Prioritize Reducing Your Energy Footprint Over Capital On GHG Reduction

Significant impacts are achievable without big capital investments!

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Expertise includes:

- Energy Management Systems
- Facility Design/Maintenance
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- Six Sigma Black Belt

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Expertise includes:

- Strategic Energy Management
- Industrial Energy Procurement
- Regulatory/Legislative
- Six Sigma Black Belt
- Energy Efficiency
- ISO 50001 Energy Management Systems

What Does ChatGPT Say?

Here are some examples of initiatives and practices that contribute to greenhouse gas (GHG) reduction:

Renewable Energy Adoption:**

Transitioning to renewable energy sources such as solar, wind, hydro, and geothermal power helps reduce reliance on fossil fuels, thereby lowering GHG emissions.

Energy Efficiency Improvements:**

Implementing energy-efficient technologies and practices in buildings, transportation, and industrial processes can significantly cut down energy consumption and associated emissions.

What Does ChatGPT Say?

Green Building Design:**

Constructing and retrofitting buildings with energy-efficient features, sustainable materials, and smart technologies reduces energy consumption and GHG emissions associated with the built environment.

Industrial Process Optimization:**

Optimizing manufacturing and industrial processes to be more efficient and environmentally friendly can lead to significant reductions in GHG emissions.

Government Policies and Regulations:**

Implementing and enforcing policies that incentivize emission reductions, such as emissions trading systems or carbon taxes, can encourage businesses and individuals to adopt greener practices.

What Does ChatGPT Say?

Community Engagement and Education:**

Raising awareness and educating communities about the impact of GHG emissions and the benefits of sustainable practices can lead to collective efforts in reducing emissions.

Electrification of Transportation:**

Shifting from traditional internal combustion engine vehicles to electric vehicles decreases emissions from the transportation sector.

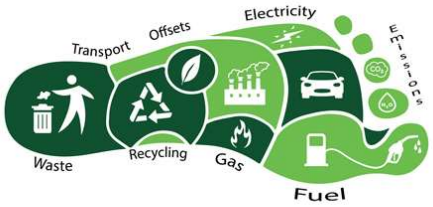
These examples highlight the diverse strategies and approaches available to address and mitigate greenhouse gas emissions across various sectors.

Interesting Statistics

- The Richest 1% of the world (77 Million people) are responsible for 16% of the global green house gas emissions
- From 2000 to 2021, global CO_2 emissions from energy use increased 45%.
- Since 2005, China has been the world's largest source of anthropogenic CO_2 emissions, surpassing the U.S
- GHG emissions in 2021 were 2.1% lower than in 1990, with an average annual decline rate of 0.02 percent (US)
- The electric power industry produces 25% of total U.S. GHG emissions. Emissions from this sector have decreased 16% since 1990 and 36% since 2005

Survey

1. Corporate headquarters location?
   1. NA
   2. Other
2. Who tracks and reports carbon footprint?
   1. Energy Management
   2. Environmental
   3. Operations
   4. Other
3. How are GHG Goals Developed?
   1. Dictated by top management
   2. Developed through a GHG reduction team
   3. Based on current state
4. Are goals realistic? (personal feeling)
   1. Yes/No



Survey

5. Mechanisms currently used to reduce carbon footprint?
   1. Energy Efficiency/Energy Management System
   2. REC/EFEC
   3. Installing Renewable Equipment
   4. PPA or VPPA
   5. Clean Energy buy (Nuclear or other)
6. Does the company have the resources to meet goals?
   1. Yes/No
7. Is there an active energy efficiency program at your company?
   1. Yes/No
8. Is your company active or pursuing an energy management system such as 50001?
   1. Yes/No
9. Contact info (Optional)

Q1. Where Is Your Corporate HQ Located?

- Does it Matter if your company is based in North America or elsewhere?

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Q2. Who Tracks And Reports Carbon Footprint?

- What is their role in improving carbon footprint?
- Do they also prioritize related projects?
  - Payback consideration
- Accuracy of Scope 1, 2, 3
  - How is accuracy confirmed?
  - Training and competency
- Impacts of inaccuracy
  - Stock price, impact to priority, tax implications

Q3. How Are GHG Goals Developed?

1. How are GHG Goals Developed?
    1. Dictated by top management
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Q4. Are Goals Realistic?

- You need all the right ingredients, or you will not get the results
  - Baking the cake
- Measurement of the goals
  - Importance of accuracy
- Long term goals, 2030 and beyond
  - Are we relying on step change in technology to meet goals?

