

What Happened to My Corner Store? The Potential for Low or Zero Energy Buildings in the Retail Food Market

A Presentation for the
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John H. Reed
Katherine Johnson
Moria Morrissey
Jeff Riggert
Charles Bailey

305 Summer Garden Way
Rockville, MD 20850
301 340-8701
jreed@innovologie.com



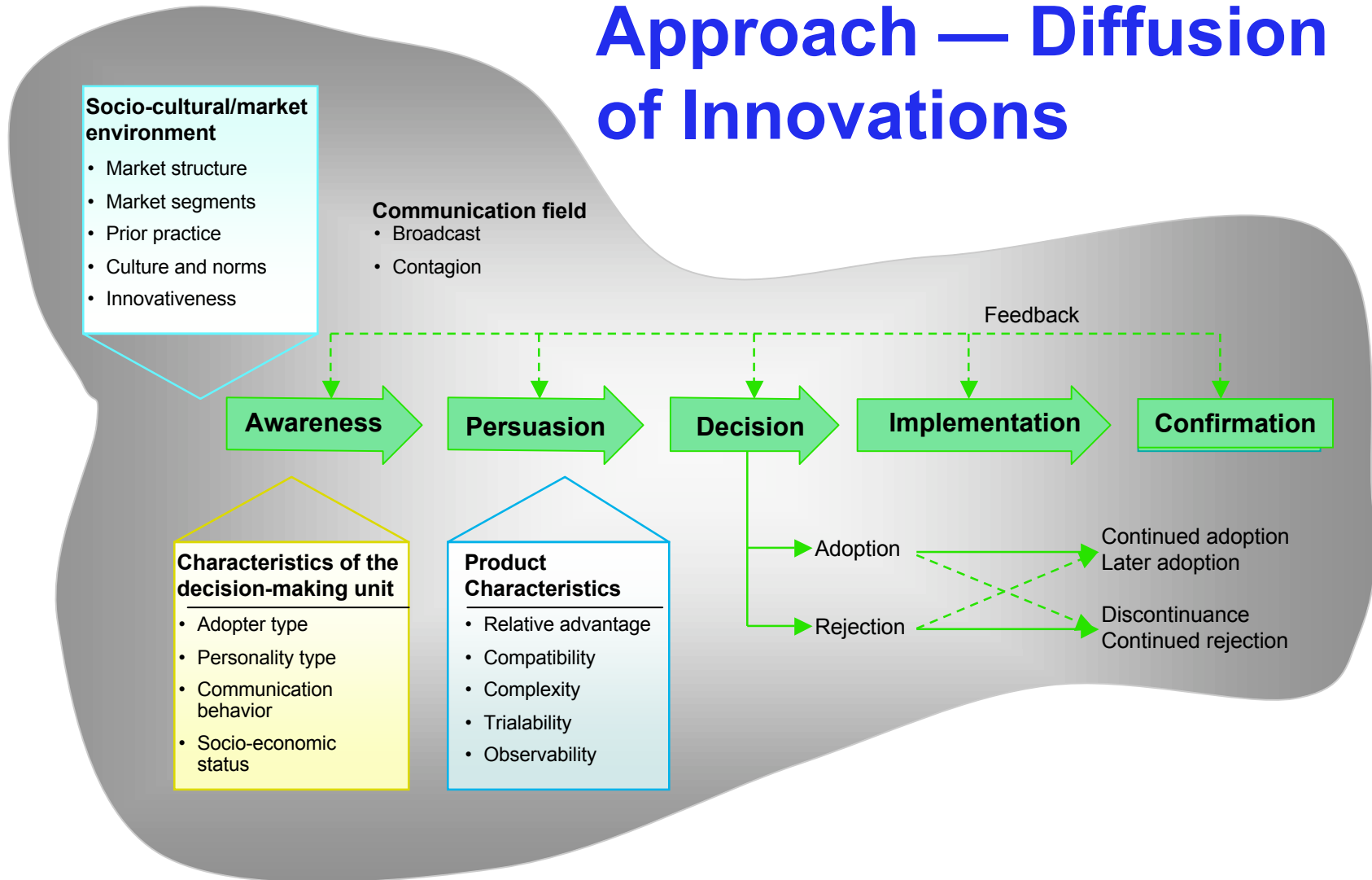
This Paper

- Identify target market segments
- Assess the opportunities for retail food market structures to be low energy or zero energy buildings
- Identify strategies for reaching those segments

