OSIsoft®

USERS CONFERENCE 2016

April 4-8, 2016 | San Francisco

TRANSFORM
YOUR WORLD

Smart Manufacturing:
Next Generation IT for Next Generation Manufacturing

Presented by **Jim Davis**
Vice Provost – IT & CTO, UCLA
CTO, Smart Manufacturing Leadership Coalition (SMLC)

SMLC
SMART MANUFACTURING LEADERSHIP COALITION

SMLC
SMART MANUFACTURING LEADERSHIP COALITION
www.smartmanufacturingcoalition.org

Current SMLC Membership

ACEEE
AMP Socal
Alcoa
AIChE
American Society of Quality
ArcelorMittal
ARC
ASSERTI
CMTC
Carnegie Mellon
Conn. Ctr. for Advanced Technology
Corning, Inc.
DOE
Danfoss Drives
Emerson
EPRI
General Electric
General Mills
General Motors
Manufacturing Enterprise Solutions Association (MESA)
MIT
MT Connect
NASEO
NCSU
Nimbis Services
NIST
NSF
OSIsoft
Owens Corning
Pacific Northwest National Lab
Pfizer Inc.
Praxair
Purdue University
RPI
Rockwell Automation
Rutgers University
Savannah Rivers National Lab
Savigent Software
Schneider Electric
SME
Southwest Research Institute
Sustainable Solutions
Texas A&M
Tulane – PolyRMC
United Technology Research Center (UTRC)
UC Berkeley
UC Irvine
UConn
UCLA
USC - EDC
UT Austin
West Virginia University

SMLC
SMART MANUFACTURING LEADERSHIP COALITION
www.smartmanufacturingcoalition.org

SMLC's Industry-Driven Public-Private Partnership Strategy

Roadmap: Operations & Technology for SM systems

NSF Workshop

Action Plan: Implementing 21st Century Smart Manufacturing

DOE Workshop

Implementation Plan: Review & Refine Collaboration Roles & Alignment

SMLC Forum Workshop

Membership Expansion

Establish Work Groups: Identify & Drive Priority areas

- Test Bed
- Platform
- People
- Business

Board Meetings, Calls, Advisory Groups, Focused Workshops, etc.

Spin-off parallel activities

2006-09 | 2010 | 2011 | 2012 | 2013 | 2014-15

ACCELERATE DOE FOA

AIChE Workshop

Technical Meetings

Infrastructure Specification: Increasing SM Platform Definition & Development

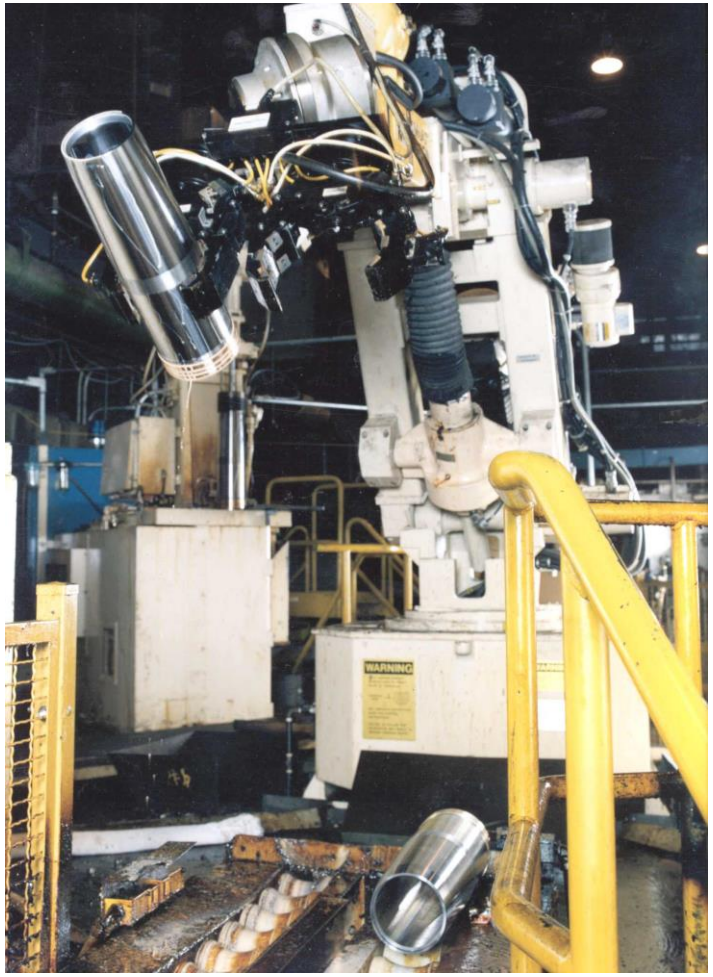
SMLC Incorporates as 501c6: Building Capacity & Resources; Leveraging Resources; Advocacy for SM

