Direction for Penetration of the Consumer Refrigerator Market
Consumer Refrigerator Market – North America

- Size of the market
- Motivators for acceptance
- Why it is starting to be used?
- What we can do as an industry?
Market Research

■ Scope
  ◆ North American focus
    ★ Europe, Far East, etc. have different energy costs, consumer requirements, and design styles

■ Methodology
  ◆ Secondary research
    ★ Literature research where someone else gathered the data
  ◆ Primary research
    ★ Direct interviews
North American Market Size

- Very large
  - Refrigerators 9.2 million units
  - Freezers 1.9 million units
  Source: 24th Annual Portrait of the U.S. Appliance Industry

- Potential VIP opportunity
  - Approx. $0.75 to $1.5 billion
Market Motivators - Energy

- Energy Use - $ (@ 8.03 cents/kWh)
  - Top-Freezer Models (18 to 22 cu.ft.)
    - $33 to $42 / year
    - Retail price $510 to $1050
  - Bottom-Freezer Models (18 to 22 cu.ft.)
    - $42 to $46 / year
    - Retail Price $695 to $1050
  - Side-By-Side Models (20 to 27 cu.ft.)
    - $48 to $57 / year
    - Retail Price $800 to $1700

Source: Consumer Reports January 2002
Manufacturers have done an outstanding job of improving energy efficiency during the last 10 to 15 years.

However, saving more energy will be very difficult and expensive.

Use of VIP will be one of the easiest, most reliable, and cost effective options for future savings.
Market Motivators - Energy

- If assume 5 year payback
  - $165 to $285 electrical use
  - At best save about 50%
    - R 10 to 14 goes to R 30 to 35 with VIP
    - Some energy not affected by VIP
  - Thus, save $82.50 to $142.50
  - Note: increased cost of VIP will be marked-up by Manufacturer and Retailer
  - Above are reasons manufacturers want to see VIP’s at $2.00/sq.ft. or lower.

Source: personal interviews
Market Motivators – Energy

- Freezers and freezer walls save almost twice the energy per sq.ft. due to the larger temperature difference.
- Not all energy saved is worth the same.
  - In order to reach the required standards, the last 5% energy savings maybe much more expensive than the first 5%.
- Energy prices will likely increase in the future – more motivation to save energy (European market).
Market Motivators – Design Freedom

- Condensation control of thin walls
- Increased internal volume
- Retrofit - energy reduction (doesn’t require new design)
- Manufacturers need for unique features
  - More about this area in a few slides
Refrigerator/Freezers Using VIP

- **Note:** Several models will be introduced in 2002 which use VIP
  - Very high end consumer models
    - First market entry point
Why Has Market Acceptance Started?

- Some small manufacturers can not get to required energy without major and expensive redesign
  - VIP can be installed into existing design
- Some manufacturers need VIP to have their new designs reach the required energy
Why Has Market Acceptance Started?

- Some manufacturers require the high R value of VIP to allow the their special design features.
- Some manufacturers want the experience because they realize their future will involve VIP.

Source: personal interviews
Use of fiberglass or carbon fiber reinforced composites/plastics in automobiles is very analogous to VIP’s in refrigerators

- They allow weight savings and therefore energy savings
- However, the primary motivator is the design freedom that composites/plastics allow
- Stylists/designers can do things with composites/plastics that they can not do with stamped steel or aluminum
Automobile Composites/Plastics Analogy

- The properties and opportunities offered by composites/plastics had to be communicated and periodically reinforced to the stylists and designers.
- Once familiar with the materials, stylists and designers used the new freedom to produce new exciting designs.
- Gas savings alone was not sufficient to motivate a change to new materials.
- New cars are sold based on new features and styling not just performance.
New Design Freedom

- Some of the features where VIP can play a roll
  - Rapid chill zone
  - Rapid freeze zone
  - Deep freeze zone (-40 C)
  - Recessed lights
  - Ice makers partially hidden in walls
  - Increase in door storage
  - Further use of thermoelectric cooling
New Design Freedom

- Additional features where VIP can play a roll
  - Kitchen cabinets that are refrigerators
  - Kitchen drawers that are freezers
  - Ultra thin refrigerator walls (12.5 mm)
    - Dramatic volume increase
    - Huge appearance difference
Existing Refrigerator Design
Potential VIP Refrigerator Design
Showroom Comparison
New Design Freedom

- New features will start on a few high end units and eventually work their way down the line
  - It is the normal design cycle
- Appliance manufacturers can not just rely on reducing the cost of their units to obtain reasonable margins
  - They must have new offerings to the customer and VIP can be a critical enabling technology
What Can We Do As An Industry?

- Communicate to the appliance industry’s management and designers the properties and features of VIP
- Assist the designers with their new designs incorporating VIP
- Communicate and highlight (to the industry and general public) when VIP’s are used in designs
- Continue to work on improving VIP value (lower cost and higher performance)
Success Will Follow

- Appliance industry change is not easy or fast
- However, it can be done