Based on:

- Extensive background market research
- In-depth hour long interviews with 10 key market players representing the Top 56 retail grocers in the US

A Theory Guided Approach — Diffusion of Innovations



Source: Everett Rogers 2003 as modified by Innovologie, LLC. 2005

Key Principles of A Theory Guided Approach

- Because of limited resources, diffusion requires relying on firms to replicate their own behaviors and firms observing and emulating the behaviors of others.
- Adoption is driven by information spread through professional and social networks.
- Contagion will be the dominant communication mode by which potential adopters will learn about technologies and practices.
- Widespread diffusion will result from technology adoption by the early majority but not necessarily from use by innovators and early adopters.

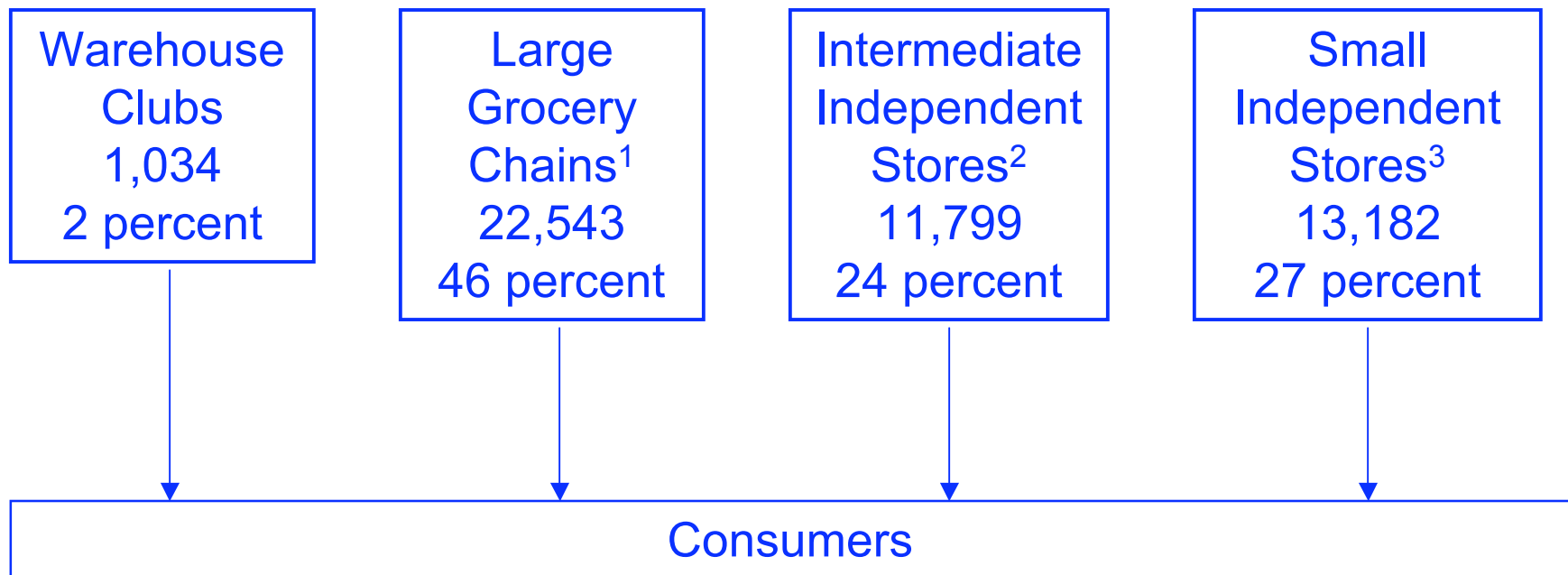
Key Principles Continued

- It is essential to identify groups of decision-makers who are highly likely to communicate with and observe each other
- Innovations that diffuse rapidly have the following characteristics:
 - Multiple forms of relative advantage such as status, increased sales, productivity, comfort, environmental friendliness, in addition to life cycle cost and price
 - High compatibility with technical, policy, social and cultural institutions, and frameworks
 - Simple to understand, use, and install
 - Observable and trialable