DOE, NSF, NIST Awards: $13 million in Project Work to develop SM Platform Prototype

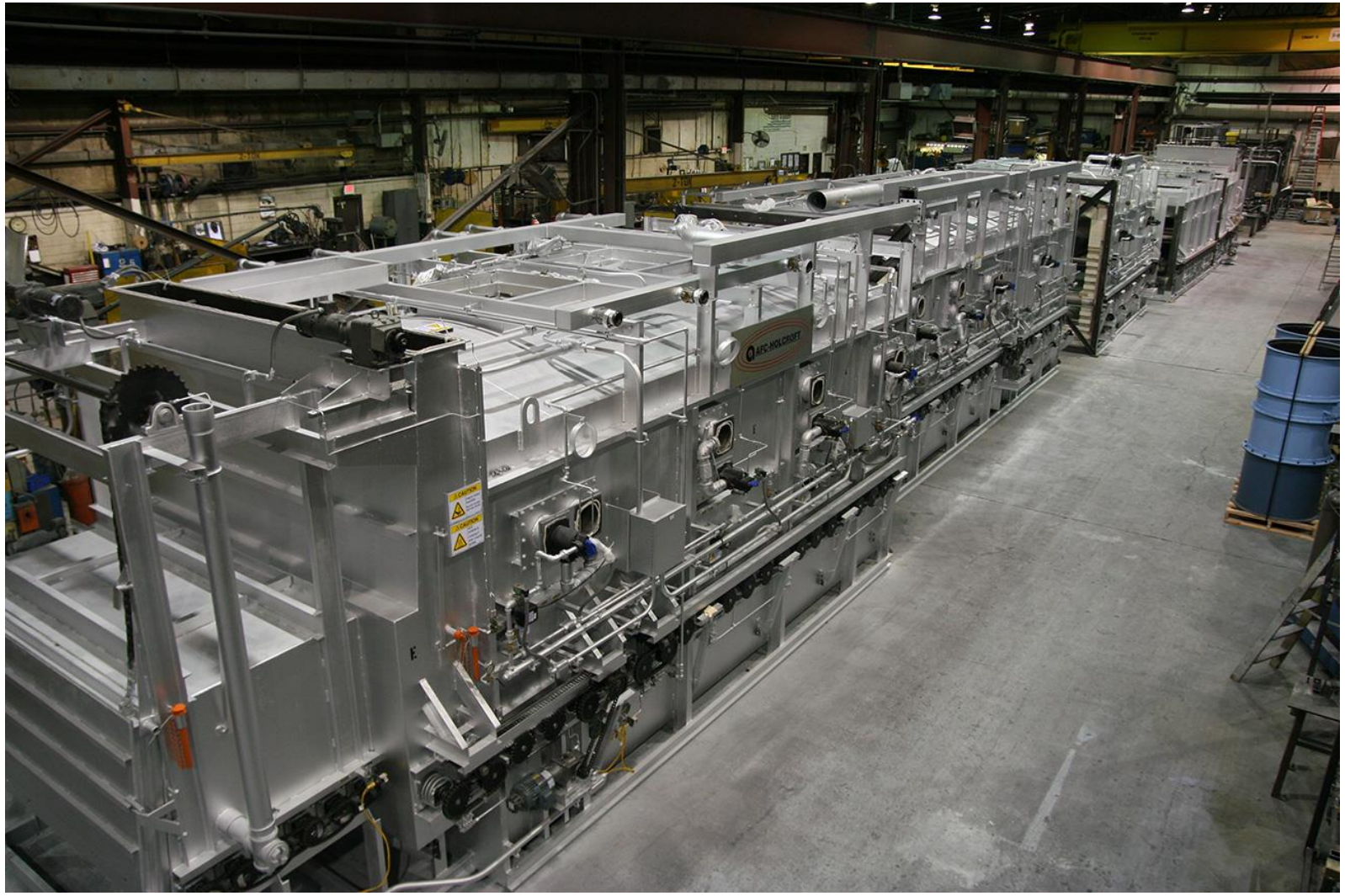
What is Smart Manufacturing?

