



# **Raising the Bar with 8,760 Savings Analyses**

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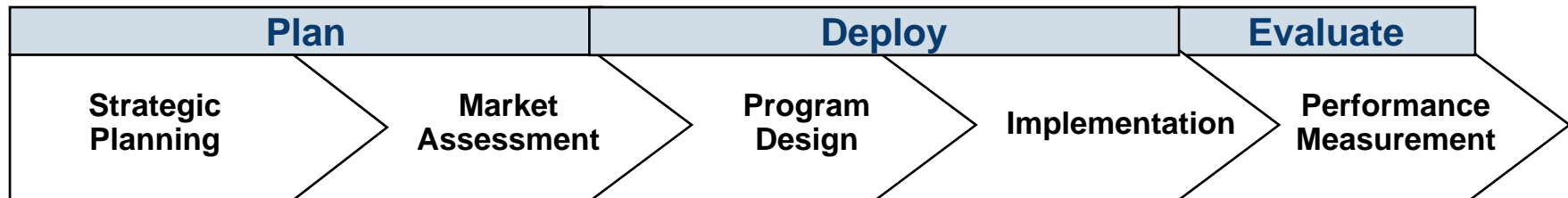
# KEMA Profile

- Four Major Areas of Business
  - Consulting
  - Testing
  - Inspection Services
  - Certification
- 79 years of experience
  - Nearly 30 years in DSM
- 1,500 professionals worldwide
  - 400 in the USA
- 50+ offices in 20+ countries



# KEMA DSM Services

## The DSM Process



- Potential Analysis
- Measure Screening
- Program Portfolio Design
- IRP
- Rate case support
- Forecasting
- Collaborative Support

- Market Research
- Technology Assessment
- Baseline Studies
- Market Segmentation
- Market Barrier Assessment
- Energy Use Survey
- Load Research

- Program Plan
- Staffing Plan
- Pilot Programs
- Marketing Plan
- Information Technology
- Incentive Design
- Load Control Strategy
- Cost-effectiveness assessment

- Program Administration
- Turnkey Programs
- Technical Support Services
- Customer Relationship Management
- Data Management
- Custom Software
- Rebate Processing
- Quality Assurance

- Impact Evaluation
- Process Evaluation
- Business Process Improvement
- Customer Satisfaction
- Market Effects

# 8,760 Analyses are the Future

- Traditional approach is “top down”
  - Annual kWh and Connected kW impacts
  - Develop and Apply coincidence factors
    - Summer and winter CP/NCP kW
    - On-peak/off-peak, summer/winter kWh usage
- Paradigm shift towards “bottom up”
  - Develop 8,760 shape of impacts -> DONE
  - It’s easier than you may think

# Motivation #1

- Time-sensitive costs and rates are shifting savings emphasis from annual kWh to market-specific coincident impacts
- ISO New England allows energy efficiency resources to participate in the Forward Capacity Market (FCM)
- Capacity payments can be significant

# How Significant?

## ICAP Transition Payments

6/1/08-5/31/09            \$3.75/kW-month

6/1/09-5/31/10           \$4.10/kW-month

**Example:** A program with 10 MW of verified impacts would receive nearly \$500,000 in capacity payments *per year*

# Other Motivations

- Seasonal/hourly periods of interest may change in future years
- Coincidence factor studies can be costly
- Peak impacts developed with coincidence factors are less rigorous
- Bin calculation spreadsheets are imperfect
- Why use **Different Data** for coincidence when it's already **In There**?