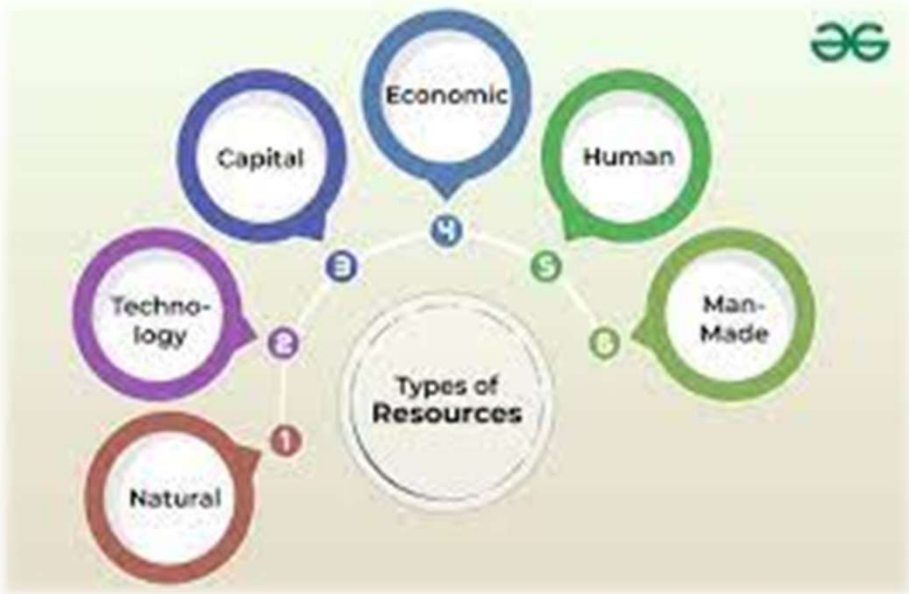
Q5. Methods Currently Used To Reduce Carbon Footprint?

1. Energy Efficiency/Energy Management System
2. REC/EFEC
3. Installing Renewable Equipment
4. PPA or VPPA
5. Clean Energy buy (Nuclear or other)

- Prioritization
- Energy is one of the most significant costs of conversion in manufacturing

Q6. Does your company have the resources to meet their stated goals?

1. $$- Biggest hurdle for most companies
2. People- Is there a team, a person, a company?
3. Focus- Is anyone asking about it with the other important items like profits and output?



Q7. Is There An Active/Effective Energy Management Or Energy Efficiency Program At Your Company?

Q8. Is Your Company Active Or Pursuing An Energy Management System Or Certification Such As ISO50001/SEM/50001 Ready?

PHASE ONE PLAN	PHASE TWO DO	PHASE THREE CHECK AND ACT
ESTABLISHING THE SYSTEM	**MANAGE ENERGY as a RESOURCE**	**VERIFYING THE SYSTEM**
√ Scope and Boundaries √ Leadership √ Roles, Responsibilities and Authority √ Energy Policy √ Energy Review √ Baseline √ EnPIs √ Legal and Other Requirements √ Objectives and Targets Initiate Energy Manual √ Connections to existing Management Systems √ Management Review	√ Action plans √ Key Characteristics √ Monitoring and Measurement √ Competence √ Operational Control √ Maintenance √ Training and Awareness √ Communication √ Design √ Procurement √ Document and record control	√ Legal and Other Compliance Evaluation √ Internal Audit √ Corrective Actions √ Preventive Actions √ Demonstration of Continual Improvement √ Management Review

The “NEW” 50001

- will start to include GHG reduction
- Differences from the current version

Website: 50001 Ready | Navigator (lbl.gov)
Resources
Tasks
Playbook

Resources

- *DSIRE (dsireusa.org)*
- *Inflation Reduction Act Guidebook | Clean Energy | The White House*

