Agenda

1. Saint-Gobain - Who we are
2. Overview of Energy Management Program
3. Saint-Gobain - Voluntary Program Participation
4. Problems and Challenges with Solutions
Saint-Gobain – Who we are

- Worlds largest building materials company, Headquarters in Paris
- Global sales 2012 $55.5 B; 193,000 Employees
- North America Headquarters in Valley Forge, PA
- North America 2012 : $7.9 B sales; 19,000 Employees
- 135 manufacturing plants throughout North America; Four Divisions; 18 business units. Building materials distributor with more than 130 outlets
  - Building Materials
  - Innovative Materials
  - Glass Containers
  - Building Materials Distribution
Saint-Gobain North America Sites

Click here for location addresses and maps
Glass Packaging

- #2 in glass containers in US
- 15 plants, 4,371 employees
- Only glass company with ENERGY STAR labeled plants
## Innovative Materials

- **#1 or #2 in most activities**
- **69 plants**
- **~7,000 employees**

<table>
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<th>Plants</th>
<th>Employees</th>
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![Image of Abrasives](image1.png)

![Image of Ceramics](image2.png)

![Image of Performance Plastics](image3.png)

![Image of Crystals](image4.png)

![Image of ADFORS](image5.png)

![Image of Glass](image6.png)
Construction Products

- Leader in US and Canadian markets
- 56 plants
- ~5,600 employees

**EXTERIOR**
- **Roofing**
  - 13 plants
  - 1,435 people
- **Vinyl Siding**
  - 9 plants
  - 1,188 people
- **Fiber Cement Siding**
  - 3 plants
  - 276 people

**INTERIOR**
- **Insulation**
  - 7 plants
  - 977 people
- **Gypsum**
  - 20 plants
  - 1,199 people
- **Ceilings**
  - 4 plants
  - 358 people
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- Problems and Challenges with Solutions
Energy is a Primary Component of our Overall Business Strategy

- **Saint-Gobain Global Strategy**
  - CEO Emphasis (Global and North America)

- **Business Strategy – Products & Markets**
  - Our strategy anticipates that energy efficiency will be valued highly in the marketplace going forward

- **Operational Excellence**
  - Cost Savings, External Marketing Activities, Process Understanding and Improvement

- **Business Impact**
  - Cost and Business Continuity

- **Environmental and Sustainability Objectives**
ENERGY POLICY

Building our environment together

As the world leader in products for the “habitat” and construction markets, Saint-Gobain provides innovative solutions to three key challenges of the future: the environment, renewable energy and energy conservation.

At Saint-Gobain, we believe we can do well by doing good, and reducing energy consumption by all our businesses is central to that belief. Our businesses work towards improving energy efficiency by establishing and implementing effective energy management programs that support our buildings and manufacturing capabilities while providing a safe and comfortable work environment, including the efficient use of energy to produce and deliver products and services to its customers throughout the world.

John Crowe
President and Chief Executive Officer
Saint-Gobain Corporation

March 2012
Critical Components for Success

As part of our centrally managed energy program, all business units require adoption of these strategic principles in order to maximize and sustain savings:

- Adoption of energy reduction goals at a business unit level and at a facility level, tied to incentive compensation
- Mandate of facility metering to identify savings opportunities and consumption reduction
- **Appoint Energy Champions at Business Unit level and creation of Energy Teams at the facility level**
- Budget for energy related projects and services
Collaborative Approach

- Annual Energy Conference
- Annual Energy Champions meeting
- Periodic Energy Calls
- National Account Vendors
- Raising Awareness
  - Energy Communications
2012 Energy Conference Agenda

- Q&A With CEO
- Recognition for Outstanding Achievement
- Energy Portal Review, Technology Update
- External Speakers, including ENERGY STAR Partner company
- Plant Presentations:
  - Engineering Decisions made with New Plant, Shutdown Procedures, Business Unit Energy Activities (two businesses), Clean Rooms, Kiln Projects, Metering Projects, Pump Changes, Culture Change Activities, Product Savings due to Improved Energy Control, Kaizen Success Story
- Training: Combustion; Heat Recovery
- Plant Tour
Energy Portal Content

- Technology Information
- Vendor Presentations
- Internal Success Stories – Projects and Kaizens
- ENERGY STAR Partner Presentations
- Energy Incentive Programs
- Energy Technology Update
- Metering - Standard & Basic Equipment
- Process Improvement
- Procurement and Procurement Strategy
- Links – ENERGY STAR, DOE
- Energy Conference Presentations
Resources