# What's the Catch?

- The ISO New England Manual for Measurement and Verification of Demand Reduction Value from Demand Response (M-MVDR)
- More rigorous and complex M&V requirements than accustomed



# Key M&V Requirements

- Other Demand Resources (ODR) must demonstrate performance consistent with traditional demand response resources
- 10% relative precision at 80% confidence level for coincident peak demand reduction
- kW measurement at 2% accuracy or better

# Analytical Implications

- Site-Specific Engineering Analysis
  - Preserve all hourly measured data
  - “Annualize” engineering analyses to 8,760
  - Necessitates consideration of hourly, day-of-week, monthly, holiday, seasonal, temperature-dependent, etc. effects
  - 8,760 “pre” - 8,760 “post” = 8,760 “savings”

# Analytical Implications (cont.)

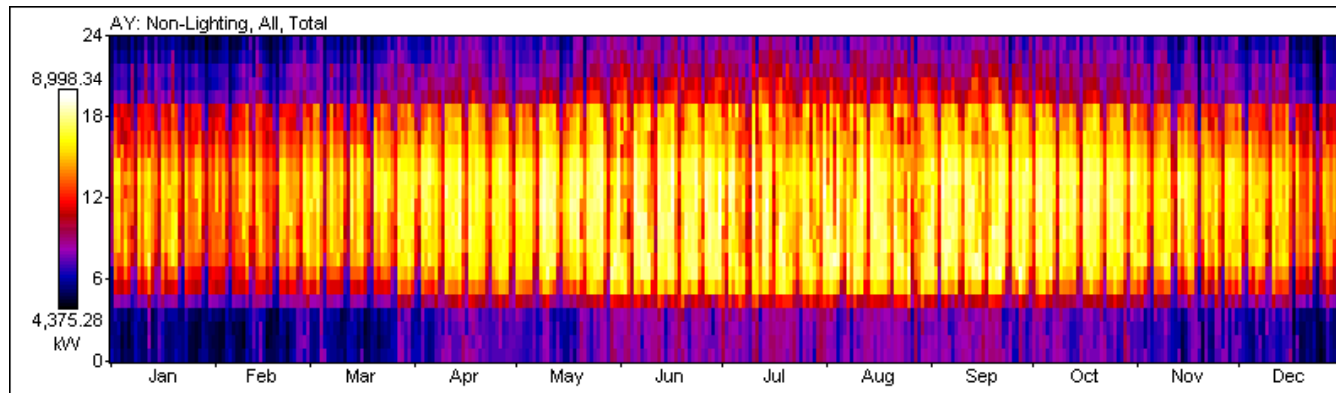
- Sample Expansion Analysis
  - Same methods, just lots more data
  - 8,760 impact values per sample point
- Future-Proof Results
  - Annual kWh = Sum
  - Non-Coincident Peak = Max
  - Coincident Energy = Sum(Period)
  - Coincident Demand = Average(Period)

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# Non-Lighting Impact Profile

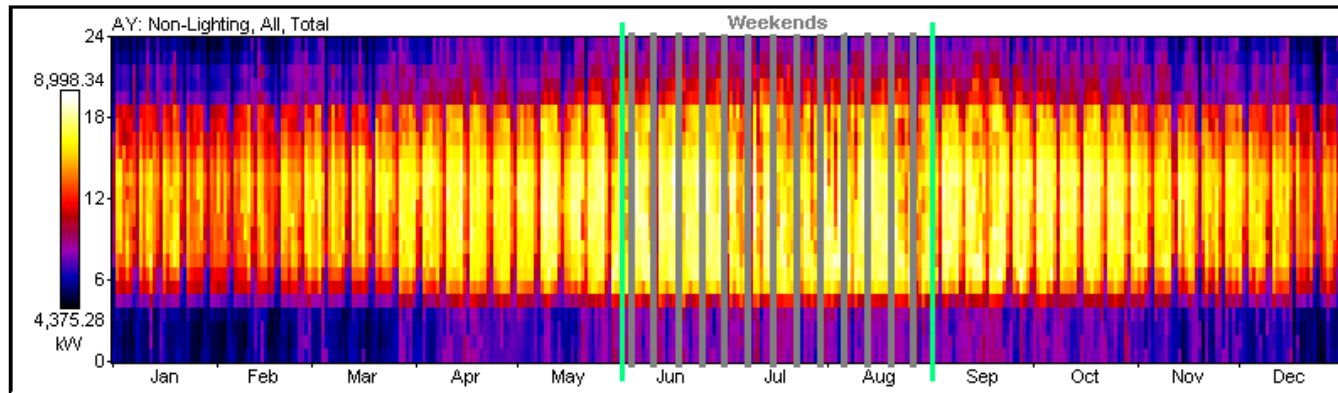
Not a load shape  
but a *savings* shape

