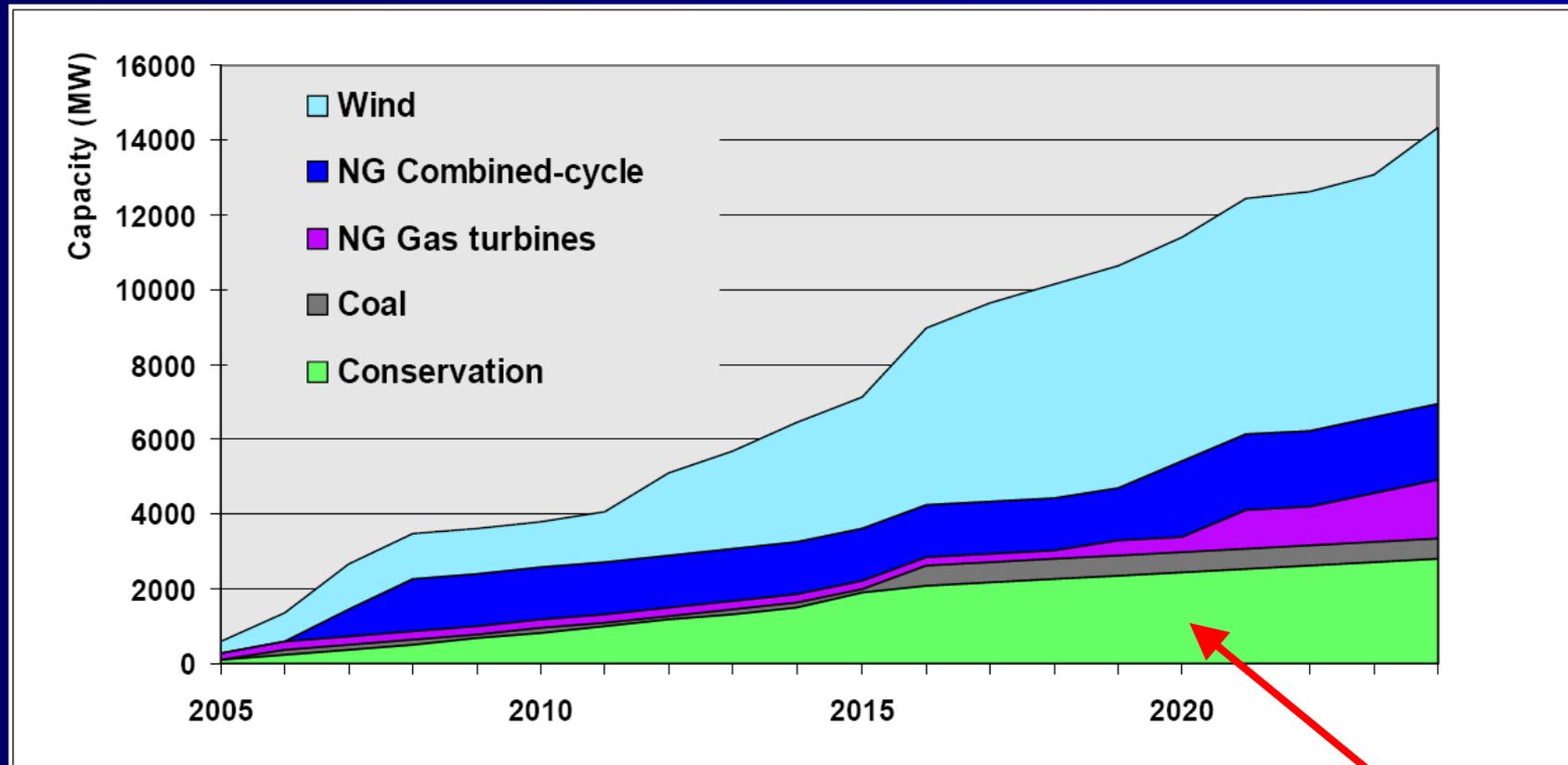
Industrial Energy Efficiency State-of-the-Union

- Government-driven change
 - Federal
 - State
- Utility Regulators
- Utility
- Non-Profit
- Customer

