VPMEP

Solutions for a better way

in collaboration with Virginia Tech

Environmental Business Symposium

May 11, 2010

Sustainability and Business Performances

a NIST MEP | Network Affiliate

The Sustainability Imperative

David A. Lubin
Daniel C. Esty

Harvard Business Review

May 2010 Issue

Getting the Vision Right

Pioneering companies in sustainability often start by focusing on risk and cost reduction and over time develop strategies for increasing value creation, ultimately including intangibles such as brand and culture.

Stage 1: Do old things in new ways.

3M's Pollution Prevention Pays. Reduced 3M pollutants by more than 2.6 billion pounds and saved the company more than $1 billion.

Stage 2: Do new things in new ways.

DuPont's "zero waste" commitment decision to shed businesses with big eco-footprints, such as carpets and nylon, was based on an analysis that the business and environmental risks would outweigh their potential contribution to future earnings.

Stage 3: Transform core business.

Dow's sweeping 2015 Sustainability Goals yielded new products or technology breakthroughs in areas from solar roof shingles to hybrid batteries.

Stage 4: New business model creation and differentiation.

GE's ecomagination initiative poised to deliver $23 billion in revenues in 2010, enabled CEO Jeff Immelt not just to reposition the company as an energy and environmental solutions provider but to build a green aura into the GE brand.

Wal-Mart Sustainability 360

Sustainable Value Networks, each comprising Wal-Mart team members, NGO experts, academics, government officials, and supplier representatives, all working under the direction of a Wal-Mart network captain.

Recent academic studies offer new data correlating strong environmental or sustainability performance with superior financial returns.

Companies seeking competitive advantage from sustainability must match innovative green product offerings and business models with strategic execution.

VPMEP Mission Statement

“We create and maintain industrial and manufacturing jobs by helping Virginia industries compete”

www.vpmep.org

How Does VPMEP Help?

- **Growth Advantage, Industrial and Business Process Improvement Services**
- **Public Seminars and workshops**
- **Specialized training**
- **Formal consulting projects**
- **Partner with public and private sector resources**
- **Access to nationwide network of MEP centers**


MANUFACTURING
EXTENSION
PARTNERSHIP


VATPDC
Virginia Applied Technology & Professional Development Center


VBEC


accenture
High performance. Delivered.

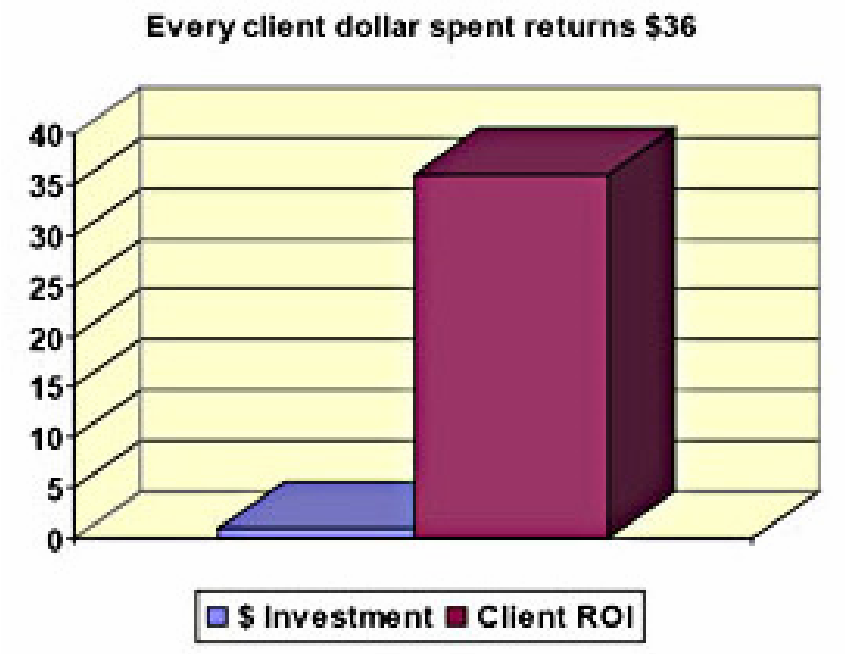
2000 – 2009 Client Impact

Increased or retained sales	**$887 million**
Bottom line impact	**$849 million**
Client investments made to operations	**$214 million**
Jobs created or retained	**5,079**

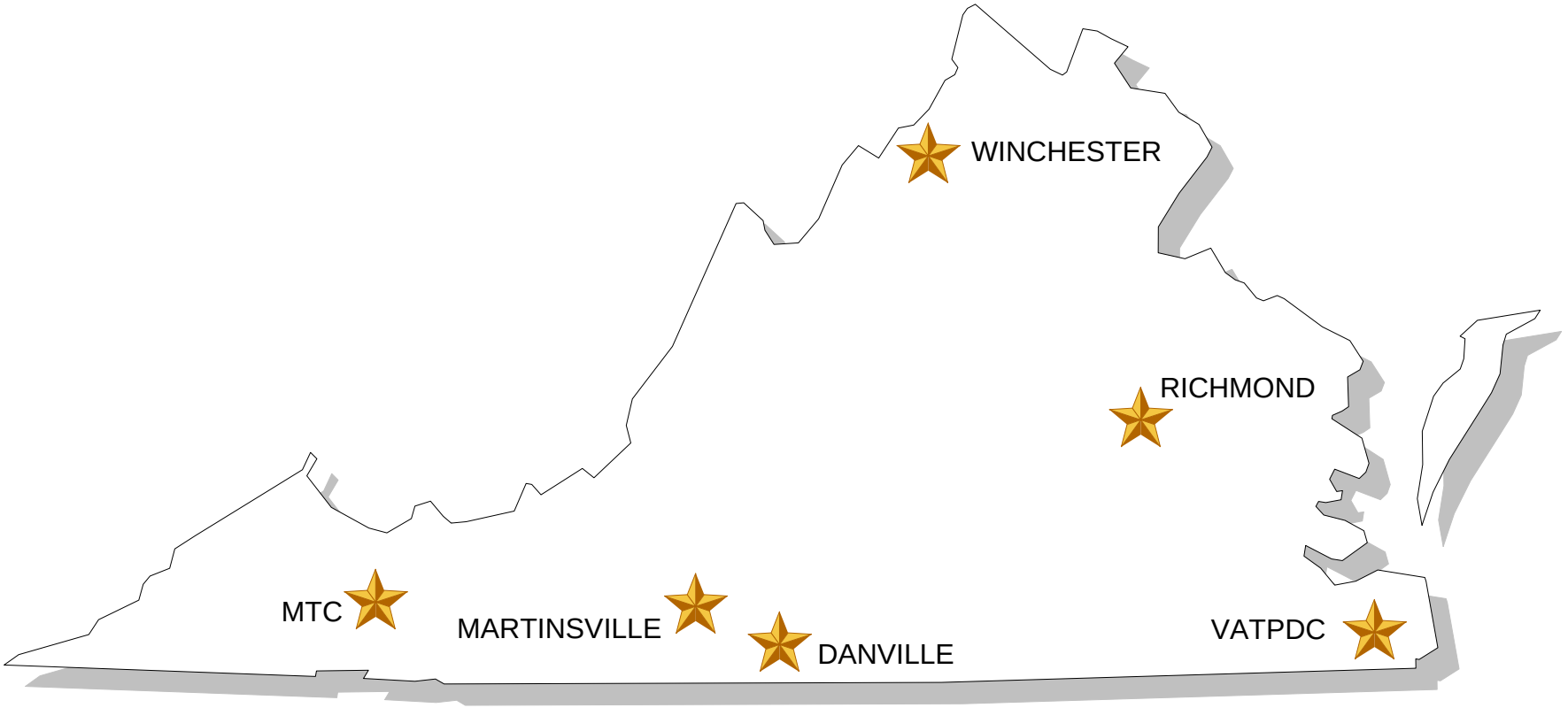
Source: U. S. Department of Commerce Independent Survey