# Net Non-Lighting Impacts



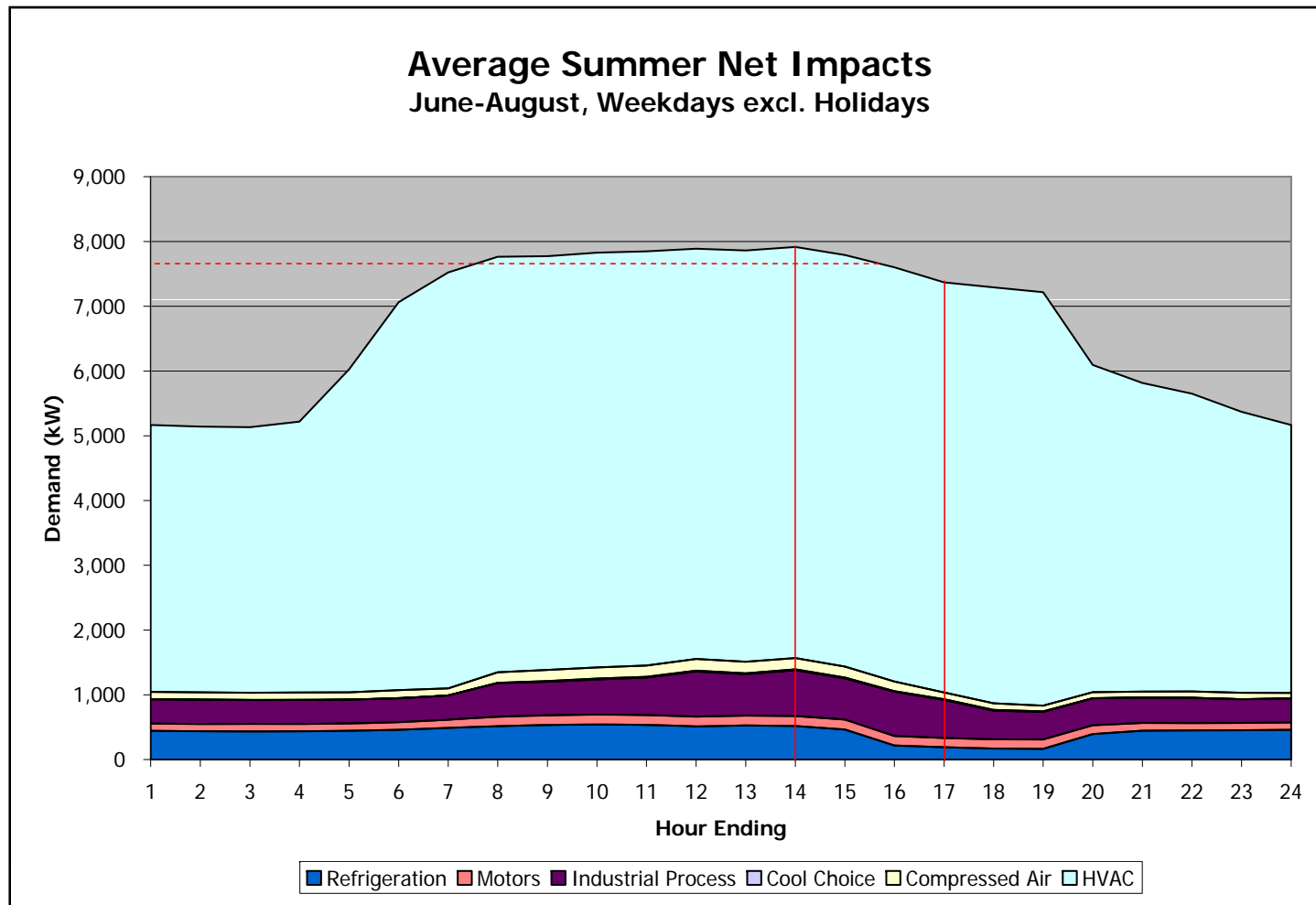
- Profile of 8,760 *savings* values
- Weighted evaluation profiles (n=99)
- Both schedule & temperature dependence
- Range of impacts 4,375 to 8,998 kW

