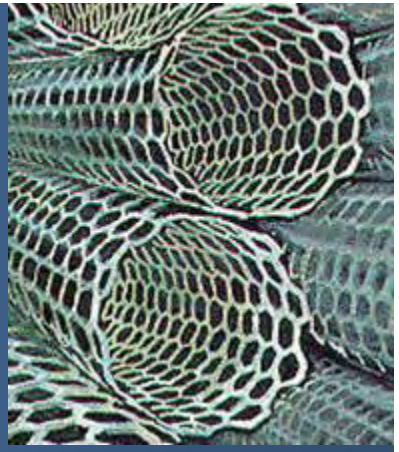
U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable



U.S. Department of Energy, Industrial Technologies Program

Meeting the Challenge

Advanced Materials for 21st Century Steelmaking

January 23, 2008

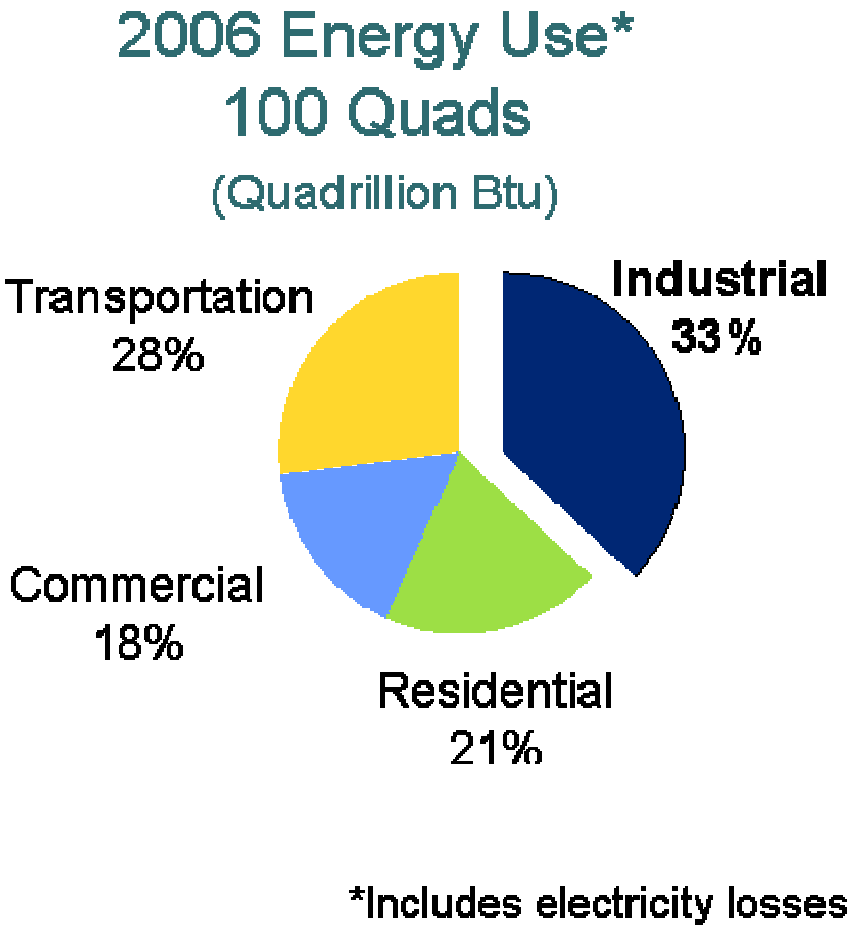
Gideon Varga
Brian Olsen

Save ENERGY Now

Presentation Overview

- Why focus on industry?
- What have we done?
- What will we do?

Industrial Sector Is Largest U.S. Consumer of Energy



U.S. industry consumes:

- 35% of U.S. natural gas
- 27% of U.S. electricity
- More energy than the entire nation of Japan

U.S. industry emits:

- 28% of U.S. greenhouse gas emissions
- 450 MMTCE in 2006 (the second largest source of carbon-based emissions)

Industry spent $176 billion in 2004 on purchased energy.