The Basic Thrust of the Theory Suggests that We Target:

- Relatively compact and homogeneous networks of firms and individuals,
- Who are likely to have extensive linkages within their own firms and/or with other firms,
- Who are likely to reference each other, and
- That can be easily addressed through one-to-one contact

Retail food market segments

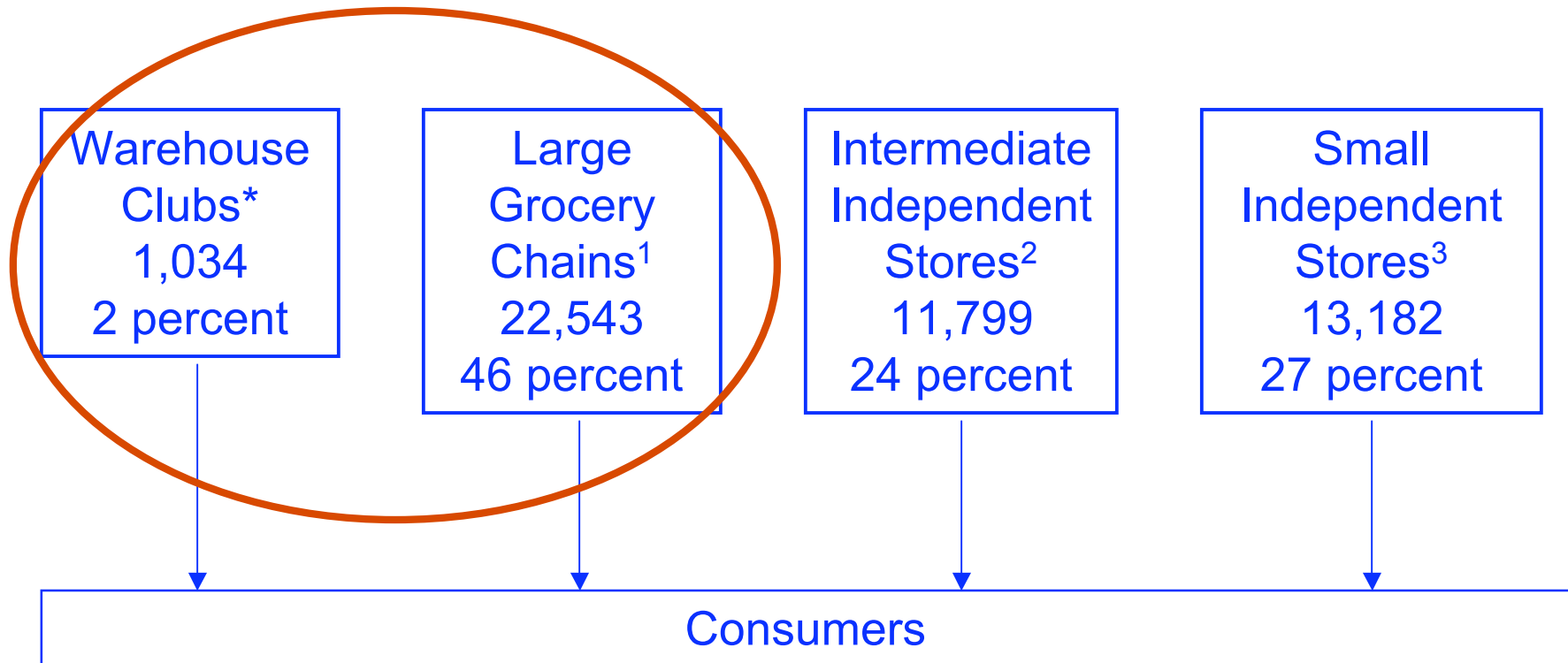


¹ Typically more than \$2 million annual sales per store

² Ten or fewer stores but more than \$2 million in sales

