

How Energy Efficiency Ensures Financial Health for Hospitals

Executive summary

This paper discusses how hospitals can translate energy-efficiency savings into significantly improved financial performance. Traditional cost-saving measures are compared with energy efficiency projects. Various specific energy efficiency solutions are examined, as well as considerations to take into account when choosing an energy management service provider. Examples of hospital energy efficiency projects that have delivered significant results in terms of cost savings and patient-centric improvements are presented.

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Executive summary

Over the last decade, hospitals around the world have faced increasing financial challenges as margins and profitability have decreased. Both private and public healthcare system administrators are challenged with similar budgetary constraints: The recent global recession has led to losses for many for-profit hospitals and has squeezed margins in others. Add to that the staggering statistic that by the year 2050, the world population aged over 60 years will nearly triple from 700 million to 2 billion¹ leading to an increase in the number of potential patients hospitals will need to serve. Yet it is unlikely that governments will take on additional debt or raise taxes significantly to pay for this change.

How will healthcare systems handle this increasing financial pressure? Hospitals must find a way to do more with less. Energy efficiency projects can unlock trapped capital that can improve a hospital's profit margin or be used to fund technological advancements, purchase medical equipment, or improve the patient experience.

This white paper will discuss how hospitals can gain energy efficiencies and translate these savings into significantly improved financial performance. To begin, we will look at trends in healthcare energy usage as well as recent and predicted changes in energy costs. Next, we will compare traditional cost-saving measures to energy efficiency projects, and illustrate how improving energy efficiency can lead to healthy financial performance and improved patient safety. This paper also discusses various specific energy efficiency solutions and considerations to take into account when choosing an energy management service provider. In conclusion, we will look at examples of hospital energy efficiency projects that have delivered significant results in terms of cost savings and patient-centric improvements.

¹ *World Population Aging*, 2009. United Nations, Department of Economic and Social Affairs. New York. 2009.

Energy costs and usage are only going up

In addition to population increases and a struggling world economy, energy costs have increased by approximately 20 percent since 1995 and are expected to continue to increase, by as much as 25 percent over the next five years² (Figures 1 and 2). Energy use in the healthcare market has increased 36 percent since 1995, due to changes in technology and data centre requirements, as well as an increase in patients.

Global warming and the international drive to reduce CO₂ emissions have caused hospital executive staff and facility managers to focus new efforts on reducing hospital energy usage. For the healthcare market, energy efficiency projects are always linked to improving financial performance, either through increased profitability or easing budgetary constraints. However, as the second-highest energy-intensive industry, healthcare also has a significant opportunity to positively impact the environment through sustainable actions and goals, as well as meet new and future energy legislation.

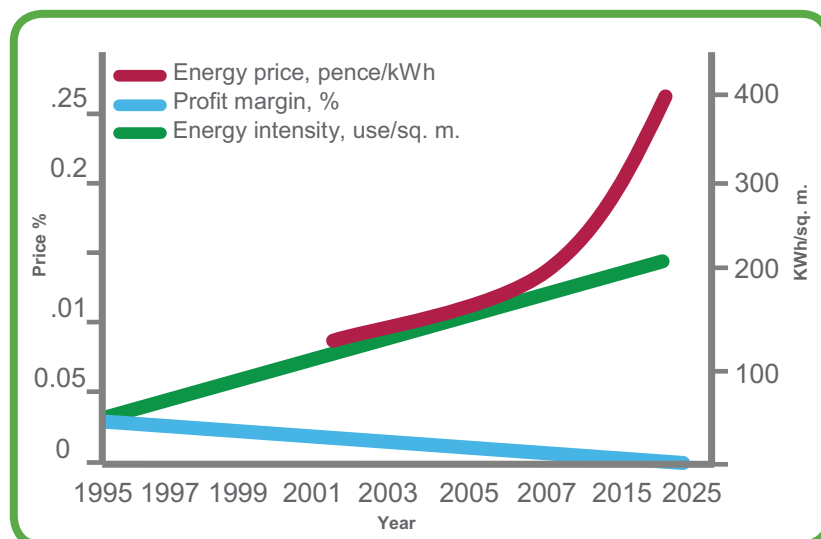


Figure 1. Healthcare Energy Trends (Europe)

