

How to develop an effective energy management plan according to business type

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Developers for AVReporter Energy Management Software

Content

- About Energy Management in general
- Energy Management Planning Process
- Energy Consumption Trends by Business Type
- Case Study on a small dairy- Food processing factory
 - Simple, low-cost instant energy savers
 - Investing in energy-efficient equipment and infrastructure
 - Project Background
 - Demands of the Customer
 - Solutions
 - Structure of the System
 - Achievements
- Do not forget

Reasons



- Be competitive (*calculating profit margins, pricing strategy, reducing costs*)
- Utilize Energy supplies efficiently
- Mitigate climate change
- Enhance corporate image

Typical end-user problems

- Lack of overview of the energy system and not knowing where energy is consumed
- Energy costs increase and the top level management wants to cut costs
- Benchmarks show that consumption is too high in comparison to comparable sites

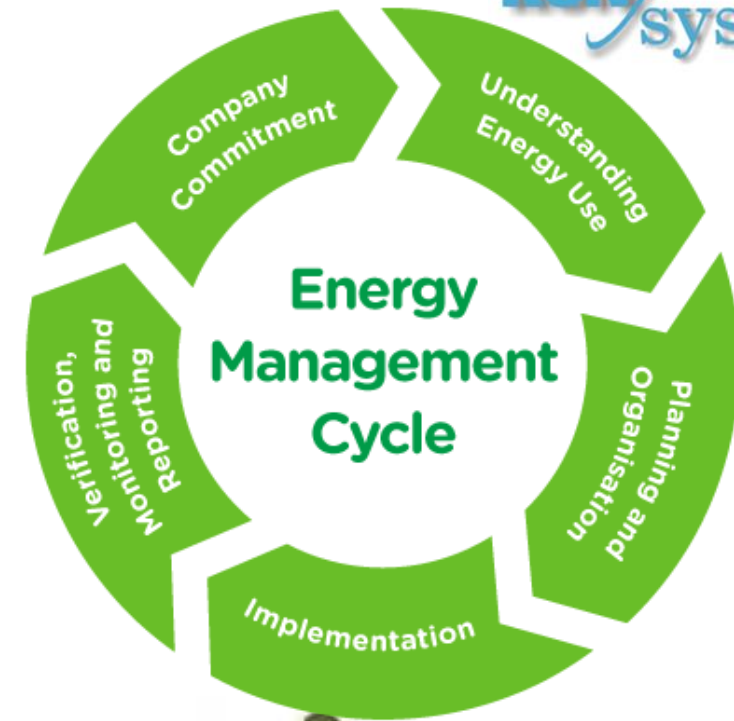


Energy Management Planning Process

1. Appoint an energy manager or energy team or assign responsibilities
2. Define the goals of the analysis
3. Define the system boundaries
4. Collect data
5. Develop an Input-Output analysis and a flow chart
6. Set up the basis for the Energy Information System
7. Prepare a register of legislation
8. Develop and Energy Management Manual
9. Develop a communication strategy
10. Carry out an Internal Audit
11. Implement a review by top management

ACTION PLAN

- Measure energy usage
- Review, compare, technology trends
- Analysis of findings, timing
- Fix the basics then Automate
- Monitor and control



The Type of Businesses- Typical demands

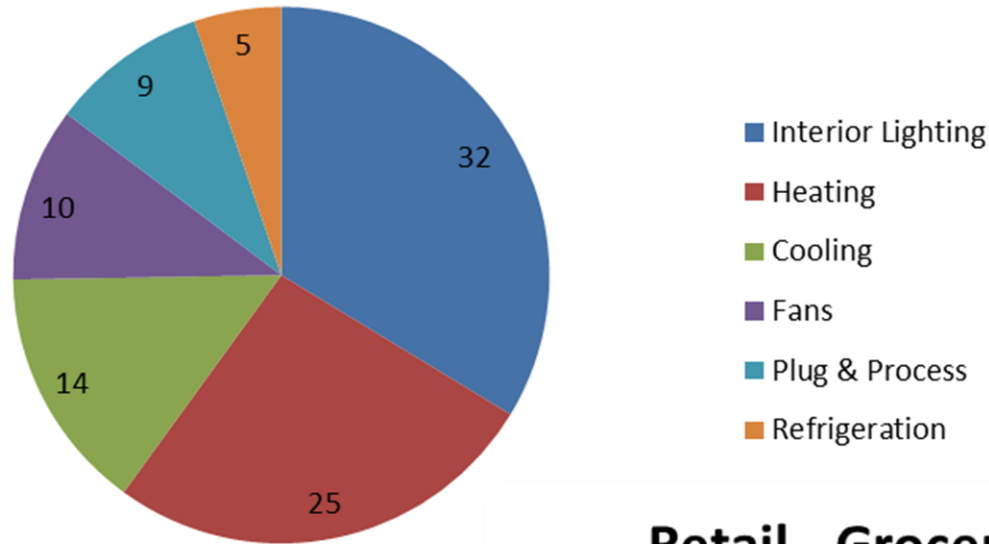
Industrial production plants

- [Manufacturing](#)
- [Food Processing](#)
- [Agriculture](#)
- [Water and Wastewater](#)