Right Data, Right Time, Right Form
Wherever Needed Throughout the Enterprise

General Dynamics | Scranton, PA



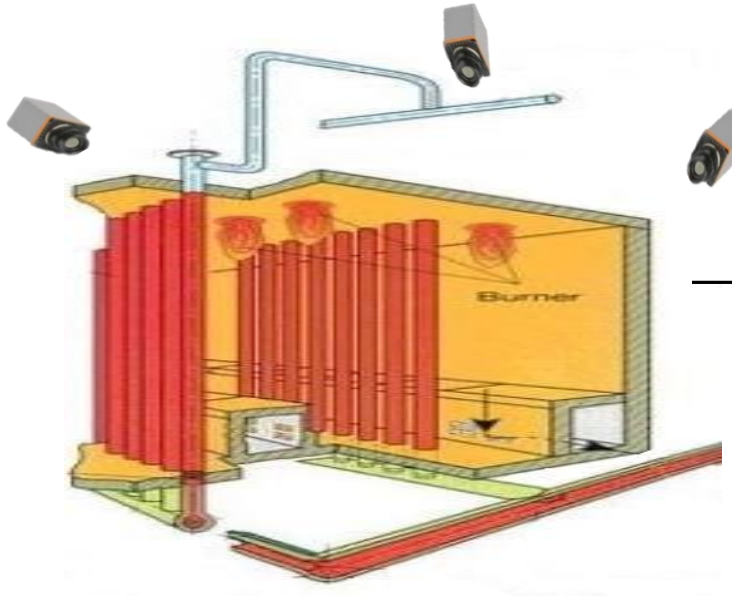
Holcroft Continuous Roller Hearth



http://afc-holcroft.com/products/continuous/roller-hearth

Praxair

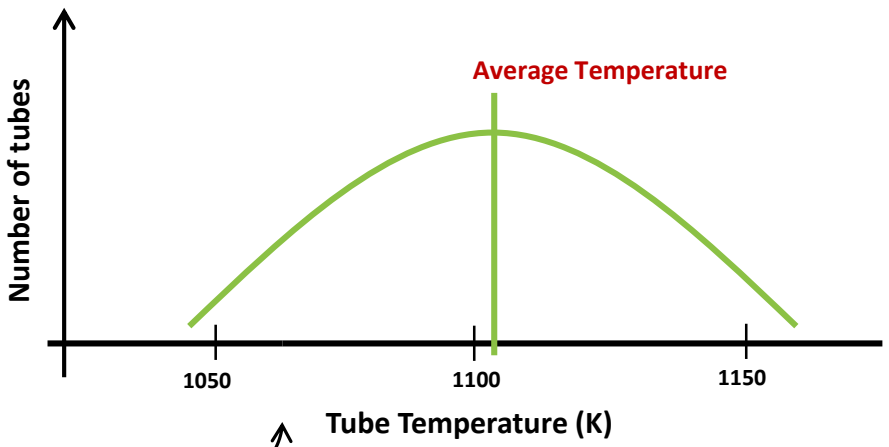
Steam-Methane Reformer Furnace

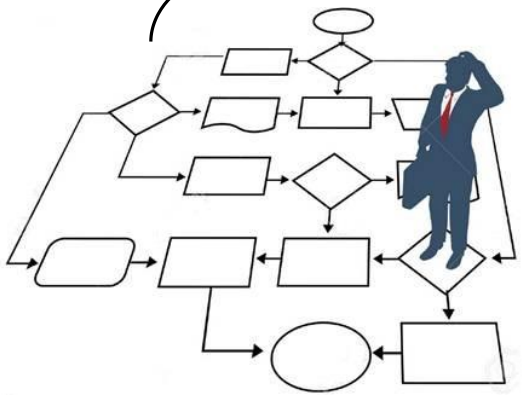


+

Fuel Flow-meters

Temperature Distribution





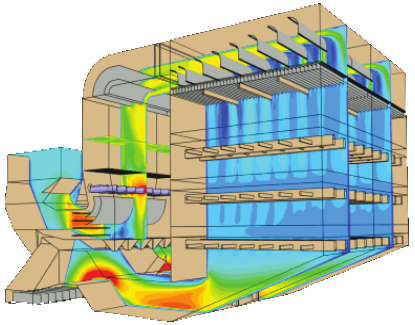
[1] F. Beyer. Steam reforming – 50 years of Development and the Challenges for the next 50 years. 2005

EERE DOE 'Project Smart Manufacturing'

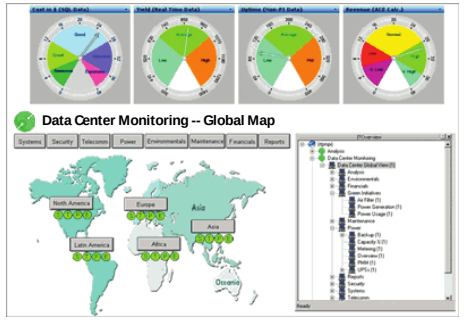
Development of an Open Architecture, Widely Applicable Smart Manufacturing Platform