R O I

Delivering Measurable Results



Statewide Coverage



VPMEP Services Focus

Helping Companies

- **Innovate**
- **Identify, Develop and Reach Markets**
- **Generate Economic Profit that Sustains the Company**
- **Be Responsible Employers & Corporate Citizens**

Converting Client Ideas into Real Growth

Innovation — • New Product Maker

Valuation Prep. — • MERWYN Research

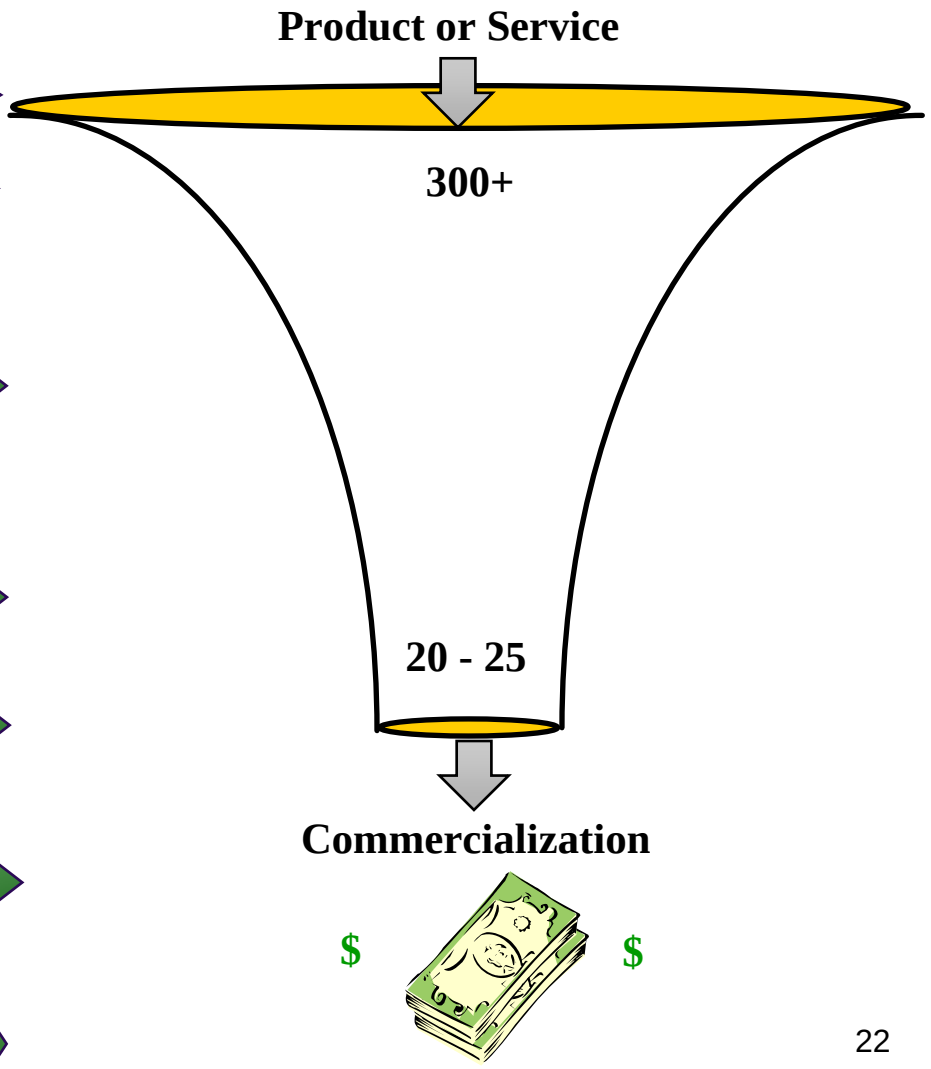
Research / Analysis / Selection — • Scoring 100 pt scale • More than 50 move to next step • Potential resubmit for marginal innovations

Business Plan — • Tactical Business Plan • Market Analysis

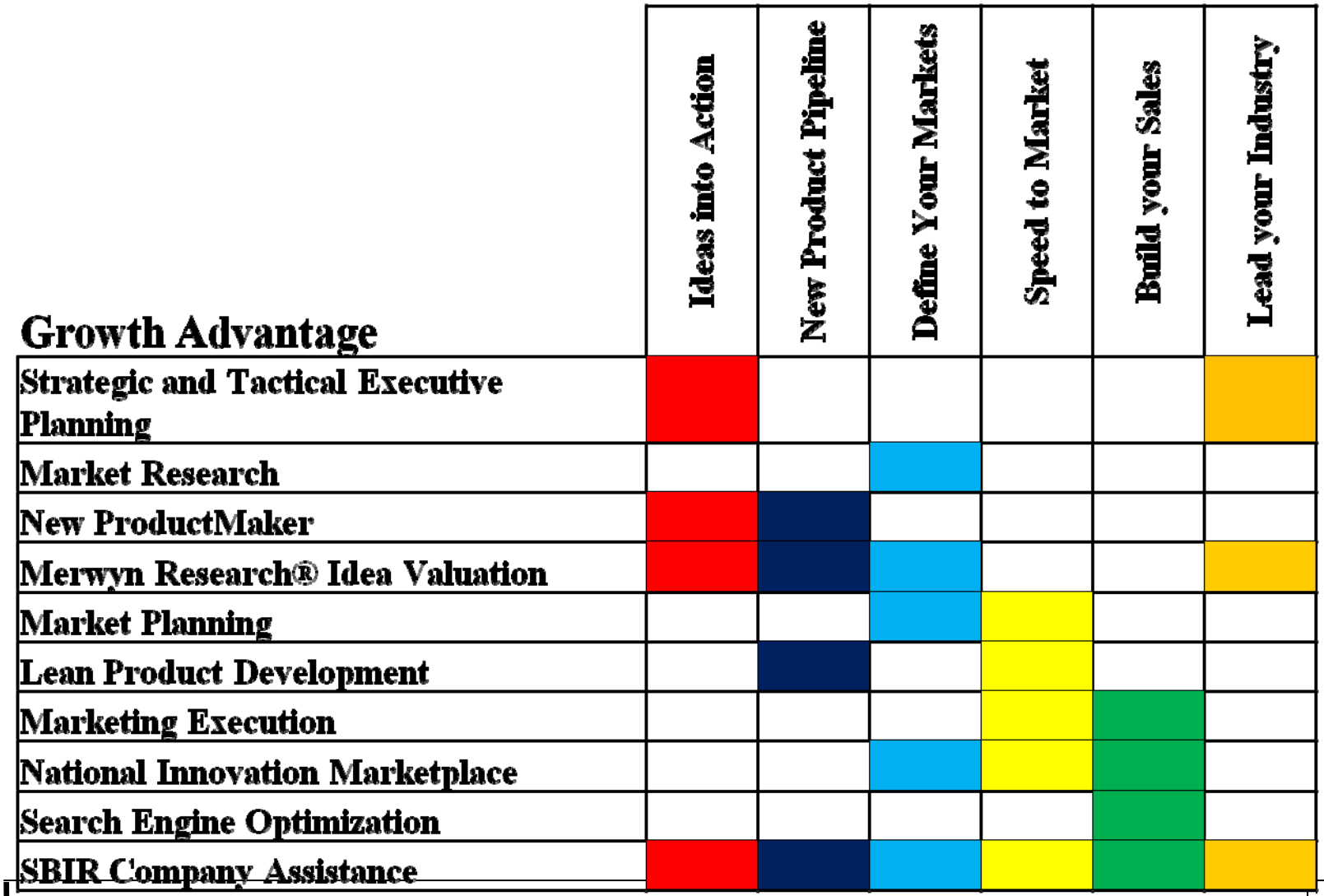
Development — • Product Development • Market Analysis