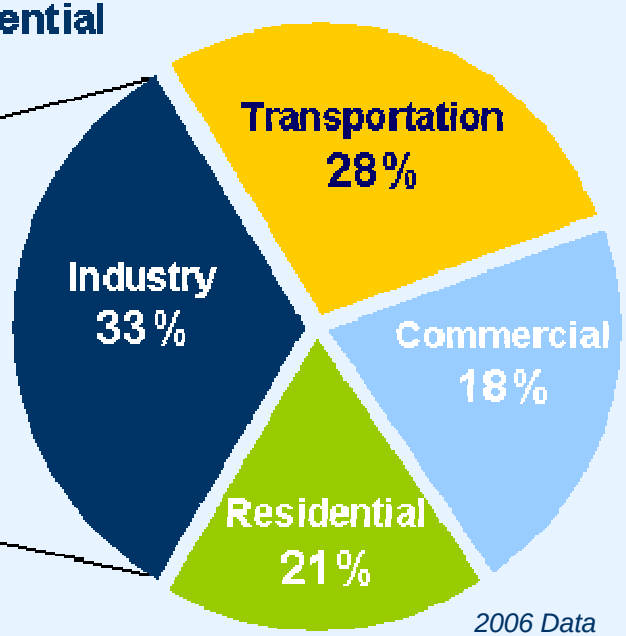
Industrial Technologies Program: Mission

Improve national energy security, climate, environment, and economic competitiveness by transforming the way U.S. industry uses energy

Reducing U.S. industrial energy intensity is essential to achieving national energy and carbon goals

Petroleum	40%
Natural Gas	32%
Electricity*	14%
Coal & Coke	8%
Renewable Energy	6%

* Excludes electricity losses



2006 Data

Source: EIA/AEO2008

Legislative Mandate: The 2005 Energy Policy Act Section 106 Voluntary Program

- Launch voluntary industrial energy partnerships with leading corporate partners
- Obtain and recognize corporate commitment to reduce energy intensity by 2.5% per year

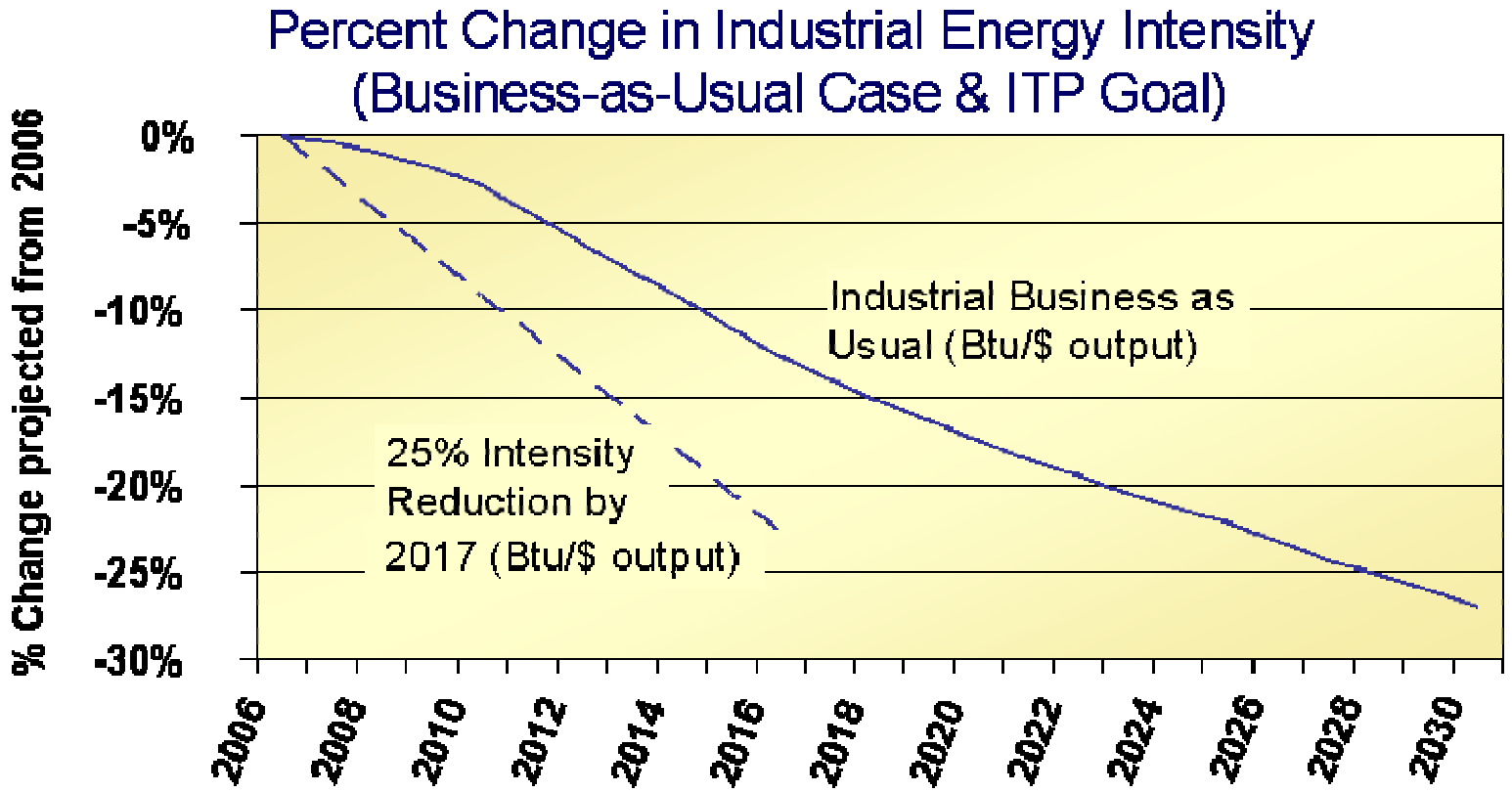
The EPACT 2005:

Sec 106

"The Secretary shall publicize…voluntary agreements…reduction of energy intensity by not less than 2.5 percent each year through 2016."

Our Goal

Drive a 25% reduction in U.S. industrial energy intensity by 2017 in support of EPAct 2005 and the President's carbon reduction goals

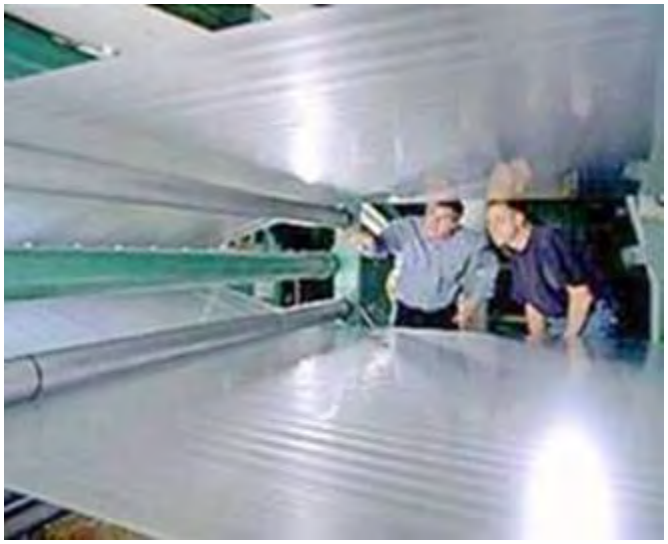


Source: EIA, AEO 2007, Business As Usual (BAU) case

Major Opportunities Exist in Industry

Improve our energy security, economic growth, and environmental quality through advances in energy efficiency

- Develop cost-effective, efficient operating and maintenance practices
- Increase adoption of state-of-the-art energy technologies
- Adopt market-ready flexible fuel and feedstock technologies
- Continue development of next-generation technologies



Industrial Technologies Program

Transforming the way American Manufacturing uses energy.