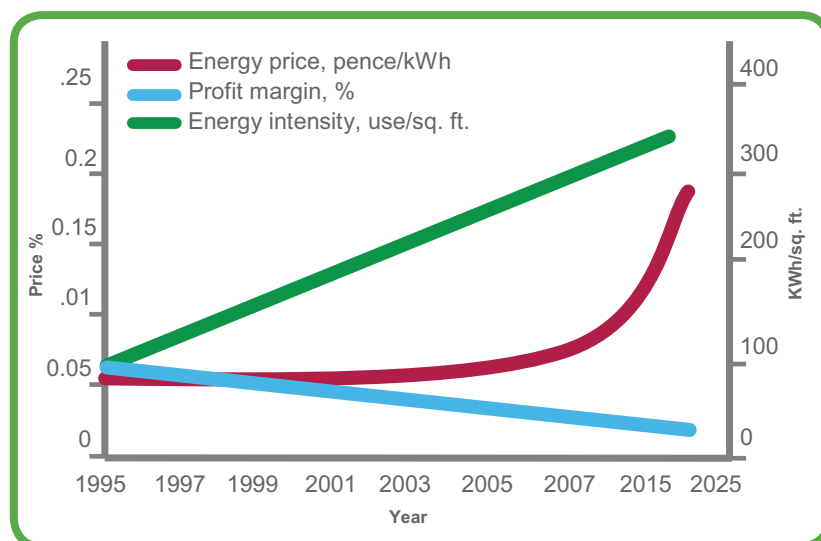


Figure 2. Healthcare Energy Trends (US)

^{2,3} Department of Energy, US Energy Information Administration (EIA) Commercial Buildings Energy Consumption Survey

Traditional cost-cutting measures vs. energy efficiency initiatives

As stated previously, energy use in the healthcare market has increased by 36 percent since 1995. Despite this increase, energy efficiency initiatives have historically been overlooked as an option to reduce costs. Hospital administrators and chief financial officers (CFOs) have typically focused on implementing new technologies, reducing staff numbers, and improving processes to reduce costs. In fact, in a recent survey of hospital CFOs, decreasing utility costs was not even mentioned as a way to cut expenses.⁴ And therein lies the disconnect.

Increased energy costs are consuming profits that could be reinvested to aid a hospital's growth and support patient-centric projects. By investing in energy efficiency projects now, hospitals can reduce ongoing operating costs and reinvest their savings to purchase new equipment and technologies. Hospital campuses could be expanded with a new wing or outpatient centre. New community care initiatives, such as specialty clinics for diabetes care or geriatric medicine, could be launched to address the aging population's medical needs.

Why is energy being overlooked? Because energy costs typically represent only 2–5 percent of a hospital's total operating budget⁵, hospital management focused on traditional cost-cutting measures, such as:

- **Reducing staff numbers and/or staff benefits:** This option could potentially make a nursing shortage even more critical and lead to an increase in the risk of medical errors. Lower staffing levels have been linked to higher numbers of adverse outcomes, such as urinary tract infections, pneumonia, shock, and failure to rescue.⁶
- **Renegotiating with suppliers:** Although renegotiating pricing with suppliers may improve the bottom line for one to two years, it is difficult to sustain such savings over the long term,

especially as the economy begins to improve.

- **Remove services:** Sometimes hospitals choose to no longer offer specific services, such as end-of-life care or nonmedical procedures. Due to the poor economic climate that prevailed throughout 2009, hospitals have most likely exhausted this option. Making additional cuts could jeopardize patient care and customer service.

Hospital administrators should be armed with the knowledge that if energy costs increase by 25 percent over the next five years as predicted, the average hospital profitability could decrease by up to 0.5 percent. This reduction is significant when you consider that the average hospital has a profitability of only 3.3 percent.⁷ That translates to approximately 1/6 of a hospital's profits lost due to increased energy prices alone. The figure below shows the financial impact for a fictitious, average 235-bed hospital. This analysis assumes that the hospital spends €2.39049 million on energy/utilities – a number based on the average energy spending by hospitals in the U.S (*Figure 3*). This amount varies slightly in Europe and from hospital to hospital, and depends partly on the climate zone and current energy efficiency, as well as the hospital's energy intensity (i.e. the number of operating theatres and types of technology used).

	Current financial performance (,000)	If utility costs rise 25% (,000)
Total operating revenue	159,259	159,259
Total operating expenses	154,066	155,029
Income (loss) from operations	5,193	4,230
Margin	3.3%	2.7%

Figure 3. Financial impact of 25% rise in utility costs

⁴ Based on average hospital data from the "Hospital Financial Management Association".

⁵ Students and Directors, EHESP School, Advanced Studies in Public Health. Intermedica Hospital Expo, 2008.