- Saint-Gobain Energy Manager
- Compressed Air services
- Combustion services
- Lighting Turnkey
- Lighting Direct Purchase
- Motor audits
- Power Factor Correction
- Metering
- Steam
- HVAC
- CHP/WHR
- Energy Purchasing
Key Takeaways for the Business

- Company Culture
- Energy is a winner
- What energy impacts
- How we add value
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ENERGY STAR – Voluntary Program

Saint-Gobain Participation

- Active participant and supporter of the program
- Proven, effective techniques guided by Industry
- Valuable tools and program resources
- Industry collaboration
- Valuable recognition
ENERGY STAR Challenge for Industry – *reward achievement*

- Recognizes 10% improvement in energy intensity within 5 years or less.
  - Calculated against an internal baseline at an industrial site.

Sites participate by:

- Selecting an *energy intensity metric*
- Establishing a baseline
- Setting a 10% improvement in 5 years goal
- Registering for the Challenge
- Verifying savings if goal is achieved
ENERGY STAR® Challenge for Industry
Social Circle, GA

- Plant Energy Champion Andy Barnes
- Plant Manager John Barone
- General Manager Rick Brinton
- SPG Vinyl Energy Champion Steve Burghart
- Reduced Energy Intensity by about 23% over the last two years

Two time winner of the Saint-Gobain Excellence in Energy Efficiency Award
Saint-Gobain Social Circle, GA
Energy Kaizen Projects ~ 15.0%

Kaizen process facilitates continuous improvement
- Week long ‘focused improvement’ event
- Source for low-cost, no-cost ideas, increased awareness
- Energizes plant energy teams

Kaizen Projects
- Occupancy Sensors (21)
- Turn It Off + Standard Shutdown Procedure
  - HVAC = 0.5%
  - Lights = 5.5%
  - Equipment + Process Insulation = 6.5%
  - Compressed Air Leaks + Pressure Reduction (13psi) (Measured savings) = 2.5%
Saint-Gobain Social Circle, GA Lighting Retrofit Project ~ 8.8%

- Cost = $92k
- Savings = $38k annual
- +EPACT Accelerated Depreciation = 1.98 year payback
- T-5 fluorescent lighting
- Occupancy sensors (hi/low) for low-use areas
ENERGY STAR® Challenge for Industry
Fort Smith, AR

Results: 10.0% Reduction in Energy Per Unit in Two years

Plant Energy Champion Rick Lee
Manufacturing Director Vince Shores
NorPro Energy Champion Patrick Sick
NorPro Energy Sponsor Antonio Vilela

Two time winner of the Saint-Gobain Excellence in Energy Efficiency Award

Fort Smith Energy Team
Saint-Gobain NorPro Fort Smith, AR
Process Reformulation Project ~ 4%

Began production of a new product, "Bauxlite", with a reformulated ore blend that sinters at a lower temperature.
Saint-Gobain NorPro Fort Smith, AR
Natural Gas Efficiency Projects ~ 2%

- Refurbished gas burner linkages controlling air/gas ratio on rotary kilns and tuned all plant burners for optimal efficiency
- More frequent measurements of flue gas components resulting in tighter combustion efficiency
Saint-Gobain NorPro Fort Smith, AR
Process Control Project ~ 4%

- Improved process control resulting in fewer recycle hours, less re-firing of off-spec materials, higher yield and throughput
2011 ENERGY STAR
Plant Label Recipient

Sapulpa Plant: (EPI Score = 76%)

- Furnace rebuild with new design, energy efficient forehearth

- Compressor room project:
  - Installed Master control system; consistent compressed air leak repair initiative
    - Shut down a 1000 hp. compressor
  - Effective Natural Gas leak repair program in the plant

- Lighting upgrades:
  - Installed T-5 fixtures motion sensors in all warehouses
  - Replaced incandescent lamps with LED in inspection machines
CEO Letter

March 14, 2011

ENERGY STAR Sustained Excellence Award

To: All North American Employees

Year after year, Saint-Gobain has displayed outstanding leadership in energy management, significantly reducing both our energy use and greenhouse gas emissions in our facilities. In honor of these efforts, I am proud to announce that the U.S. Environmental Protection Agency has recognized Saint-Gobain with a coveted “ENERGY STAR” Award for the third year in a row.

This latest award reflects the EPA’s highest level of achievement—Sustained Excellence. We are the first and only manufacturer of glass containers or fiber-glass insulation ever to receive this award.