# Deriving Summer Coincidence

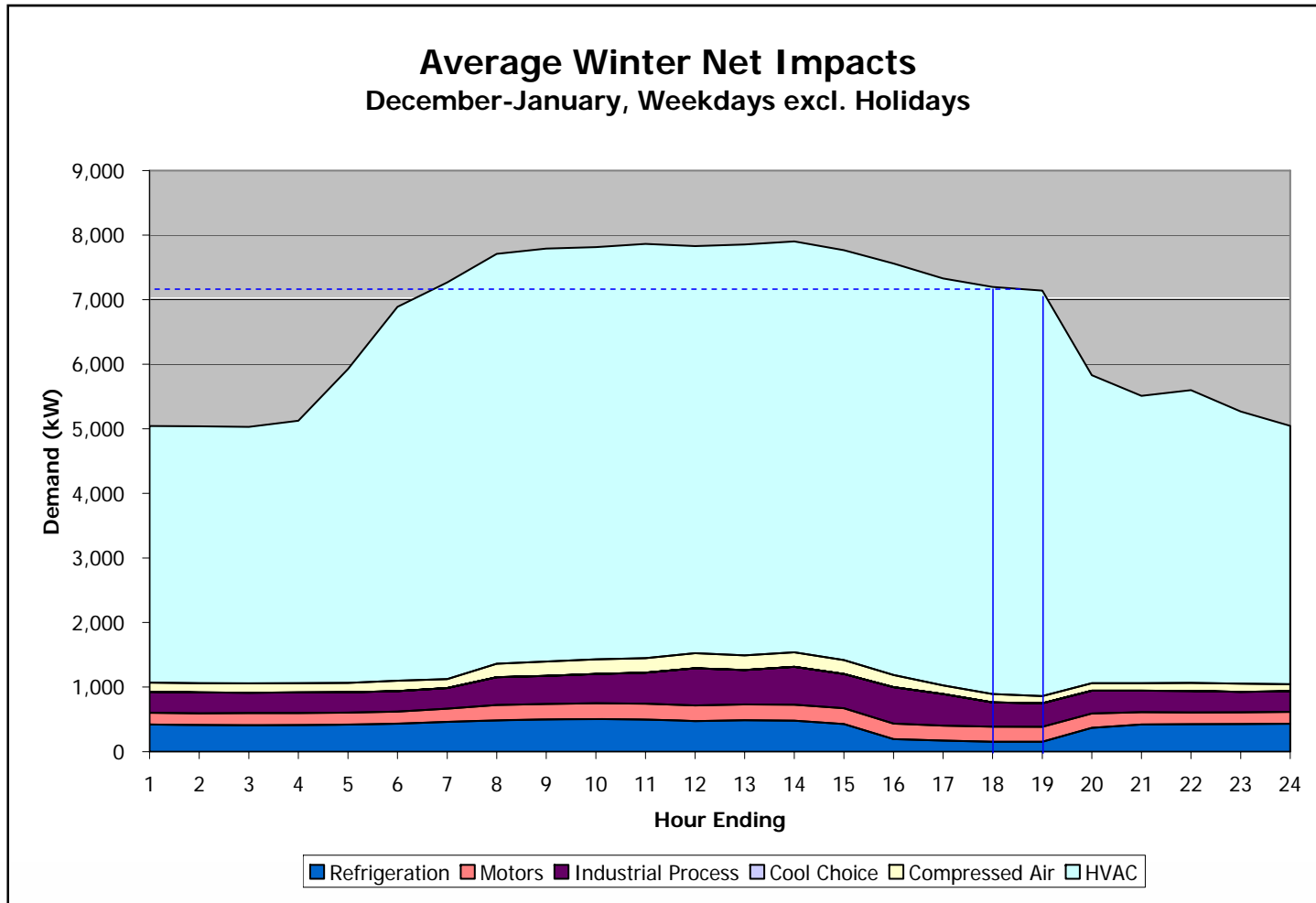


1. Restrict data to June thru August (between **green** lines)
2. Limit data to weekdays (filter out **gray** weekends and holidays)
3. Then average by hour to yield...