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Retail food market segments



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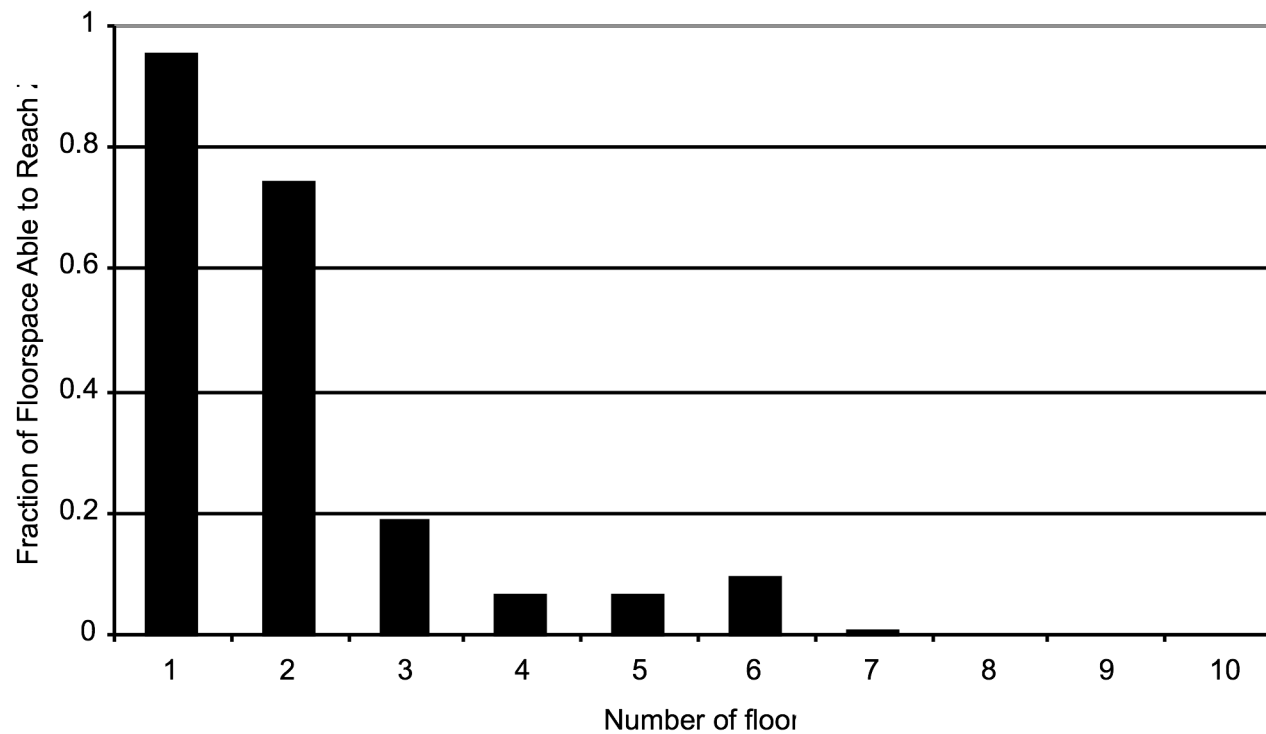
Why this submarket and segment

- 56 firms (compact target audience)
- 25,000 buildings (significant square footage owned by a “few” firms)
- Design as well as maintenance is centrally managed making replication possible (high potential for replication)
- Many are doing centralized monitoring and control
- The 56 firms pay attention to each other (high potential for emulation)