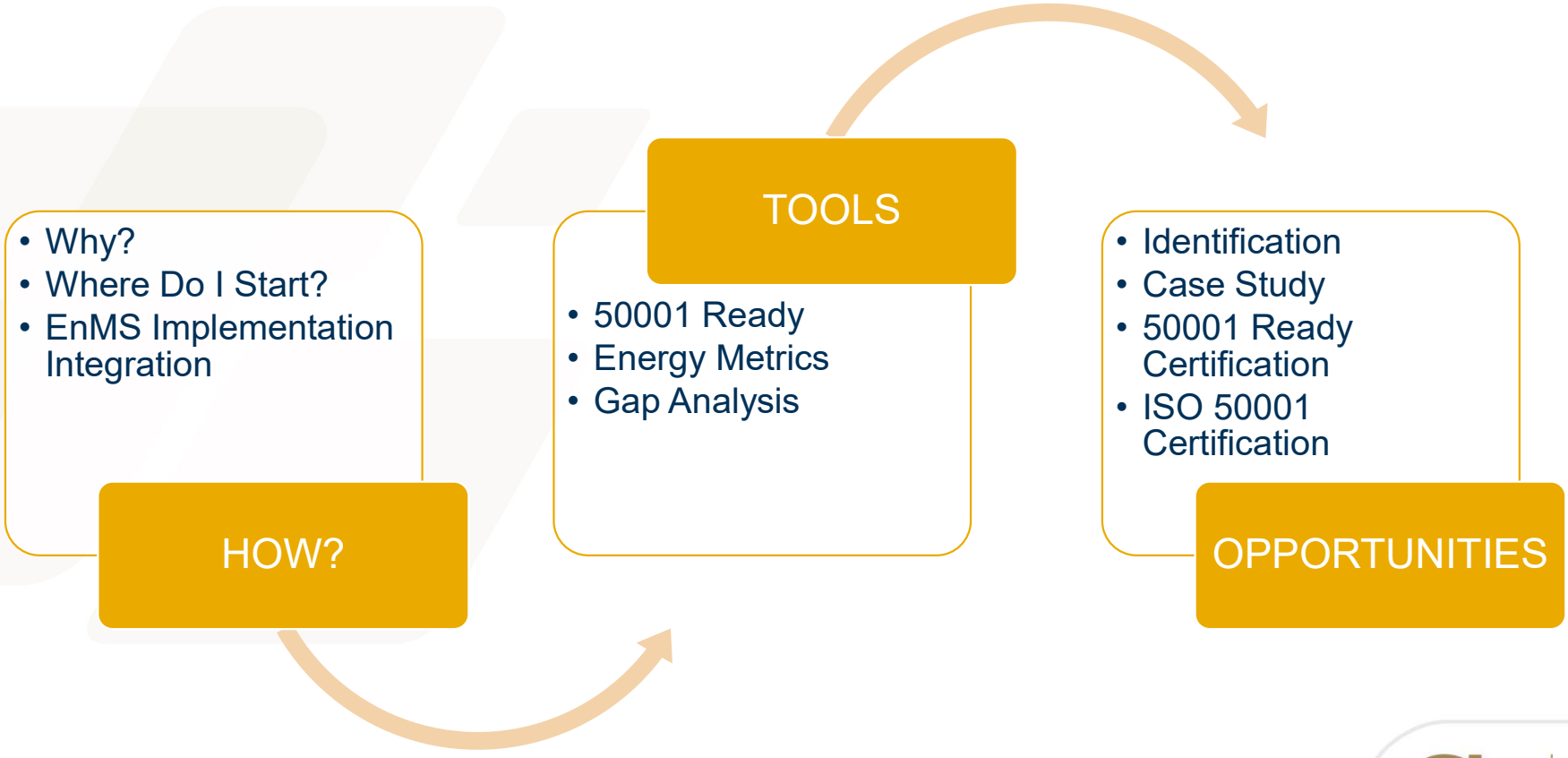
- *Energy Exchange Pre-Conference Workshop: Distributed Energy Technologies for Resilience and Cost Savings (nrel.gov)*

Ending Survey

- Add website
- Start dialog

- Did you take away any ideas for how you can help your company reduce GHG?
- Would you like more information?
  - 50001 Ready
  - ISO50001
- Are you interested in a podcast or Youtube Video on these topics?
- Are you interested in a follow up discussion?
- Name
- Email

Agenda


HOW?
• Why?
• Where Do I Start?
• EnMS Implementation Integration
TOOLS
• 50001 Ready
• Energy Metrics
• Gap Analysis
OPPORTUNITIES
• Identification
• Case Study
• 50001 Ready Certification
• ISO 50001 Certification

Defining terms

- GHG reduction
  - Considering GHG is a by product of using energy,
  - Requires Installing infrastructure, increases your operating costs
- Energy efficiency
  - Is using less energy
  - Historical focus was payback on cost
  - Current focus is around cost of GHG associated
- Outline the differences and value of each
- Relationship to an Energy Management system

GHG reduction

- GHG reduction through offsets, REC, PPA, VPPA is a financial transaction.
- Considering GHG is a by product of using energy,
- Ohio's strong Nuclear power – carbon free
- Address carbon within your energy supply
  - Ohio has an abundance of nuclear power that is carbon free
- Reducing GHG does not need to be renewable
- Define the dollar value that carbon is in your product
- Corporate/investor perspective

Why is an EnMS valuable?

Sustainability- GHG Reduction

- Alignment with corporate social responsibility strategies and sustainability goals
- Impact to carbon footprint
- Cleaner Energy supply chain
- Stakeholder Confidence

Why is an EnMS valuable?

Cost savings

- Think of energy as a raw material
- Identify the costs associated with your energy usage
- Bring energy costs into cost of product
- Impact on profitability – Energy costs directly impact the bottom line

Why is an EnMS valuable?