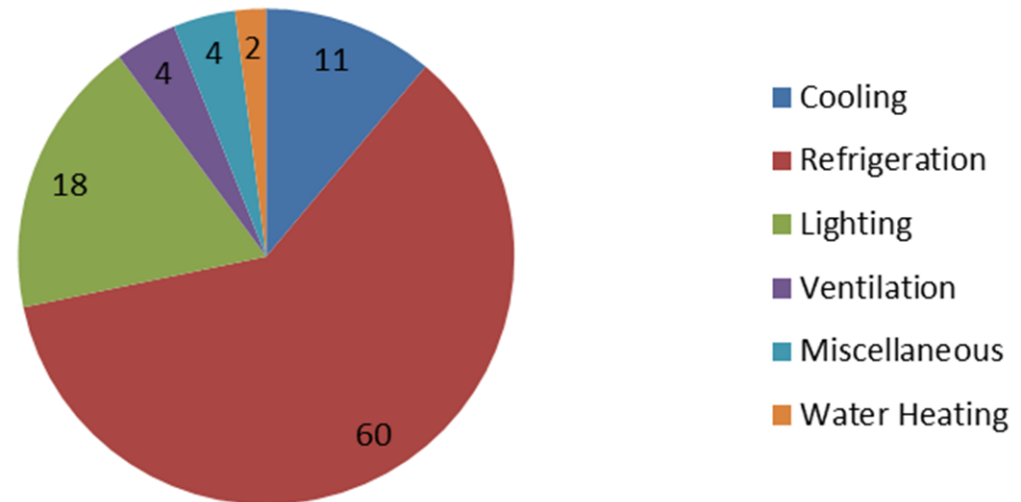
Building Complexes

- [Buildings](#) (office complexes, shopping centers ...etc)
- [Restaurants](#)
- [Lodging](#)
- [Healthcare](#)
- [Schools](#)
- [Government](#)
- [Warehousing](#)