Test Bed: Praxair

Design



Operations



Supply Chain

Dynamic Energy Risk Management & Cross Unit Performance

Test Bed: General Dynamics

Heating & Forging

www.army.mil

Cutting & Machining

Power Mgmt & Energy Grid

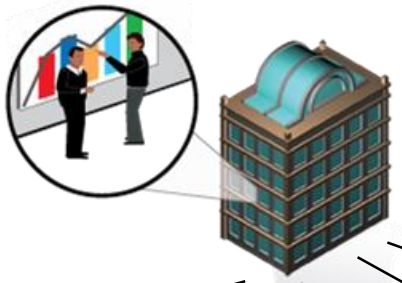
Integrated Line Operations Management

SMLC
SMART MANUFACTURING LEADERSHIP COALITION
www.smartmanufacturingcoalition.org

Affordable, Accessible, Innovative and Secure Intelligent, Seamless, and Collaborative Network-Based, Smart Manufacturing

Connected Supply Chain

- Agile
- Demand Driven
- Raw Material to Finished Product



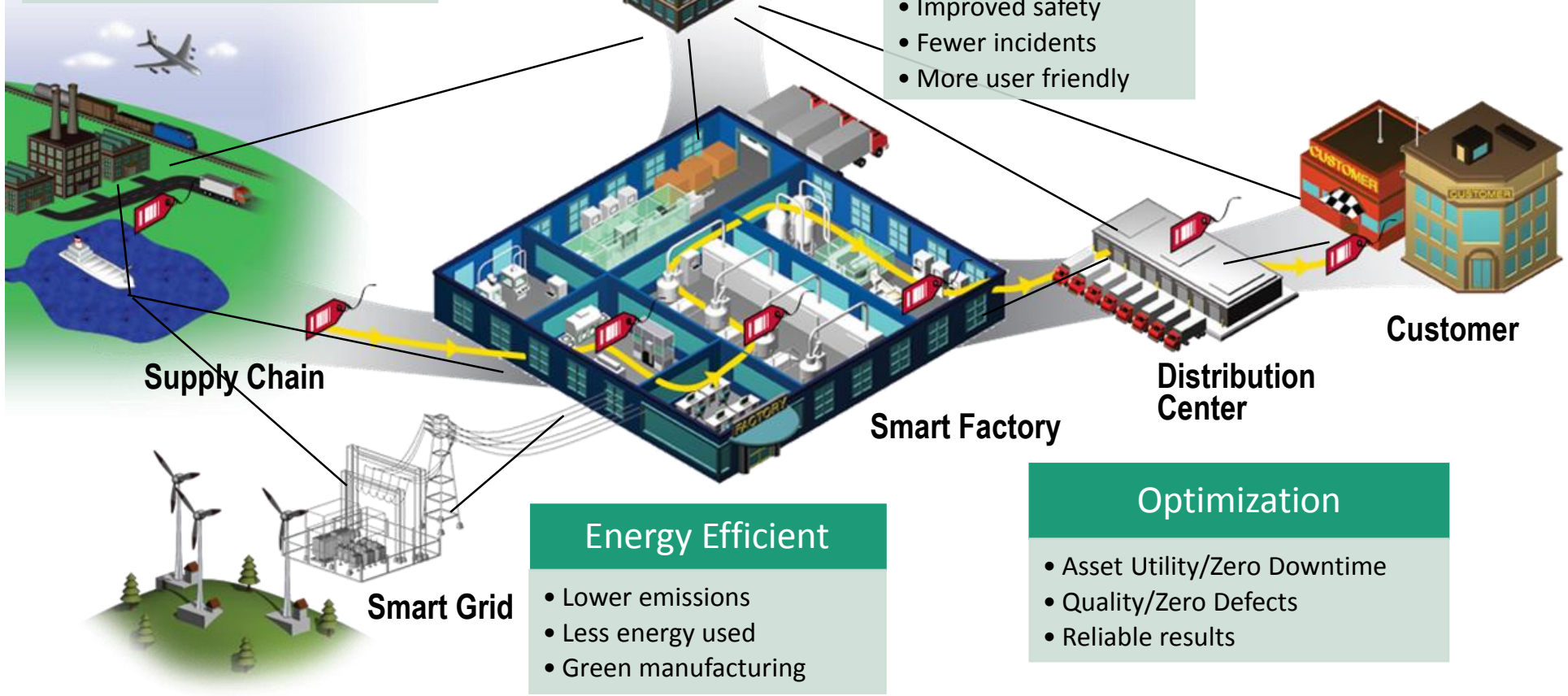
Business Systems, ERP

Safe Production

- Improved safety
- Fewer incidents
- More user friendly

Sustainable Production

- Higher value products
- Data for decision making
- Product Lifecycle Management