# Summer Coincidence



# Winter Coincidence

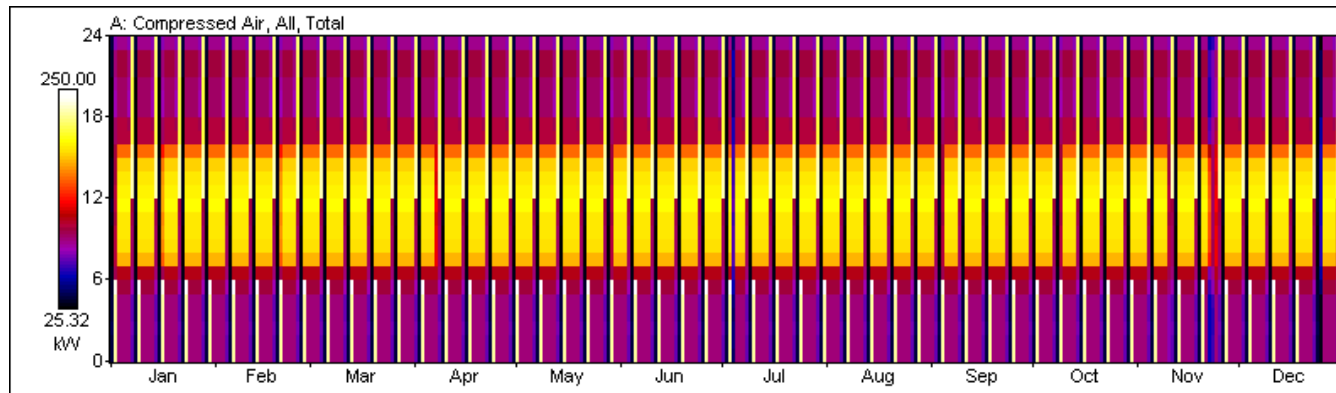




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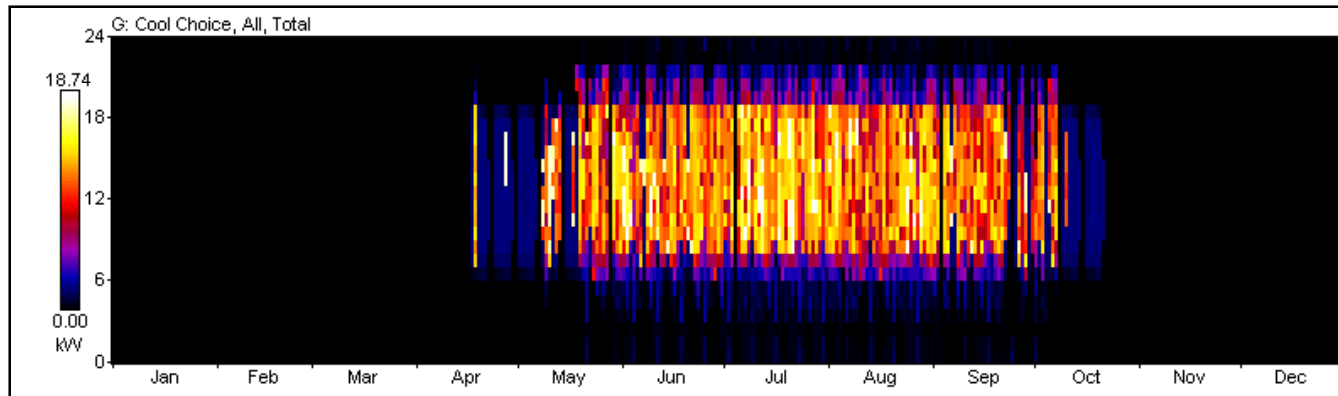
# Impact Profiles by End Use

