2025 WORKFORCE PLANNING

STEVE WANDERS, PE, PURDUE UNIVERSITY
MARK JACOB, CITIZENS ENERGY GROUP
MODERATOR: HEATHER DEVOCHELLE, INDOT

Purdue Road School
March 8, 2016
• Topic Overview, Statistics and Trends—Steve Wanders

• Citizens Energy Group Talent Development Initiatives – Marc Jacob

• Cooperative Education at Purdue, ("Recruit Once, Hire TWICE") – Steve Wanders
TOPIC OVERVIEW

2025 WORKFORCE PLANNING
• High demand for additional STEM graduates in ALL disciplines, however:
  • From 1990 to 2010, overall U.S. college graduation levels GREW 50%
  • During same period, number of U.S. engineering graduates fell flat at 120,000
    • India and China each produce nearly 1 Million engineers annually.

Clearly, there is a limited supply, but high demand for STEM professionals, especially for Biomedical and Civil Engineering graduates.

“According to the U.S. Bureau of Labor Statistics, employment of civil engineers is projected to grow 20% from 2012 to 2022.”

In December 2015, Congress passed the Fixing America’s Surface Transportation Act:

- 5-year, $305 Billion in funding for transportation infrastructure improvements

So, what does all of this mean?

- With 2013 ASCE Infrastructure grade of D+ AND
- Estimated investment of $3.6 Trillion needed to revitalize infrastructure AND
- Increased investment in/development of tech-centric enterprises:
  - Industry must invest in STEM graduates

STATISTICS AND TRENDS

2025 WORKFORCE PLANNING
Spring 2016 College of Engineering Undergraduate Enrollment by Residency

- Indiana Resident: 24.5%
- Nonresident: 31.1%
- International: 44.4%

Initial Post-Graduation Work Location (3-Year Survey of College of Engineering Baccalaureate Completers)

- Employed in Indiana: 73.4%
- Employed Outside Indiana: 23.6%
- Employed Internationally: 3.0%

"Purdue University Spring 2016 College of Engineering Undergraduate Breakdown by Residency." Purdue University Data Digest. Purdue University Office of Enrollment Management. Web. 01 Mar. 2016.
According to the Purdue Center for Career Opportunities, top five destinations for baccalaureate engineering completers are:

- Indiana, 23.6%
- Illinois, 12.2%
- Texas, 9.5%
- Ohio, 6.4%
- Michigan, 6.4%

Average salary as of May 2014:
- $61,434

CITIZENS ENERGY GROUP
TALENT DEVELOPMENT INITIATIVES
2025 WORKFORCE PLANNING
Purdue Road School
March 2016
Workforce Development
Mark C. Jacob | citizens energy group
Vice President | Capital Programs & Engineering and Quality Systems
Safety Topic

Accident Causes & Prevention

- Accident –an unplanned and unwanted event which may or may not cause injury and/or property damage
- 88% of accidents - caused by unsafe acts
- 10% of accidents - caused by unsafe conditions
The Citizens Public Charitable Trust

- Established 1887
- Operated since then as a public charitable trust
- For the benefits of the inhabitants of Marion County
- Does not operate the Trust passively
- Devise and implement strategies to build and renew the businesses of the Trust
- Keeping the Trust competitive and adding value creates greatest long term benefit for the beneficiaries of the Trust
Citizens Energy Group and CWA Authority Inc.

A Public Charitable Trust

- **Energy**
  - Citizens Gas
  - Steam
  - Chilled Water

- **Water**
  - Indianapolis (area) Water (1M customers)
  - Indianapolis (area) Wastewater (CWA)

- **Shared Services**
  - Corporate Support Services
  - Shared Field Services

- **Citizens Resources**
  - Kinetrex Energy
  - Oil Exploration & Production
  - Citizens Gas of Westfield
  - Citizens Southern Madison
  - Westfield Water
  - Westfield Wastewater
**Infrastructure Challenges We Face**

- Annually - 6 Billion gallons of sewage was flowing to the city’s streams and rivers
- $1.9 B Combined Sewer Overflow (CSO) Consent Decree
- Aging infrastructure and expansion needs
- Aging workforce
- Capital investments are a constant need
- Bring / keep our Water, Wastewater and Energy Utilities at acceptable / affordable performance levels
- Large and diversified water system
- Significant septic tank elimination project (STEP) needs
- Future water supply