Energy Efficient

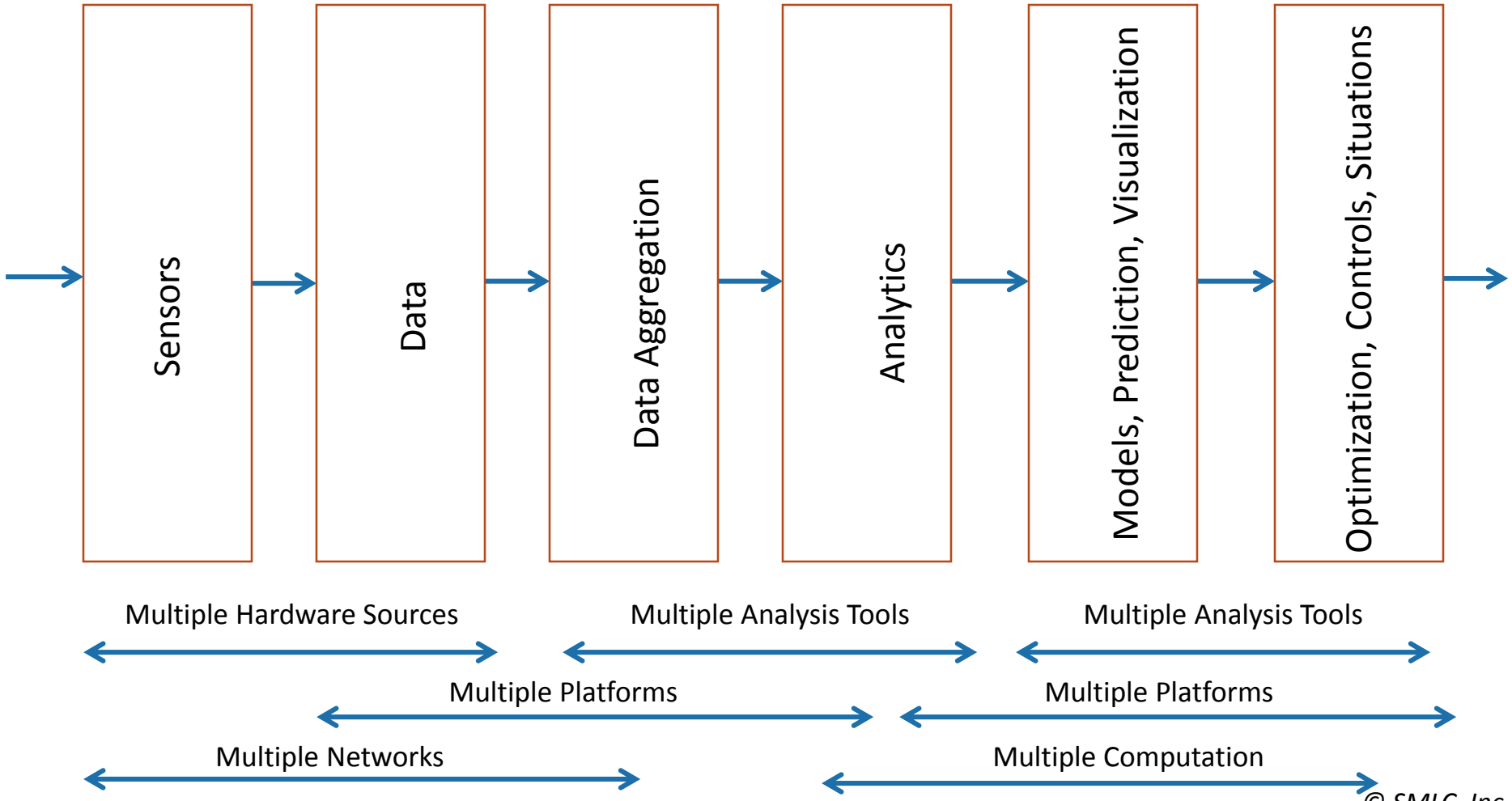
- Lower emissions
- Less energy used
- Green manufacturing

Optimization

- Asset Utility/Zero Downtime
- Quality/Zero Defects
- Reliable results

End-to-End Systems

Advanced Sensing Controls Platforms & Modeling (ASCPM)



Technical Drivers for End-to-End Applications

- Make multiple vendor applications and infrastructure systems a dominant capability
- Eliminate, simplify and/or automate the overall execution of real-time systems
- Don’t make me deal with security every time I want collaborative business relation or multiple vendor system

Some points reference ARC 2014 Forum, Insider Industrial and Automation by Sandy Vassar, ExxonMobil

What got us here

Won’t get us there

SMLC Defined Technical and Business Challenges to Smart Manufacturing

Challenges Individual Company

- **Compartmentalized ROI's are constrained or prohibitive**
  - Incremental investment difficult
  - Need 80% reduction in systems costs
  - Need 10x reduction in the cost of sensors
  - Need radically shortened deployment time
- **Business Risk**
  - New business model
  - Collaboration vs. transaction
  - Uncertainty technology, security & IP
- **Organizational Risk**
  - IT capability lacking
  - Workforce skills
  - Collaboration

