Headline.
Refrigeration a Hot Topic for Retailers

Vorspann (Teaser).
Food retail operates with extremely narrow margins, making cost-benefit ratios and controlling permanent management topics in the industry. A new study by Dr. Steinmaszl Management Consulting shows that the area of chillers/freezers – and energy-saving potentials of plug-in refrigeration units in particular – can have profound effects on business success. The study reveals that food retail stores are frequently home to veritable money eaters.

Text.
"A remarkable number of managers have no clear understanding of how energy flows throughout their store(s). Their estimates for individual refrigeration appliances deviate by factors of up to 25 from the actual power costs. These misjudgments can make profitable operation difficult or even impossible." This statement by Dr. Jürgen Steinmaszl was and is all the motivation and purpose needed to provide food retailers with an overview of the savings opportunities offered by using optimized refrigeration systems. The baseline study "Plug-In Refrigeration Appliances in Food Retail. Inventory – Power Requirements – Savings Potentials" illustrates that "a change of perspective in food retail with regard to energy controlling seems urgently necessary."

Over the past years, Dr. Steinmaszl Management Consulting has measured and analyzed load curves and power requirements for various plug-in refrigeration appliances. Reactions to the presentation of the results of their measurements ranged "from incredulous astonishment to dismay and infuriation. Nearly all food retailers that we questioned were unable to correctly estimate the power costs of their plug-in refrigeration appliances and were surprised by their sometimes exorbitantly high power consumption. There were even some cases where clients interrupted our debriefing momentarily in order to switch off one or more particularly energy-guzzling appliances," Dr. Steinmaszl sums up his experiences.

Due to their many advantages, plug-in chillers and freezers are an integral element of food retail. Small and medium-sized stores and supermarkets operate an average of 7 such appliances. For larger retail stores, this number goes up to between 8 and 18 units depending on the size of the store. Discount supermarkets operate an average of 22 units, predominantly freezer chests.

Zwischenzitat (Interjected quote):
„Potential savings due to energy-optimized plug-in refrigeration appliances in the food retail industry in Germany amount to around 400 million kWh per year."

The results unambiguously prove that blanket statements like "plug-in refrigeration devices have higher power requirements than integrated solutions", "due to their heat generation, plug-in appliances are to be blamed for higher air conditioning requirements in stores" or "plug-in chillers and freezers have no automatic defrosting capabilities" are not tenable and "flat-out wrong even though they are regularly repeated even in technical literature," Dr. Steinmaszl states and continues: "It is in fact the case that energy-optimized, highly efficient plug-in refrigeration appliances boast lower – or at worst similar – power requirements compared with newest-generation integrated systems. We have found that energy-efficient freezer chests – even when used in large numbers – are only responsible for 12 % of heat generation in stores at most, and that operation of energy-optimized plug-in appliances does not necessitate the installation of in-store air conditioning."

The study clearly shows that plug-in refrigeration appliances with automatic defrosting are no longer the exception but in fact the norm. The power requirements of plug-in chillers and freezers depend on a multitude of factors, some of which the producers of these appliances have no influence on. This includes environmental conditions at the store location, proper maintenance, rate of use, age of the appliance and temperature settings – to name only a few. These factors can quickly add up to double the baseline power requirements.

Zwischenzitat (Interjected quote):
"If only 25% of the abovementioned 400 million kWh were achieved, the reduction in power consumption of 100 million kWh in Germany would equate to 60,000 metric tons of CO_2 per year."

One surprising result of the measurements was the large spread of power requirements within individual groups of appliances. For example, the costs per cubic meter of chilled air volume per year can differ as much as shown below:

Plus Refrigeration (CH = Chilling)
• Shelves, open: 2,785 EUR/m^3 to 3,567 EUR/m^3
• Shelves, closed: 613 EUR/m^3 to 1,385 EUR/m^3
• Chests, open: 1,284 EUR/m^3 to 6,303 EUR/m^3
• Chests, closed: 212 EUR/m^3 to 357 EUR/m^3

Minus Refrigeration (FR = Freezing)
• Chests, open w/ electr. defrosting: measurement example: 2,690 EUR/m^3
• Chests, closed w/o electr. defrosting: 292 EUR/m^3 to 2,178 EUR/m^3
• Chests, closed w/ electr. defrosting: 336 EUR/m^3 to 3,554 EUR/m^3

When examining the costs of plug-in refrigeration appliances over their entire operational lifetime in the store, it becomes obvious that keeping an eye on energy efficiency is absolutely worth the trouble, for comparatively small differences can add up to gigantic amounts over time. For example, while one beverage chiller with a nominal volume of ~900 liters might cost around 3,100 EUR over 10 years, a different model with a nominal volume 360 liters smaller could cost as much as 11,500 EUR over the same period. The decision to add another beverage cooler is often made in a split second, but may end up costing the store owner 8,400 EUR more than

necessary. This sort of misjudgment will result in a drain on financial capacity accumulating over time with the potential to seriously affect the competitiveness of a store.

The issue is much the same with freezer chests. A chest with ~645 liters of nominal volume might cost 5,700 EUR over 10 years, while a different model with a volume of 395 liters (an almost 40 % smaller nominal volume) could cost 21,000 EUR over the same period, resulting in additional costs of 15,000 EUR. This is obviously an excellent reason to compare the pros and cons of various freezer models before buying.

The goal of Dr. Jürgen Steinmaszl's study is first and foremost „to eliminate the apparent information deficit in the food retail industry. The intent is to enable the reader to:
• more precisely estimate the power requirements of individual refrigeration appliances,
• gain an overview of the bandwidth of power requirements for plug-in refrigeration appliances,
• purposefully reduce the power requirements of his refrigeration appliances,
• make realistic cost estimates for his calculations,
• attach greater importance to power requirement values during buying decisions and
• generally focus more closely on the power requirements of plug-in refrigeration appliances in order to reduce his overall power requirements and costs."

Zwischenzitat (Interjected quote):
„Assuming an average power consumption of 1,800 kWh per person per year, a reduction of 100 million kWh equates to the power requirements of 55,000 people. This is comparable to the entire population of Ulm or Schweinfurt."

Dr. Jürgen Steinmaszl and his team conduct several hundred energy consultancies per year; with offices in Garching an der Alz and Taching am See, their company is among the largest energy consultancy businesses in Germany. Steinmaszl, whose roots are in business management consulting, emphasizes "the connection between ecology and economy. We are particularly interested in letting our customers benefit holistically from our diverse professional competence and enabling them to implement the results optimally. Our greatest pleasure is to link energy saving potentials and cost-efficiency within our customers' businesses."

The study can be downloaded free of charge from the company's website at http://www.steinmaszl.com under the category "Publications".

(ca. 8.000 Anschläge inkl. Leerzeichen / ~ 8,000 characters incl. spaces)