Stakeholder Collaboration

Collaborative R&D

Investing in research & development for high-efficiency manufacturing

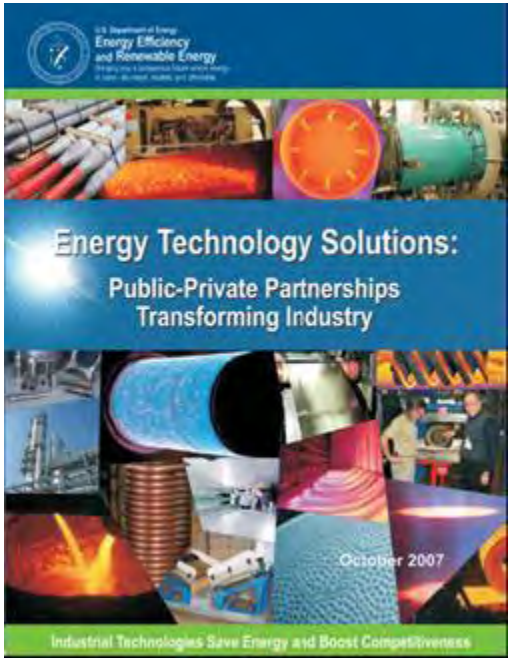
Technology Delivery

Putting energy-efficient practices and technologies into use

ITP's Energy Efficiency R&D Delivers Results

Together with industry, we have successfully put cutting-edge technologies and energy-saving measures into practice

- Received 42 R&D 100 awards between 1991 and 2007
- Commercialized over 220 technologies since program inception
  - 5 quads of energy savings
  - 86 MMTCe reduction
  - 85 technologies in market today
- Over 16,000 U.S. manufacturing plants using ITP software and best practices
- Obtained 156 patents between 1994 and 2005



Available today

ITP Technologies at Republic Engineered Products

- Aluminum Bronze Alloy
- Laser Contouring System
- HotEye Surface Quality

Aluminum Bronze Alloy

A high-performance aluminum bronze alloy offers unprecedented lifetime improvements in basic oxygen furnace (BOF) and electric arc furnace (EAF) components such as hoods, roofs, and side vents. Al-Bronze resists extreme temperatures, corrosive conditions, physical erosion, and damage from slag accumulation to improve component lifetime up to five times. Reduced downtime increases energy efficiency, productivity, and environmental performance.

Benefits

- Saves nearly 5.3 billion Btu per year in BOF installation
- Energy cost savings of $100,000 per year
- Reduces CO_2 emissions by 550 metric tons per year
- Reduces maintenance costs by 95%
- Reduced downtime resulted in $11 million in increased revenues.

Al-Bronze Skirt Prior to Installation

Partners

- Energy Industries of Ohio (lead)
- Oak Ridge National Laboratory
- Republic Engineered Products
- AmeriFab Inc.

Laser Contouring System (LCS)

The LCS is a high-speed, laser-based tool that provides highly accurate 3-dimensional measurements of a molten steel vessel's entire refractory lining within minutes. Quick, on-line feedback eliminates downtime and costs due to offline inspection and unnecessary relining. Steelmakers using this system can extend equipment lifetime while ensuring operational safety

- Most installations on BOFs
- Republic was first ladle installation. Others in China, Korea, Germany and soon Mexico