Planning — • Create next steps for commercialization • Brand Differentiation

Launch — • Launch Plan • Channels to market • Channel education



Growth Advantage Portfolio



VPMEP

The Open Innovation Marketplace
Where Innovation Buyers, Sellers, Investors & Distributors
Speak the Same Language

Seller BENEFIT

60 Second
Business Credibility

Inventor's ideas are taken more seriously by companies because each idea comes with an independent research report and sales forecast that can be understood in 60 seconds.

Buyer BENEFIT

Smarter, Faster, Cheaper
Innovation Development

Companies can painlessly access a virtual Innovation Department that is as much as 3X times more successful, 85% more efficient and requires 50% less capital investment.

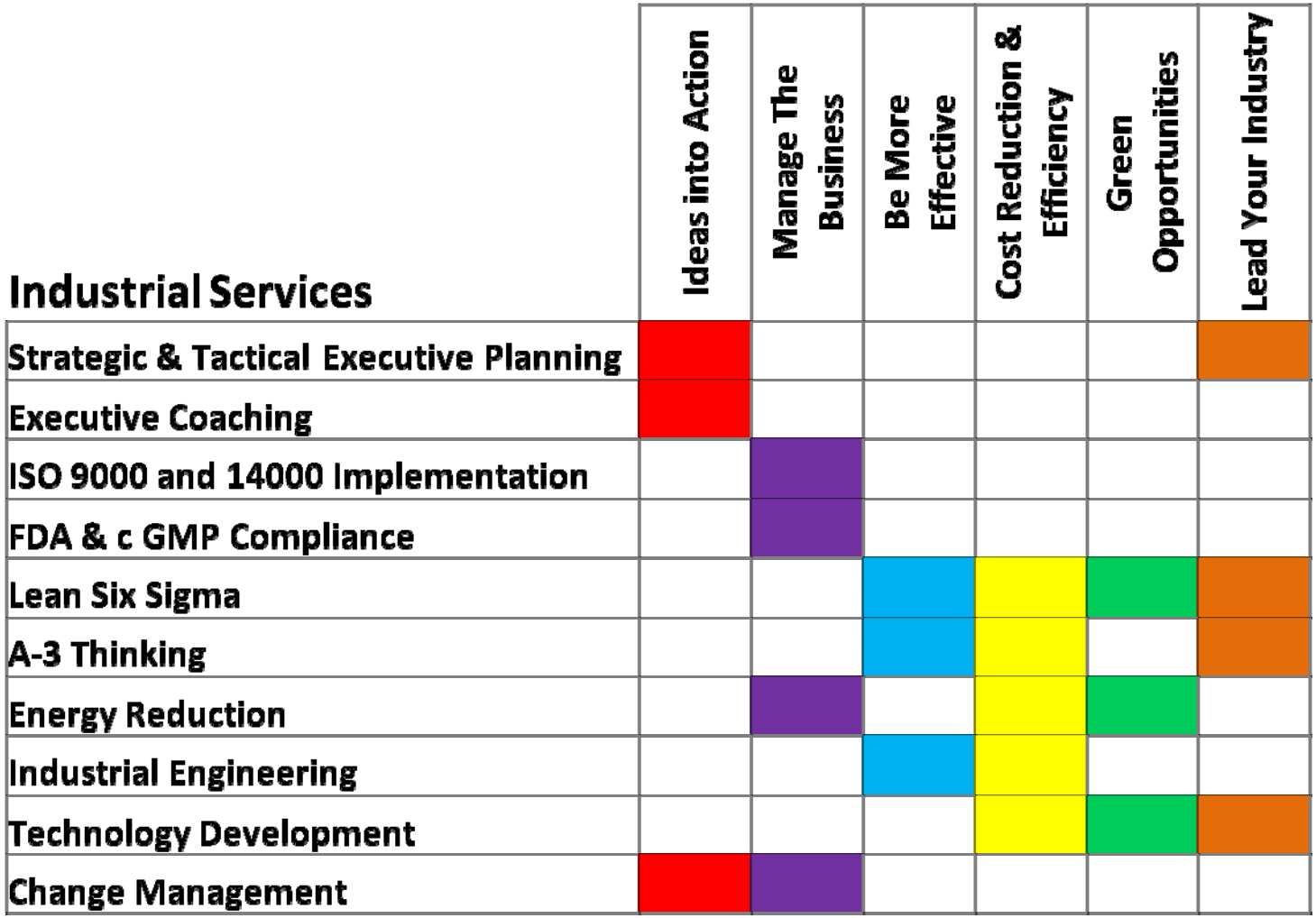
Buyer/Seller Connections by NIST/MEP
USA Innovation connections accelerated by the U.S. Commerce Department's NIST/MEP Network of 1,600 experts across the USA & Puerto Rico.