Budgeting

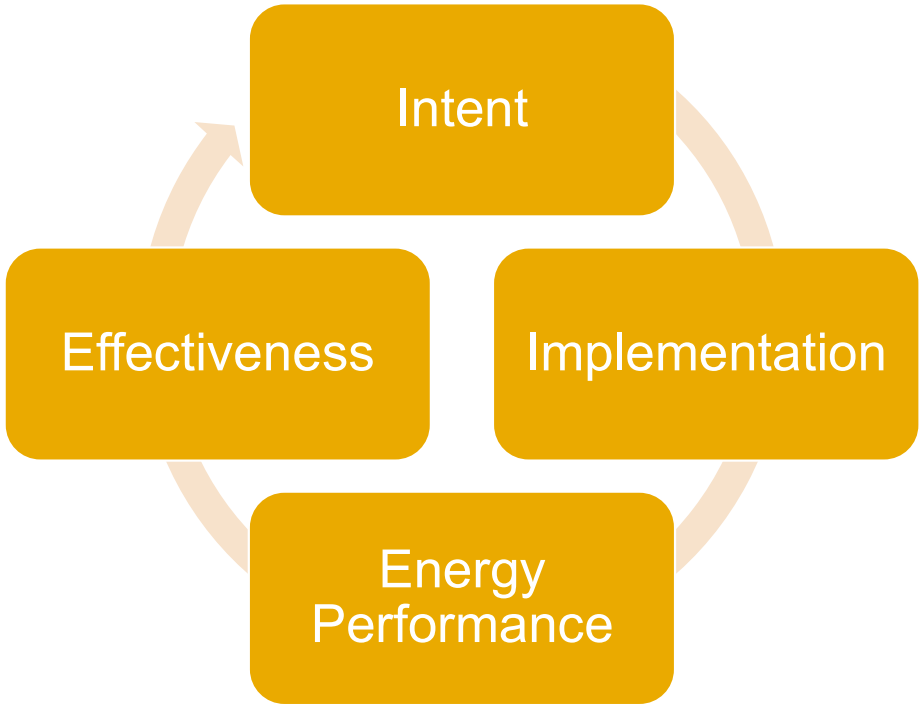
- Reduce variability of energy costs will lead to more accurate budgeting/forecasting
- Minimize impacts of volatile energy markets
- Predictability based on your own relevant variables

What is the real goal?

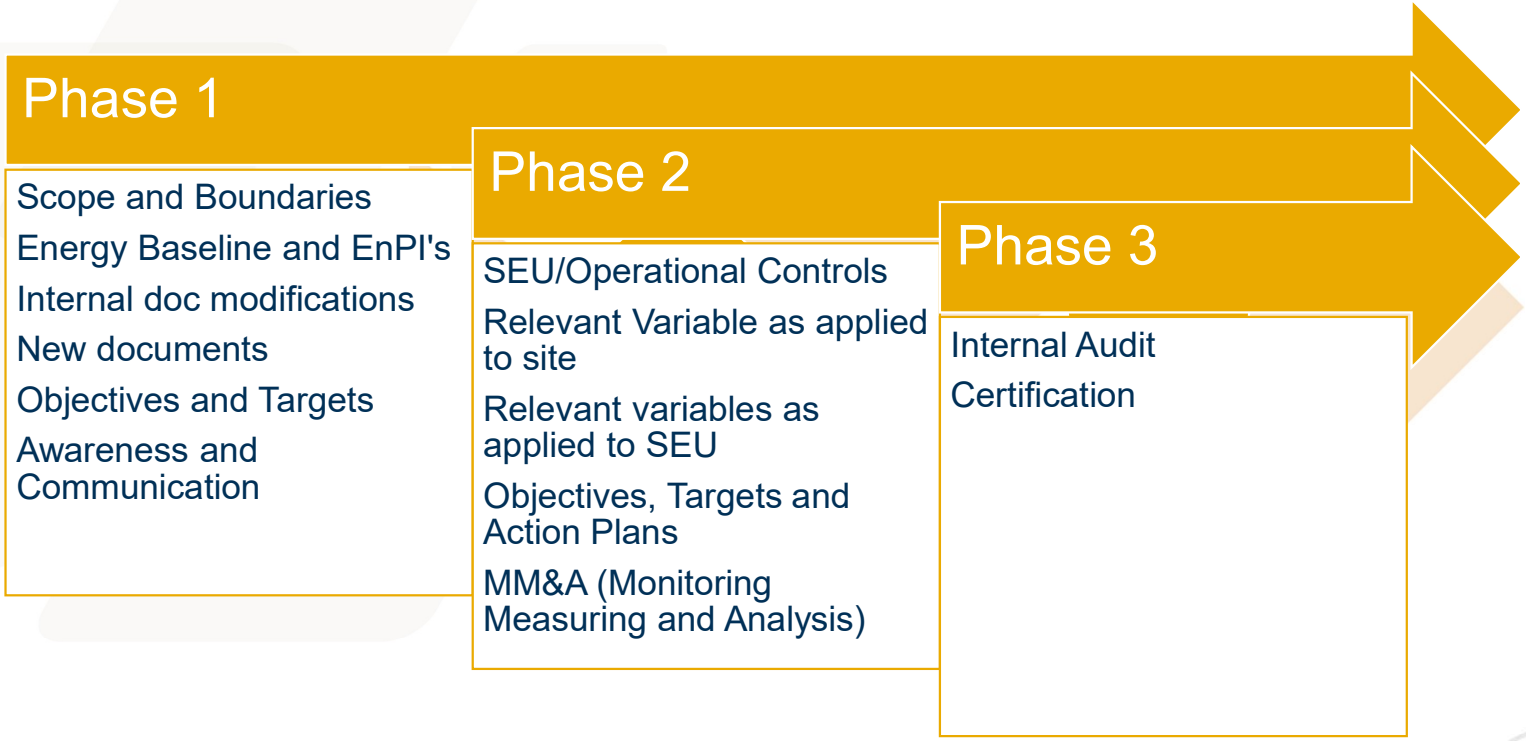
- GHG now has a value ($$ tax, CBAM, Financial/investor impacts)