⁶ Stanton MW, Rutherford MK. Hospital nurse staffing and quality of care. Rockville (MD): Agency for Healthcare Research and Quality; 2004. Research in Action Issue 14. AHRQ Pub. No. 04-0029.

⁷ Based on average hospital data from the "Hospital Financial Management Association".

The overlooked alternative: Improve energy efficiency

In contrast to other cost-cutting approaches, energy efficiency can be achieved through professional services and equipment rather than process changes that affect the behaviour of hospital staff or the level of patient care.

Perhaps the most important benefit of an energy management solution is that energy efficiency is directly measurable. In order to monitor and improve energy efficiency, CFOs and facility managers need insight into real-time energy usage in their hospital. An automated building management system can gather, centralize, and analyze energy usage and history throughout the hospital and displays that information in what is often called an ‘energy dashboard’, where building

information and energy usage can be quickly viewed and filtered by hospital section, utility, time, day, or any other number of variables. As a result, this real-time information enables facility managers to quickly alter usage and achieve results with low risk to patient care, staff productivity, and customer service.

A 30% savings in energy costs has the potential to improve profitability by up to 1 percent. That can translate to a savings of nearly €908,115.38 in 28 patient days for a typical 235-bed hospital with a 59.8 percent maintained bed occupancy (*Figure 4*), thus proving the case that reducing energy costs can have a significant and positive impact on hospital financial performance.

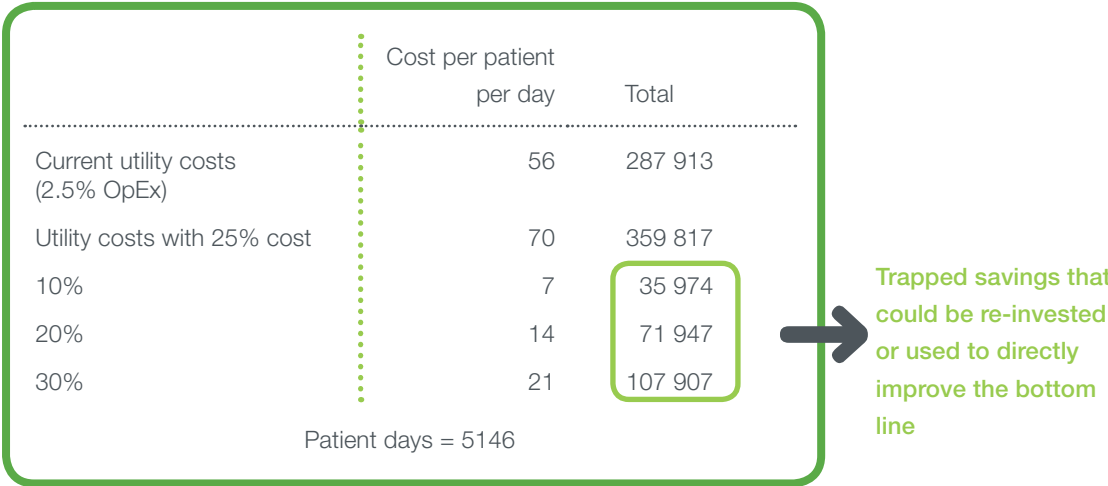


Figure 4. Financial impact of energy efficiency savings

Measurable, sustainable benefits

So where does that 30% savings come from? Energy efficiency solutions can be scaled to an entry-level, medium, or advanced investment, depending on the hospital's needs and evolving energy goals. Each level offers increasing savings opportunities.

- **Entry** – A small investment with a typical payback in less than two years reduces energy use up to 10 percent. Projects typically include building optimization, utility rate reviews, and variable speed drives. Typical project costs range from €12,575.24 to €31,437.47.
- **Advanced** – A medium investment with a typical payback in two to five years reduces energy use up to 20 percent. This approach includes advanced building recommissioning, HVAC optimization, and lighting retrofits. Typical project costs range from €62,873.59 to €628,735.85.
- **Comprehensive** – Aggressive investment and third-party financing with an extended payback period reduces energy use up to 30%. This approach requires comprehensive energy

projects, including building upgrades, HVAC improvements, lighting retrofit, building envelope improvements, and application of innovative energy-saving measures.

Within the comprehensive option, publicly funded entities can make energy efficiency improvements over a longer payback period. Since publicly funded hospitals may not have money in their budgets to pay for large projects, a third party finances the improvements based upon forecasted and guaranteed energy savings. Third-party financing may be available for projects that cost between €628,735.85 and €31,436,828.83.