# Compressed Air



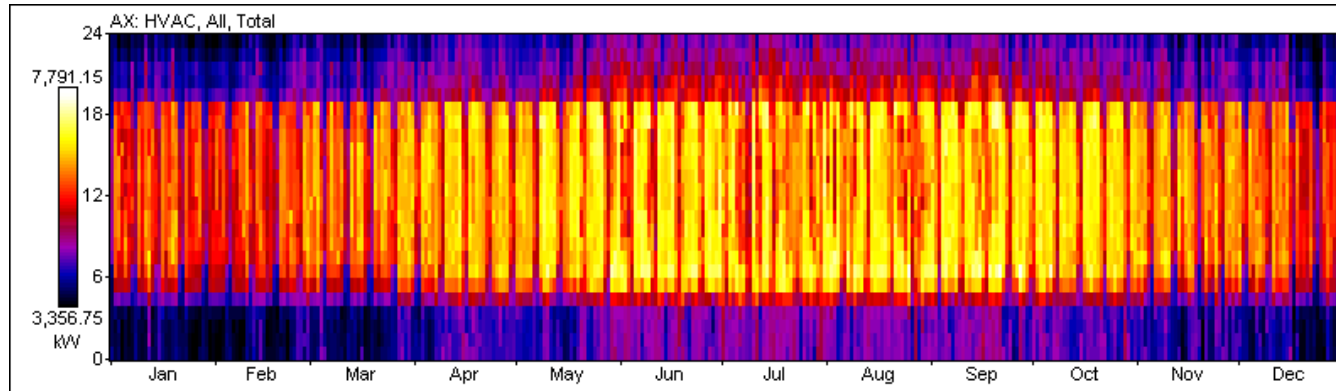
- Entirely schedule dependent
- No perceivable seasonal/temperature influence
- Small relative impact: 250 kW max

# Cool Choice



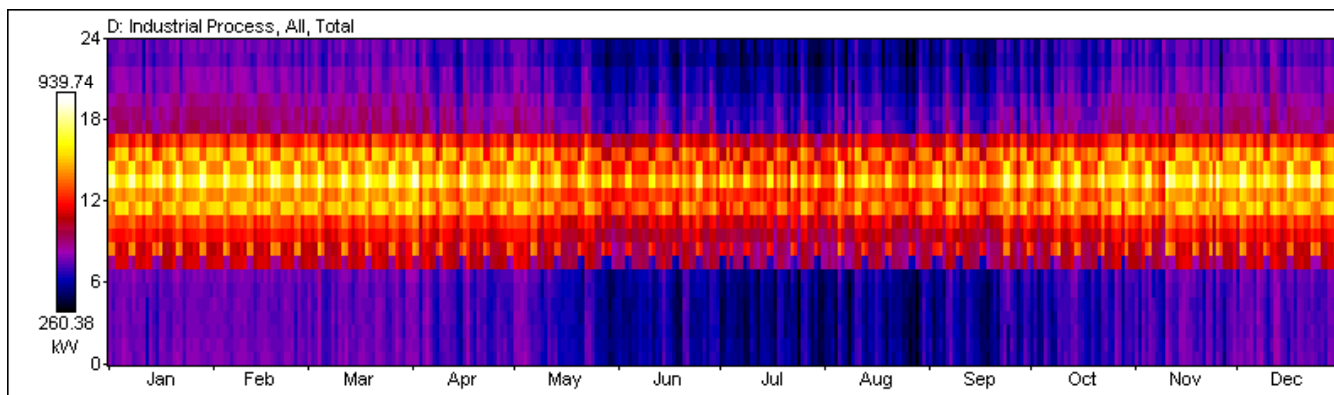
- Obvious seasonal impact profile
- On close examination, both schedule and temperature dependence is evident
- Extremely small impact: 19 kW max