How to start your Journey

- Adopt a continuous improvement mindset
  - Plan, Do, Check, Act
- Start at the Top! Without management support you will fail
- Identify a champion that will help you make an impact across different departments
- Online tools that will help
  - DOE website
  - 50001 ready navigator
- Integrate with your current management systems



EnMS – Implementation/Integration



Energy Metrics

- Conversions
  - Energy savings – GHG reduction
    - 1kWh~2.23 lbs. CO_2 (coal) or ~.91 lbs. CO_2 (NG)
  - Source to site
    - For US electric power plants are only about 33% efficient at POU
  - Carbon tax
- Beyond the metrics – make sure to apply common sense

Energy Metrics

- Normalized vs intensity
  - Normalized accounts for weather, production, other relevant variables
    - A linear regression model can be created that tells more!
  - Intensity metrics are easier but don’t tell the real story
    - XX kWh/# of widgets

EnMS – Implementation/Integration

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Notes from 11/17/23

CC. Prioritize reducing your Energy Footprint before spending capital on GHG reduction
Considering GHG is the byproduct of energy use, we will discuss how a focus on Energy Efficiency and a 50001 Energy Management program can enhance the impact to your GHG reduction efforts and help keep operating and capital costs under control.

We have entered an era of playing this CO2 game.

Greenwashing

GHG focus:
EE Focus:
Optimize control programs
Urgrade equipment
Use less energy
Aged equipment

How do you maintain value in your home, same thought applies to manufacturing
Behind the meter – does not reduce what you use

Phased approach
Emissions factors
Future tax as motivation

Add survey –

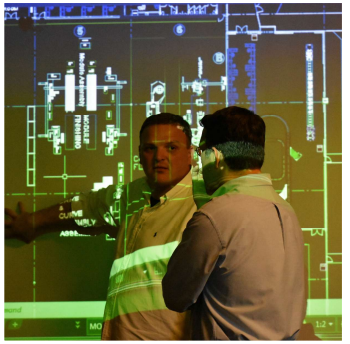
Research topic: carbon reduction strategies, what is successful?

For REC and PPA – is there an understanding on how there requirements are getting more restrictive. Example, you buy into a PPA and later, rules change and this PPA no longer meets requirement to reduce your carbon emissions

GaMEP at Georgia Tech: How We Work

- Onsite and Virtual Project Implementation
- Training
- Events
- Peer-to-peer Learning Groups
- Connections to Additional Resources



Two Certificate Opportunities

Professional Education

Manufacturing Leadership Certificate

Track Your Progress

To earn your Manufacturing Leadership Certificate take five Required Courses and two Elective Courses.

Required Courses (Take all 3)

- ☐ Creating Metrics to Drive Performance
- ☐ Leading for Organizational Excellence
- ☐ Lean Boot Camp: Applying Process Improvement Tools

Required Technology Courses

Choose 2 (all technology courses are one-hour online classes)

- ☐ Additive Manufacturing as a Secondary Process
- ☐ Applications for Robots
- ☐ Automated Systems and Control
- ☐ Industrial Network Integration
- ☐ Integrating Additive Manufacturing with Traditional Manufacturing
- ☐ Intro to Composites

Elective Courses (Choose 2)

- ☐ Best Practices in Workforce Development: Building Your Team for World-Class Performance
- ☐ ISO 9001:2015 Internal Quality Auditing
- ☐ Lean Office and Administration
- ☐ Lean Tools for Product Development
- ☐ Root Cause Analysis
- ☐ Streaming the Project Management Process for Manufacturing
- ☐ Value-Added Safety: Combining Lean Enterprise and Safety Management

For information or to register, visit pe.gatech.edu/certificates/manufacturing-leadership-certificate or contact Jay.Boudreaux@innovate.gatech.edu.

