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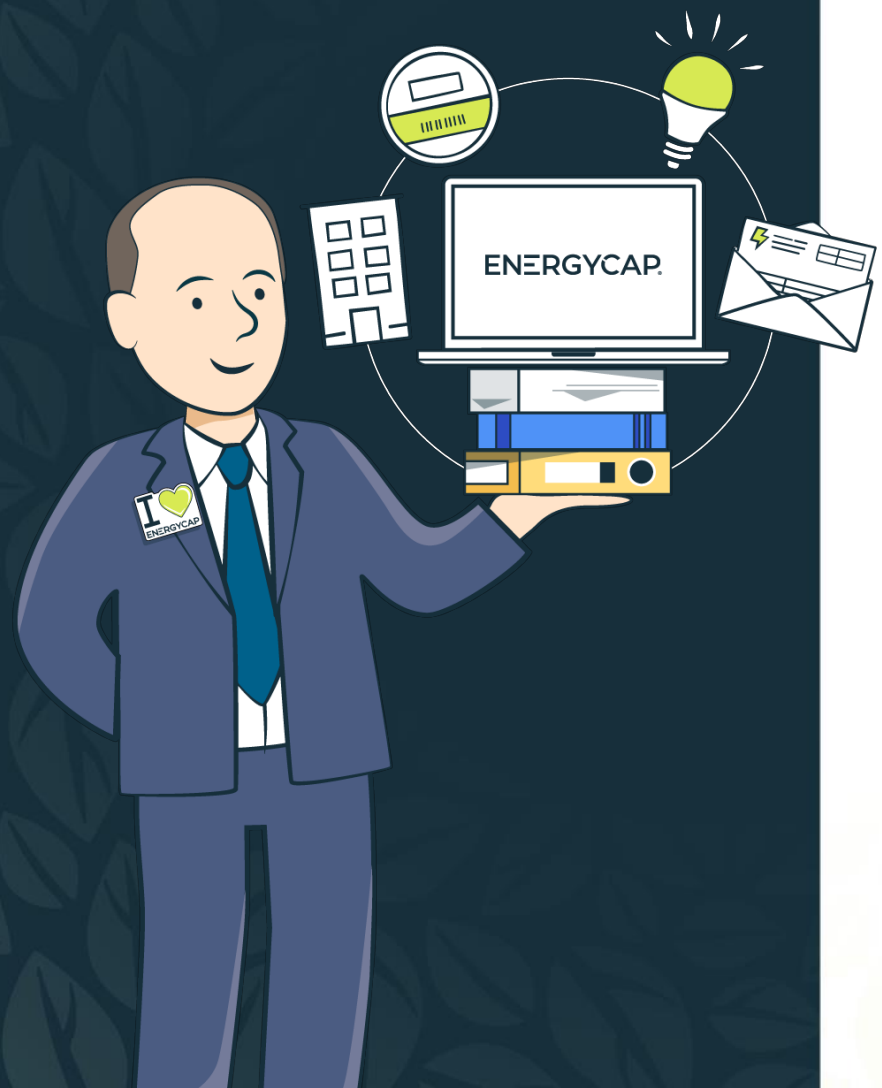
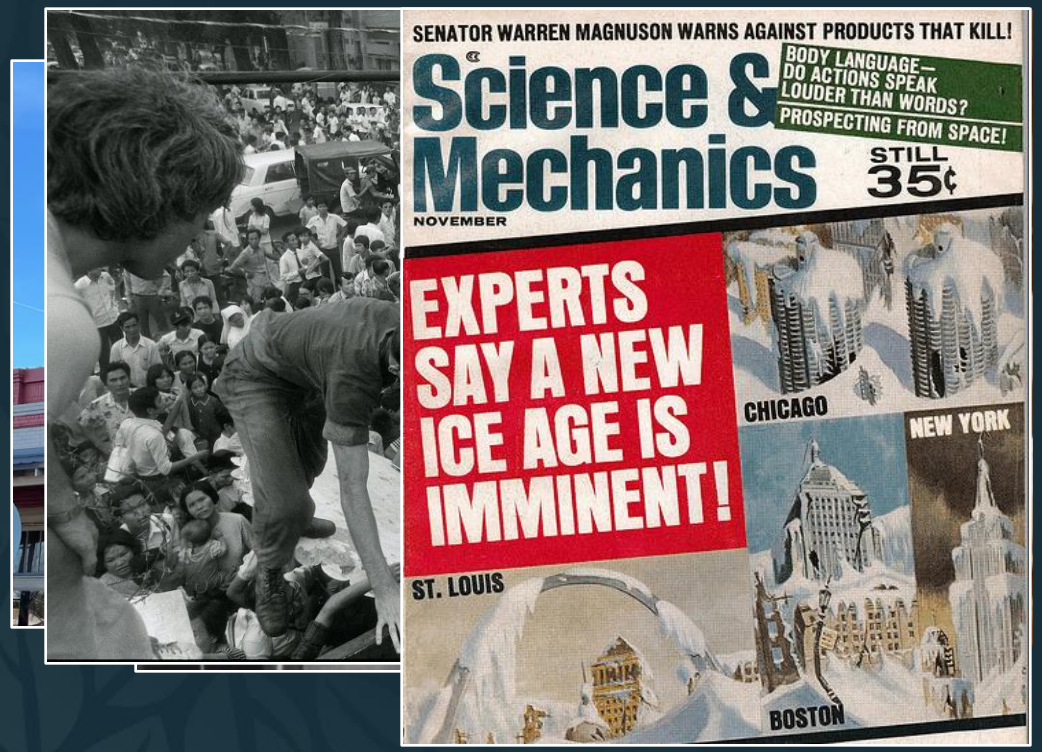