NIST/MEP Network

Industrial and Business Process Improvements

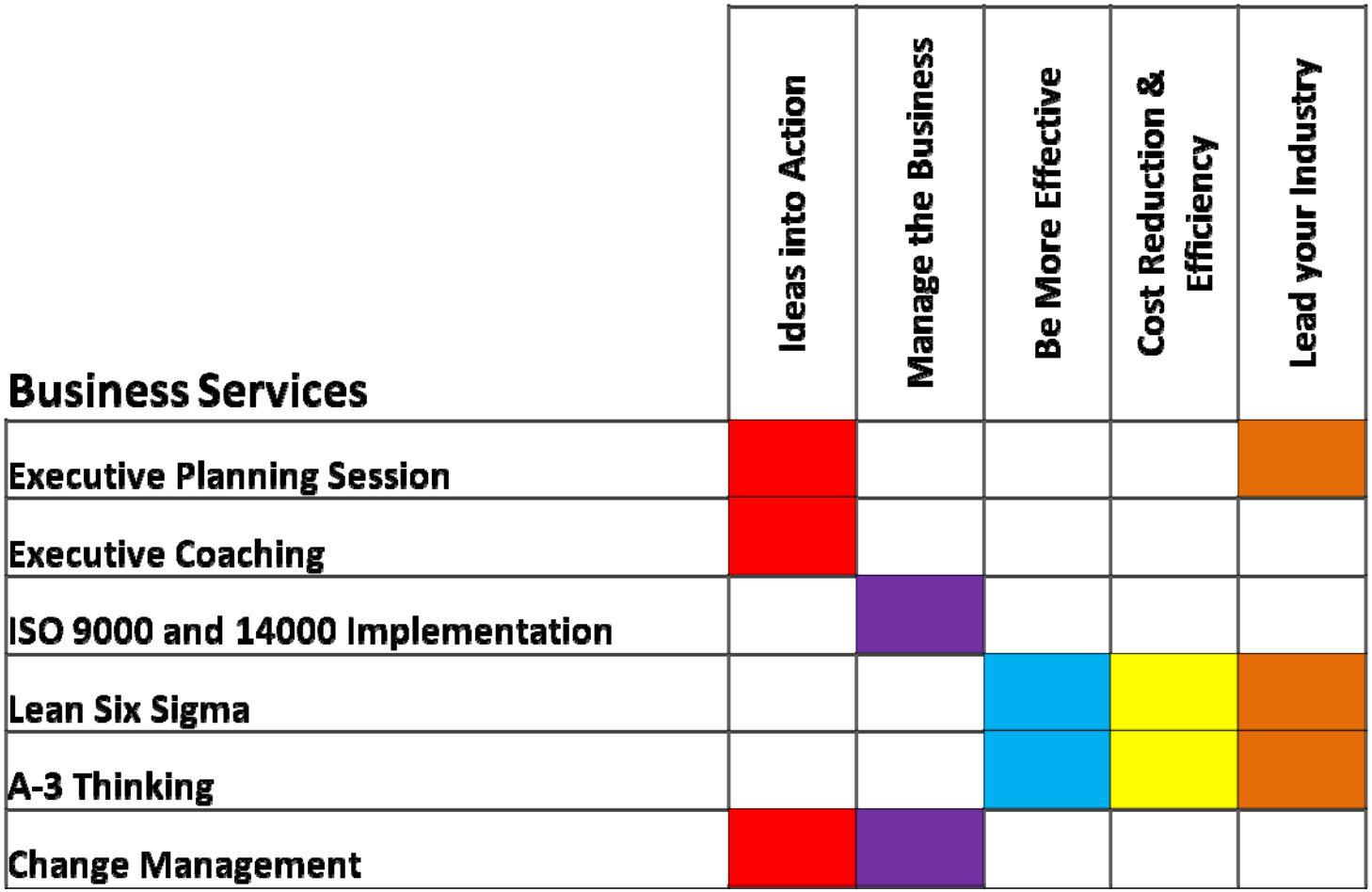
- Develop and execute your theory of business from strategy to actions.
- Implement practices that internationally recognize quality and management excellence.
- Assure good management practices that attract and retain great people.
- Improve your team's effectiveness at satisfying customer needs.
- Reduce costs by relentlessly increasing process efficiencies and lowering energy intensity.
- Design and Develop innovative facilities that flow product with minimum effort and investment.
- Create new technology solutions for tomorrows opportunities.
- Leverage culture to implement positive change.

Industrial Process Improvement Portfolio



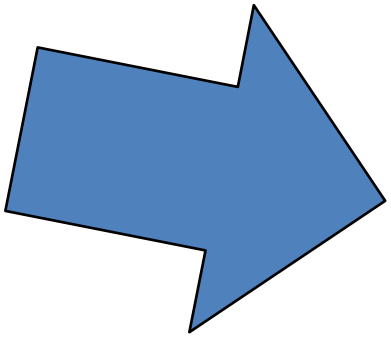
VPMEP

Business Process Improvement Portfolio



VPMEP

Strategic and Tactical Executive Planning



Helping Client Executive Teams Build Business Plans that Translate into Results

Quality Management Systems

Affordable Assistance from Certified Consultants to Create and Maintain Quality System Requirements

Lean and Six Sigma Are Essential for the Success of Any Company

Lean

Speed + ~~Waste~~ +
Implicit Infrastructure

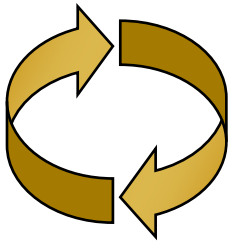
- **Goal** – Reduce waste and increase process speed
- **Focus** – Bias for action/ Implementing Toyota tools
- **Method** – Kaizen events, Value Stream Mapping

Six Sigma

Quality, Cost +
Explicit Infrastructure

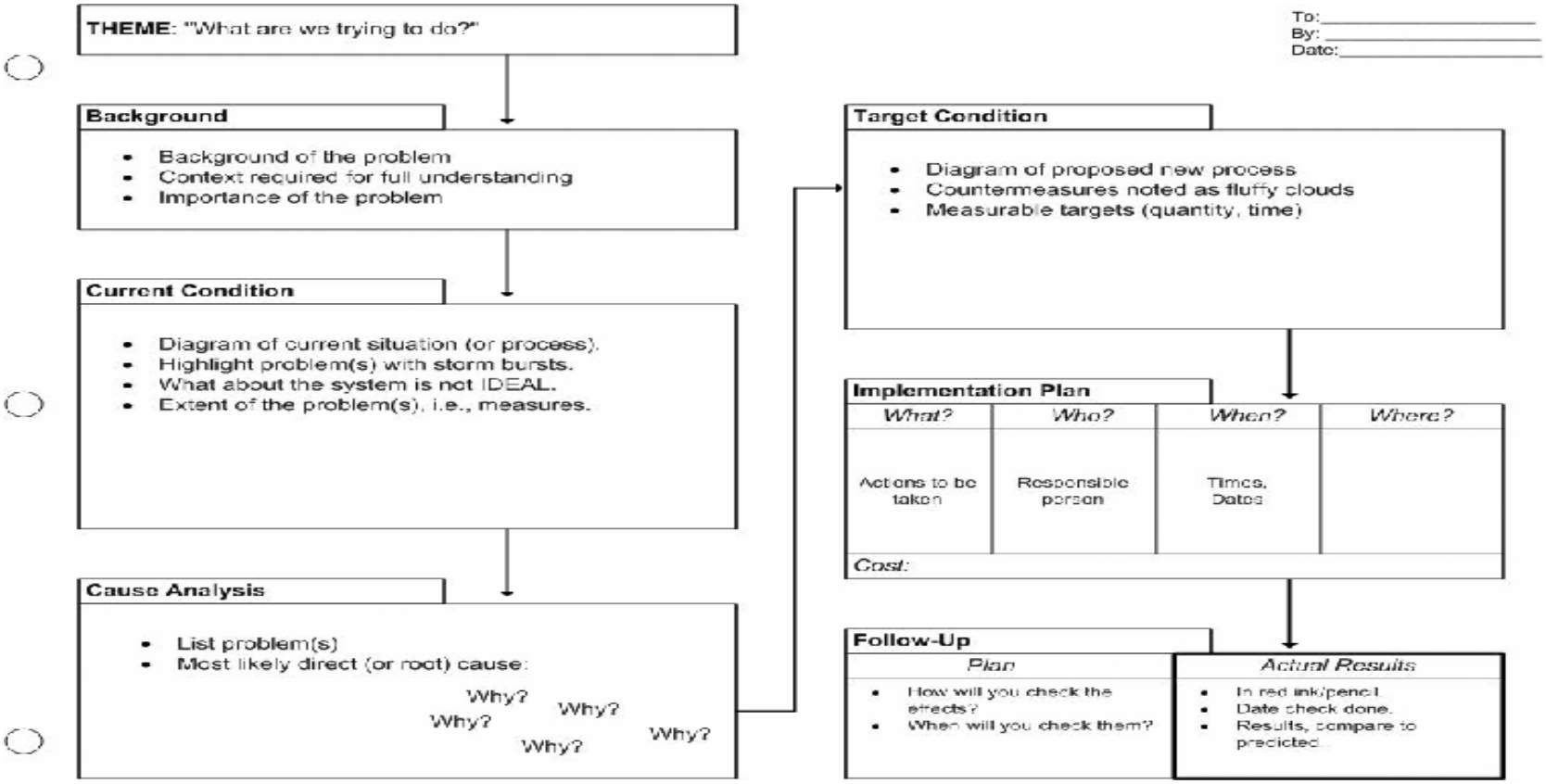
- **Goal** – Improve performance on Customer CTQs
- **Focus** – Use DMAIC with TQM tools to eliminate variation
- **Method** – Management engagement, 1% dedicated as Champions and Black Belts