Georgia Tech Professional Education

Quality Core Tools

Master the building blocks of an effective quality management system.

More is being required today than ever before from automotive manufacturers and suppliers. To continue managing your existing business, while reaching for new business opportunities, it's critical that the products you manufacture not only meet the ISO 9001 quality system requirements, but also those specific to the automotive industry. By conforming to the Quality Core Tools required by IATF 16949, your operation and products will meet the quality requirements necessary to help you maintain and grow your business. These quality core tools are also considered best practices in other industries such as aerospace and medical devices.

Advance Product Quality Planning (APQP) and Control Plan
September 27 | Online | $750
This virtual instructor-led course covers the industry standard that ensures engineering design and product specification requirements are met. In this course we lead you through the 5 step APQP methodology from Voice of the Customer to Production Validation Testing and Customer Approval.

Failure Mode and Effects Analysis (FMEA) – Part 1 & Part II
October 4 (Part 1) & October 11 (Part 2) | Online | $750
This course covers the analytical methodology used to ensure that potential problems have been considered and addressed throughout the product and process development process.

Measurement System Analysis (MSA) – Part 1 & Part II
October 18 (Part 1) & October 25 (Part 2) | Online | $750
This course provides a guide that will help you assess the quality of your measurement systems, providing a basis for recognizing where improvements can be made.

Statistical Process Control (SPC) – Part 1 & Part II
November 1 (Part 1) & November 8 (Part 2) | Online | $750
This course covers the use of statistical techniques, such as control charts, to analyze a process or its output so as to take appropriate actions to achieve and maintain a state of statistical control and to improve the process capability.

Production Part Approval Process (PPAP)
November 15 | Online | $750
PPAP is the final submission for customer approval and supporting documentation developed during the APQP process. This course reviews the submission information required for new products, and what conditions require resubmission for product and process changes.

Courses can be taken individually or take all 5 to earn the Quality Core Tools certificate!

pe.gatech.edu
For information contact Jay Boudreaux at Jay.Boudreaux@innovate.gatech.edu.

GaMEP at Georgia Tech: What We Do

- Automation
- Cybersecurity
- Energy
- Food Safety
- Industry 4.0
- ISO Systems
- Leadership Development
- Human Resources
- Marketing
- Organizational Alignment
- Plant Layout
- Process Improvement
- Quality
- Strategy
- Supply Chain
- Sustainability

Additional Resources at Georgia Tech

Georgia Tech Enterprise Innovation Institute
Safety, Health, and Environmental Services

Oshainfo.gatech.edu

Georgia Tech Enterprise Innovation Institute
Southeastern Trade Adjustment Assistance Center