Key components Zero Energy Buildings

- Buildings with one or two stories
- Daylighting and high efficiency lighting
- High efficiency building shells
- Area for solar arrays or other renewable source
- Low power density
- Integration of systems
- Monitoring and controls
- Detailed attention to operations and maintenance

Fraction of Floor Space Able to reach ZEB



Distribution of Percentage of Floors in Food Sales Establishments by Size

Number of floors	Grocery Stores under 10k square feet	Grocery Stores from 10k-50k square feet	Grocery Stores greater than >50k square feet	All grocery stores
1	42	80	39	55
2	10	15	57	29
3	49	5	4	17
4	0	0	0	0
Total	100	100	100	100

CBECS, 1999

These firms have at least two different strategies representing a continuum

- Merchandising (Whole Foods, Food Lion, etc)
 - High premium on presenting the merchandise and creating a sales environment
 - Layout, product selection, display and customer experience take precedence over other issues
- Operational execution (Limited selection stores, Costco, Wal Mart, etc)
 - Focus on keeping cost low and low prices
 - Merchandising at a minimum
 - Wring costs from the system where ever that can be done

Decision-making done by teams composed of some or all of the following:

- An investment analysis group (usually several people)
- Merchandising has the responsibility to “sell” things — presentation and customer interface
- Property acquisition - usually responsible for siting and construction (if not a separate group)
- Property management
- Energy management

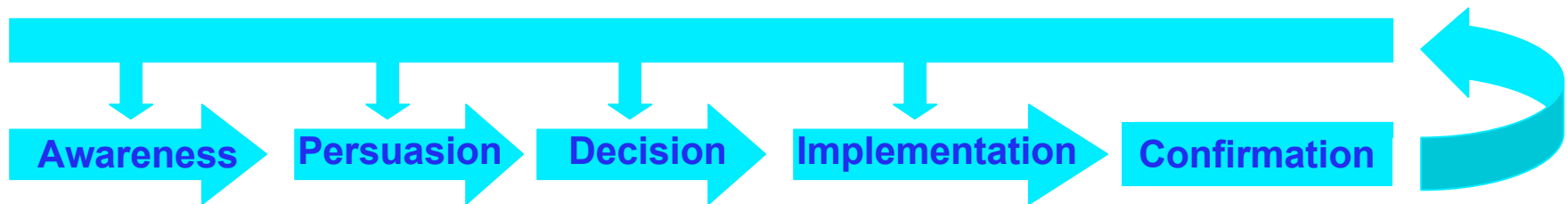
The importance of decision-makers varies by strategy

- Marketing is primary in a *merchandising* strategy
- Marketing considerations take precedence over the other criteria (The meat “window” — Costco versus Food Lion)
- Marketing arguments are frequently less evidence based than an energy manager’s arguments
- Where the strategy is *operational execution* other decision-makers may have a more equal or larger say

Characteristics of the these firms

- Own sites or have ground leases (defacto control)
- Maintain prototypes (specs and drawings) that are updated in two to five year cycles
- Have internal engineers and architects who contract to a stable of architects and engineering firms
- Make regular investments and are not afraid to invest
- Payback or ROI is an issue — They like two years but five years or more is possible (key is availability of capital)
- More investment in stores with staying power / potential
- They remodel on 7 to 10 year cycles. They are not afraid to change equipment early when justified.

These Firms Are a *CLASSIC EXAMPLE* of Diffusion of Innovation



- Vendors
- Conferences
- Each other
- Utilities (sometimes)

- Observation of others
- Initial “back of envelope” investment analysis
- Trial in store
- Full investment analysis

- Payback
- Merchandising
- Reliability
- Maintenance
- Operational cost
- Operational considerations
- Performance in trial — day to day use
- Decision 3 - 5 months

- Trial
- Becomes part of prototype or standard

So what's happening out there - I?