Lean Speed Enables Six Sigma Quality
(Faster Cycles of Experimentation/learning)



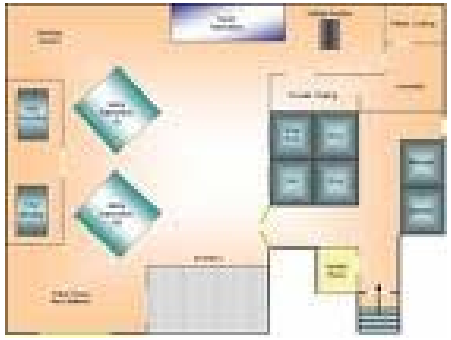
Six Sigma Quality Enables Lean Speed
(Fewer Defects Means Less Time Spent on Rework)

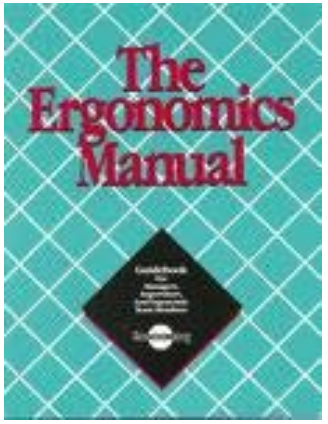
A-3 Problem Solving



Standard Problem Solving Method, Developed by Toyota, Rapidly Being Applied in Health Care

Industrial Engineering Services





Facility Layouts, Ergonomics, Time and Motion Studies

Technology Development

- VPMEP partners with Virginia Tech and Old Dominion University to provide access to research faculty that can translates ideas into technology.

- VPMEP acts as the client representative in university tech transfer, assuring that the clients objectives are represented and a win – win relationship is established.

- VPMEP serves as a client project management resource for federal and local grant opportunities for where such a relationship is either required or advantageous.

Supporting Manufacturing Leadership Through

E3: Economy, Energy, and Environment

Agenda

- **Benefits for manufacturers, communities, utilities, and federal government**
- **What is E3?**
- **Who is involved in E3?**
- **E3 on the Ground: Columbus, Ohio and San Antonio, Texas**
- **How to Get Started: Four Steps to Progress**

Benefits for Manufacturers

Cost Savings

- **Significant cost savings result from increased process efficiencies and reduced waste**
- **Profitable sustainability practices**

Increased Competitiveness

- **State-of-the-art sustainable business practices**
- **Technical support to drive entry into new markets**
- **Job creation and retention**

Access to Technical and Financial Resources

•Additional funding through federal and state programs

- **Enhanced skills and capabilities for workers**

Benefits for Communities

Economic Growth

- Improved competitiveness of existing manufacturers
- Enhanced ability to attract new business
- Increased manufacturing jobs and/or job retention
- Trained workforce with skills for a sustainable economy

Progress toward Environmental and Climate Change Goals

- Catalyze meeting local government's environmental and climate change goals

Benefits for Utilities

Increased Competitiveness

- **Invest in local communities**
- **Strengthen and stabilize industrial rate-payers**

Progress toward Environmental and Climate Change Goals

- **Catalyze meeting environmental and climate change goals**
- **Achieve organizational carbon reduction goals**

What is E3?

A model for collaboration among manufacturers, utilities, local government, and federal resources intended to:

- Invest in local communities
- Address energy and sustainability challenges
- Provide valuable technical training and assessments
- Enable economic growth

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E3 in Action

- **Establish replicable, self-sustaining initiatives to increase the sustainability and profitability of local and regional manufacturers**
- **Harness *existing* federal, state and local expertise and resources**
- **Develop *new* sources of technical assistance, technology, knowledge, expertise, and labor from federal, state and local resources**

E3 Package

1. **Technical Assessment**
2. **Implementation Support**
3. **Training and Continuous Improvement**

Technical Assessment

A **Lean Review** which leads to increased productivity and reduced costs

An **Energy Assessment** which provides tools and insight to reduce energy demand and costs savings

A **Greenhouse Gas (GHG) Evaluation** that teaches manufacturers how to calculate GHG emissions and evaluate reduction strategies

A **Clean Review** which results in water and energy conservation, reduced emissions, and additional cost savings

Post-Assessment Recommendations that guide each facility toward improvements in overall efficiency, reduced waste, more efficient use of resources including energy and water, and cost savings

Implementation Support

E3 will identify appropriate implementation resources, such as:

- **Leveraged Funding**
  - **DOC Economic Development Administration grants**
  - **DOL "green jobs" and workforce development grants**
- **Loan Guarantee Programs**
  - **SBA 7(a) and 504 loans provide general equipment and working capital loans up to $2 million and manufacturers' equipment financing up to $10 million**

Training and Continuous Improvement

Resources for:

- **Green Worker Certificate – provides a standard approach to 'green skills' training that companies can use to develop internal capabilities and establish sustainable programs**

- **Green Practitioner Certificate – provides a standard for training, evaluation and certification for all practitioners in the E3 program, similar to the Lean Certification program**

Who is involved in E3?

E3 MODEL: Federal Programs Working Together with Local Communities

ECONOMY:	ENERGY:	ENVIRONMENT:
DOC's NIST Manufacturing Extension Partnership (**MEP**), **SBA** financing, and **DOL** skills training	**DOE**'s Industrial Technologies Program (**ITP**) program	Green Suppliers Network (**GSN**) **EPA/MEP** collaboration - and Climate Leaders (**CL**) program

COMMUNITIES:

Large and small manufacturers, utilities, local government, and other municipal authorities

A federal agency that helps Americans start, build, and grow businesses

Loan Guarantee Programs

- **General equipment and working capital loans up to $2 million**
- **Manufacturers' equipment financing up to $10 million**

Small Business Development Centers (SBDCs)

- **Provide business counseling, training, and other services**
- **Help businesses identify how equipment retrofitting can be integrated into the company's profit plan**
- **Provide services related to energy efficiency and green buildings for small businesses through energy competitive grants**

SBA
U.S. Small Business Administration

- **Employment and Training Administration awards workforce development grants with an energy focus**
- **Support for cross agency “green” skills certification program with focus on energy and environmental skills**
- **Coordination of E3 activities and information across DOL outreach resources**
- **Coordination of One Stop Career Center with DOC and DOE one-stop-shop staff**
- **$500 million in "green job training grants" under five separate competitions**

- **An initiative of DOE, Office of Energy Efficiency and Renewable Energy (EERE), Industrial Technologies Program (ITP)**
- **26 Industrial Assessment Centers (IACs) that conduct energy audits**
- **Promotes energy efficiency as a profitable business model and expands markets for new energy technology**
- **Aims to reduce industrial energy intensity by 25% in 10 years**