Photo of the Laser Contouring System (LCS) mobile platform design

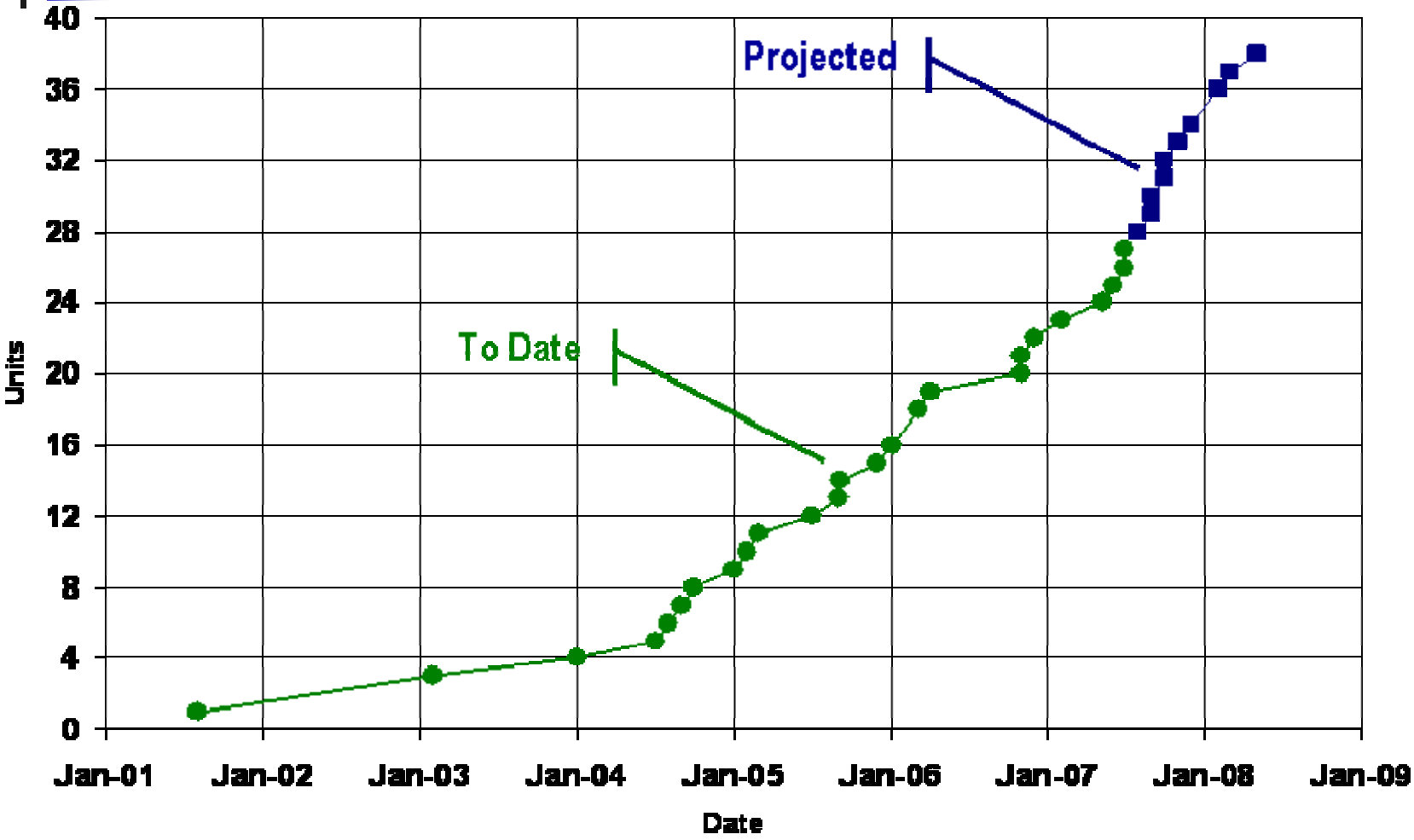
Benefits

- Enhances predictive maintenance and allows operators to optimize relining frequency
- Avoids equipment failures, unnecessary relining, and unanticipated downtime
- Ultimately reduces downtime and associated production losses

Partners

- Sandia National Laboratories
- American Iron & Steel Institute
- Berry Metal Company
- Process Metrix

LCS Sales Show Rapid Growth



SQA™: Surface Quality Assured

- Online identification of defects on rolled steel bar surfaces
- Allows quick response.
- Improved surface quality control
- Minimization of defect-related costs.
- Increases process efficiency
- Replaces conventional slow, off-line procedure
- Root cause identification capability being added.

SQA™ in commercial use

Benefits

- Simplifies billet preparation process
- Provides tool for process diagnostics
- Enhances quality control (One user reduced customer complaints by 89%)

Partners

- OG Technologies, Inc. (lead)
- University of Michigan
- University of Wisconsin
- Charter Steel
- Metaldyne

HotEye™ RSB Systems

A new imaging-based surface quality tool used in SBQ mills for:

- **Feedback on process design & verification;**
- **Effective process diagnosis & control; and**
- **Enhanced quality review & control.**

Sold in US, Canada, China & Japan.