Challenges Beyond Individual Company

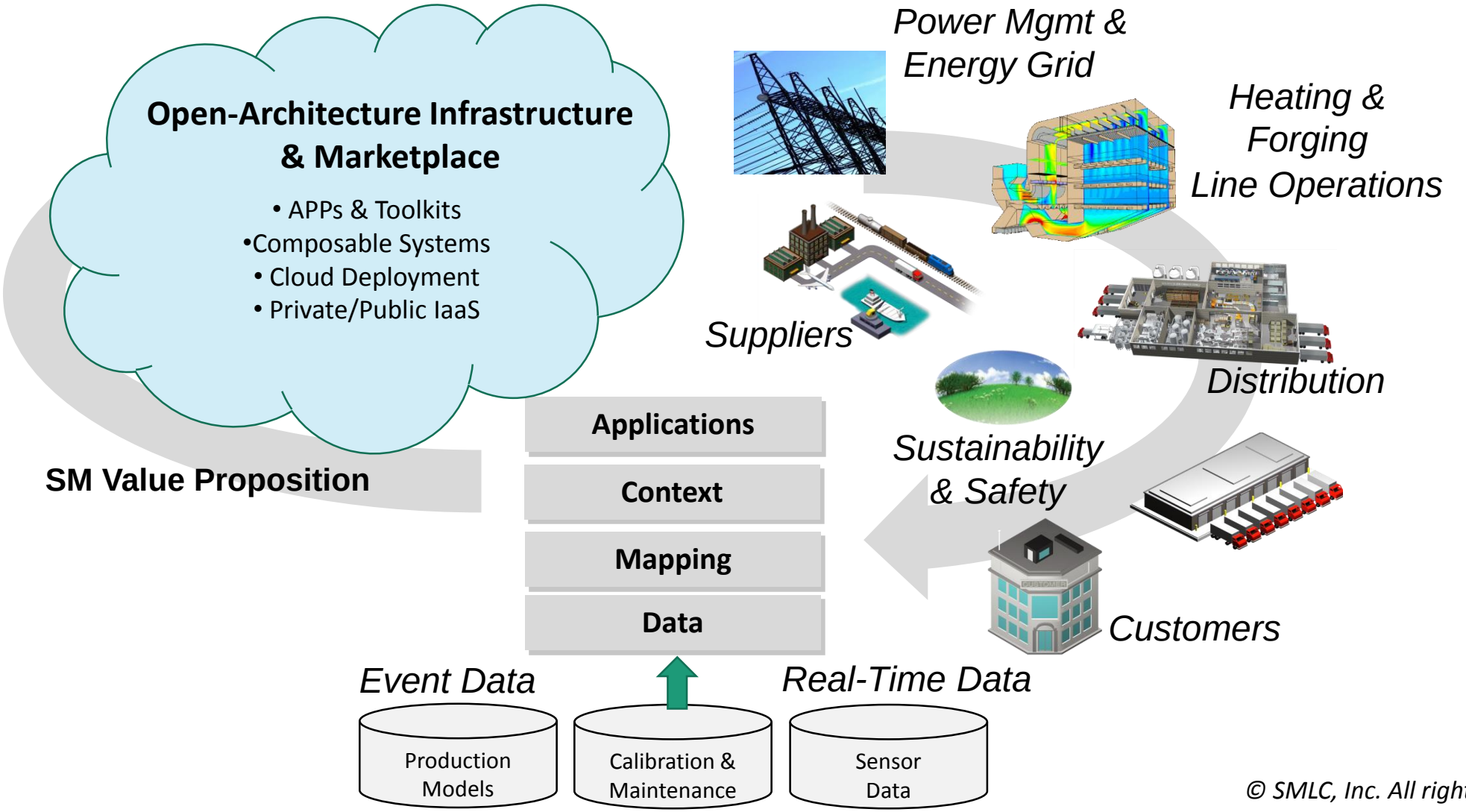
- **ROI opportunity comprehensive**
  - Multiple systems
  - Integrated performance metrics
  - Depends on other companies - supply chains
- **Investment/Return "Chicken & egg" Issues**
  - Software innovation
  - Increased revenue
  - Increase in SME's total market
  - Skilled sustainable jobs
- **IT Infrastructure and support needs to be scaled**
  - Retrofit $60 B installed IT investment
  - Halve the non-value IT infrastructure costs

What Brings the Coalition Together
The Case for an Open Platform

SMLC
SMART MANUFACTURING LEADERSHIP COALITION
www.smartmanufacturingcoalition.org