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

- **U.S. companies have partnered with DOE's Industrial Technologies Program (ITP) to significantly reduce industrial energy intensity**

- **National recognition for energy management achievements and access to a portfolio of technical and financial resources**

- **SEN Leader Pledge – a voluntary commitment to achieve energy efficiency and waste reduction targets**

- **Raise the bar for all industrial facilities, while benefiting their own bottom line**

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

A joint program between EPA and MEP that

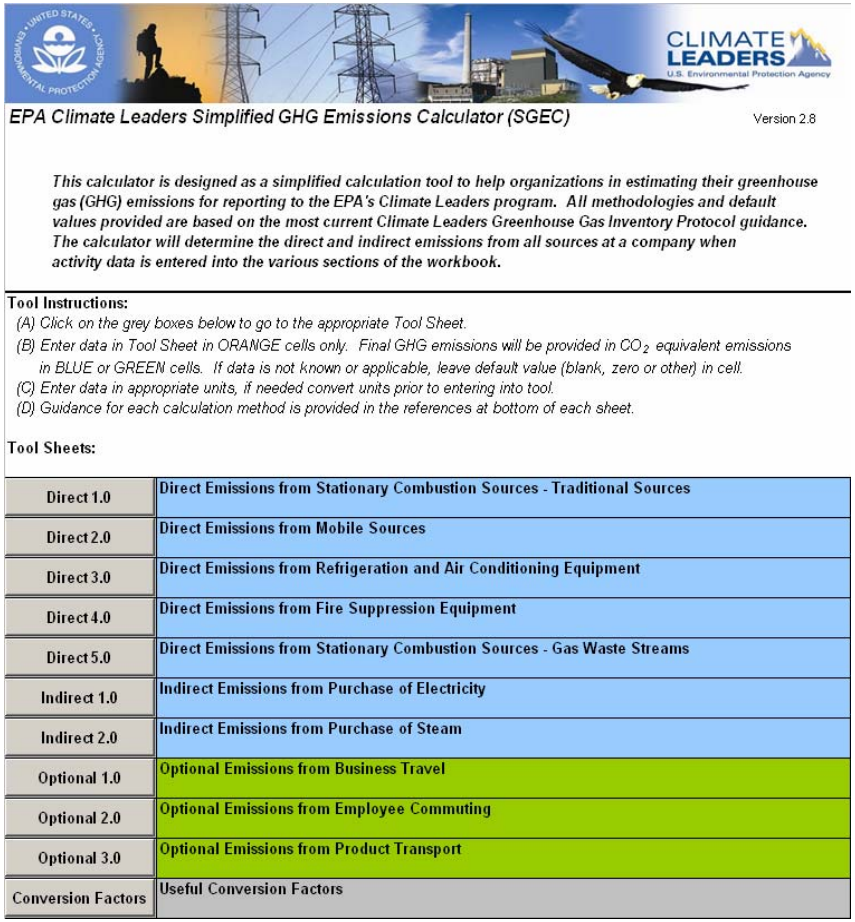
- **Provides *Lean and Clean* assessments to small- and medium-sized enterprises**
- **Has helped over 100 small businesses identify more than $60 million in *Lean and Clean* opportunities**
- **Works with the automobile, aerospace, healthcare, office furniture, and utility industries, among others**

GREEN SUPPLIERS NETWORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MEP • MANUFACTURING EXTENSION PARTNERSHIP

- **EPA's partnership with industry to:**
  - measure greenhouse gas (GHG) emissions
  - set aggressive GHG reduction goals
- **287* partners, 70 of which are small enterprises**
- **Climate Leaders tool:**
  - simple calculator to help organizations estimate their GHG emissions
  - GHG Inventory management plan to help organizations with continuous improvement



EPA Climate Leaders Simplified GHG Emissions Calculator (SGEC) Version 2.8

This calculator is designed as a simplified calculation tool to help organizations in estimating their greenhouse gas (GHG) emissions for reporting to the EPA's Climate Leaders program. All methodologies and default values provided are based on the most current Climate Leaders Greenhouse Gas Inventory Protocol guidance. The calculator will determine the direct and indirect emissions from all sources at a company when activity data is entered into the various sections of the workbook.

Tool Instructions:

(A) Click on the grey boxes below to go to the appropriate Tool Sheet.
(B) Enter data in Tool Sheet in ORANGE cells only. Final GHG emissions will be provided in CO_2 equivalent emissions in BLUE or GREEN cells. If data is not known or applicable, leave default value (blank, zero or other) in cell.
(C) Enter data in appropriate units, if needed convert units prior to entering into tool.
(D) Guidance for each calculation method is provided in the references at bottom of each sheet.

Tool Sheets:

Direct 1.0	Direct Emissions from Stationary Combustion Sources - Traditional Sources
Direct 2.0	Direct Emissions from Mobile Sources
Direct 3.0	Direct Emissions from Refrigeration and Air Conditioning Equipment
Direct 4.0	Direct Emissions from Fire Suppression Equipment
Direct 5.0	Direct Emissions from Stationary Combustion Sources - Gas Waste Streams
Indirect 1.0	Indirect Emissions from Purchase of Electricity
Indirect 2.0	Indirect Emissions from Purchase of Steam
Optional 1.0	Optional Emissions from Business Travel
Optional 2.0	Optional Emissions from Employee Commuting
Optional 3.0	Optional Emissions from Product Transport
Conversion Factors	Useful Conversion Factors

***As of July 31, 2009**

E3 Metrics

Economic Metrics:

- Environmental savings identified
- Lean savings identified
- Other cost savings
- One time potential cost savings identified
- Individuals trained
- Jobs created
- Jobs retained
- Total annual potential impact identified
- Number of small businesses engaged
- Percentage of small businesses engaged
- Number and value of SBA loans granted
- Capital infusion dollars invested
- Hours of counseling provided

Energy Metrics:

- Energy conserved (MM BTU/kWh)
- Energy intensity per unit of production
- Carbon reductions (tons)
- Carbon intensity per unit of production

Environment Metrics:

- Air emissions reduced (lbs)
- Solid waste reduced (lbs)
- Material intensity per unit of production
- Hazardous waste reduced (lbs)
- Hazardous materials reduced (lbs)
- Water pollution reduced (lbs)
- Water used/conserved (gal)
- Water intensity per unit of production

E3 On the Ground

Pilot Projects in:

San Antonio, Texas

Columbus, Ohio

E3: Columbus, Ohio

Responding to the Challenge:

Doug Kaempf
Program Manager,
Industrial Technologies Program
US Department of Energy

Jim Jones
Acting Assistant Administrator,
Office of Prevention, Pesticides and Toxic Substances
US Environmental Protection Agency

Roger Kilmer
Director, NIST MEP
Department of Commerce

Michael B. Coleman,
Mayor, City of Columbus

Ronald Mills,
Executive Director,
Solid Waste Authority of Central Ohio

Michael G. Morris
Chairman, President and CEO
American Electric Power

E3: Columbus, Ohio

Pilot Update:

- **6 pilot facilities:**
  - **Central Ohio Welding**
  - **G and J bottling Co (A Pepsico company)**
  - **Hirschvogel**
  - **Crane Plastics**
  - **Archmittaler**
  - **Timber Tech**