# HVAC



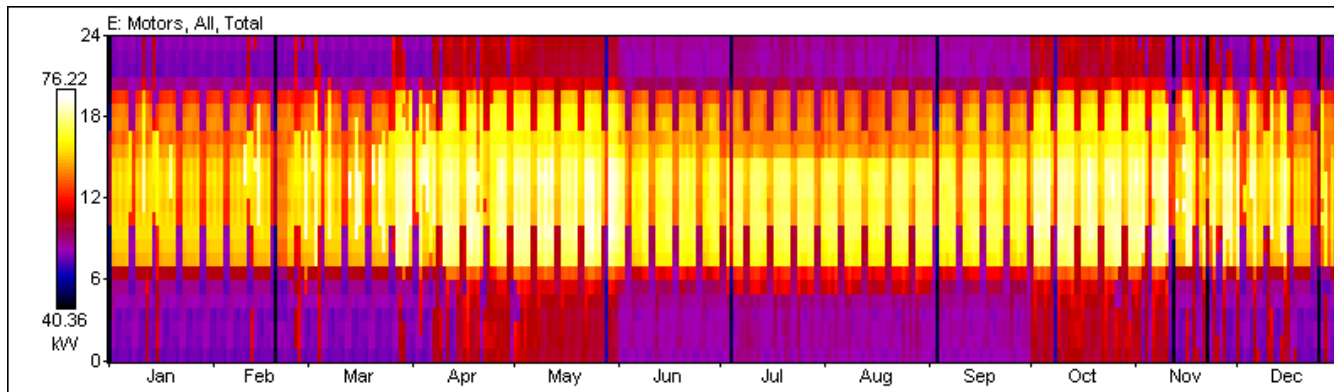
- Dominant end use; nearly identical to total non-lighting profile
- Both schedule and temperature
- Significant impact: 7,791 kW max

# Industrial Process



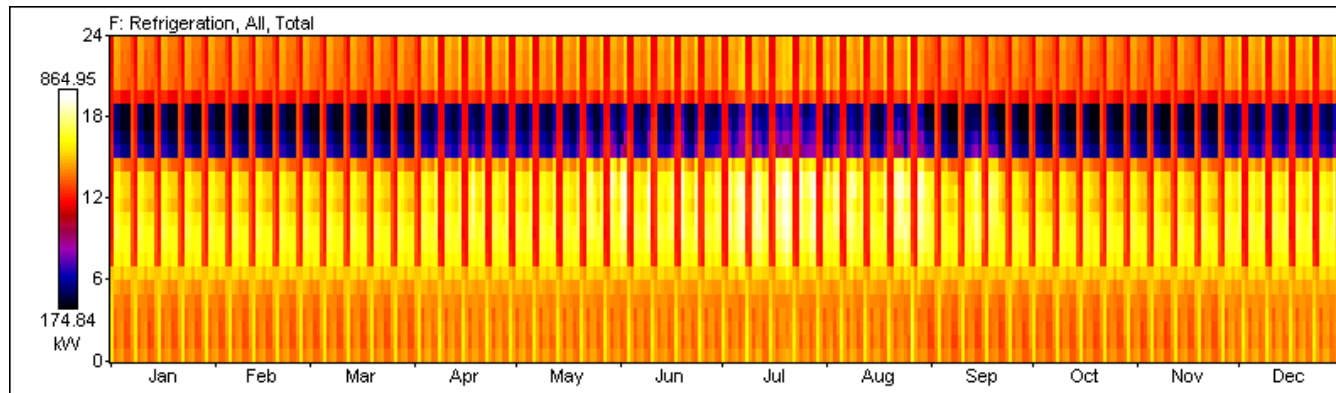
- Mostly schedule dependent
- Slight *inverse* temperature dependence?
- About 8% of total non-lighting impact