Smart Manufacturing Value Proposition

Bridging Seams Extending the Real Time Infrastructure Data to Applications



SMLC Industry-Defined Open Platform

Marketplace as a Service

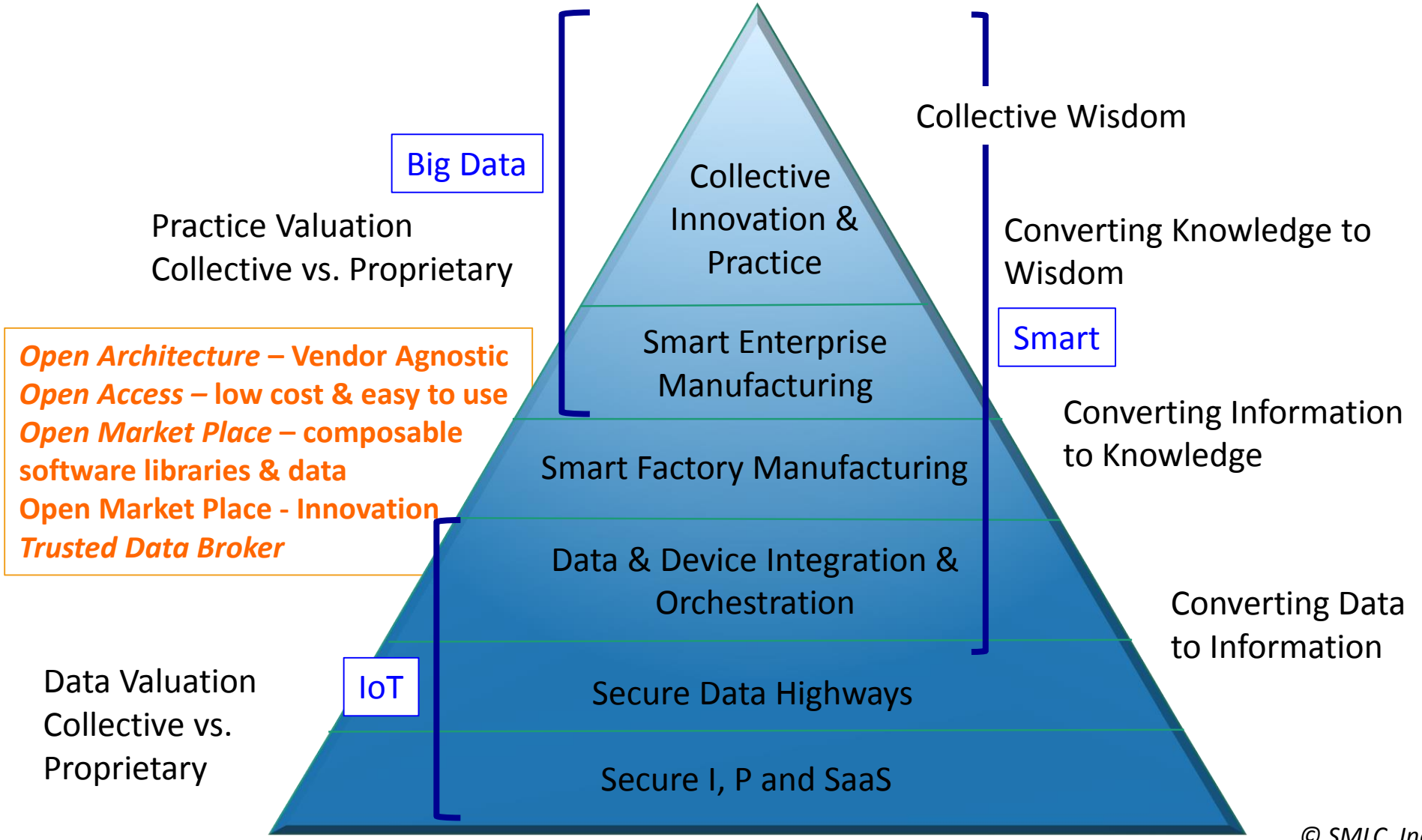
- **Buyer/Seller Dashboard**
- **Composable apps & libraries**
  Data tools, viewers, metrics, models
- **Toolkits, App, Interface, Data services, Validated licensed environments**

Development
Deployment
Performance
Reuse
as a Service

- **Workflow as a Service**
- **Data Configuration management**
- **Mobile Interface**
- **Secure historian & private virtual computation**
- **Secure data connectors**

Smart Manufacturing
How we make it work

Manufacturing Health & Sustainability



Performance Metrics with Platform

	Year 1	Year 2	Year 3	Year 4	Year 5
Decrease First of Kind System	25%	30%	35%	40%	50%
Accelerated outcomes	2 years to 1 year	+5% faster	+10% faster	+15% faster	+20% faster
Decrease Replication cost/risk		60% first replication	65% multiple replications		