- **Technical assessments completed by August 2009**
- **Each assessment spans 3 to 4 days**

•Facilities invited to join pilot program based upon utility review of rate-payers

- **Several assessment recommendations expected to be low outlay or fast payback**

Preliminary improvements quantified

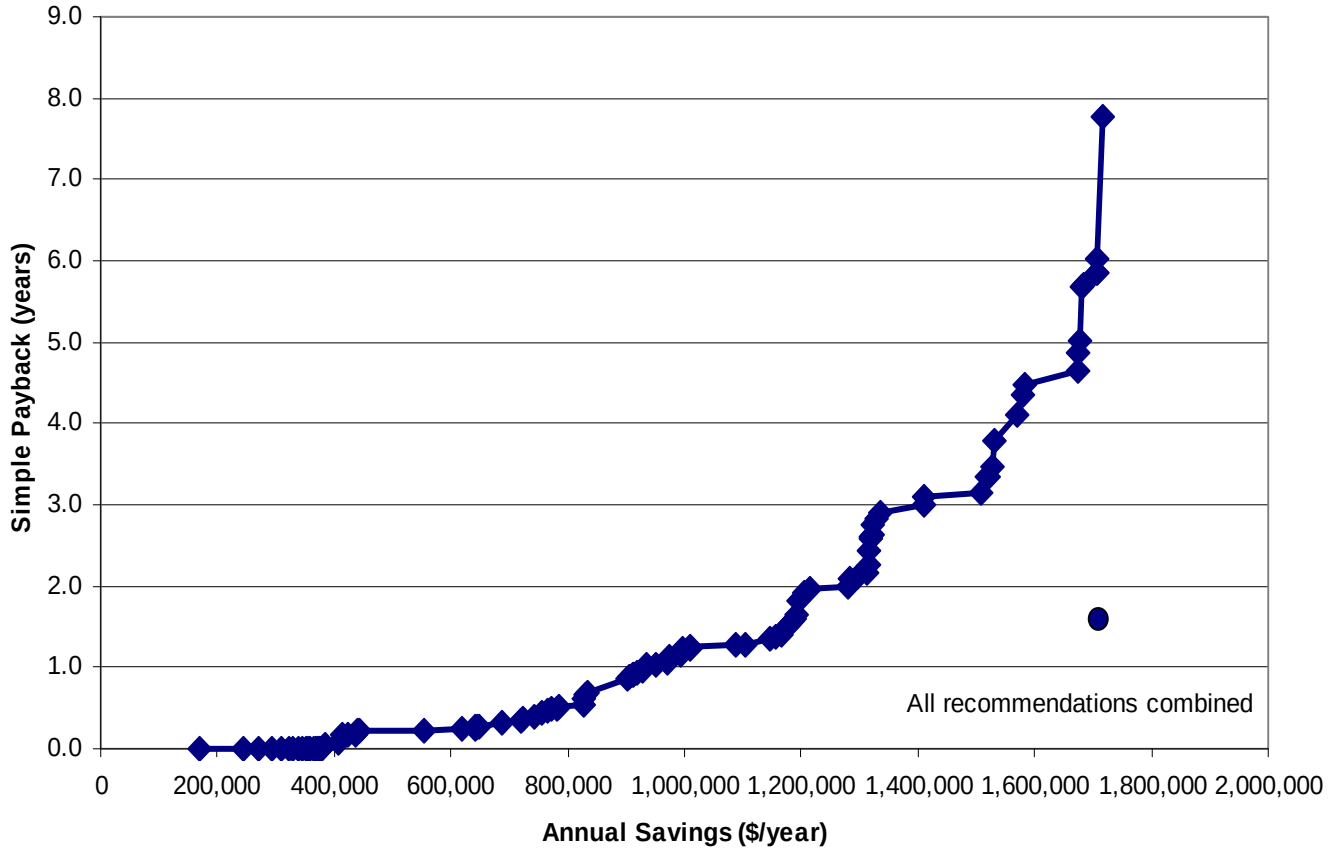
Energy cost savings:	**$1,716,288**
Environmental savings	**$1,909,538**
Economy savings (lean)	**$496,378**
Capital Jobs	**35**
Water pollutants avoided	**257,000 pounds**
CO_2 emissions avoided	**23,161 tonnes**
SOx Reduction	**207 tonnes**
Solid waste reduction	**24,000 pounds**
Improvements implemented	**$237,873**

TechSolve

Energy Savings System Analysis

- **Electrical**
- **Lighting**
- **Motor Drive**
- **Fluid Flow**
- **Compressed Air**
- **Steam**
- **Process Heating**
- **Process Cooling**
- **Heating, Ventilating and Air Conditioning**