# Motors



- Mostly schedule-dependent
- Good base 'round the clock' savings
- Interesting 'shoulder' month increase
- Small part of overall program

# Refrigeration

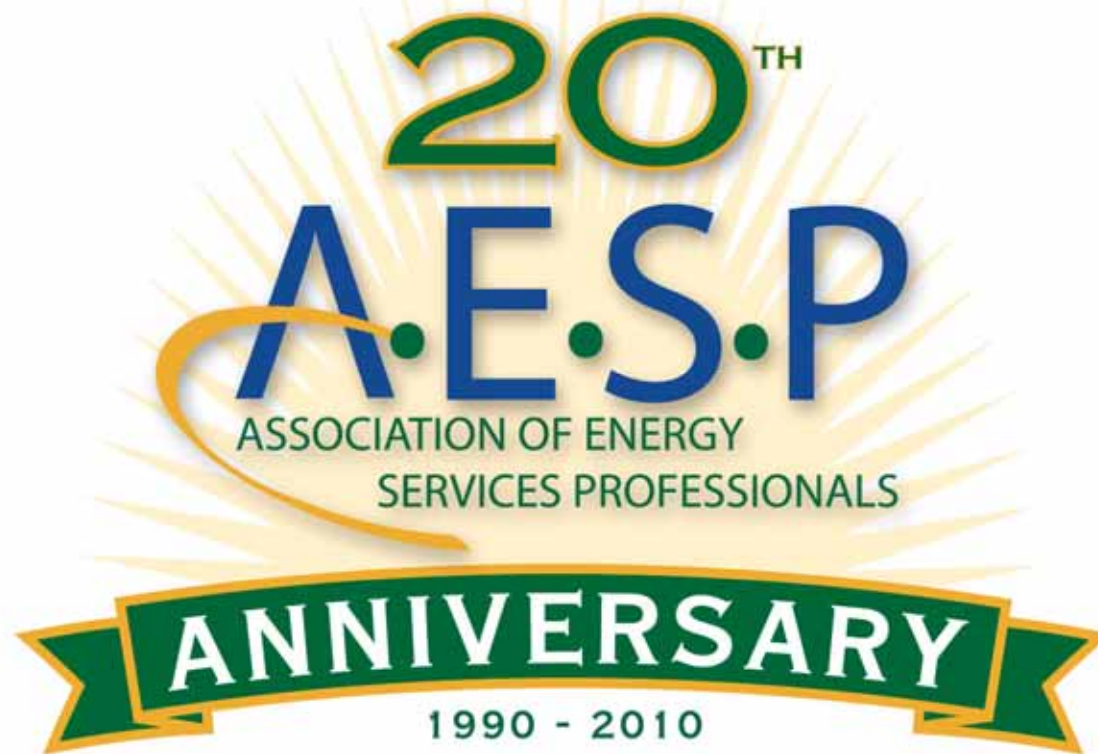


- Only 3 refrigeration projects
- Dominated by one very large process
- Policy to make ice during off-peak hours!

# Conclusions

- 8,760 Analyses are the Future
  - Hourly rigor improves validity of engineering
  - Eliminates many assumptions & shortcuts
  - Reveals schedule & temperature dependence
  - Provides tremendous dynamic insight
  - Well within spreadsheet capabilities
  - Yields any results one can possibly conceive
- Do It Right the First Time!





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