Lessons Learned: 50 Years of Energy Efficiency

Steve Heinz
Founder,
EnergyCAP

Time travel back to 1975

What was happening then?

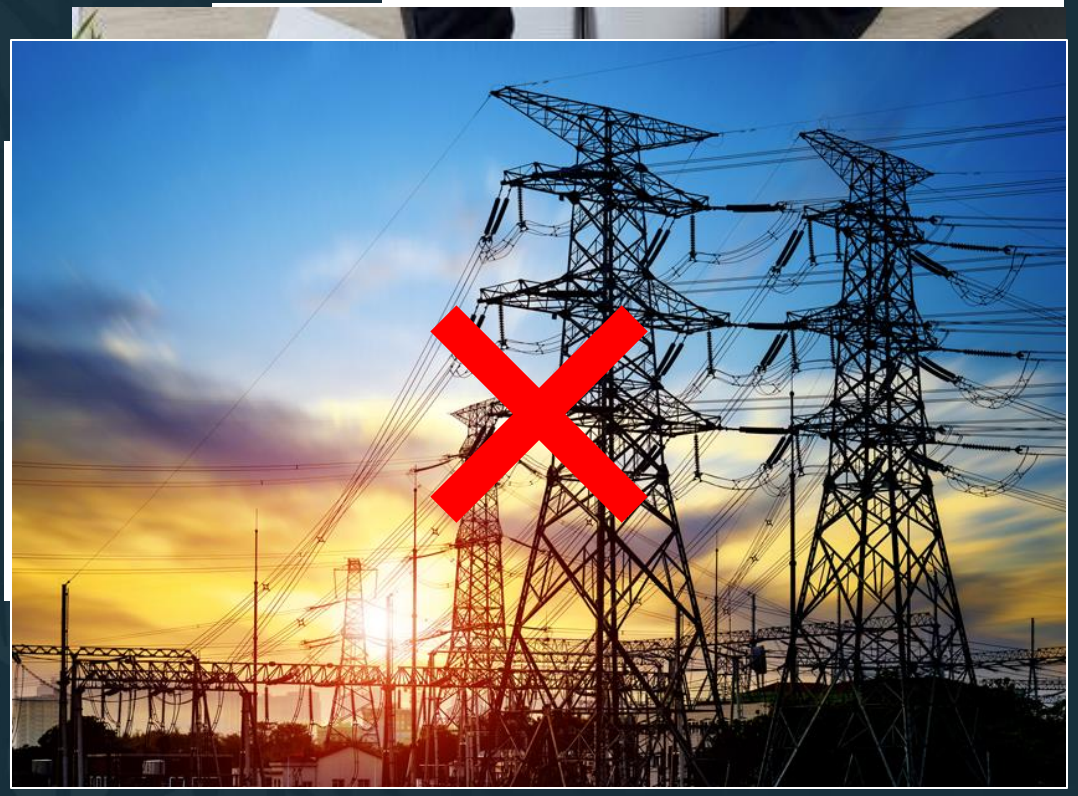


The National Scene

- Gerald Ford was President
- No one outside of Georgia had heard of Jimmy Carter
- A small tech company named Microsoft was founded
- Pete Rose was Sportsman of the Year
- Premiere of *Saturday Night Live* and *Jaws*
- The evacuation of Saigon was a disaster
- Global *cooling* was the prevalent concern

Time travel back to 1975

What was happening then?



The Energy Scene

- Following the Arab oil embargo of 1973–74, oil prices were high, and the U.S. consumed 330 million gallons/day more oil than we produced