As the world leader in sustainable habitat, Saint-Gobain’s goal is to reduce the environmental impact of our business at every stage, from product design, through manufacturing, to point-of-sale and end-of-life disposal. With your help, we are making this happen.

Congratulations to everyone who helped to make this award a reality. Thanks to all of you for living our commitment to energy efficiency every day.

Yours truly,

Gilles Calus
General Delegate, Saint-Gobain North America
“C” Level Attention to Energy Efficiency

- Saint-Gobain’s 2012 Energy Savings equate to the energy required to produce:
  - 716 million typical glass containers
  - Shingles for new roofs on over 1 million typical houses
  - Insulation for 147,000 typical homes
- Five year improvement of 14.9% energy-per-unit
- Ancillary benefits
DOE Better Buildings Better Plants – Voluntary Program

Saint-Gobain – Challenge Partner
- Committed to 25% improvement over 10 years
- Improved access to ORNL
  - Energy efficiency ideas
  - Advanced manufacturing techniques
- Assessments and technical collaboration
  - Combustion
  - Fans
  - Pumps
- Collaboration with other Partners
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Thanks for the Great Advice, But…

US Housing Starts
April 2012 = 516K
Internal Challenges

- Plants designed to run 24X7
  - Temporarily or permanently closed
  - Operating as little as 4 days per month
  - Reduced shifts
- Reduced technical resources available
- Reduced and limited capital available
Efficiency Success Despite Challenges

- Two Approaches: Culture Change and Project

  - Culture Change: Strong focus on Low-cost / No-cost initiatives
    - Near Term
    - Target ‘Low Hanging Fruit’ First
    - Easy to do, immediate savings, keeps people engaged, establishes the proper baseline

  - Project: Capital investments to improve infrastructure
    - Longer Term
Low Cost/No Cost Activities

- **Energy Kaizens**
  - Kaizen process facilitates continuous improvement
  - Energy teams use this established/recognized methodology for the energy efficiency improvements
  - Management support for the event and follow through, including spending on opportunities discovered during the event.
  - Source for low-cost, no-cost ideas, increased awareness at all levels in the company.

- **Enhance plant energy teams**
Kaizen Success

- Top Management Support (Top Down)
- Engagement (Bottom Up)
  - Kaizens
  - Communication
- Communication - Fit it into the plant culture

Cost to run chiller per week - $926.44!
Run weeks per year 25
Total amount saved $23,161!!!

MSRP of a 2010 Dodge Challenger is $23,460!
Low Cost/No Cost Activities

- Develop standard work to operate equipment
  - Shutdown procedures – Modified Toyota shutdown procedures
  - Consolidate facilities and modify operating schedules
  - Find the minimum energy mode for all buildings and equipment (then find a way to go lower)

- Encourage out-of-the-box thinking
  - What if? Why?
  - Challenge the process engineers
  - Creativity before capital

- Use what you need when you need it
  - It is possible to run your plant with less energy
Low Cost/No Cost Activities

- Utilize external resources
  - Take advantage of supplier/customer relationships
  - ENERGY STAR network

- Culture Change
  - Raising awareness:
    - plant video screens,
    - internal publications,
    - how to save energy at home.
  - Engineering awareness; substantive improvements with approved projects - perform an energy review for existing capital projects; it’s the easiest time to implement improvements.
Low Cost/No Cost Activities

- Take advantage of down time
  - Install monitoring equipment and systems
  - Replace insulation and refractory
  - Fix leaks: air, steam, gas and water; repair steam traps
  - Burner tuning or replacement – safety upgrades

- Fuel switching

- Drive the concept of sustained savings and that when sales improve you will be incrementally more profitable
Now What?

- Success sells!
  - Successes lead to increased senior management support for improved investments in energy efficiency

- Leverage the credibility from results of low cost initiatives and increased awareness into funding for capital investments.

- Anticipate process improvements
  - “We don’t have any capital for energy projects”.
  - What about capital for process improvement projects paid for out of energy savings?

- Due diligence on low-cost/no-cost with demonstrated results, now perform due diligence for capital projects
Project Benefits

Savings and improvements are generally retained over time so effort put forth in the one year yields benefits in subsequent years.

Ancillary benefits are expected with energy efficiency improvements:

- Lighting – reduce energy consumption but improve light levels
- Compressed air – improve plant pressure consistency which reduces process variations, reduce moisture which reduces maintenance, turn off a compressor and achieve redundancy
- Kiln energy project – reduced smoke, reduced car rebuild costs, improved quality and throughput
- Etc…
Questions?