States & Provinces Taking Pro-Active Stance

- **Washington:** Measure I-937
 - All utilities >25,000 customers get 15% or more of energy from renewable resources by 2020
 - Pursue "all available conservation that is cost-effective, reliable, and feasible."
- **British Columbia:** Acquire 50% of incremental resource needs through conservation by 2020
- **Efficiency and conservation will be a big deal for the rest of our lives!**

Role of Efficiency in Pacific Northwest



From Northwest Power & Conservation Council, "Carbon Dioxide Footprint of the Northwest Power System, September 13, 2007"

Utility Regulators

- California Energy Commission
 - Example: CA Public Interest Energy Research (PIER)
 - Pilot projects
 - Blast freezer VFD pilot with United States Cold Storage



Typical Utility Incentive Programs

- Energy: \$0.12/kWh, 50% cap
- Demand: \$200/kW
- Study Co-Funding: 50% to 100%
- Stout post-installation measurement and verification (M&V)
- Intention is to make projects happen
 - Improved economics
 - Customer awareness
 - Overcome staffing limitations
- Utility is purchasing energy or capacity from customer

Typical Project Flow

- Scoping
- Data Logging / Power Measurement
- Analysis
- Cost Estimating
- Report Presentation
- Customer Implementation
- Commissioning
- Final Inspection
- Long-Term Energy Management

Similar Activity to IAC



Assess the Whole Process



New and Old Technology



Interact with Utility and Customer Staff



Project Success Breeds More Projects



Non-Profit Programs

- Example: Northwest Energy Efficiency Alliance
 - Industrial Efficiency Alliance (IEA)
 - Charter is “market transformation”
 - Pilot projects, training, seeding, etc.
 - Funded through regional utilities

Opportunities for IAC Students

- Government
 - Research, training, education, standards, etc.
- Utility
 - Managing, implementing, or promoting projects
- Vendor
 - Designing or selling equipment
- Engineering & Design
 - Designing systems
- Contractor
 - Installing systems
- Customer
 - Corporate energy manager
- Non-Profit
 - Market transformation, pilot projects, market assessment

Nature of this Work

- High Demand
- Specialized
- On-the-Job Education
 - Phase II of education starts when you get your job
- Uncommon
 - “What do you do for a living?”
 - “I’m an industrial energy efficiency consultant”
 - “Oh....that’s....interesting....”

Valuable Skills & Traits

- Smart
 - Knowledge tempered by common sense
 - After you are hired, no one cares about your GPA
- Team Player
 - Exceptional personal skills
 - You will deal with very difficult people and busy people
 - Attitude should be “How high do you want me to jump...”
- Analytical Skills
 - Excel proficiency
 - Minimize learning Excel skills during heat of project
 - Appropriate approach for budget and size of project
- Thermodynamics
 - Think the “right way”
 - Nothing is for free
 - Energy doesn’t disappear
- Big Picture versus Minutia
 - Transition on the fly
 - Time is money

Advice: Choose One or More "Specialties"



Advice: Develop Expertise in Measurement & Logging



Advice: Get Your Hands Dirty...



Advice: Interact With The Right People...



Advice: Develop Critical Vendor & Contractor Relationships



Advice: Hunt Shaft Horsepower

- Motors are interesting, BUT...
- Shaft load dictates the bulk of energy use
 - Understand the equipment connected to the shaft; full load, part load, etc.
- Stay away from "snake oil" or "black box" technology
- Lighting is fast-moving and vendor-driven

Advice: Develop Expertise in Steam Systems

- Electric utility program have driven focus on electrical savings
- Customers are clamoring for expertise in steam systems
 - Probably 5:1 ration in electrical to steam expertise

Lastly: Undergo a Paradigm Shift

- Knowledge won't be handed to you, you will have to scrap for it.
 - Transition from textbook
- Balance use of templates with new development
 - Learn 10x more when you create the tool
- People with the knowledge are swamped, and have limited bandwidth.
- Time = Money
 - You are being paid for your time
 - You are using time of others that being paid by others
 - Many customers will want something for nothing
- You must EARN the right to be involved, offer advice, etc.
 - That operator has been running the boilers for 20 years...
- You are dealing with other people's money and business – take it seriously!

Questions?

- Thank-you!