- A few large manufacturers dominated building HVAC (Carrier, Trane, Honeywell, JCI).
- Innovation limited to the large manufacturers
- Meager amounts of venture capital funding available for innovative startups
- No ESCOs
- No Association of Energy Engineers
- No performance contracting, no savings M&V
- No deregulated electricity or gas

My job as an Energy Manager was to:

Turn it off

Set it back

“Tune it up”

After 5 years as an Energy Manager, it became clear to me that the key to future energy management success was:

Technology and Data

Lesson #1

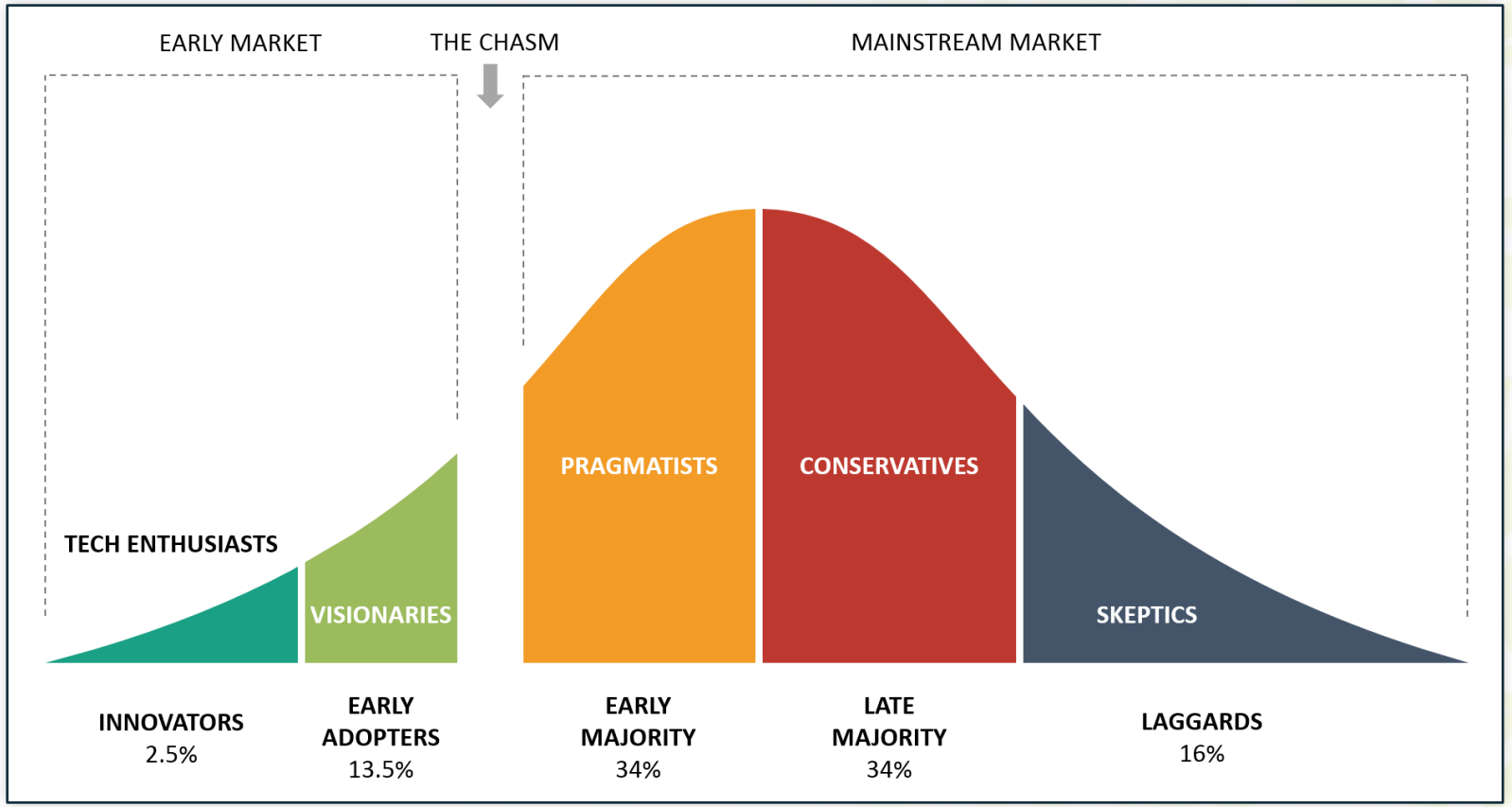
Technology drove 50 years of efficiency advancements