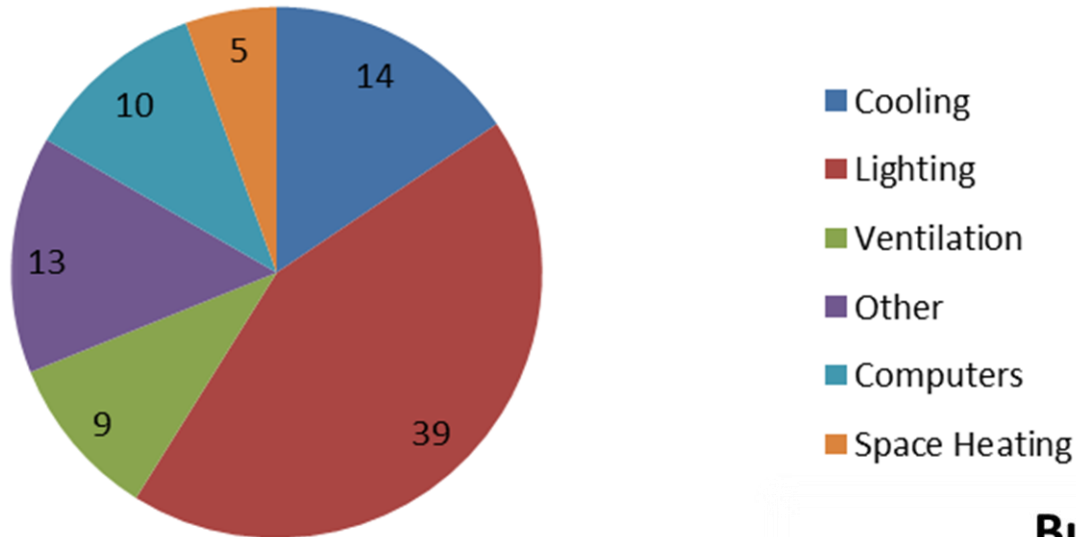
Retail - Non-Food Stores



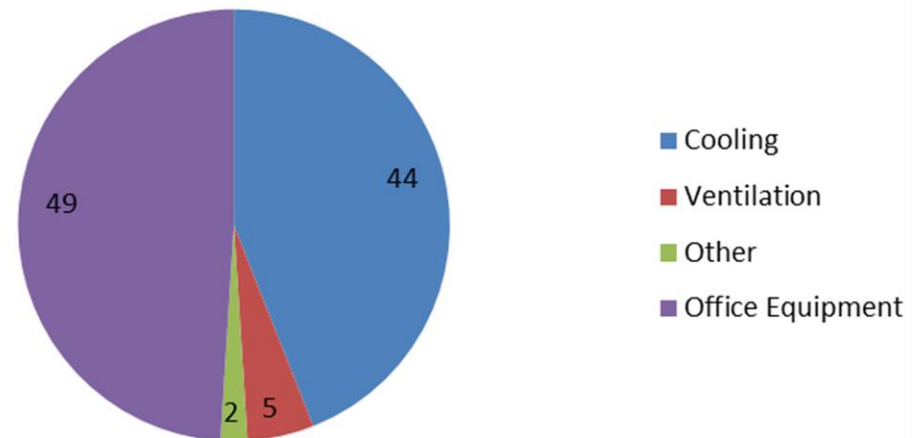
Retail - Grocery & Convenience Stores



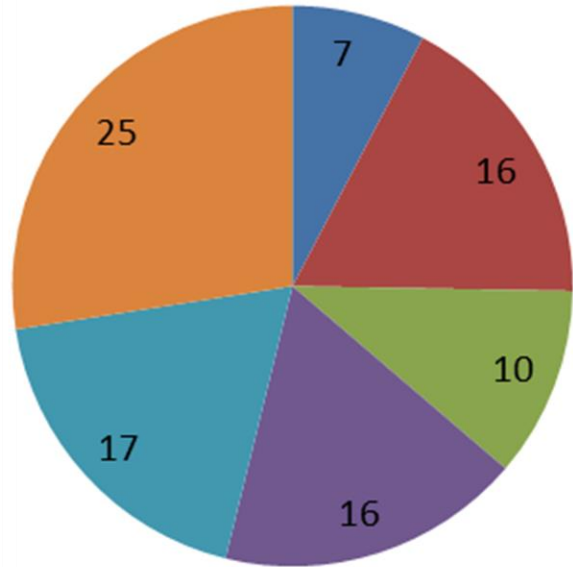
Buildings - Offices



Buildings - Data Centers

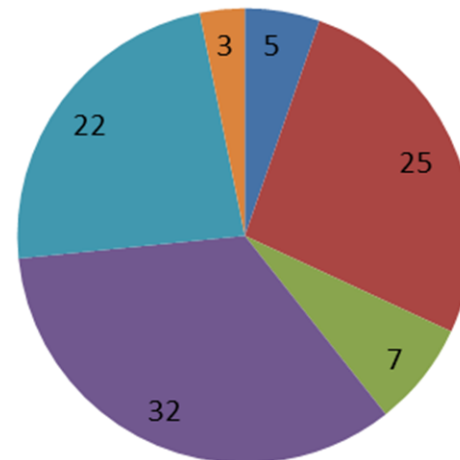


Restaurants



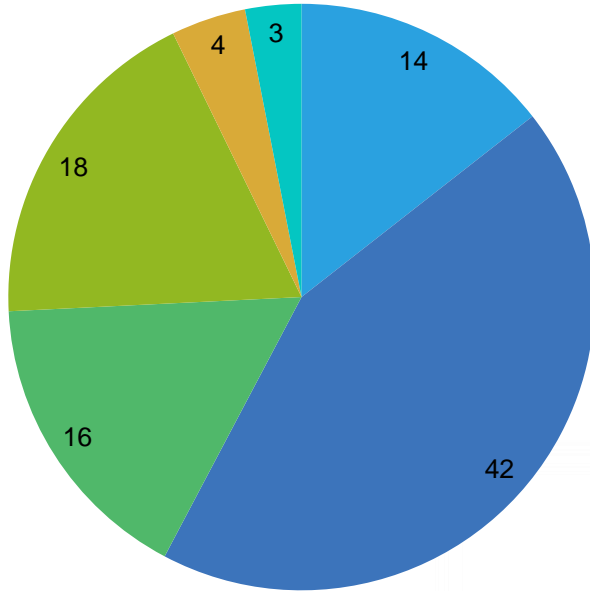
- Cooling
- Refrigeration
- Lighting
- Water Heating
- Space Heating
- Equipment

Lodging



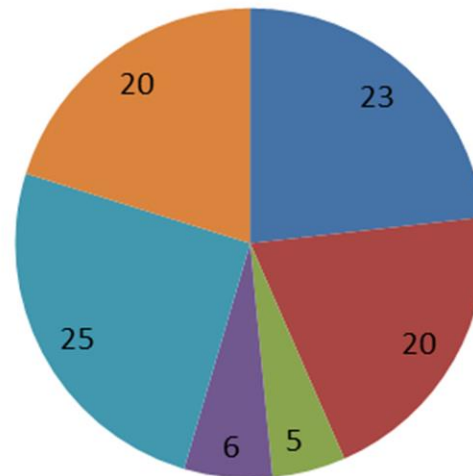
- Cooling
- Lighting