- Lighting
 - High efficiency T-8s (accepted technology)
 - Great anticipation about LEDs
 - Some early adopters - one firm using them for outdoor signage and some use in displays
 - Several have made decisions to adopt in refrigerator cases but are waiting for technology to mature to implement
 - Maintenance not energy is the driver
 - Concern about certification of color temperature - hodge podge of colors is unacceptable, I.e. standardization
 - Ceramic Metal Halides (being adopted)

So what's happening out there - II?

- Daylighting
 - Some chains have adopted (Wal Mart, Costco)
 - Some chains are exploring because the leaders have done it
 - Concerns about payback
 - Concerns about leaks — this is an issue of contractor knowledge and competency; it's a general issue not one just isolated to daylighting
 - Some chains have tried and rejected
 - Won't do it on retrofits maybe on new construction
 - Paybacks are not good enough

What's happening out there - III?

- HVAC/Refrigeration
 - Dual path HVAC systems (one designed for humidity control another for temperature control)
 - Thinking about zero-zone refrigeration
 - Refrigerators using floating head pressure (consistent with going as low as 30°F outdoor ambient). Specialized system design with respect to expansion valves.
 - Heat reclaim on refrigeration systems (parallel reclaim condenser coil) for heating and ware washing
 - High efficiency coil designs
 - Designing own refrigeration systems (patent pending)
 - Recognition that integration is a way to go

What's happening out there - IV?

- Use of renewable energy technology
 - High level of interest — everybody is watching
 - At least some of our firms are at the trial stage
 - Case 1 - Turnkey rooftop PV to deliver 40 percent of baseload at \$0.13 per kWh under 10 year provider contract. Internal commitment to more systems if it proves out. The bet is that energy costs will exceed \$0.13 per kWh in the out years increasing the benefit.
 - Case 2 - Trial PV system to be installed at one location with more four more units in the wings
 - Case 3 & 4 - Wind turbine at warehouse
 - Key is payback
 - Right now incentives are crucial to force payback
 - Companies are reading the long-term power cost tea leaves

What's happening out there - V?

- Monitoring and controls
 - Multiple firms using Vista Advantage or similar (i.e., they receive monthly utility data and examine it)
 - Firms are using EPA benchmarks in conjunction with Vista Advantage. At one of our firms, buildings that are flagged get a visit from a tech
 - Some firms are using end-use energy monitoring and some are monitoring pressure and temperature as well. Firms have operators who flag alarms. Headquarters caller: “Did you know your bakery oven door is open?”
 - Store managers are still the front-line
 - Recognition that someone needs to do the monitoring and there needs to be someone to respond

Can Retail Food Sales Markets Be Zero Energy Buildings

- Buildings with one or two stories (Yes)
- Daylighting (Doable and being done)
- High efficiency lighting (Being done)
- High efficiency building shells (Doable)
- Rooftops for solar arrays (Yes, experimenting high first cost; not likely to provide all of the needed energy)
- Low power intensity (refrigeration is a problem)
- Monitoring and controls (Being done)
- Detailed attention to operation and maintenance (being done)

Other reasons for some optimism about this submarket

- The retail food sales area now has an annual gathering devoted to energy efficiency (potential for replication)
- It has an association, the Food Marketing Institute, that is paying attention (potential for networking)
- Within retail submarket, third largest amount of construction
- “High” interest in energy efficiency
- Retail food sales establishments are paying attention to costs
- Energy efficiency is a measured part of personnel bonuses

Summary and Conclusions

- Likely low energy buildings rather than zero energy buildings
- There are “quick followers” but not all firms are ready and some are not so adventurous
- National/regional strategy that focuses on the central decision-makers in these firms
- Meet them where they are in terms of their approach to the market
- Pilots are what makes the world go round
- Make sure that they get feedback from their pilots
- Focus some research efforts on refrigeration
- Increase integration wherever possible
- Make sure that it is smart integration
- The merchandisers are an audience too, help them evaluate effectiveness of their positions

Resources

- Who Plays and Who Decides @ www.innovologie.com
- Everett Rogers, Diffusion of Innovations, 5th ed., New York: Free Press, 2003.
- These slides @ www.innovologie.com