50 years of technology-driven efficiency advancements:

- Direct digital controls replace pneumatic
- EMS's replace time clocks
- LEDs replace all prior lighting technologies
- High efficiency gas boilers and furnaces replace oil and coal
- Insulating glass (Thermopane) replaces single glazed windows and storm windows
- Foam insulation and Tyvek building wrap
- Low flow plumbing fixtures replace high flow (1.6 gpf vs. 7 gpf)
- Occupancy-sensing controls become common
- Variable speed fans replace constant RPM

Lesson #2

The mainstream adoption of technology takes time



Lesson #3

Utility bills have become more complex, yet vendors have not invested in tech, standardization or easy access

- Edison Electric Light sent the first electric bill in 1883. Not much has changed since…
- There are 166 large investor-owned utilities (IOUs), 2,000 publicly-owned municipal electric companies, 812 customer-owned electric companies (co-ops) and an estimated 200,000 water and sewer systems (many very small). That's 3,000 formats just for electric bills.
- Little to no standardization within the industry. That's a LOT of different bill formats.
- And many more available rates and options, particularly in deregulated states. DOE's Utility Rate Database lists 61,000 electric rates.
- EDI 810 and Green Button are government-initiated attempts to facilitate data access. Adoption lags
- **Mission:data** is an organization that fights for better data access by consumers. It's amazing to see utility company and PUC pushback on providing access to smart meter and bill data.
- The government and ratepayers have funded 120 million smart meters yet only a small minority have easy and free data access.