**Objectives:**
1. Serve Peak
2. Reduce Peak
   - Primarily Lawn Irrigation

![Graph showing water consumption](graph.png)
Workforce Challenges We Face

- Total Management Eligible to Retire Now: 21
- Eligible to Retire within 5 years: 10
- Eligible to Retire within 10 years: 11

- Total Staff Eligible to Retire Now: 132
- Eligible to Retire within 5 years: 30
- Eligible to Retire within 10 years: 42

- All CP&E Employees Eligible to Retire Now: 13

Graphs showing workforce demographics and retirement readiness.
III. Professional Obligations

2. Engineers shall at all times strive to serve the public interest.
   a. Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.
Strategies for Long Term Success

- Incorporate **Sustainability** – ‘EBC’s – Environment, Business, Community
- Voice of the Customer
- **Customer Affordability**
- **Safe, Affordable, Reliable** utility services
- **Partnerships for Excellence in Research & Learning (PERL)** – Partnerships with Purdue, IUPUI, Rose-Hulman, etc.
- **Vendor Partnerships** – Cost Controls, Innovation, Community Involvement
- **Economic Benefits** – Jobs
- **Peer City Collaboration** – Share experiences with other cities – Two way learning opportunities
- **Effective management** of the CSO **Consent Decree** – Our single biggest capital investment
Strategies for Long Term Success
Partnership for Excellence in Research and Learning (PERL)

POTENTIAL PARTNERSHIP OPPORTUNITIES:
• Enhanced consideration and use of Co-ops & Interns
• Partnership opportunities for senior design projects
• Sharing university research data (e.g. Purdue’s data on regional water supply or infrastructure integrity)
• Evaluate use of university technologies (e.g. Purdue owns ‘Soilermaker’...soil remediation)
• Research partnerships on topics such as:
  o Sustainability
  o Energy efficiencies
  o GIS applications
  o Water reuse
  o Water-quality modeling
  o Water and wastewater treatment alternatives
• Collaborate on infrastructure needs, trends, and patterns
• Training opportunities on active construction projects

SHORT AND LONG TERM GOALS & VISIONS (‘EBC’s):
✓ Gain better access to more / better data to benefit our environment (E)
✓ Help create more opportunities for our future business leaders and technical talent (B)
✓ Encourage more students to remain in Indiana / Indianapolis, after graduation (C)
Strategies for Long Term Success
Diversity

• Strengthening a diverse business community economically contributes to the overall economic growth of our markets.

• Minimum participation goals
  – 15% for Minority – Owned Businesses
  – 8% for Woman – Owned Businesses
  – 3% for Veteran – Owned Businesses

• In 2015, Citizens exceeded these goals with $128.6 million of spending with diverse suppliers:

<table>
<thead>
<tr>
<th>Eligible Expenditures``</th>
<th>$364.2 million</th>
<th>% of Eligible Total</th>
<th>Supplier Diversity Goals</th>
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</thead>
<tbody>
<tr>
<td>MBE Expenditures</td>
<td>$63.4 million</td>
<td>17.5%</td>
<td>15%</td>
</tr>
<tr>
<td>WBE Expenditures</td>
<td>$49.8 million</td>
<td>13.7%</td>
<td>8%</td>
</tr>
<tr>
<td>VBE Expenditures</td>
<td>$15.4 million</td>
<td>4.2%</td>
<td>3%</td>
</tr>
<tr>
<td>Total MBE/WBE/VBE</td>
<td>$128.6 million</td>
<td>35%</td>
<td>26%</td>
</tr>
</tbody>
</table>
Strategies for Long Term Success
Community Involvement Statistics and Benefits