- Miscellaneous
- Water Heating
- Space Heating
- Cooking

Healthcare



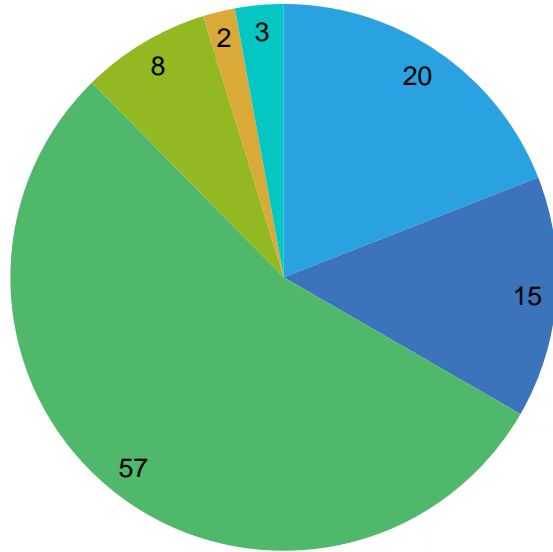
- Cooling
- Lighting
- Ventilation
- Other
- Computers
- Space Heating

Government



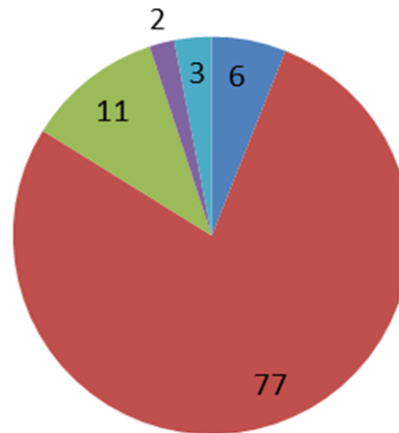
- Cooling
- Lighting
- Ventilation
- Miscellaneous
- Space Heating
- Office Equipment

Warehousing - Non-Refrigerated Warehouses



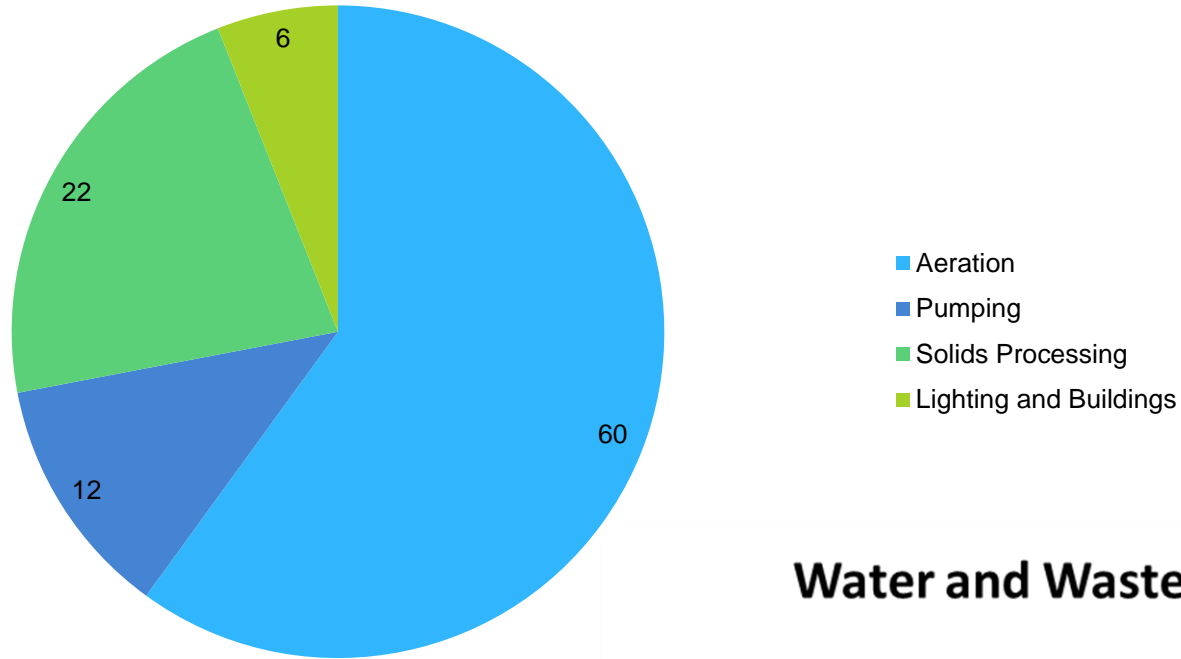
- Cooling
- Refrigeration
- Lighting
- Ventilation
- Water Heating
- Office Equipment