The graph below shows that energy services are one of the best investments a hospital can make (Figure 5). An investment in saving energy offers an internal rate of return of 15 to 25 percent, and yet the risk is not much more than a government bond. Most important, by making electromechanical systems much more efficient and optimized, hospitals can take this bold, cost-reducing step without adversely impacting patient safety or the quality of care.

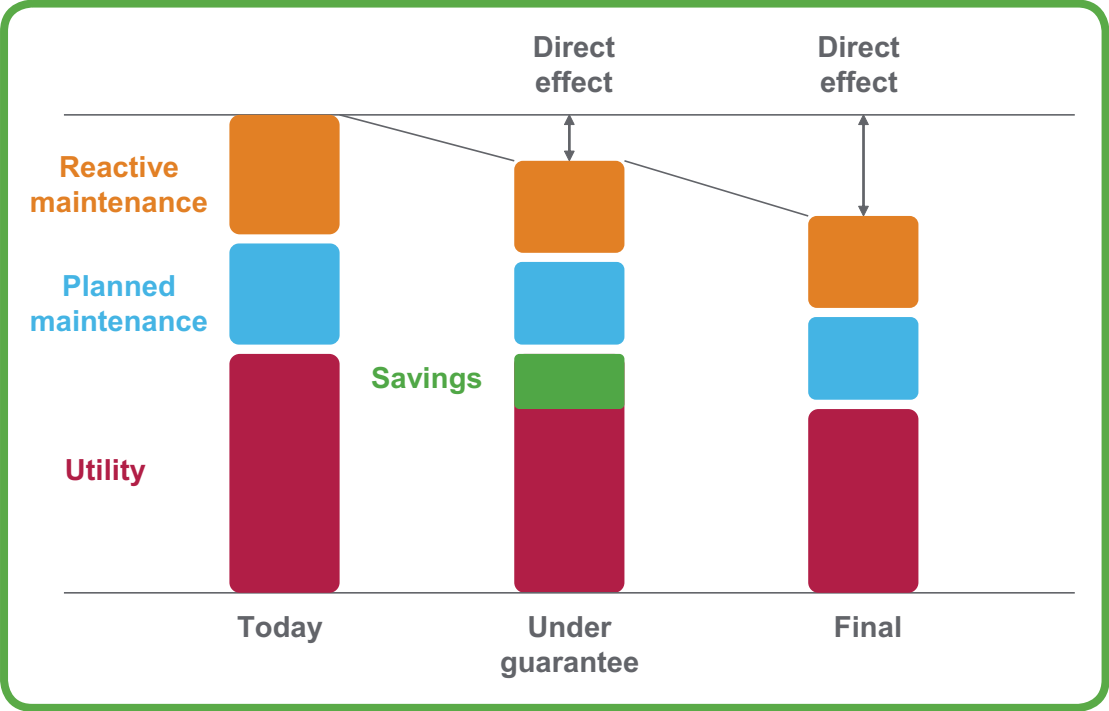


Figure 5. Impact of self-funded, comprehensive energy solutions

Choosing an integrated energy management solution

Using a complete system approach, hospitals have the potential to save 10, 20, or 30% on energy costs or more, resulting in increased profitability by one-quarter to a full percentage point – nearly a 25 percent increase for some hospitals. The solution should also provide CFOs with a comprehensive insight into both sides of energy management – demand side and supply side – for a greater potential for cost savings.

When evaluating energy efficiency solutions, CFOs should look for an integrated system approach that uses a common architecture with smart, enabling technology that spans numerous domains, such as power, white space or data management, building automation and management, and security. In addition, the solution provider should have extensive experience working within the nuances of the healthcare industry and hospital environments.

CFOs should consider vendors whose solutions make energy:

- **Safe:** for patients, staff, and visitors, with easy regulatory compliance
- **Efficient:** to improve financial performance and achieve more with less redundancy
- **Productive:** to enable less IT downtime, resulting in better protection of electronic health records
- **Reliable:** with 99.999 percent power reliability
- **Green:** to reduce energy usage and greenhouse gas emissions

To achieve this broad scope, an energy management solution should include the following services and capabilities that cover both energy supply and energy demand.