• Spreads the word about your values and intentions
• Get to know our customers and helps build stronger relationships with them
• Getting to know our vendors and build stronger relationships with them
• Over 50% of 18-26 year olds “would prefer to work for a company that offers volunteer opportunities
• Over 50% of those surveyed said a company’s work on charitable causes helped influence them to accept job
• Most consumers have a better outlook on businesses that give to a charity that they care about
• Americans gave over $350 billion in 2014 (a 7.1% increase from 2013)
• It is estimated total charitable contributions will total between $21 and $55 trillion between 1998 – 2052
• Over 98% of high net worth households give to charity
• 63% of high net worth donors cite “giving back to the community” as a chief motivation for giving
• In 2015 there were over 1.5 million charitable organizations in the United States
Strategies for Long Term Success
Part of the Community

Employees Pave the Way for Another Successful United Way Campaign in 2014

2014 United Way Campaign Key Events and Highlights:

- Citizens United Way Golf Caring conducted on June 25 at the Woodwind Golf Club in Westfield.
- The Campaign Com-Build at the Masonic, Friday on August 19.
- Chuck-A-Rama Breakfast at the Largabler and Perry Center on September 19.
- Chuck-A-Rama Breakfast at Wawasee on September 20.
- Hamburgers and Hot Dog Cookout at the Corporate Office on September 21.

The employees’ efforts will be the same part of our annual payroll, the Largabler and Corporate Office facilities.
Over 3,000 employees were awarded to stiving employees through the daily donor’s campaign week.
A total of $37,000 was awarded to stiving employees who contributed to the United Way.

Help Three Local Families this Holiday Season through the Paul Riggins Giving Tree

At the upcoming holiday season, Citizens United Way is offering an annual community tradition. The Paul Riggins Giving Tree provides another opportunity to make a difference for those who are less fortunate by honoring the memory of the late Citizens United Way. The project started 20 days before Christmas in 1992, when Paul issued a holiday challenge to his team. He said that if it remained, he would give it to charity. To Paul’s surprise, other employees started raising money on their own, and we went on to raise money for charity. This year, the Giving Tree will continue.

CITIZENS PARTNERS WITH IFD RECUTS IN “BADGES TO BURN CAMP” HYDRANT PROJECT

Project Intended to Help Citizens and IFD Give Back to Burn Survivors and Community

Citizens Energy Group teamed up with the Indianapolis Fire Department (IFD) to put in a new fire hydrant on October 3 to paint the town red and raise money for a great cause. Under the direction of Citizens Energy Group’s President and CEO, Citizens Water Distribution 2 members of the FD Recutts and repairing 300 hydrants in the downtown.
Citizens also provided all of the water supplies needed from its own inventory, which is known as “Badges to Burn Camp” is part of a requirement—class 415 is one of the mandatory curricula that students must complete during their training.

OFFICE OF THE PRESIDENT

July 25, 2014

Citizens Energy Group

Attn: Mark C. Jacobs

Vice President, Major Capital Projects

250 N. Capitol Ave., Suite 600

Indianapolis, IN 46204

Dear Mr. Jacobs,

On behalf of Purdue University, thank you for the gift of $62,102 from Citizens Energy Group to the Science/Research program.

At Purdue, we recognize that early college preparation is vital to student success. By partnering with the Indianapolis Public Schools and local school corporations, we can introduce high school students for careers in science, technology, engineering, and mathematics (STEM) disciplines.

Through this partnership, we have the opportunity to receive the support of Citizen Energy Group’s employees and volunteers. I look forward to hearing from you about the impact of this grant.

Sincerely,

Michael L. Daniels Jr.
President
Strategies for Long Term Success
Sustainability

What the Engineer Said: “The purpose of this white paper is to start the discussion for an outline of potential elements of an overall sustainability initiative or charter for Citizens Energy Group (CEG), which consist of green infrastructure projects, the use of sustainability rating systems, sustainable metrics, and coordination across CEG business units and potentially with partners outside the utility as well. Due to its recent integration of energy, water, and wastewater business units, CEG currently has an unprecedented opportunity to implement sustainable projects and initiatives to reduce capital costs, improve the natural environment, increase energy efficiency, and provide aesthetic benefits and reduced costs to its customers, within its unique characteristics and consolidated utilities and significant operational and capital programs....”

What the CEO Said: “…it’s really about the EBC’s....The Environment, the Businesses, and the Community. A strong utility supports strong EBC’s and strong EBC’s make a strong utility.”