Warehousing - Refrigerated Warehouses

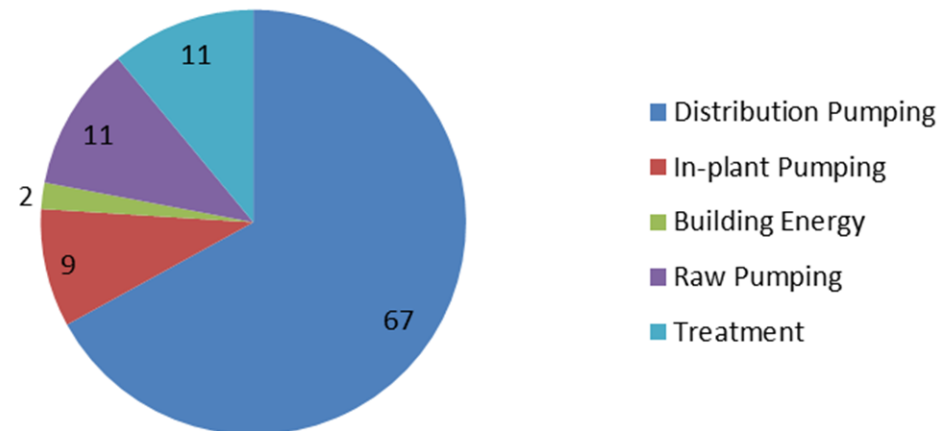


- Cooling
- Refrigeration
- Lighting
- Ventilation
- Other

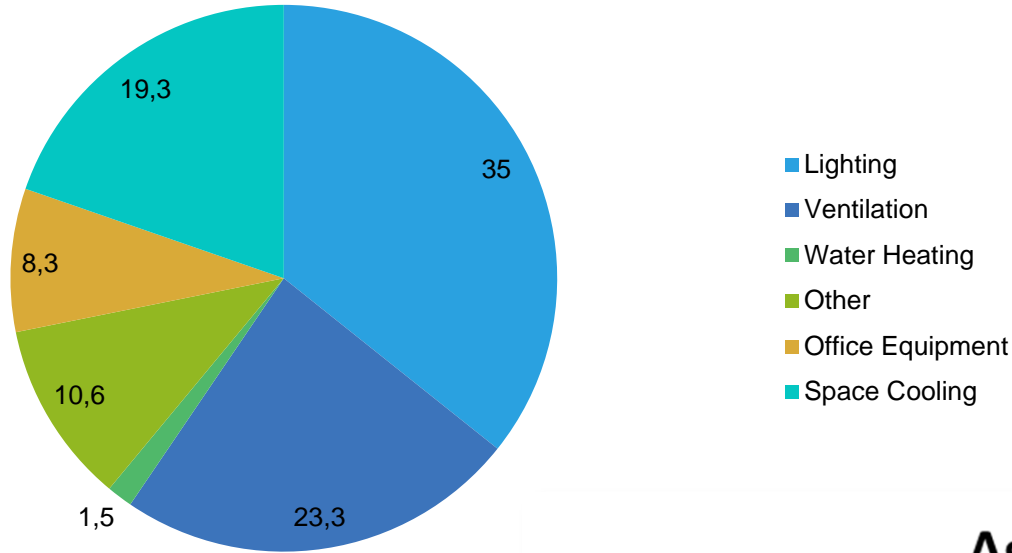
Water and Wastewater - Wastewater



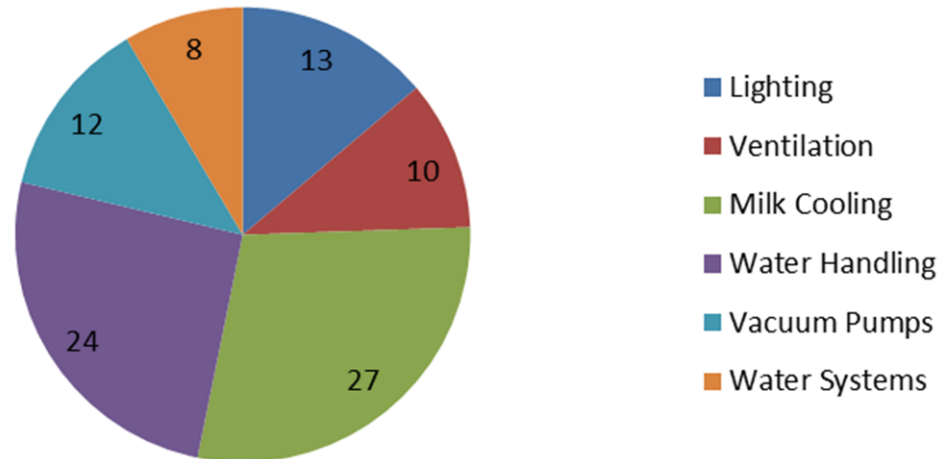
Water and Wastewater - Water



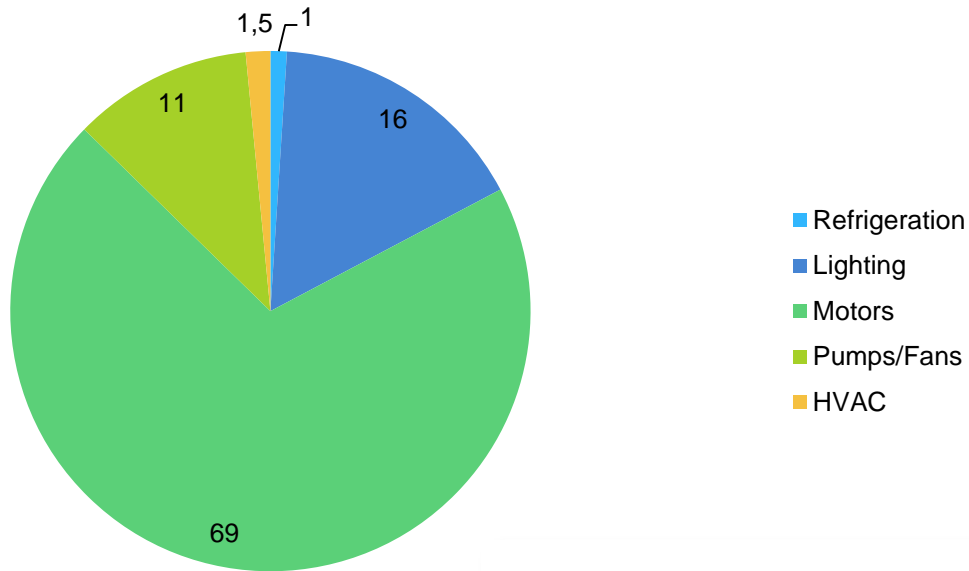
Schools - Colleges & Universities



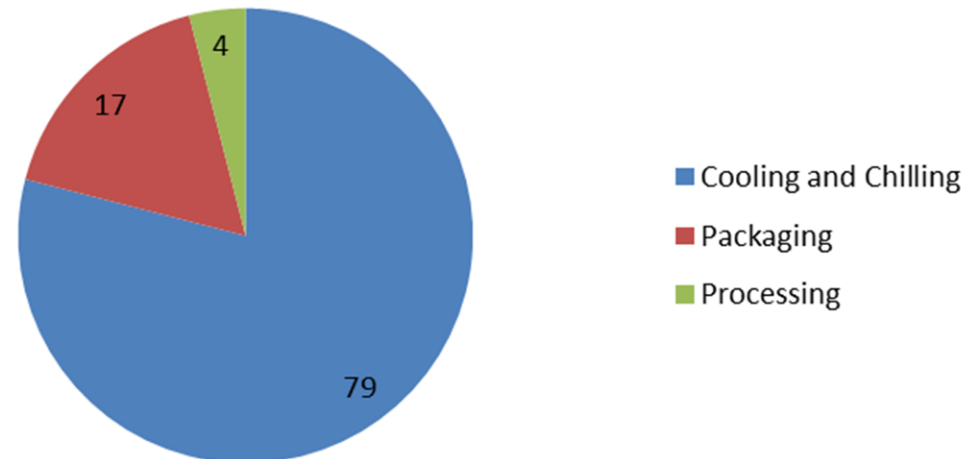
Agriculture



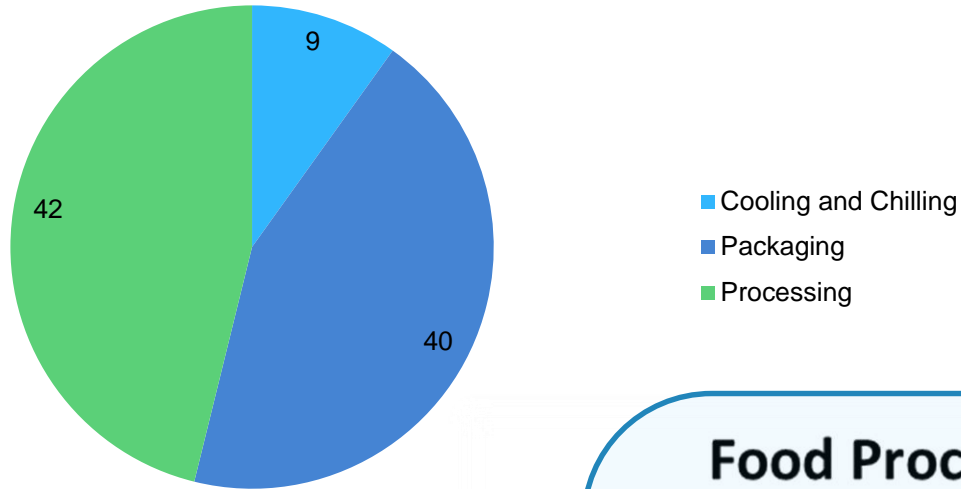
Manufacturing



Food Processing - Meat Processing

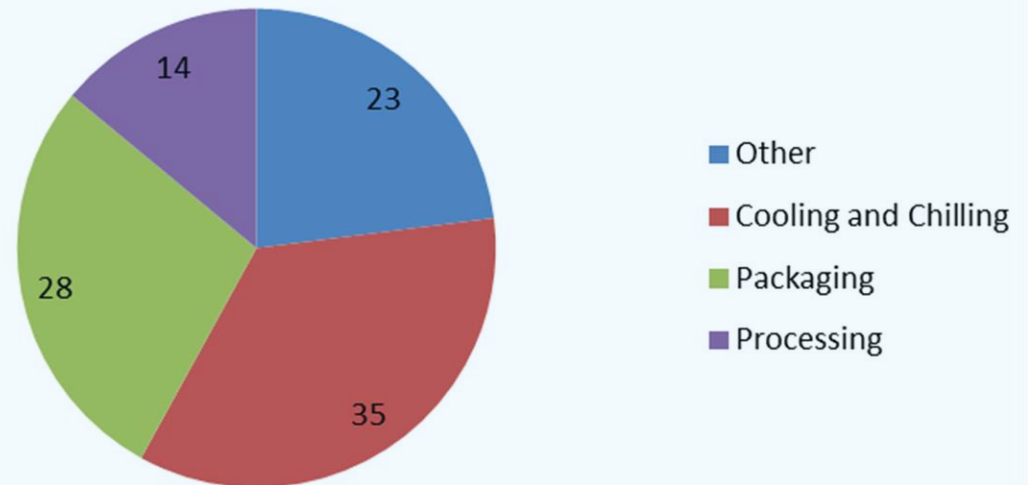


Food Processing - Cooked-Fruit Canning



- Cooling and Chilling
- Packaging
- Processing

Food Processing - Fluid Milk



- Other
- Cooling and Chilling
- Packaging
- Processing

An SME Case Study on a small dairy manufacturing company

- Budget will dictate
- Energy Audit: an analysis of the current energy use to identify savings opportunities, customized to the type of business with the aim to reduce energy use and lower operating costs.
- Choose strategy:
 - a) Simple, low-cost instant energy savers (temp.)
 - b) Invest in new, energy-efficient equipment, like compressed air systems, refrigeration systems, variable speed drives, infrastructure improvements, like complex energy management system (long-term)

Food Processing Business Electricity Use¹

Meat Processing

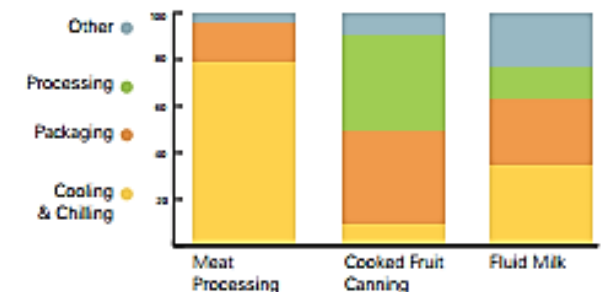
- Cooling & Chilling 79%
- Packaging 17%
- Other 4%

Cooked-Fruit Canning

- Processing 42%
- Packaging 40%
- Cooling & Chilling 9%
- Other 9%

Fluid Milk

- Cooling & Chilling 35%
- Packaging 28%
- Processing 14%
- Other 23%



¹ ESource: Food Products and Beverages, August 2003 (average industry numbers)

a., Low-cost energy savers

□ Time It Right

Shift use of non-essential electrical equipment to before or after peak hours