DOE Funding Opportunity Announcement

Manufacturing Innovation Institute for Smart Manufacturing:

Advance Sensing, Controls, Platforms and Modeling for Manufacturing

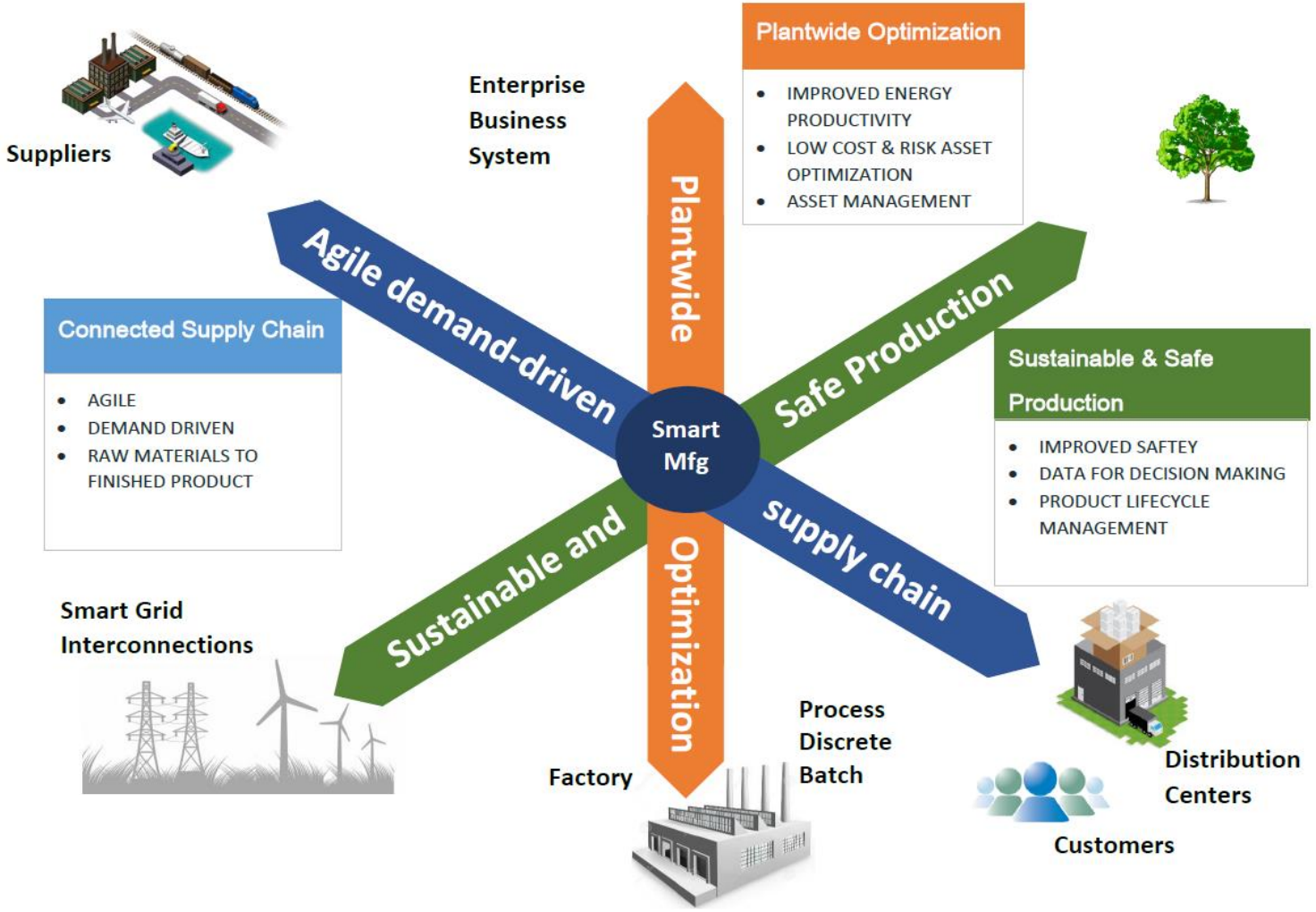
Next Generation IT for Next Generation Manufacturing

Make Data a Key Asset

A Comprehensive Approach to Manufacturing

…to achieve:

- Connected Supply Chain
- Plantwide Optimization
- Sustainability & Safety
- Increased Productivity
- Effective Risk Management
- High Quality Products
- Innovation
- Great Customer Service



Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please remember to…

Complete the Online Survey for this session

http://ddut.ch/osisoft

감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado

Please visit www.smartmanufacturingcoalition.org

OSIsoft®

USERS CONFERENCE 2016

April 4-8, 2016 | San Francisco

TRANSFORM
YOUR WORLD