Environment: “...our efforts to sustain our environment are being achieved through unprecedented infrastructure investments in each of our utility systems.”

Business: “As we make wise long-term investments in our utility systems, we are sustaining our business through disciplined cost control efforts; sound financial and strategic planning; adherence to documented quality processes; and development of new businesses to support community investment activities”.

Community: “…promote development of a more sustainable community” (e.g. Winter wise, education, Earth Day, environmental clean up, day of sharing, sustainable neighborhoods, youth programs, etc.).
Water Utilities – At a Glance

(Acquired August 26, 2011)

• Acquired Indianapolis Water Utility
  – serving 1 million customers in 6-county area
  – system previously operated by Veolia Water
  – now operated by staff transferred to CEG

• Acquired Indianapolis Wastewater Utility
  – system serving 800,000 people in Marion County
  – operated by United Water under contract to CEG
  – 8,000 septic tanks to address
  – $2 B CSO Consent Decree
Integrated Water Resource Plan (25 & 100 years)

IWRP Supply Plan

- Projected Available Supply (MGD)
- System Capacity Target (Demand Forecast + 5%)
- Water Reuse
- New Water Storage
- New Surface and Groundwater Supplies
- Water Wise Initiatives
- System Optimization

Integrated Water Resource Plan

- Deficit Resolved via Watering Restrictions
- Additional Resources in IWRP
- Current Moderate Drought Supply Available
- System Yield 2012 (Moderate Drought)
Location: Olio Road & Geist Reservoir
Property: 74 Acre / 8 Acre Potential Plant Site
Quarry Depth: 230 Feet
Geist Reservoir: 6.7 Billion Gallons
Quarry Water Storage: 3.2 Billion Gallons
Supply: 20-25 MGD (Summer Supply)
Projection: 10-15 Years System Growth
Deep Tunnel System Components

Robbins Main Beam Tunnel Boring Machine
http://www.youtube.com/watch?v=J0YqpZCoYEQ

- Deep Tunnel System Components
- Robbins Main Beam Tunnel Boring Machine
- Video link: http://www.youtube.com/watch?v=J0YqpZCoYEQ
Deep Rock Tunnel Connector Pump Station Update

DRTC Tunnel
Launch Shaft 18’ Diameter

39’ Diameter

60’W x 100’L x 66’H

FACT SHEET

- Pumps are “dry pit vertical centrifugal”.
- 3 pumps need 4,500 kilowatt – hours
- Deepest floor is almost 280 feet below the ground surface
- Cavern excavation produced over 16,000 cubic yards of rock
- Pump Station houses four (4) 30MGD pumps
- Each pump is rated at 2,000 horsepower
- Flow enters the Pump Station through a 72-inch diameter tunnel extending from the Screen & Grit Shaft
- Pumps discharge into twin 42-inch diameter pipes
- Water is lifted over 300 feet before flowing into Southport AWT

PROJECT DESCRIPTION

The Deep Rock Tunnel Connector captures and conveys combined sewer overflows to the pump station. The core function of the pump station is to empty the tunnel system and deliver the flow to the Southport Advanced Wastewater Treatment Plant.

PROJECT STATS

- Project in construction
- Pump room is approximately 270 feet below grade
- Located at Southport Advanced Wastewater Treatment Plant
- Four main tunnel pumps for dewatering are each rated at 30 MGD
- Pump station firm capacity (with one pump out of service) of 90 MGD
- Project to be completed by December 31, 2017
Southport Advanced Wastewater Treatment Plant Update

Projects: 1) Headworks 2) Secondary Expansion 3) Primary Clarifiers and 4) Wet Weather (UV) Disinfection

Contractor: Bowen Engineering Corporation

Bid Price: $87,584,040.00

Notice To Proceed Issued: March 27, 2014

- New screening and grit removal @ Headworks
- Evaluate need for pump station upgrades

Secondary
- Convert ANS tanks to reverse flow
- New mixed liquor channel to convey flow to ONS
- Increase ONS capacity and rehab clarifiers

- Add UV Disinfection for 150 MGD
- Rehab existing 60” ANS effluent line (now online)