Energy source

- Demand response incentives
- Emergency/standby generation
- Power factor correction
- Renewable energy incentives

- Energy forecasting and procurement

Energy infrastructure

- Advanced metering solutions
- Critical power solutions
- Electrical distribution
- Energy price risk management
- Rate analysis and negotiation
- Market/regulatory analysis
- Commodity procurement
- Billing administration and payment

Energy analysis

- Real-time energy usage monitoring over many years
- Energy life cycle programmes
- Energy surveys
- ROI analysis
- Sustainable solutions (LEED® and NABERS)
- System design

Building management

- Building automation/management systems
- Drives, motion control, motor control
- Power factor correction, filtering
- Lighting and sensors
- Heating, ventilation, air conditioning (HVAC) optimization and upgrades
- Building envelope
- Water conservation
- Waste heat capture
- Carbon tracking
- Demand response
- On-site renewable

Ongoing services

- Proactive maintenance
- Remote monitoring
- Carbon reporting
- Long-term energy planning
- Executive reporting
- Training
- Building optimization

All of these features and capabilities add up to an integrated solution that enables hospitals to manage several different subsystems as a single cohesive network, including those from third-party providers. This 'smart grid' approach can generate comprehensive energy savings across the enterprise. In addition, it is possible to better control and optimize overall savings over time with an intelligent metering and centralized energy monitoring system.

Most important, integrating building management with your hospital's IT, security, and building systems, offers greater cost savings and allows facility managers to see real-time energy use trends and building alarms, and avoid costly reactive maintenance. For example, a smart grid enables organizations to link peak energy costs to load shedding and/or the building management system.

There are many other significant cost-saving scenarios available to hospitals. For example, by integrating bed-flow management software to patient room control systems, you can set lights to turn off and lower room temperatures automatically for patient rooms that are not in use. Another example: By integrating with the peri-operative management software systems, ventilation systems can be set to operate in a reduced mode when operating theatres are not in use, yet still maintain the minimum required air changes, as well as temperature and humidity requirements.

Conclusion

As the world's population ages, and as medical technology continues to advance and become more complex, the energy demands on hospitals will only increase along with associated costs. In addition, hospitals must be ready with the resources to respond to both expected and unexpected changes in the healthcare industry, such as future regulatory demands, downstream effects of healthcare reform and future healthcare IT innovations.

Even though there is no sure way to know what energy costs will be in the future, both private hospitals and public healthcare organizations can start now to unearth the 'hidden treasure' of savings that result from reducing costs with energy-efficient products and services. As the statistics reported in this white paper have shown, energy cost savings are sustainable over many years, with the added benefit of reducing the risk of incurring penalties and taxes for an excessive carbon footprint.

Furthermore, hospitals that embrace energy efficiency in new construction or building renovations are poised to gain long-term, improved financial performance, as well as demonstrate better compliance with patient safety initiatives and staff productivity goals.

Most of all, the potential to save up to 30% on energy costs is an opportunity that hospitals should not ignore. Regardless of size or current financial status, most hospitals can adopt an automated energy efficiency solution with either an entry-level, medium, or advanced investment.

Taking a proactive and integrated approach to energy management now is the most effective way to achieve energy efficiency and significant long-term cost savings. However, before embarking on an energy efficiency initiative, CFOs and other decision makers need to be sure they engage an energy service provider that understands the goals and compliance regulations of the healthcare industry. In addition, hospital decision makers must ensure that any proposed energy management system can put the right information at their fingertips, in real-time, so this critical key performance indicator can be managed effectively.

Proven Success

RegionFastigheter (Sweden)

Three hospitals in southern Sweden have achieved guaranteed energy savings of more than €1 million per year and have reduced CO₂ emissions by over 4724.191 tons, thanks to a comprehensive energy performance contract.

'At the same time as we achieve significant energy savings, we add value to our customers and our own organization.'

— Robert Johansen, Head Administrator,
RegionFastigheter

Kittitas Valley Community Hospital (US)

Thorough energy usage analysis and planned energy efficiency improvements saved this community hospital more than €125 138 in energy costs.

'Not only are we using much less energy than previously, we have been able turn the savings into improved equipment and facilities. This allows patients, staff, and visitors to be more comfortable and to enjoy cleaner, healthier air at the hospital.'

— Randy Kaiser, Director of Facilities, Kittitas Valley
Community Hospital

About Schneider Electric

As a global specialist in energy management with operations in more than 100 countries, Schneider Electric™ offers integrated solutions across multiple market segments, including leadership positions in energy and infrastructure, industrial processes, building automation, and data centers/networks, as well as a broad presence in residential applications. Focused on making energy safe, reliable, and efficient, the company's 100 000 plus employees achieved sales of 15.8 billion euros in 2009, through an active commitment to help individuals and organizations.

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