Setaac.org

Georgia Tech Enterprise Innovation Institute
Georgia MBDA Business Center

Georgiambdabusinesscenter.org

APEX Accelerator

Gtpac.org

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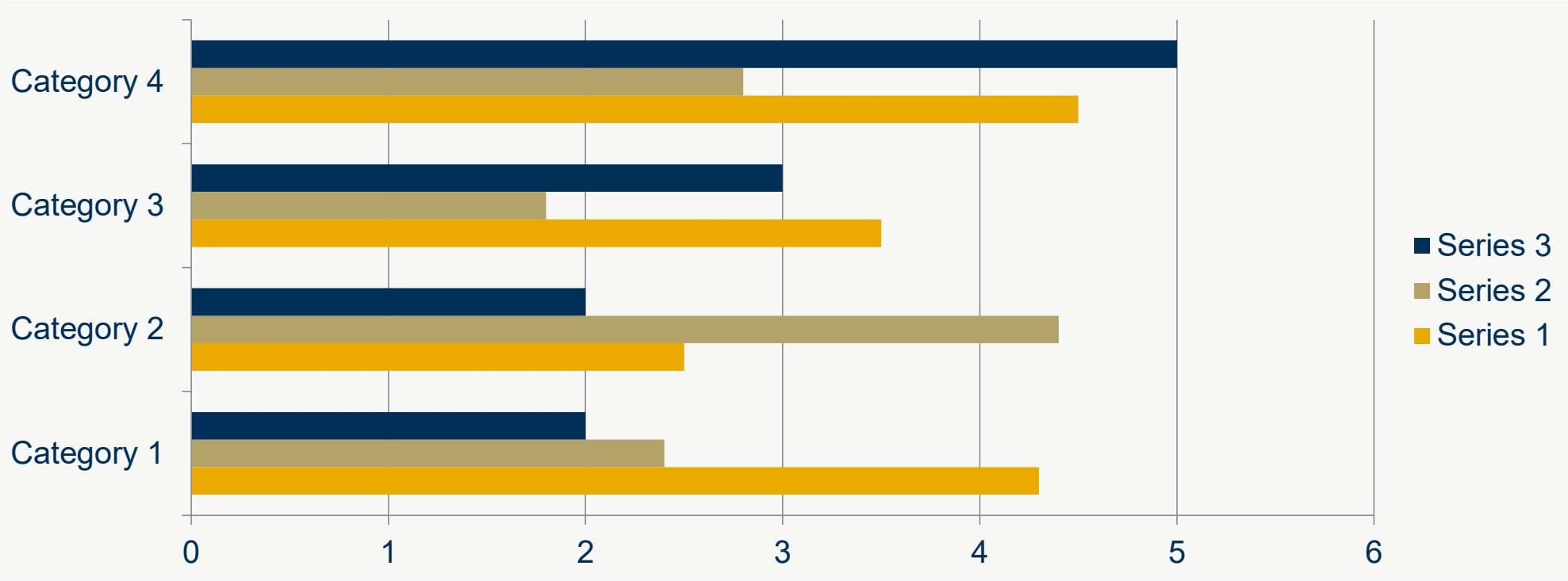
Sample Table

Title	
Text	

Sample chart



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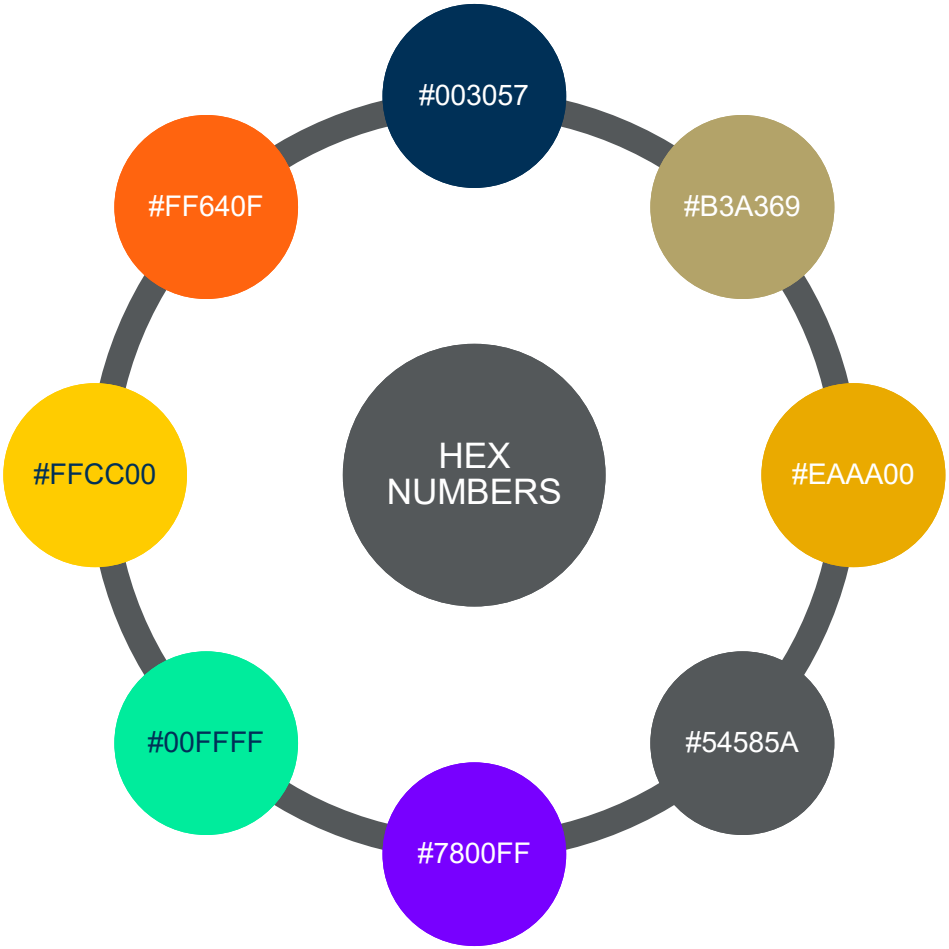

MEP National Network

Last year, GaMEP worked with more than **1,100** Georgia manufacturers to achieve the following results:

- **1,941** Jobs created and retained
- **$737 Million** in new and retained sales
- **$48 Million** in reduced operating costs
- **$84 Million** in plant investments

MEP National Network™

The Go-To Experts for Advancing U.S. Manufacturing

GaMEP at Georgia Tech: Who We Are

10 regions across the state

- 30+ project managers within 2 hours of any Georgia manufacturer

Scan to find your region manager:

GaMEP
Georgia Manufacturing Extension Partnership

GaMEP at Georgia Tech: Who We Are

State and Federally funded program designed to help manufacturers:

- Decrease bottom-line cost
- Increase top-line growth

To ultimately:

- Improve their performance in the global market
- Enhance the economic well-being of Georgia

Biographical Information

Renee L. Rambo, 10471 Gilbert Rd. Newton Falls, OH 44444
ReneeRamboMcewen@gmail.com 330-519-1815

Renee Rambo currently serves as the Energy Manager for Vallourec STAR in Youngstown Ohio. Renee attended Youngstown State University where she earned three degrees, Associates in Drafting and Design, bachelor's in mechanical engineering technology and Masters in Industrial Engineering.

Over the course of her career, she has held many leadership roles in the Automotive, Utility and Steel industries.

Renee started her career at Delphi Packard Electric as an Intern in Purchasing and later became Buyer and Commodity Team Leader for Rubber products. She then moved into Connection Systems Engineering as a Program Manager and later transitioned into Sales focused on Device Connections later to become the Customer Manager General Motors representing Delphi Connection Systems.

After her departure from the automotive industry in 2005, Renee went back into Purchasing taking on a position in Corporate Services at FirstEnergy Corporation. She got her CMP/CPSM in 2007 to recommit to the Purchasing Profession. At FirstEnergy, she managed various commodities such as freight services, corporate credit cards, network services, including a special assignment on contract management and supplier development.

Renee came to Vallourec in 2008 as a Senior Technical Buyer. She was the lead buyer on the $1Billion Fine Quality Mill built in Youngstown Ohio where she negotiated construction, equipment and service contracts for the green field project. Moving up in the Sourcing organization, Renee served as the Global Sourcing Manager for consumables for Vallourec worldwide. She led a Global Team of 30 people that manage strategic commodities such as Thread Protectors, Cutting Tools and Oils & Greases, Lubricants/Coatings, Consumables, MRO and spare parts. In her Sourcing role, Renee also managed Energy, electricity, and gas contracts for Vallourec in NA.

In 2017, Renee moved to the operations side of the business in Industrial Performance where she continued and expanded her role on Energy. With a focus on cash and cost she led Results Accelerator teams, continuous improvement teams and supported many six sigma initiatives as a Six Sigma Blackbelt.

As the need for increased focus on Energy becomes more important in our culture, Renee was well positioned to assume a newly created role of Energy Manager mid-2019. In this role Renee is responsible for utility and energy relationships, utility cost management including curtailment and regulatory impacts, and strategies for efficiency, sustainability, and carbon emissions. She recently led Vallourec Star to be 50001 Ready Recognized in December of 2022 by the Department of Energy. She has completed several courses at GaTech in Energy Management including Certified Practitioner in EnMS and ISO50001 Lead Auditor.

Renee is currently serving OELC, (formerly IEU-Ohio) as the Chairman.

Biographical Information

Jason Clarke, Rock Spring, Georgia

Jason.Clarke@innovate.gatech.edu 928-699-7591

Jason Clarke has over 20 years of manufacturing experience and holds a master's in business administration from Kennesaw State University, and a Mechanical Engineering degree from San Diego State University. Jason is a Navy veteran from the Gulf War and has operated in multiple combat theatres.

His career has included engineering and leadership roles with US Steel, Carrier, Shaw Industries, Honeywell, GKN, and Hexcel Aerospace prior to joining the Arizona and Georgia MEP programs. As a part of the Manufacturing Extension Partnership, he has worked with over 250 companies across virtually every type of manufacturing industry. Jason currently works as a Project Manager for Georgia Tech conducting industrial outreach as a consultant, and he teaches courses in the Professional Education curriculum including the CP EnMS - Certified Practitioner in Energy Management Systems course as well as being lead faculty for IAC – Industrial Assessment Center energy assessments paid for by the United States Department of Energy.

Jason's Certifications include: Certified Practitioner in Energy Management Systems, Certified Energy Manager, Distributed Generation Certified Professional, Existing Building Commissioning Professional, and he is a Lean Six Sigma Black Belt He has experience in Operations and Engineering Management, Facilities Design/Operations, Maintenance and Asset Management, Capital Project Management, Energy Efficiency, and Sustainability, and has implemented over $700M in capital projects over his career.