- Charge batteries and battery-operated equipment before or after peak hours
- Reduce or shift production tasks
- Schedule batch or continuous process around planned peak hours

□ Keep The Cool

Refrigeration is one of the biggest energy guzzlers in most food processing.

- Pre-cool, then reduce or shift refrigeration load
- Install refrigeration curtains and auto door closers on refrigeration units
- Delay electric resistant defrost controls
- Insulate bare suction lines
- Benefit from lower unplanned repair costs, cost-covering incentives, lower energy bills,
- improved air quality and system reliability with heating-ventilation-air conditioning (HVAC) optimization

❑ Power Down

Ensure equipments, motors and facility aren't using energy unnecessarily

- Reduce air compressors and processing loads using pre-programmed load shed strategies
- Adjust variable-speed drive controls for fans, blowers, and pumps
- Install a variable frequency drive (VFD) to control the frequency of the electrical power supplied to your heat pump or fan
- Turn off vertical lifts, conveyor belts and non-essential process equipment

❑ Flip the Switch

for energy-efficient LEDs

- Replace warehouse and other high-bay lighting with high intensity discharge (HID) lamps or high-bay fluorescent fixtures
- Install occupancy sensors in general usage areas so that lights turn on only when area is occupied and automatically turn off when it isn't
- Install dimmable ballasts to control the current passing through fluorescent lamps. Lower light levels use less energy, and dimming enhances employee comfort
- Replace lighting fixtures with metal-halide lamps, which have high about twice the efficiency of mercury vapor lights and 3 to 5 times that of incandescent lights