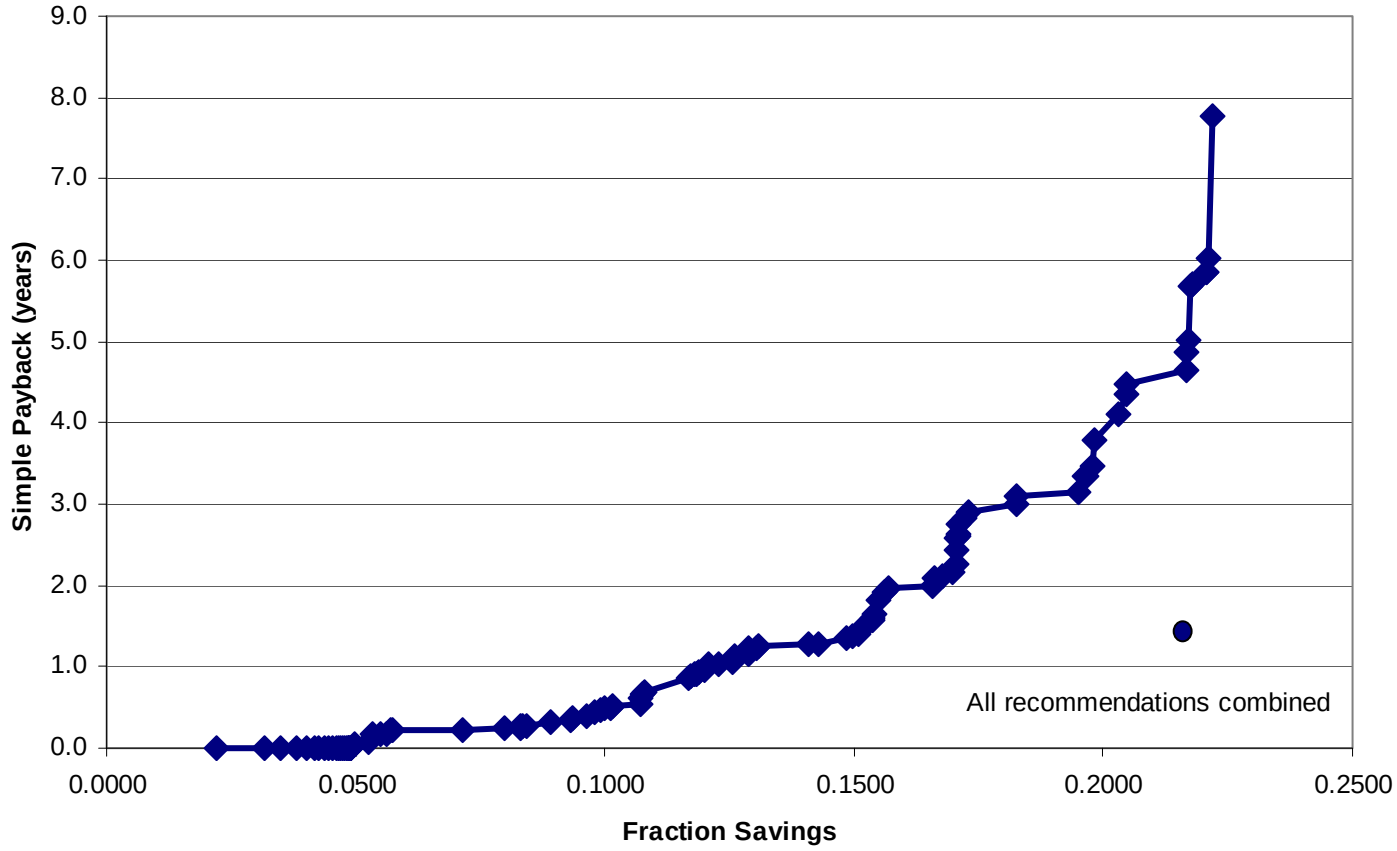
Annual Energy Savings from Six Plants



$1.7 M/yr

1.4 years

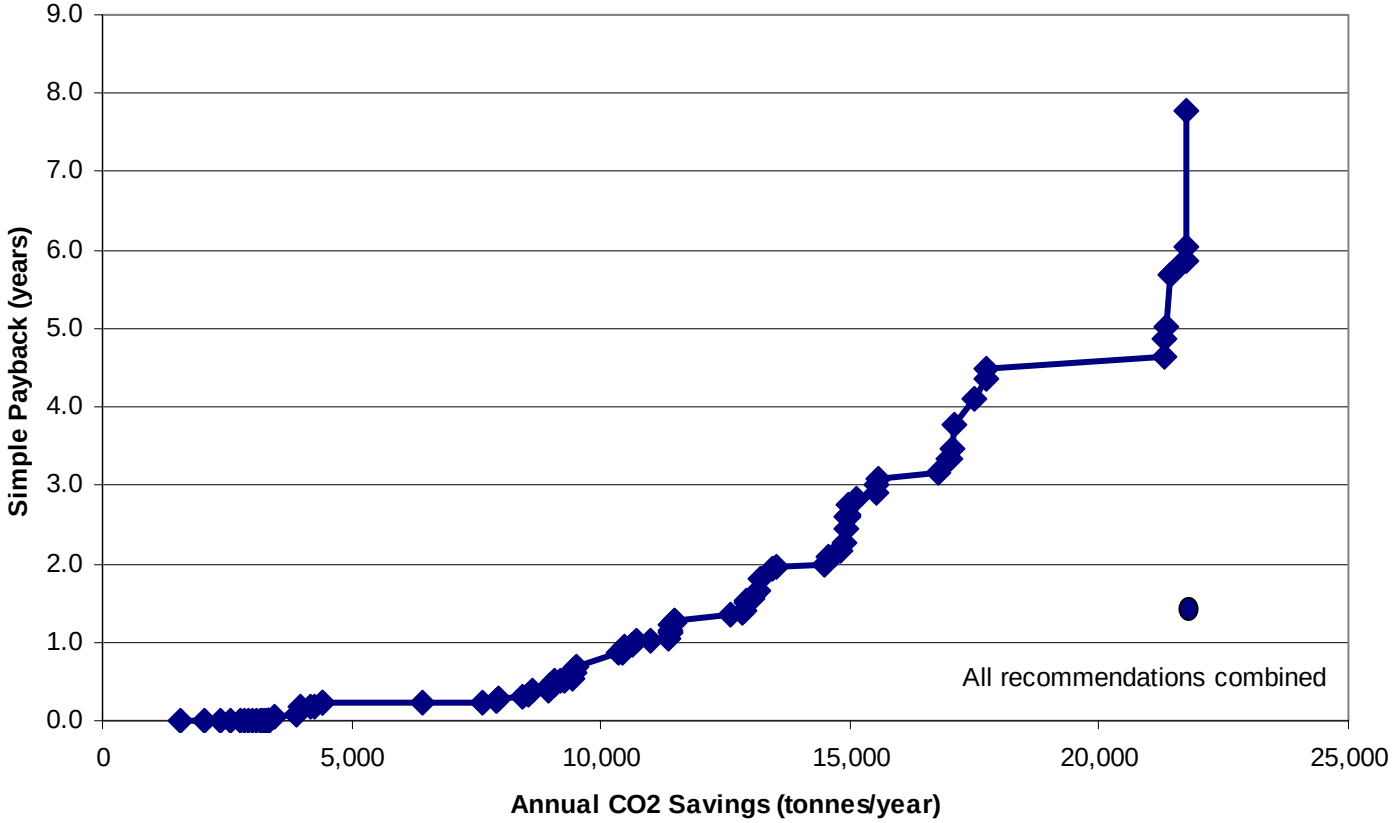
Fraction Energy Savings from Six Plants



22%

1.4 years

Annual CO_2 Savings from Six Plants



21.8 kT/yr

1.4 years

E3: Columbus, Ohio

Implementation and Future Funding:

- **AEP funding available to support energy efficiency measures**

- **Engaging local SBA Small Business Development Center (SBDC) for capital outlays**

- **City is seeking future funding from the Energy Efficiency and Conservation Block Grants (EECBG)**

  http://www.eecbg.energy.gov/

E3: San Antonio, Texas

Pilot Update:

- 6 pilot facilities:
  - Southern Folger
  - Munters
  - Danbury (AirCool Motors)
  - San Antonio Aerospace
  - UEMC
  - Pratt & Whitney

- Technical assessments completed by August 2009
- Each assessment spans 3 to 4 days
- Facilities invited to join pilot program based upon utility review of rate-payers
- Several assessment recommendations expected to be low outlay or fast payback

E3: San Antonio, Texas

Example of E3 assessment results:

At Southern Folger, a detention equipment manufacturer, identified energy efficiency opportunities include:

- **$85,000 in potential energy savings**
- **Reduced annual electric consumption of 159,000 kwh**
- **Reduced monthly electric demand of 48 kW**
- **Reduced annual natural gas usage of 36,000 CCF**

E3 San Antonio – Results

- **Ten companies in '09, Q2-pilot to Q3-Q4 program**

Manufacturer Type	Average Demand Reduction	Annual Energy Reduction	Annual C02 Reduction**	Annual Cost Savings	Company Investment
	(kW)	(kWh)	(metric ton CO2)	($)	($)
HVAC	87	203,652	122	22,725	57,233
Commercial Bakery	30	241,154	145	34,947	51,562
Confections	41	122,471	74	9,472	51,118
Aerospace MRO	96	518,502	311	45,571	93,324
Apparel	96	337,862	203	26,548	33,950
Apparel	27	94,240	57	8,208	40,932
Metal Fabrication	48	159,935	96	85,061	47,794
Aerospace OEM/MRO	42	414,296	249	81,018	179,410
Injection Molded Plastics	39	538,364	323	30,255	43,034
Aerospace OEM	51	272,978	164	20,723	36,993
Total	**557**	**2,903,454**	**1,744**	**364,528**	**635,350**

January 21, 2010

How to Get Started

Four Steps to Progress:

Step 1

Select areas with available resources

Step 2

Establish team

Step 3

Secure funding streams

Step 4

Engage manufacturers

Contact

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