US Patents issued/allowed;Internationally patent pending

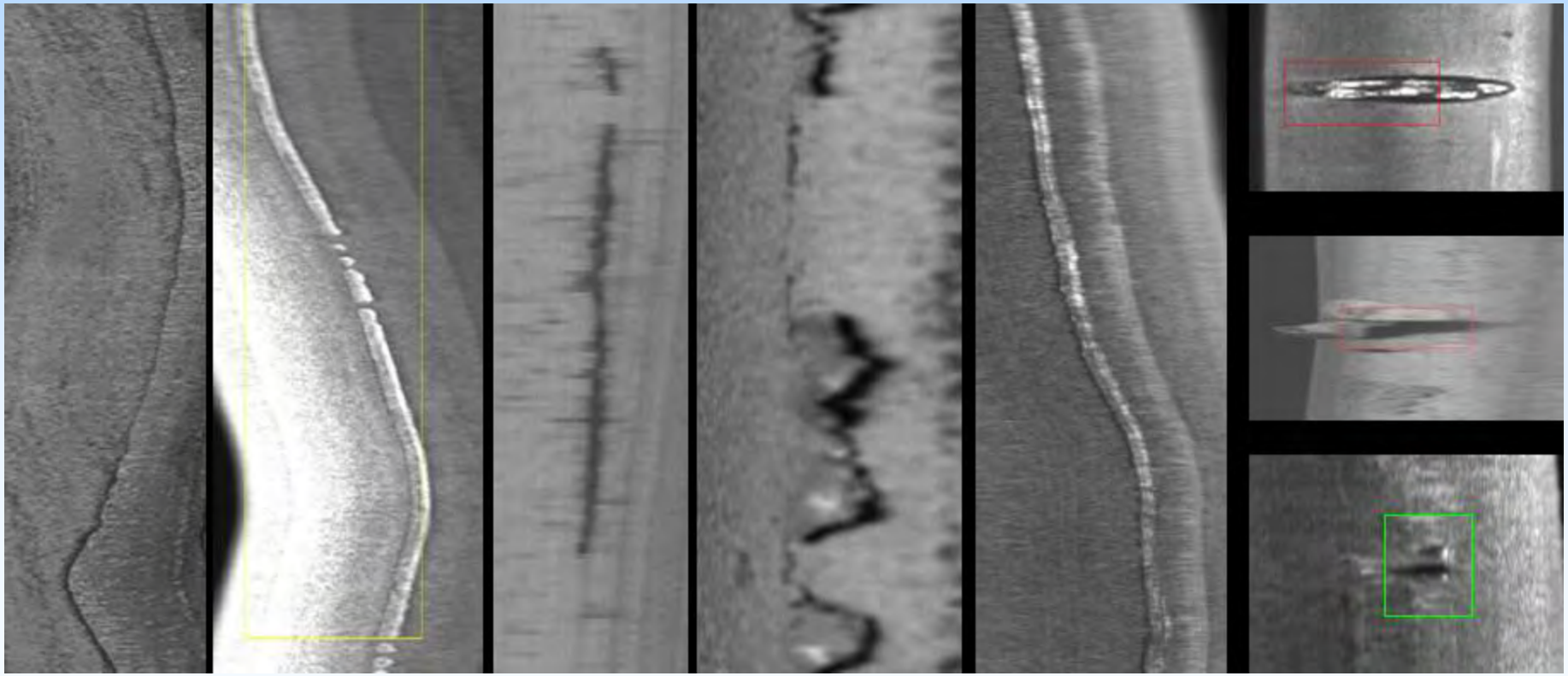
OG Technologies, Inc., 4300 Varsity Drive, Suite C, Ann Arbor, MI 48108, 734/973-7500, 734/973-1966(fax)
Contact@ogtechnologies.com, www.ogtechnologies.com

OG™

Power of the RSB Visibility

Seeing images from seams to scratches, laps, overfills, slivers, etc.

Moving toward simpler process, higher quality and better profitability.



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ITP Solicitation for Industry

- Will include industry specific and crosscutting elements
- Will focus on later stage: prototype development through field testing
- Target release date: end of February

More Information ??

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