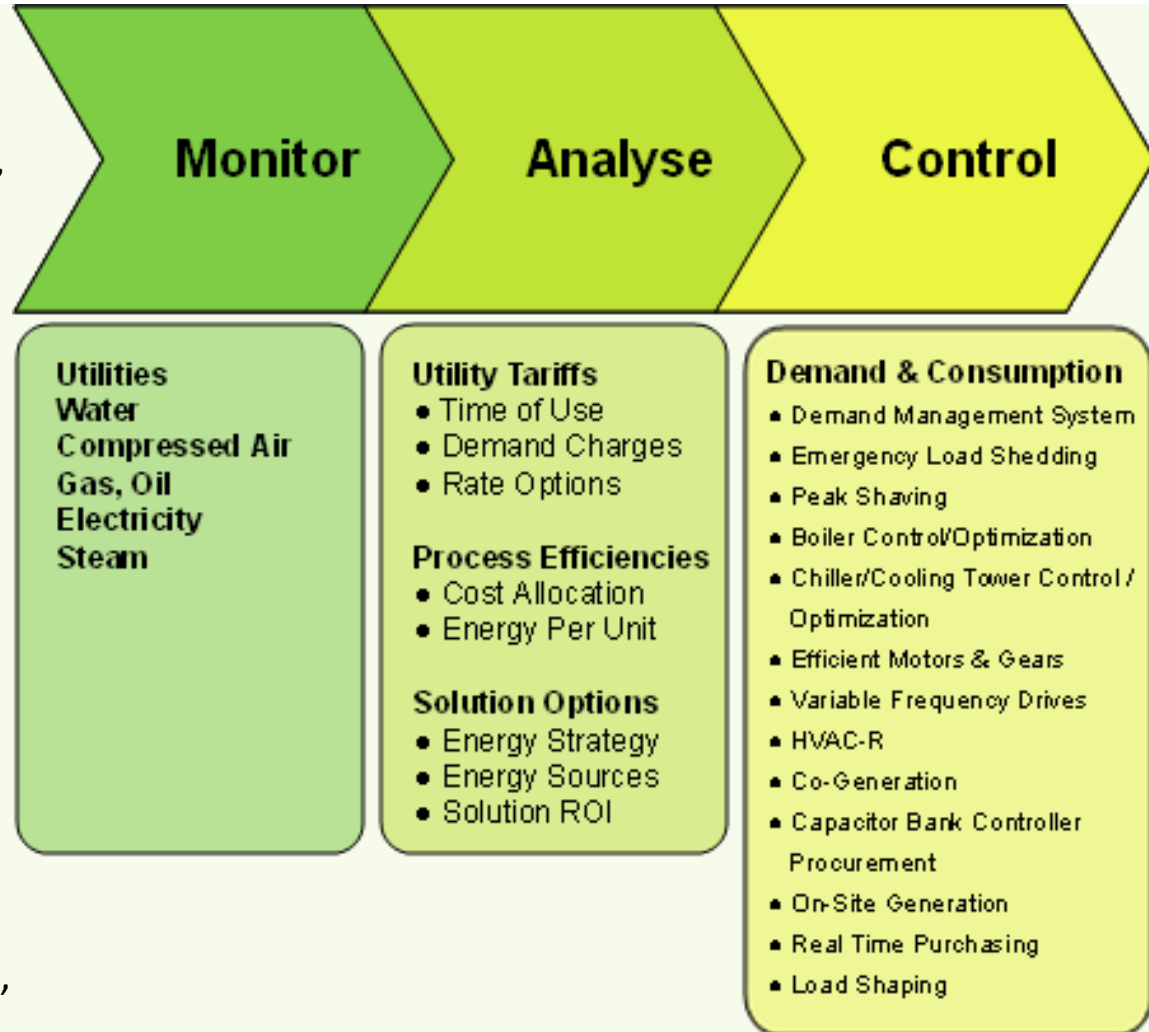
b., Power Tools for Long-Term Savings

Implementing an Energy Management metering and monitoring system for an accurate and continuous decision making process

Energy management data is derived, recorded and stored by a system of hardware and software components, displaying vital data ready for analytic investigation.

The same data will relate to a number of different areas of the business and intended as the basis from which energy management decisions can be made:

- Energy consumptions and costs
- Production levels
- Power quality
- Purchasing energy saving technology
- Benchmarking (efficiency, price calculations etc..)
- Creating calculations, analytics and forecast for the regular Energy Report, EMS documentation



Background

The „Örségitej” dairy processing the milk using sensitive technologies. Processes 15 000 liters of milk per week, employing 14 people. The technologies use large quantity of water, vapor and gas. The manufacturing process requires steady temperature and reliable and continuous energy supply. The building was planned by architects to use integrated green technology the most efficient way.