Lesson #4

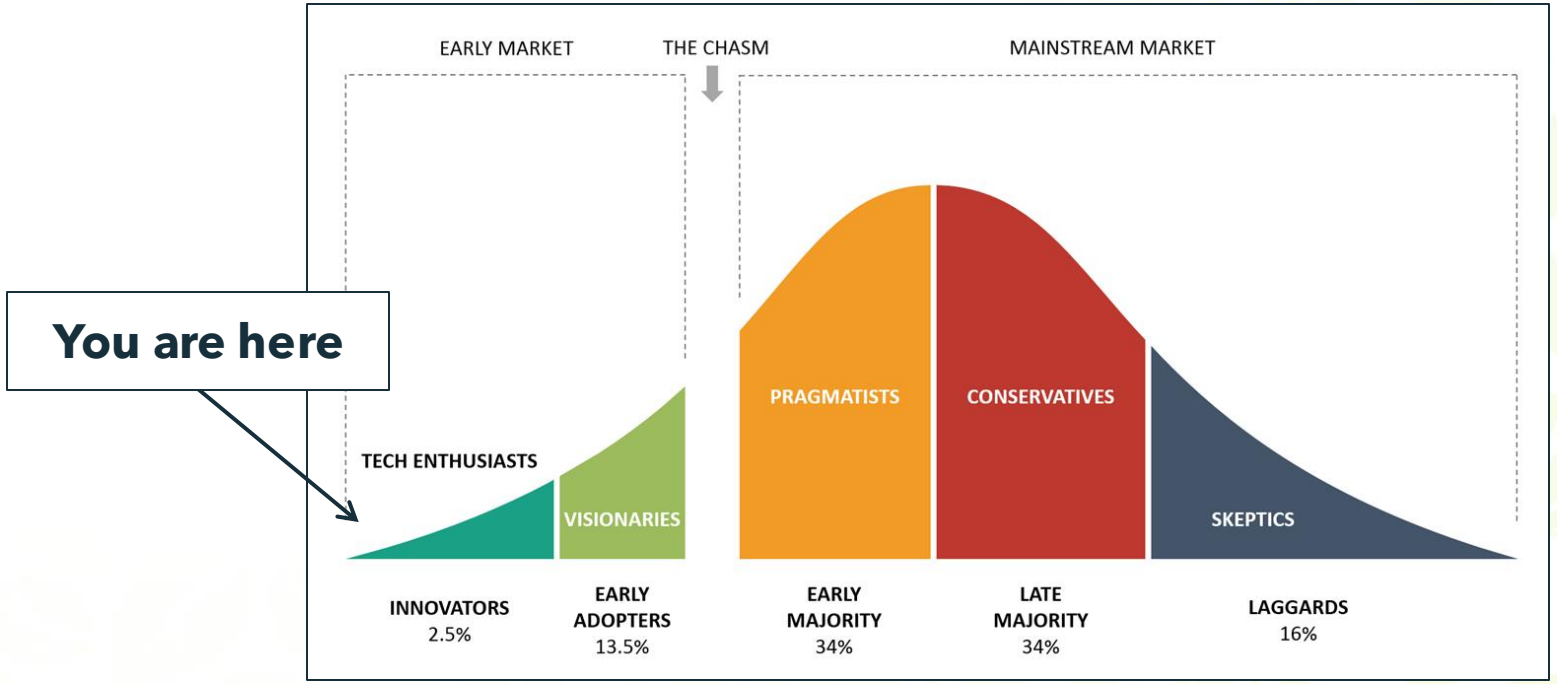
As a result of Lesson #3 (bill complexity and lack of easy electronic access), utility bill out-sourcing continues to grow in popularity

- Bill processing outsourcing started to gain popularity around 2000, primarily in the retail chain sector (We launched a utility bill processing "service bureau" in 1997.)
- Adoption continues to grow steadily
- What's the value of bill processing outsourcing?
  - Reduces headcount in organizations that pay thousands of bills each month
  - Eliminates the need to employ knowledgeable (in utility bills and rates) specialists
  - Increases the accuracy and amount of detail of data collected from the bills
  - It may not seem less costly, but study after study has shown that in-house processing is more expensive, all factors considered.

Lesson #5

The next 25 years will be all about data and "smart" stuff

- Smart grids
- Integrated smart building systems
- Integrated renewables and battery storage facilitate grid optimization
- Variable occupancy due to remote workers is both a challenge and an opportunity…for a smart system
- But remember, mainstream adoption takes time



Lesson #6

The importance and value of energy data has grown over time and is key to all emerging "smart" technologies

- 50 years later, the approach is still: **Turn it off, Set it back, Tune it up.**
- 50 years later, the key is still: **Technology and Data**
- The story of the next 25 years will be AI.
- And AI requires training, and training requires data. Primarily two streams: interval data and utility bill data.
- Due to seasonality in building operations and utility rates, effective AI will require a few years of interval and bill data.

- Now's the time to start preparing for an AI future!
  - Bill CAPture for detailed utility bill data
  - SmartAnalytics for interval data

Thank you!