Primary Clarifiers
- Rehab north Primary Clarifiers – wet weather flow
- Convert south primary clarifiers – dry weather flow

DRTC Pump Station
Steam System Overview

- Perry K - Second largest steam utility in U.S.
- 8 boilers: Converted to natural gas
- 24 Miles of Distribution Piping / 700 Manholes
- Covanta Energy – Refuse incinerator provides 50% of steam supply for Citizens’ steam system
- Natural Gas usage nearly 4.5 BCF
- Controls are newest technology
- System peak is 1,500,000 lb/hr (Jan 2014)
- Serves about 200 institutional, commercial and industrial customers (Including: Eli Lilly, Lucas Oil Stadium, IU Health, IN Gov Center, downtown hotels)
- O & M

Gas and Oil System Overview

- 260,000 customers – Marion County
- 3,000 customers – Westfield
- 245 miles of 20” transmission line including line from Greene County
- Five primary suppliers – Panhandle, Texas Gas, Rockies Express, Heartland, Midwest Gas Transmission
- 4,000 miles of distribution mains
- 4,000 miles of service lines
- Underground Storage – 7 Bcf
- LNG storage facility, 1 Bcf
- Oil Field producing 225 barrels a day
COOPERATIVE EDUCATION AT PURDUE

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COOPERATIVE EDUCATION AT PURDUE

• Started in ME in 1954

• Now serving 45 majors in 8 colleges:
  – Agriculture, Engineering, Health & Human Sciences, Liberal Arts, Management, Pharmacy, Purdue Polytechnic, and Science
  – 32 faculty coordinators
  – 26 faculty coordinators in Engineering, Polytechnic, and Science

• 8 staff members
5-Session Co-Op Program
- Recruit students during first year
- Attend callout beginning of second semester
- Minimum GPA of 2.8
- First work session either summer or fall after first year
- Alternating academic and work sessions afterward
- Total of 5 work sessions (~16-20 months)
- Typically 2 summer and 3 spring and/or fall
- Students graduate in 5 years
- Global work sessions are possible

3-Session Co-Op Program
- Callouts year round, focused during IR
- Minimum GPA of 2.6
- Students in fourth semester or higher
- Much more flexible, can start as late as third or fourth year in summer, fall, or spring
- Alternating academic and work sessions afterward
- Total of 3 work sessions (~12 months)
- Typically 1 summer, 1 spring, and 1 fall
- Students graduate in 5 years
- Global work session possible
Active Professional Practice Students by Program

- **Study Abroad**: 0 (2011), 0 (2012), 0 (2013), 0 (2014), 10 (2015)
RECRUIT ONCE, HIRE TWICE

2025 WORKFORCE PLANNING
Why utilize Cooperative Education as a means to realize Human Resource needs?

- Discover ambitious students early
- Assess potential permanent hire prior to graduation
- Enhance campus recruiting reputation

Average recruiting cost:
- $3,582

• Co-Op Students vs. Interns
  • Duration of Engagement
    • Intern: generally, one semester or summer in length.
    • Co-Op: Three or Five work rotations over four years.
  • Work Product
    • Intern: Usually, one limited duration project.
    • Co-Op: Several projects, occasionally spanning multiple work rotations. Tasks escalate in complexity as student progresses in studies.
  • Work Experiences
    • Intern: Limited exposure to one segment of business/engineering cycle.
    • Co-Op: Deep exposure to one segment of business across multiple rotations OR opportunity to experience multiple areas of business.
In next ten years, there will be an exceptionally high demand for STEM graduates. 
- FAST Act creates significant investment in infrastructure, yielding large demand for new Civil Engineers.

Indiana MUST retain the STEM talent it produces. 
- Only 23.6% of Purdue Engineering BS graduates remain in Indiana post-graduation.

Talent Development Initiative: Citizens Energy Group established Partnerships for Excellence in Research & Learning (PERL) to better connect with Indiana’s STEM institutions, creating a sustainable talent pipeline.

Establishing a Cooperative Education program can help organizations to “Recruit ONCE, Hire TWICE.”
- Reduce recruitment costs, fill talent pipeline.
- Cooperative Education at Purdue is facilitated by the Office of Professional Practice (www.opp.purdue.edu).
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