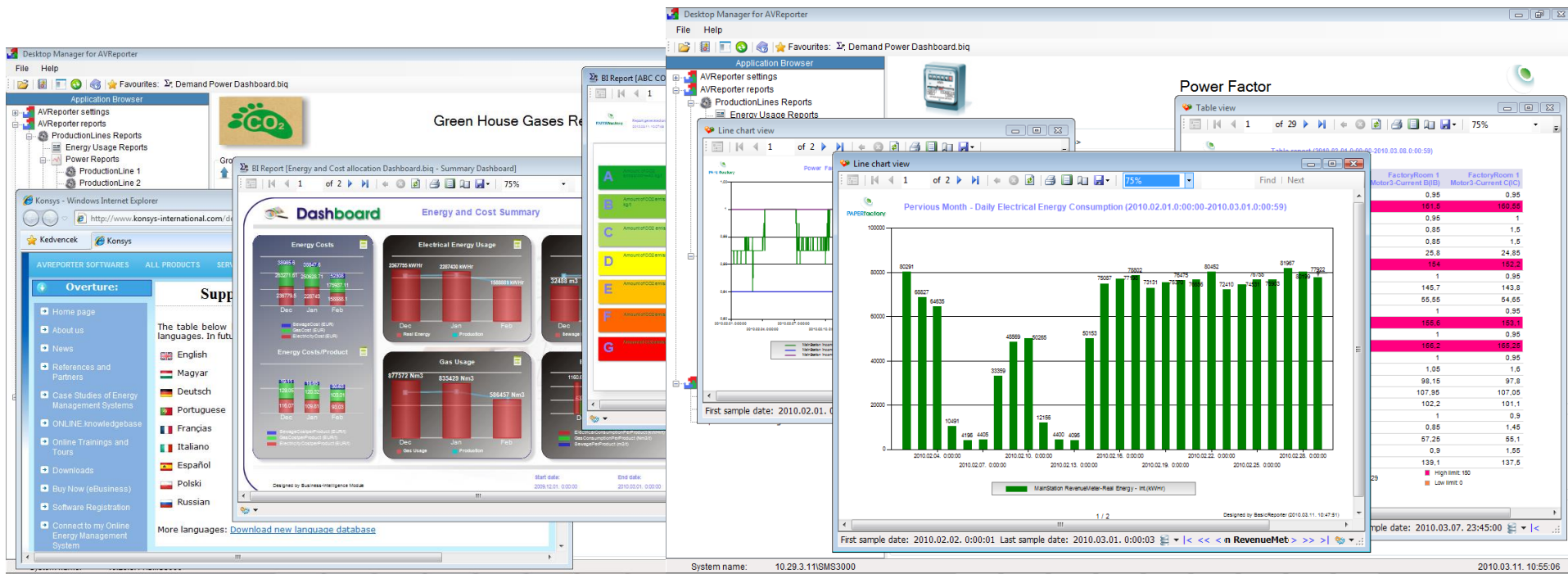


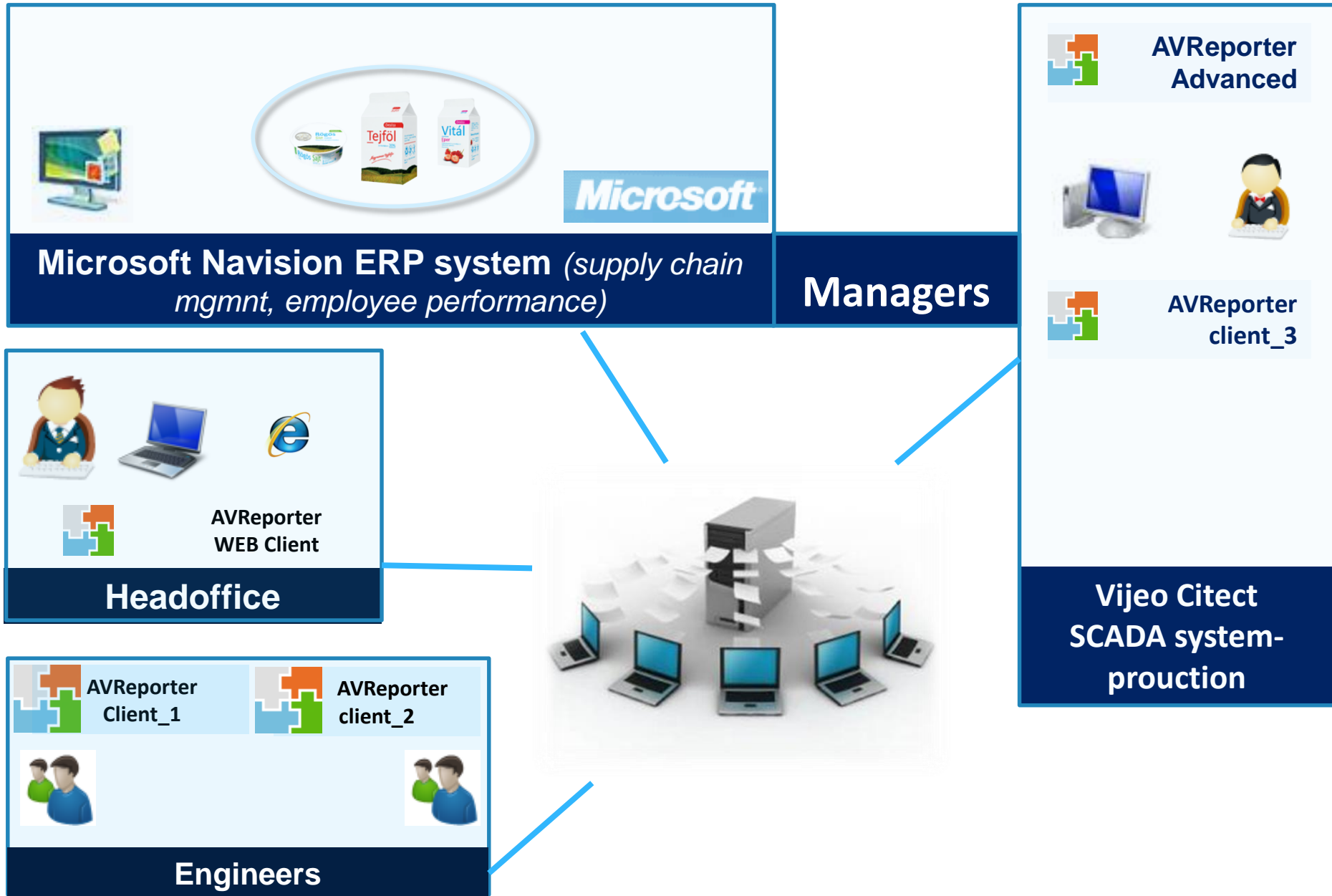
Demand of customer

The goal was to optimize the energy consumption throughout the manufacturing process (storage cooling in this case was managed by the use of geo-cellar) and the heating and lighting system of the building, using integrated green technologies so the requirements were:

- Real time measurement of utilities (water, gas, electricity, waste water) used in production
- Store and analyze the collected data (energy usage forecasting from production data)
- Analyze the quality of the supplied energy
- Automatic temperature control in the building based on measured data
- Lighting control based on the presence of the crew and the current visibility conditions
- Solar heating system control designed to supplement the dairy's energy need
- Controlling recycling of waste heat system from technology
- Preparation of energy cost and internal cost allocation reports (calculation of energy cost per production unit)
- Customized report and dashboard creation (company logo, currency, individual layout, local language support)
- Unlimited possibilities of report preparation functions: KPI reports, Green House Gases reports, CO2 emission calculations, optimization of energy bookings, examination of quality features, efficiency statements of renewable energy source application
- Track and manage GHG emissions
- Connection to 3rd party systems and databases (ERP, SCADA and Stock registry system)

- Energy distribution and placement of electrical measuring devices (*Prisma electrical cabinets, CM power quality meter, PM710 power meters, PM9C power meters*)
- Temperature and lighting control subsystem (*TAC equipment and Twido PLCs, Magelis terminal*)
- Controlling solar heating system and recycling of waste heat system (*Twido PLCs and Magelis terminals, TAC sensors and heat meters*)
- Gas, water and sewage meters
- AVReporter Advanced Edition Monitoring and Reporting software





The Achievements of the implemented Energy Management System

- Órségtej Dairy Manufacturing can be called as a model application for automated production facilities.
- The system provides information for continuous operation of the facility
- Optimizes the energy usage efficiently
- Provides the necessary data for maintenance work
- Ensures the continuous production and the quality of the product
- AVReporter Energy Management Software, Microsoft Navision ERP system and Vijeo Citect SCADA and performs analysis on the data efficiently
- AVReporter is capable to break down the used energy per production unit. It helps the management price their product on the market correctly.
- The Energy Management Software also supports renewable energy usage by providing analysis on the share of the used solar energy and the CO2 emission.
- AVReporter is easy to use and the reports and dashboards are available in different languages. It helps communication between the local personnel and the management abroad.

The involvement of HUMANS

- Show energy issues are being taken seriously by management
- Raise awareness amongst staff
- Communicate a good message externally to interested parties



MOTIVATE:

- Ask them to help identify actions that could be taken- offer a reward
- Initiate an energy-awareness raising campaign to promote energy efficiency
- Establish clear and achievable energy reduction targets
- Agree how key responsibilities should be allocated
- Report results simply, clearly and relevantly to staff
- Share the glory – to maintain enthusiasm for energy conservation you must ensure that people get praise and credit for making savings
- Promote energy measures in internal newsletters, websites, staff briefings etc
- Link work energy savings to measures they can take at home

Thank you for your attention.

Should you need any further general or technical information, please get in touch.

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